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Tragic Trade-offs:

THE MRC COUNCIL STUDY AND THE IMPACTS OF HYDROPOWER DEVELOPMENT ON THE MEKONG

QUICK FACTS ABOUT THE COUNCIL STUDY

- The Mekong River Commission (MRC) completed the study over six years from 2012 to 2017.
- The study shows that the 11 large hydropower dams on the Mekong River's lower mainstream and 120 tributary dams planned by 2040 seriously threaten the region's ecology, economy, and food security.
- These hydropower plans would reduce the amount of sediment reaching the Mekong Delta by 97 percent.¹ Sediment enriches and replenishes the entire basin and supports agriculture, fisheries, and water quality. These in turn support the economies of basin countries.
- Mainstream dam reservoirs, flood-protection infrastructure, and barriers to fish migration are expected to harm the region's ecosystems in many different ways.

¹ Mekong River Commission (MRC), *Thematic Report on the Positive and Negative Impacts of Hydropower Development on the Social, Environmental, and Economic Conditions of the Lower Mekong River Basin*, MRC, 2017, p. 10.



- Hydropower development through 2040 will cause fish stocks to decline dramatically. The total fishery biomass will be reduced by 35–40% by 2020, and 40–80% by 2040. Individual countries will lose the following percentages of current catches: Thailand 55%; Laos 50%; Cambodia 35%; and Vietnam 30%.²
- Hydropower development through 2040 will eliminate migratory fish in large parts of the Mekong.³ No Mekong migratory fish species will be able to survive in the reservoirs of dams planned by 2020 and 2040.⁴
- Climate change combined with the loss of fish may cause “acute levels of food insecurity in communities in Lao PDR and Cambodia.”⁵

WHAT IS THE COUNCIL STUDY?

The *Study on the Sustainable Development and Management of the Mekong River, including Impacts of Mainstream Hydropower Projects*—known as the Council Study—was conducted by the Mekong River Commission (MRC) over six years from 2012 to 2017.

The study’s overall objective is to help the MRC advise member countries—Cambodia, Lao PDR, Thailand, and Vietnam—on the positive and negative impacts of water resources development in the Mekong Basin.

The study aims to establish reliable scientific evidence on the environmental, social and economic impacts of Mekong development. This evidence is intended to enhance planning processes, build the capacity of member countries, and inform ways to better prevent, mitigate or compensate countries for any negative impacts.

HOW WAS THE COUNCIL STUDY INITIATED?

During the MRC’s Prior Consultation process for the Xayaburi Dam, the Government of Vietnam called for dam building to be suspended for ten years while more studies on potential impacts were done. This followed the recommendations of a Strategic Environmental Assessment commissioned by the MRC to assess proposed hydropower projects against their cumulative risks and opportunities.

In 2011, the MRC agreed to implement the Council Study to provide a basin-wide assessment of the

cumulative impacts of planned dams to supplement project-by-project decision-making under its *Procedures for Notification, Prior Consultation and Agreement*. In doing so, it was hoped the study would fill knowledge gaps, inform decision-making and support a basin-wide approach to planning.

The MRC’s development partners funded the \$4.7 million study, including Australia, Belgium, the European Union, Finland, France, Germany, Japan, Luxembourg, the Netherlands, Sweden, Switzerland, the United States and the World Bank. MRC member countries also contributed.

WHAT DOES THE COUNCIL STUDY LOOK AT?

The Council Study analyses hydropower development in the Mekong Basin, as well as other important areas of water resources development including irrigation, agriculture and land use, transportation, domestic and industrial water use, flood protection, and climate change. This brief focuses on the study’s findings around hydropower development.

While the Council Study considers the entire Mekong Basin, the impacts of water resources development are primarily assessed in the main Mekong corridor, including the coastal area. This consists of four zones:

1. A 15km corridor on both sides of the mainstream from the Chinese border to Kratie (Cambodia);

² Mekong River Commission (MRC), *The Council Study: Key Findings from the Study on Sustainable Management and Development of the Mekong River Basin, including Impacts of Mainstream Hydropower Projects*, MRC, 2017.

³ Mekong River Commission (MRC), *The Council Study: Cumulative Impact Assessment of Water Resource Development Scenarios*, MRC, 2017, p. iii.

⁴ *Thematic Report*, 2017, p. 63.

⁵ *The Council Study: Cumulative Impact Assessment*, 2017, p. v.



Riverbank garden at Pak Beng
Photo: International Rivers

2. The Cambodian floodplains, including the Tonle Sap River and Great Lake;
3. The Mekong Delta in Cambodia and Vietnam;
4. The coastal areas directly influenced by the Mekong River.

The Council Study assessed three main scenarios for water resources development in the basin:

1. The Early Development Scenario (M1) includes developments as of 2007.
2. The Definite Future Scenario (M2) includes all existing, under-construction, and firmly committed development expected to be in place by 2020.
3. The Planned Development Scenario (M3) includes all existing, under-construction, and planned water resources development that would be in place in 2040 if fully implemented. This includes all proposed mainstream dams.

When the MRC examined planned development between 2020 and 2040, it accounted for expectations that the climate will be warmer and wetter, and that human settlements will have expanded in the floodplains.

THE COUNCIL STUDY: KEY FINDINGS

The study shows that the 11 large hydropower dams on the Mekong River’s lower mainstream and 120 tributary dams planned by 2040 seriously threaten the region’s ecology and economy, as well as local people’s access to sufficient nutritious food.

Water resources development through 2040 is predicted to “create substantial trade-offs between water, food and energy.”⁶ If fish catches and agricultural productivity fall, food will become scarcer and food prices will rise. As a result, more people living in the region will be pushed into poverty and much of the lower Mekong Basin will become increasingly vulnerable to climatic conditions.

The future growth potential of all MRC member countries depends on the availability of natural capital, particularly soils, forests, and fish. Predicted declines in natural capital of the medium-term (2020) development plans amount to nearly 40 percent of the entire gross domestic product (GDP) of the Lower Mekong Basin in 2017.⁷

⁶ *The Council Study: Key Findings*, 2017, p. 1.

⁷ *ibid.*

Overall, “the combined development plans for 2020 and 2040 are likely to trigger a decline in resilience, vulnerability, and sustainability of communities in the Lower Mekong Basin...Poor households are likely to be most disadvantaged.”⁸

The following key points from the Council Study relate to potential impacts of water resources development on the Mekong:

SEDIMENT

Current hydropower plans would reduce the sediment load reaching the Mekong Delta by 97 percent.⁹

Sediment enriches and replenishes the entire basin and performs critical ecosystem services for agriculture, fisheries, water-based plants and animals, and water quality, which in turn support basin countries' economies.

Reduced sediment and nutrient transport caused by upstream dams will significantly reduce soil fertility, rice production and fish yields.¹⁰ The study states: “The coincidence of reduced fish and rice production introduces an increased potential of household undernourishment.”¹¹

Rural populations throughout the Mekong Basin whose livelihoods depend on the river for irrigation, soil fertilization, fisheries or water-related natural products will be particularly hard hit by the loss of sediment caused by upstream dams. The most vulnerable areas are the Cambodian floodplains and the Tonle Sap ecosystem, and the Mekong Delta in Vietnam.¹²

River bank and bed erosion is expected to increase substantially due to sediment reduction and water level fluctuations in the lower basin, especially in the Mekong Delta in Vietnam and some areas along the Mekong River from Vientiane to Stung Treng.¹³

ECOSYSTEM IMPACTS

The transboundary impacts of water resources development through 2040 is predicted to cause “an extensive deterioration of the overall ecosystem integrity.”¹⁴

The connectivity-related impacts of mainstream hydropower dams, such as trapping sediment, disrupting

migration paths and altering flows, are “substantial and far-reaching, and overshadow those of all other planned water resource developments in the Lower Mekong Basin.”¹⁵

Hydropower projects in the Mekong Basin will reduce wet season flows and increase dry season flows under normal operation (with the exception of extreme climatic conditions). This will reduce flood damage but introduce negative effects on riparian ecosystems, sustainability and local people's access to enough fish to feed themselves and their families.

Wide-ranging negative ecosystem impacts are predicted from the reservoirs associated with mainstream hydropower projects, the construction of flood-protection infrastructure and barriers to fish migration. Reservoirs are expected to convert much of the Mekong River from Chiang Saen in Thailand to Kratie in Cambodia into deeper lake-like habitats, except for an area from Vientiane to Pakse in Lao PDR that will not be impounded. Such habitats are unsuitable for many species that inhabit the Mekong, but suitable for others such as bivalves (mollusks), frogs, and snails.¹⁶

Transboundary erosion will increase rapidly when dams in the Lower Mekong Basin are completed. Extensive erosion is likely to occur in all zones in the Lower Mekong Basin, in particular the Mekong Delta.¹⁷

Up to \$6 billion will need to be invested to protect riverbanks most at risk of erosion. Flood risk and potential damage will increase five to ten times as the value of assets increase with developing economies, especially in urban areas with higher exposure.¹⁸

While dam development under regulated operation could boost agricultural productivity by reducing the risks of recurring floods and droughts, reduced Mekong flows and rising sea levels will increase saltwater intrusion and significantly lower rice production in the Mekong Delta.¹⁹

IMPACTS ON FISHERIES AND FOOD SECURITY

Hydropower development through 2040 will result in massive declines in fish stocks. The total fishery biomass will be reduced by 35–40% by 2020, and 40–80% by 2040.

Individual countries will lose the following percentages of current catches: Thailand 55%;

⁸ *The Council Study: Cumulative Impact Assessment*, 2017, pp. iv–v.

⁹ *Thematic Report*, 2017, p. 10.

¹⁰ *The Council Study: Key Findings*, 2017, p. 2.

¹¹ *ibid.*, p. 1.

¹² *ibid.*, p. 2.

¹³ *ibid.*

¹⁴ *The Council Study: Cumulative Impact Assessment*, 2017, p. iii.

¹⁵ *The Council Study: Key Findings*, 2017, p. 2.

¹⁶ *ibid.*

¹⁷ *The Council Study: Cumulative Impact Assessment*, 2017, p. iii.

¹⁸ *The Council Study: Key Findings*, 2017, p. 3.

¹⁹ *ibid.*



Mekong Delta, Vietnam
Photo: International Rivers

Lao PDR 50%; Cambodia 35%; and Vietnam 30%.²⁰

Hydropower development through 2040 will eliminate migratory fish in large parts of the Mekong.²¹ None of the Mekong migratory fish species will be able to survive in the reservoirs of dams planned by 2020 and 2040.²²

When reservoirs are created, they will prevent eggs and larvae from drifting downstream, severely affecting the reproduction cycle for migratory species. Downstream migration of adult fish will be associated with high injury and mortality rates through dam turbines. The study states: “Certain larger migratory species may become extinct and a 60% reduction in biomass within the cascade reach may occur.”²³

Projected climate variation, combined with the loss of fish-based protein, is likely to create “acute levels of food insecurity in communities in Lao PDR and Cambodia.”²⁴

²⁰ *ibid.*

²¹ *The Council Study: Cumulative Impact Assessment*, 2017, p. iii.

²² *Thematic Report*, 2017, p. 63.

²³ *ibid.*, p. 67.

²⁴ *The Council Study: Cumulative Impact Assessment*, 2017, p. v.

ECONOMIC IMPACTS

According to the Council Study, “Current development plans over-invest in agriculture and hydropower to the detriment of existing food security. The proposed investments are likely to negatively affect GDP growth in the Lower Mekong Basin countries.”²⁵

The benefits and trade-offs of hydropower development are not evenly distributed throughout the Lower Mekong Basin, and are not necessarily confined to the source country.²⁶ Most of the hydropower profits will be transferred to foreign companies and banks.

Hydropower dams would benefit the four MRC member countries differently. Thailand emerges as the main beneficiary of Lao mainstream dams and Vietnam as a key beneficiary of mainstream dams in Cambodia due to planned energy imports.²⁷

From a macro-economic perspective, many of the economic benefits related to mainstream hydropower would flow to investor countries outside of the Lower Mekong Basin such as China, Malaysia, and South

²⁵ *The Council Study: Key Findings*, 2017, p. 2.

²⁶ *ibid.*

²⁷ *Thematic Report*, 2017, p. 6.

Korea.²⁸ The costs of the projects would be borne primarily by fishing and farming communities along the Mekong corridor.

CLIMATE CHANGE

Impacts from climate change and from water resources development are closely interrelated. This interrelationship is extremely complex and will need broader multidisciplinary analyses. Climate change impacts highlighted in the Council Study include an increased rate of sea level rise, a propensity for flooding and salt-water intrusion in the Vietnam Delta, and increased vulnerability of some riparian communities.²⁹

Climate change will likely amplify the negative impacts of hydropower development. Climate change poses a significant risk to food security and economic growth, particularly if predicted drier conditions materialize.³⁰

According to the Council Study, drier climatic conditions would reduce hydropower benefits by up to \$2.2 billion in net present value and increase fish losses by about 15 percent.³¹ The combined effects of over-investment in agriculture and hydropower and more severe climate change could compromise the prospects of Lower Mekong Basin countries achieving or sustaining lower or middle-income status.

COMMENTARY: ANALYTICAL GAPS AND UPTAKE OF FINDINGS

Following on from the 2010 Strategic Environmental Assessment and its recommendations for more detailed assessment of impacts, the Council Study clearly shows that the impacts of the dams will be dire for Mekong countries' sustainable development and their economies.

Critical questions remain regarding the study's methodology and the way in which recommendations will be taken up and implemented by MRC member country governments. For example, there are many inconsistencies between the Council Study key findings and the MRC's thematic reports and there is no monetary evaluation of the forecast sediment loss. Due to these limitations, the study potentially understates the overall impacts of Mekong hydropower projects on Lower Mekong Basin populations and economies.

DATA LACKING ON THE IMPACTS FOR WOMEN

The Mekong supplies the region's citizens with up to 80 percent of their protein needs. Women are primarily responsible for feeding their families and finding water

for use in the home. Furthermore, the Council Study notes that "gender issues are relevant to water resource developments as women are more vulnerable than men during flood and drought due to their higher dependence on natural resources and the social barriers thought to limit their adaptive capacity."³² Despite this, the Council Study fails to provide data on how hydropower and other water resources development will impact women in particular, and their ability to access enough nutritious food for their families. The study recommends that the MRC investigates gender issues to correct this important omission.

LITTLE GUIDANCE FOR LESSENING IMPACTS ON INDIGENOUS PEOPLES AND ETHNIC MINORITIES

The Council Study provides little guidance on how to assess, consider, avoid and mitigate the specific impacts on ethnic minority and indigenous peoples, who are particularly vulnerable to Mekong Basin hydropower development. Ethnic minority and indigenous groups already experience considerable disadvantage, including high levels of poverty, lack of infrastructure, education, healthcare, economic opportunities, and political participation.³³ Moreover, these groups heavily depend on access to natural resources for their survival, with limited job opportunities and income available to them.³⁴ Consequently, ethnic minorities and indigenous peoples will be disproportionately affected by the loss of fisheries and subsequent loss of fish to eat.³⁵

NO PROCESS FOR IMPLEMENTING STUDY RECOMMENDATIONS

The 2018 MRC Leaders' Summit Declaration includes as a priority action to consider the Council Study findings as a "reference for planning and implementation of national plans and projects, and in relevant MRC work."³⁶ Despite this, Mekong governments have yet to explain how the study will inform the Prior Consultation process and overall decision-making on Mekong dams.

Achieving the Sustainable Development Goals in the Lower Mekong Basin depends on the availability of natural capital and biodiversity being preserved.

²⁸ *ibid.*

²⁹ *The Council Study: Key Findings*, 2017, p. 3.

³⁰ *ibid.*

³¹ *ibid.*

³² *The Council Study*, 2017, p. 3.

³³ International Fund for Agricultural Development (IFAD) and Asian Indigenous Peoples' Pact (AIPP), *Country Technical Notes on Indigenous Peoples' Issues: Lao Peoples Democratic Republic*, IFAD and AIPP, November 2012, p. 4.

³⁴ International Centre for Environmental Management (ICEM), *Strategic Environmental Assessment of Hydropower on the Mekong Mainstream*, 2010, p. 111.

³⁵ *ibid.*, p. 106.

³⁶ See <https://www.mrcsummit.org/assets/previous-summits/3rd-summit/0d11506d00/Siem-Reap-Declaration_3rd-MRC-Summit-2018.pdf>, p. 4.

Particularly important are healthy soils, watershed and riparian forests, and seasonally flowing rivers to support the world's largest inland fishery. Current plans for large hydropower dams are certain to decrease resilience, increase vulnerability, and reduce sustainability in each of the Lower Mekong member countries.

Other options to meet regional energy needs exist. For example, recent studies show that solar power and an electricity transmission grid (to send excess power from South West China to Thailand and Vietnam) would be cheaper than more mainstream hydropower projects.³⁷

Given the Council Study reports extremely negative impacts—food insecurity, deteriorating ecosystems and sustainability loss—it is surprising that the study seems to accept more mainstream hydropower projects will be constructed and recommends a levy on hydropower profits, which may not be accepted by project developers.

Why are large hydropower projects on the mainstream Mekong still going ahead? Why has the Lao PDR Government recently announced the development of the Pak Lay project several months after the release of the Council Study?

The Council Study notes that overall production is sufficient to maintain 100 percent food security within the Mekong Basin. However, MRC member countries will need to cooperate and create effective distribution networks to avoid significantly more people becoming undernourished as a result of changes in Mekong Basin ecology.³⁸ Mekong governments have not indicated how this will be achieved.

Given the severity of impacts and trade-offs, the Council Study recommends that governments seriously consider renewable energy alternatives to Mekong-destructive dams. Yet it provides no information as to how this will be achieved or how other key findings and recommendations will be adopted by lower Mekong governments to inform decision-making.

LACK OF PUBLIC PARTICIPATION, TRANSPARENCY AND ACCOUNTABILITY

Despite significant impacts on regional food security and livelihoods, planning and decision-making processes for hydropower projects have to date lacked public participation, transparency and accountability. Comprehensive information on mainstream Mekong dam projects has not been made publicly available, despite repeated requests from communities, civil society groups, development partners, and downstream countries. Promises of public disclosure have not been honored. This includes details of project designs and assessments demonstrating how measures such as fish passages will prevent Mekong Basin fisheries from being destroyed and other negative impacts on the river ecosystem.

A SUSTAINABLE FUTURE FOR THE MEKONG?

To date, MRC member country governments have made decisions on hydropower projects on a project-by-project basis, with limited regard to basin-wide impacts. The lower Mekong governments must now ensure that the findings of the Council Study, which provides a basin-wide assessment of the cumulative losses and trade-offs inherent in these projects, meaningfully inform their decisions on future projects.

A major recommendation emerging from the Council Study is for MRC member countries to consider emerging energy technologies such as solar and wind as alternatives to hydropower. Assessing these technologies, together with demand-side management and energy-efficiency measures, would “provide major insights for managing the water, energy, and food security nexus in the lower Mekong basin.”³⁹

All stakeholders must be meaningfully involved in decision-making for negotiations to succeed and to achieve solutions that protect the environmental wealth of the Mekong, while supporting livelihoods of river communities and national economies.

³⁷ International Renewable Energy Agency (IRENA), *Renewable Power Generation Costs in 2017*, IRENA, Abu Dhabi, 2018, <<http://www.irena.org/publications/2018/Jan/Renewable-power-generation-costs-in-2017>>.

³⁸ *The Council Study*, 2017, p. 4.

³⁹ *The Council Study: Key Findings*, 2017, p. 4.

TIMELINE: PROGRESS OF MEKONG DAMS

This diagram shows the timeline of progress on Mekong mainstream dams in relation to key developments that should inform decision-making, in particular, the release of important assessments and requests for further information and studies before dams proceed. The timeline shows the way in which mainstream projects have been pushed forward individually with little regard to regional concerns and cumulative and basin-wide impacts.

