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SOCIO-ENVIRONMENTAL PROBLEMS OF THE MEKONG DELTA IN VIETNAM

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Abstract. The article discusses the features of the socio-environmental situation in the Mekong Delta in Vietnam. The first part analyzes the causes of its degradation under the influence of factors related to the economic development of the river both in Vietnam and abroad and multiplied by the consequences of climate change. The destruction of the Mekong Delta ecosystem calls into question the sustainability of the region's future economic development and threatens the country's food security. The second part of the article analyzes the policy promoted by the state to minimize the environmental consequences of ongoing development projects and adaptation to climate change. The author comes to the conclusion that despite the existing difficulties in implementing the planned measures, the state is ready to create conditions for the transition to sustainable development in the Mekong Delta.

Keywords: Vietnam, Mekong Delta, climate change, environmental problems, sustainable development.

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Introduction

The Mekong (it ranks the twelfth in the world as far as its length is concerned) coming from the Tibetan plateau in China and flowing into the South Chinese Sea, is the chief waterway of Indochina, its resources providing for vital activity of more as 60 mln people, including Vietnam (Fig. 1). However, its intensive economic exploitation for needs of agriculture and fishery, industry, energy and town while ignoring environmental and social costs, multiplied in the conditions of climate change, is accompanied with the growth of contradictions between society and environment and calls into question the achievement of this region's sustainable development. This devalues the results of economic progress and enhances the issue of searching the measures to minimize ecological losses from the intensive use of the Mekong water resources.

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Fig. 1. The Mekong River on the map of Southeast Asia. *An open source photo*

Relevance and practical importance of this problem research is due to the impossibility to consider it but the one of strictly local nature. Also, it is the question of Vietnam's development perspectives and of its food security, its usual rice export from the Mekong Delta to the world's markets, what acquires the global character, the country's export potential being taken into consideration.

The article discusses the origin of environmental and social problems in the Mekong Delta in the scope of systematic approach, which allows to analyze the nature of interrelationship between economic and ecological development processes. It considers the state policy of adaptation to the changing environmental situation in order to stabilize it in perspective of the conditions created for the transition to sustainable development with the parity of economic, environmental and social interests.

The aim of this work is to analyze the interaction of environmental, social and economic development processes in the Mekong Delta in Vietnam over the past decade. The objectives of the article include consideration of the features of the socio-ecological situation in the region; analysis of the causes of its degradation under the influence of factors related to the economic development of the river both in the country itself and abroad; identification of the impact of climate change on the nature of nature management; study by the state of policy to minimize the environmental consequences of ongoing development projects and adaptation to climate change; assessment of sustainable development prospects.

The approach used in the study of this issue is complex and allows for the first time to analyze the complexity of interaction in the system "society – environment", which allows us to assess both the scale of the emerging imbalances in its functioning and the prospects for achieving its sustainability.

The issues raised in the article find their reflection in various foreign works concerning some aspects of the problems under investigation. Their common feature is the lack of comprehensive approach to the research of the socio-environmental aspect of the Mekong Delta in Vietnam. These

works mostly deal with the analysis of this region's socio-economic development. Among them, the work by M. Garschagen et al. [Garschagen et al. 2012] is worth to be noted. It analyzed the main tendencies of the region's development caused by the transformation of the agrarian sector, urbanization and industrialization. The authors show the inconsistency of this process; the Mekong Delta with its considerable contribution into national GDP (17%), at the same time lags behind other regions of the SRV in terms of dimensions of poverty, education and incomes of the population.

The work by O. Dun [Dun 2009] touches on some problems of inundations' influence on migration processes being a factor increasing disproportions in the development of the region. Vietnam has been chosen the research object due to its vulnerability to natural disasters intensified in the conditions of climate change. The author comes to the conclusion that though the migration is a kind of the local population's reaction to the living conditions changed under global warming influence, this is not the only factor, and the problem demands the comprehensive approach. In her work, Nguyen Phuong Nga [Nguyen Phuong Nga 2015] investigates the inundations affecting the living and economic conditions of the local population. Concentrating on the adaptation of local dwellers to this disaster, she comes to the conclusion that their behavior, lifestyle, and forms of economic activity are better fit for inundations in comparison with the state programs enhancing social risks. Unlike the above-mentioned work, P. Minderhoud [Minderhoud 2017] shows the destructive effect of the traditional groundwaters' use for the environment. J. Weger [Weger 2019] has investigated a number of questions connected with the design of the Mekong Delta's development from the origin of the idea to its implementation in Vietnam.

The lack of theoretical works on environmental and social problems of the Mekong Delta in Vietnam is balanced with a broad empirical material which has been used for this article. Such sources are the World Bank's reports [World Bank 2010], as well as those for the Ministry of Natural Resources and Environment [Tran Thuc et al. 2016], for the Ministry of Planning and Investment (MPI) [World Bank 2015] and "The Mekong River: Geopolitics over Development, Hydropower and the Environment", the report prepared for the European parliament [Soutullo 2019]. Also, materials of Vietnamese and foreign press have been widely used.

Environmental and social disbalances in the Mekong Delta

The importance of the Mekong Delta's region (it consists of 12 provinces and the city of Can Tho in the south of Vietnam) for the country's economy depends on its role in Vietnam's economic activity. Occupying but 12% of the country's territory, this region provides 17,7% GNI (former GNP), 54% of rice crops, 60% of fruit and 70% of seafood [Vien Thong: 15.12.2020]. The Mekong Delta, being the most productive region, as far as agriculture and aquaculture are concerned, is important for providing its food security and for maintenance of its export potential. The region accounts for 50% of agricultural production export. Besides, here runs the trade corridor between Vietnam, ASEAN countries and those of the Mekong River basin. More than 20% of the country's population lives in this area, employed mainly in the agricultural sector.

However, the further maintenance of the Mekong Delta vitality, being the main country's granary, is becoming a serious socio-environmental problem. Its solution demands for immediate reaction to overcome the consequences of the river's economic development multiplied in the conditions of climate change. The Mekong Delta's ecosystem undergoes serious degradation showing itself in frequent droughts, inundations, water salinization, and soil erosion.

The Delta lies in a low place; that is why it is highly vulnerable to inundations caused with the sea-level rise, being a consequence of climate change. According to the forecasts of the International Centre for Environmental Management, it can reach 28–33 cm by 2050 and 65–100 cm by 2100, which can result in the Delta's 40% loss [Khadka: 20.10.2015]. The Delta's flooding will result in inundations, particularly in the Ca Mau Peninsula, the destruction of the irrigation system and infrastructure, houses, water resources salinization, undermining of agricultural sustainability. The data of the experts of Utrecht University (the Netherlands), who investigate the climate change consequences in the Mekong Delta, show that more as 12 mln persons will be forced to migrate from the flood areas [Minh Nga: 02.11.2019].

Another problem has emerged due to climate change and the sea-level rise is the water salinization and erosion of the soil along the banks. The existing forecasts show that by 2050 the Delta can undergo the complete salinization due to the penetration of sea water. This will result in the loss of fertile soils, make them unfit for cultivating rice and most other cultures. By the end of the century such losses can account to 70% of the total agricultural area [The Mekong 2014]. This is a serious threat to Vietnam's food security allowing for the region's role in the country's agriculture.

Though the Mekong Delta belongs to the world's regions most vulnerable to climate change (according to the Vulnerability Index to climate change Vietnam belongs to the group of 30 countries which are most at risk) [World Bank 2015: 14], the main cause of environmental degradation of this region should not be sought in climate change. Its influence on the growth of environmental problems in the Mekong Delta is assessed but 5% [Osborne: 25.07.2021]. Both in Vietnam and abroad, the main harm is brought with those development projects which are implemented without ecosystem limiters. The most dangerous among them are the construction of hydroelectric power stations on the Mekong and its tributaries, sand mining, excessive use of groundwaters for the needs of agriculture and town.

The construction of big dams on the Mekong and its tributaries abroad, in particular in China, as well as in Laos and Cambodia[2], has been connected with the breach of the hydrological cycle in the Delta, the decrease of water runoff and the reduction of sedimentary deposits necessary for the maintenance of the soil fertility. According to the data of the Mekong River Commission (MRC), in case of the construction of all the planning dams the volume of sedimentary deposits will reduce from 143 mln tons in 2017 to 5 mln tons by 2040 [Minh Nga: 02.11.2019]. This will result in the water salinization level rise along with the sea-level rise and speed up the process of the soil erosion, its catalyzer being also the increase of the area of the land used for urbanization and numerous infrastructural objects on the Delta's fertile soils and extensive sand mining both in Vietnam and in neighboring Laos, Cambodia and Thailand. Every year up to 500 ha (5 km^2) of the cultivated land are lost [Khadka: 20.10.2015]

The increasing demand for sand in Vietnam in the course of urbanization spread and quick development of the construction sector resulted in the emergence of numerous sand mining companies. Some of them are illegal, which hampers the state regulation of the branch. The extraction of more than 50–100 mln tons of sand from the river's bottom can deepen the reiver-bed (by 200–300 mm annually) [Osborne: 22.04.2020] which results in the Mekong Delta's salinization.

[2] By now, 102 dams have been built, 11 dams in China and 64 ones in Laos among them. 64 dams more are being planned [Minh Nga: 02.11.2019].

All these problems are aggravated in the periods of drought. According to some assessments, during the dry season the Mekong Delta loses up to 10 billion m^3 of water [Ibid.], while the demand for the water increases in the course of agricultural intensification. The shortage of fresh water, its pollution with the wastes of industrial and agrarian production, as well as its salinization excite local dwellers (nearly half of them experience the shortage of fresh water) [Khadka: 20.10.2015]. They actively collect groundwaters; therefore, the water line has been 15 m lower according to the database of Vietnam Association of Hydrogeology [Minh Nga: 02.11.2019]. In its turn, it speeds up the process of the Delta's subsidence. That has been confirmed with the model developed by the experts at Utrecht University; in their opinion, in case of the present level of groundwaters' use, the Mekong Delta will either become a saltwater or be flooded by 2100 due to climate change [Minderhoud et al. 2017]. Philip Minderhoud, the leader of the project, believes that intensive use of groundwater should be considered along with the most important factors which influence the delta's subsidence 1 cm annually [Boyle: 16.02.2019].

The Mekong Delta's salinization and the shortage of fresh water complicate livelihoods of the local population and undermine the stability of the local economy based on rice and fish cultivation. Droughts 2016 and 2020 exposed the severity of the problems. Traditional modes of collecting and storing water in reservoirs and dams, which peasants use in the dry season, are inefficient, and local dwellers are forced either to buy water for domestic needs or to use salt water. Fishing, rice cultivation, horticulture and vegetable-growing, shrimp cultivation are declining. The reduction of the agricultural area and the productivity entails the reduction of the jobs in these economies and in the branches connected with transportation, treatment and sale of the products. The reduction of incomes from agriculture results in the growth of debt among peasants, who are forced to look for additional sources of earning, which stimulates migration from the countryside to town, mostly the youth. For the recent decade, the Mekong Delta region, according to the assessment of Vietnam Chamber of Commerce and Industry (VCCI), has lost more as 1,1 mln dwellers, who moved to Ho Chi Minh City and to neighboring industrial areas [New development model: 16.12.2020]. However, socio-economic consequences of the Mekong Delta ecosystem degradation have not been limited with local changes; they acquire national scope, because they may breach the whole chain of production and food deliverance.

The measures for overcoming socio-environmental crisis

The Mekong Delta socio-environmental problems are becoming the topic in the community of experts, which offers a wide scope of recommendations to the government including the enhanced cooperation in the field of collective control of the Mekong water resources, also with China. The latter's hydroelectric projects are of special concern to Vietnam. The propositions to change the existing development model revealing its socio-environmental disbalances are more radical. The adaptation to a climate should be combined with the measures creating conditions for sustainable development. It was in the past decade that the government became aware of the necessity to overcome the socio-environmental crisis in the Mekong Delta and to create a new model of its development based on the observance of environmental, social and economic imperatives. It has largely been the result of the successful cooperation with Dutch experts, who were the first to sound the alarm concerning the increase of environmental problems in this region of Vietnam in the conditions of climate change. Seeing that it is impossible to completely overcome negative tendencies, they suggested to minimize the future consequences. Since 2009 there has begun the work at Mekong Delta Plan. It was accompanied with a number of important state papers, the first of them

being Resolution 120, “a road-map” for “sustainably developing the Mekong Delta in adaptation to climate change” (2017). For the first time it was openly acknowledged that the Mekong Delta’s viability was threatened not only with the climate change consequences but also with the short-sighted resolutions on the economic development of the region having been adopted by the government. It was decided to give a response to the challenges posed [Tatarski: 21.06.2021].

Resolution 120 called to the development of ecologically oriented agriculture and to the introduction of new technologies. The Ministry of Planning and Investment was charged to develop the Mekong Delta Integrated Regional Plan (MDIRP) for the period up to 2030 with the perspective for 2050. Being financed with the International Bank for Reconstruction and Development (IBRD), it has become the first plan in accordance with the new Planning Act (adopted in 2017) which created the mechanism to improve the coordination between economy sectors and provincial authorities at the regional level. This Act provides social protection of the population, their welfare, the maintenance of more balanced regional development and the improvement of the environment. Both acts targeted for the integrated and ecologically sustainable development of the Mekong Delta. The implementation of the regulations was controlled by the Prime Minister Nguyen Xuan Phuc.

In the scope of the planned tasks the Ministry of Agriculture and Rural Development (MARD) recommended measures of adaptation to the changing environmental situation to regional authorities. In particular, it was acknowledged necessary to reject fixed indicators on rice production and areas of the used rice fields; to give the farmers freedom to choose cultivating cultures; to acknowledge ecologically dangerous to harvest three crops of rice and its cultivation on the territories susceptible to salinization, to avoid the shortage of fresh water; to transit to shrimps cultivation at aquafarms; to plant mangrove trees on vacant lands in the coastal area. Depending on the conditions of every region, the industrial models used in the Mekong Delta’s provinces varies.

In June 2020 the Mekong Delta Coordinating Council for 2020–2025 was established headed by Deputy Minister Trinh Dinh Dung. The Council consists of the representatives of 12 provinces and Can Tho city (the center of the Mekong Delta) and five relevant ministries. Their task is to develop coordinated resolutions to implement development models at the provincial level taking into account climate restrictions and to attract investments for their implementation.

Unfortunately, the finance shortage hampered the implementation of the adopted decisions. Vietnam is planning to borrow $2 billion to provide for sustainable development of the Mekong Delta and to minimize the consequences of climate change [Borton: 26.10.2021]. The government is planning to attract money from the private sector, which according to the research of the International Finance Corporation must transform the problems into new opportunities for the development of renewable energy sources, ecologically oriented agriculture, green transportation and green buildings [Diji Chandrasekharan Behr: 01.10.2019]. The transition to clean development and overcoming the consequences of climate change will cost $16,5 billion for the nearest five years [Vietnams Mekong Delta region plan 23.03.2021].

Limited funding and the lack of coordination between different ministries and departments are not the only causes of delaying the performance of the planned tasks. Provincial authorities which are still carrying out the projects harmful to the environment (such as the construction of the dams causing the soil erosion) hamper the Mekong Delta’s transition to sustainable development. The plan of the region development being approved, the main problem for the dwellers of the region is the adaptation to the transforming environment.

Conclusion

The Mekong Delta in Vietnam undergoes serious environmental problems aggravated with a complex of interconnected factors. The global warming consequences revealing themselves in the drought, inundations, water and soil salinization are overlapped with the changes in the environment under the impact of economic activities. The construction of hydroelectric power stations in the headwaters of the Mekong River, sand mining and the implementation of agricultural development models oriented mostly to intensify rice cultivation resulted in breaching the ecosystem sustainability and in the spread of soil erosion and water shortage, which in their turn, undermine the local economy sustainability and complicate the existence of the local population. To adapt it to new conditions of livelihoods, new production models must be developed in the framework of the transition to the Mekong Delta's complex development. This cannot be achieved by the efforts of local communities only, but with the resolution adopted at the state level.

Their implementation is delayed, so far, complicated with the shortage of financial resources and poor coordination between state departments and provincial administration. None the less, the government's acknowledgement of the necessity of a new approach to overcoming environmental and social challenges of the previous development stage multiplicated with the consequences of climate change, inspires in the hope to create the conditions for the transition to sustainable development in the Mekong Delta. At the same time, we should not expect great changes in the nearest future, because this process may take a lot of time, be connected with the involvement of various interested parties in it and is mostly experimental in its nature.

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