TRANSBOUNDARY WATER MANAGEMENT OF THE MEKONG RIVER IN THE CONTEXT OF CLIMATE AND ANTHROPOGENIC CHALLENGES

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Water has always been and remains a central issue causing disputes and conflicts, particularly in recent years, with rapid global population growth, climate change, and industrial development exacerbating the situation. A striking example is a transboundary river in Southeast Asia, which flows through six countries and is deteriorating every year due to intensive water consumption and climate change.

The Mekong River is one of the largest and most significant rivers in the world in terms of its reserves. It is the 12th longest river and originates in the mountains of Tibet, flowing through countries such as China, Myanmar, Laos, Thailand, Cambodia, and Vietnam. The total population of countries sharing the Mekong River basin exceeds 300 million people, and in some parts of the subregion, the Mekong River is a key source of livelihood for the population.

Due to a number of factors, the volume of water in the river is currently declining sharply, leading to problems in the lower reaches and, in particular, to a reduction in the Mekong Delta and the inflow of salt water into the depths of the delta. First, the most significant in terms of their impact are the hydroelectric power plants built along the entire length of the river, especially upstream. Today, there are 30 hydroelectric power plants operating on the Mekong River, and construction of 10 new plants is underway. In the future, it is planned to increase their number to 170, despite the fact that the negative impact of these dams on the river's ecosystem is already evident at this stage. Eleven of the 30 large hydroelectric power plants belong to China, and as the country at the source of the river, it actively uses the watercourse and continues to actively build reservoirs. This is a concern for countries downstream, as the operation of large dams alters water flow patterns, reducing inflow and limiting availability during dry periods or causing flooding. In countries such as Myanmar and Thailand, the river flows only along the borders, although Thailand and Cambodia also have a share in the river's hydropower potential, the number of hydropower plants is significantly lower compared to neighboring countries. In Laos, the river flows through a significant part of the territory, which is why the country also actively uses its waters to build its hydroelectric power plants. Vietnam suffers the most, as it is here that the river flows into the South China Sea, forming a delta. The delta provides jobs for 20% of Vietnam's population. It is the largest sector in agricultural production. More than

50% of the total volume of cereals and fruits are grown here, as well as 60% of the volume of fish production. The Mekong Delta is not a leading industrial center, but it produces 10% of the country's gross output (2011 data).

Thailand, Myanmar, Cambodia, and Laos use the river for irrigation. The waters of the Mekong irrigate large areas of agricultural land, where rice and other crops are grown in most cases. The second most important industry that depends directly on the river is fishing. The Mekong River is one of the world's largest fishing grounds. The latter sector is particularly sensitive to the problem of water quality deterioration. This is exacerbated by agriculture, where pesticides are actively used, and untreated water from urban sewage and industrial facilities is discharged into the Mekong River. Also, in 2025, after a long period of analysis of satellite images from Planet Labs, significant pollution of the rivers flowing into the Mekong was confirmed as a result of mining and leaching of minerals in countries such as Laos, Cambodia, and Myanmar. There has been a significant and sharp increase in unregistered mines and sites for the extraction of minerals and rare earth elements along the Mekong River between 2024 and 2025. As a result, water pollution from hazardous chemicals has already led to a decline in river fauna populations. The governments of the Mekong countries are unable to control illegal mining and river pollution.

Secondly, in addition to anthropogenic factors, there are also environmental problems affecting the river. Due to climate change in recent years, the contrast between natural phenomena has increased, with severe and prolonged droughts alternating with extended floods. For example, in the spring of 2025, during the dry season, the Mekong River delta faced the threat of salinization of rice-irrigated lands due to drought and the penetration of seawater deep into the delta. By the fall of 2025, coastal residents were forced to leave their homes due to severe flooding. Such climatic cataclysms have a dramatic impact on coastal settlements. When agreeing on the use of river water, according to the 1995 Mekong River Basin Sustainable Development Cooperation Agreement, all projects and actions related to the use of river water resources must take into account environmental sustainability and minimize negative impacts on the environment and local communities. This significantly complicates the issue of water resource distribution. In addition, due to the decline in water levels in the delta, the inflow of seawater inland is increasing, causing soil salinization in Vietnam, which in turn affects the agricultural sector.

Issues related to water resource distribution and consumption are regulated by a number of legal documents. In addition to the 1995 agreement signed by Cambodia, Laos, Thailand, and Vietnam, there is also the Mekong River Commission. The Mekong River Commission serves as the primary intergovernmental body for coordinating water governance. The permanent members of the commission are Laos, Cambodia, Thailand, and Vietnam. China and Myanmar participate as dialogue

partners. The commission deals with a wide range of issues, from regular meetings to coordinate projects, monitor and assess water resources, to conducting scientific research on the ecosystem. The commission is also directly involved in managing hydropower projects, monitoring their environmental impact. However, it is not always possible to successfully resolve disputes over resource use. In the spring of 2025, the commission marked the 30th anniversary of the signing of the 1995 agreement and held a Mekong Day in Vietnam.

For example, the start of construction of a large hydroelectric power plant, Xayaburi in Laos in 2012, became the center of controversy with neighboring countries. The capacity of the plant is 1,285 MW. Cambodia and Vietnam expressed concern about the possible impact of the dam on agriculture and fisheries. The countries actively participated in negotiations and called for stricter control and monitoring of the dam's impact. The commission, in turn, organized meetings to find compromises. The commission launched PNPCA (Procedures for Notification, Prior Consultation, and Agreement) to assess the impact of Xayaburi on the environment and socio-economic development of the region. As a result, the Mekong Commission provided recommendations on water resource management and environmental monitoring. However, despite the fact that the hydropower plant was launched back in 2019, disputes over its operation continue to this day.

Due to the struggle for Mekong water resources, geopolitical tensions are evident in the region. The drought of 2019–2020 clearly demonstrated the acrimony between countries in the Mekong subregion. During these years, the region faced the most severe drought in decades. The activities of Chinese reservoirs sparked protests among residents of Cambodia and Vietnam who lost their jobs, as well as demonstrations by environmental organizations. China was accused of holding water in its reservoirs and exacerbating the drought situation, to which China responded that it was also suffering from drought and that the dams were only helping to regulate water flows. The countries appealed to the commission with protests, asking for independent research and monitoring of the situation. The commission conducted its research and made recommendations to mitigate the effects of the drought and held a series of meetings with the parties to reach agreements. Although recommendations were developed, the situation was not resolved, which showed the need for additional agreements between countries and further improvement of international cooperation.

The issue of managing the Mekong River's water resources remains acute. The construction of hydroelectric power plants, particularly by China, is causing concern among downstream countries, and the surge in mineral extraction could bring the situation to a critical level. The Mekong River Commission is coordinating efforts, but disputes and competition for resources continue. The drought of 2019–2020 highlighted the importance of cooperation and long-term strategies. For the sustainable

development of the region, it is necessary to continue dialogue, conduct independent research, and implement effective water management measures.

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