



Ensuring water security policy in the Law on Water Resources (amended)

NGUYỄN PHƯƠNG TUẤN

Vice Chairman National Assembly Committee on Science, Technology and Environment

With the great demand for the exploitation and use of water resources today, Viet Nam is facing many challenges. Consequently, legislation on water resources and several laws related to managing and protecting water resources must soon be updated, amended, and supplemented. In particular, ensuring water security is an issue that requires synchronous mechanisms and policies to solve, improve the initiative in water resources and ensure the safety of water supply for daily life and essential needs of the people at the highest level in all situations.

1. APPROACHES TO ENSURING WATER SECURITY, MAKE DIFFERENCES TO TRADITIONAL SECURITY

Water security is a type of non-traditional security with common characteristics which includes non-military factors, related to natural and socio-economic factors from both inside and outside the territory, rapidly and widely spreading, impacting on the country's stability and sustainable development.

There are many approaches to ensure water security, such as the view that access to safe drinking water and sanitation is a fundamental human right, the opinion of ensuring that the water source is sufficient to meet the needs and solve the situation of severe drought; ensuring water security requires building and developing water sector infrastructure that is resistant to adverse impacts, including providing the safety of dams and reservoirs...

Each country has its characteristics and views in proposing and implementing solutions to ensure water security. For Vietnam, we can sum up ensuring water security in some specific issues, such as:

Defining views, goals and approaches

Water security is a type of non-traditional security. There are many approaches, but they all include fundamental factors such as ensuring adequate quantity and quality of water for domestic and production needs, ecological and environmental protection, and limiting risks brought by water. Water security needs to be associated with the goal of "proactively ensuring water resources in all situations". The approach of integrated management of water resources is a cross-cutting principle. Also, it is necessary to clearly define resources, in which the state is the key to ensuring water security. And this is a lesson learned in many countries. Combined harmoniously structural and non-structural solutions, especially in response to climate change

and different types of water-caused disasters. Strengthen international cooperation, especially with countries in upstream areas and international organizations.

Institutions

Viet Nam has a relatively complete legal system for developing managing, and using water resources (Law on Water Resources, Law on Irrigation, Law on Natural Disaster Prevention and Control, Law on Environmental Protection...). Still, there needs to be unified regulation and detailed guidance on ensuring national water security and rules on coordination among relevant agencies still need to be improved. In addition, there should be a clear assignment of tasks and powers of the parties involved in the implementation process. Review, finalize, or propose the development of international cooperation regulations in managing and using of water resources with countries sharing the same river basin in the new context to ensure national water security proactively.

Investment and finance

Develop investment policies with clear criteria, ensure focused and practical investment, avoid spreading to realize the goals of efficient allocation and use of water resources and ensure national water security. Develop and propose mechanisms to mobilize and encourage the private sector's and stakeholders' participation in investment, development, and expansion of services related to water resources.

Review and develop sustainable financial mechanisms to ensure post-investment efficiency and provide sufficient funding for management, operation and maintenance of irrigation works as well as services related to the water sector. Review to perfect the current irrigation service pricing mechanisms to ensure feasibility in the application, increase revenue and ensure payment rates according to users.

Develop and apply policies on water management and irrigation services according to the demand management approach, including policies: water reuse; water-saving



technology application in use, especially at the end-use level - households; land use planning, especially at the basin level; education to persuade users to save water; water pricing.

Monitoring and evaluation

Build a national data system on water resources and demand and apply remote sensing and GIS technology to support decision-making on water resource management and allocation. Build a monitoring and evaluation system with specific criteria in terms of technical aspects (control of water sources, distribution of water on the system), institutional aspects (Law enforcement), economic aspects (costs, investment efficiency, water price, contribution to GDP, HDI, poverty, income) in the management and use of water sources.

2. SITUATION OF WATER SECURITY AND CHALLENGES OF VIET NAM

2.1. Situation of water security

The situation of water security in Vietnam through 3 periods is as follows:

Period before 1945

Feudal period: Vietnam always took irrigation as the leading technical measure as the foundation for agricultural cultivation. Over the feudal dynasties, although still at a primitive level, the system of dykes and irrigation has helped our people to expand the area of arable land, reclaim many large areas, protect crops and people's lives... During this period, irrigation was managed by the imperial court. Agricultural production depended on natural water.

French colonial period: Irrigation was one of the significant fields in the colonial rule and exploitation policy of French and was managed by the Indochina Government. During this period, irrigation works and dyke systems were built to serve directly for the war of aggression and expansion of colonial agricultural exploitation (by the early 1930s in North and Central Vietnam, France had only invested in building and renovating five irrigation works with a total designed irrigation area of 118,500 ha/2.593 million ha of arable land).

During this period, although the construction of irrigation works has been limited and the full potential of agriculture had not been exploited, initial conditions have been created for agricultural production in the North and Central regions; large areas of land have been utilized and populations have been concentrated in the South. Despite annual reinforcement of dykes and investment in irrigation, overall, our agricultural sector during the French colonial years still had to endure significant risks from natural disasters, droughts, major floods, and frequent dike breaches...

Period from 1945 to 1975

Immediately after achieving independence, the Government paid attention to water management and water control to exploit water resources and mitigate

the impact of natural disasters related to water for agricultural production and population protection.

The water management work during the period can be divided into several stages, with different development goals: The focus was on reinforcing and protecting dykes, ensuring efficient management of existing agricultural irrigation systems, expanding the irrigated area combined with small-scale water management (from 1945 to 1954). Efforts were made to restore major irrigation works and expand medium-sized and small-scale projects as part of the economic recovery plan (from 1955 to 1957); The emphasis was on implementing three main principles: water retention, small irrigation and people's participation as a priority in the plan for economic and renovation development (from 1958 to 1960); Strong emphasis was placed on the development of irrigation and land reclamation to boost agricultural production, control droughts and saline intrusion eliminate acidity from the soil, minimize waterlogged areas, flood, storm and saline intrusion control; Initial efforts were made in water treatment and utilization of the Red River within the first 5-year plan (from 1961 to 1965). The focus was on the completion of water management projects, particularly in agricultural areas (from 1968 to 1975).

During this period, there were remarkable accomplishments by the Government and our people in water management. Breakthrough policies and significant solutions were implemented to develop water resources and embankment systems, addressing the initial challenges faced by the Democratic Republic of Vietnam.

Period from 1975 to the present

The first ten years after liberation

During this period, water management primarily focused on serving rice cultivation. In the North region and the Thanh - Nghệ - Tĩnh region, several important irrigation works were constructed according to the planned design and thorough preparations. These works included: Yên Lập Lake (Quảng Ninh), Xạ Hương Lake (Vĩnh Phúc), Núi Cốc - Sông Cầu Canal (Thái Nguyên), Mực River and Yên Mỹ Lakes (Thanh Hóa), Kê Gồ Lake (Nghệ Tĩnh)...

Period from 1986 to the present

During this period, there were changes in the management structure of the irriga-



tion sector from the Ministry of Irrigation to the Ministry of Agriculture and Rural Development (1995), the establishment of the Ministry of Natural Resources and Environment (MONRE) in 2003, the Directorate of Water Resources (2009) and the General Department of Disaster Prevention and Control (2017).

The Law on Irrigation was passed in 2017, preceded by the Dyke Law (2006), the Law on Natural Disaster Prevention and Control (2013), the Law amending and supplementing a number of articles of the Law on Natural Disaster Prevention and Control, and the Dyke Law (2020) and the Law on Water Resources (1998, amended in 2012). Along with the Law system are various Decrees and Circulars... which have also fundamentally changed the role in management, exploitation, use of water and prevention of harmful effects caused by water.

In terms of strategy and planning, the irrigation sector has developed an Irrigation Strategy to 2030, with a vision until 2045. The National Strategy for Natural Disaster Prevention, Control, and Mitigation has also been established. Numerous water resources plans have been formulated and approved to address climate change, sea-level rise in coastal areas, and water resources planning to support the restructuring of the agricultural sector. The MONRE has also developed a national strategy for water resources.

2.2. Challenges (problems) for water security in Vietnam

Dependence on upstream countries

Surface water produced in Vietnam's territory accounts for only 37% of the country's total surface water. The source of water produced from outside the territory, from upstream countries accounts for 63% (90.1% of the Mekong River, 38.5% of the Red River, 18.4% of the Cà River, 27.1% of the Mã River), beyond the direct management capacity of Viet Nam, utterly dependent on the management, exploitation, use, and protection of upstream countries. Upstream countries of international rivers tend to increase investment and exploitation of water sources for hydropower development, water supply for production, and people's livelihood in and outside the basin, along with the impacts of climate change, it will seriously affect the water security of Vietnam, especially the Mekong River Delta and Red River Delta.

Currently, the impacts due to development activities of upstream countries on water flow and pollution to Viet Nam have been recorded through monitoring data at locations flowing into our country on the Đà, Thao and Lô rivers. However, up to now, there have been no effective mechanisms, policies, and measures to cooperate and share water sources among countries having the same water sources.

According to the International Mekong River Commission, the countries of the Mekong Basin have completed. They will continue to build many hydropower reservoirs on both the mainstream and tributaries, with

a full storage capacity of tens of billions of m³ of water equivalent to 20% of the total flow of the Mekong River.

Unevenly distributed water sources in space and time

Viet Nam's surface water resources are unevenly distributed in both space and time. The time variation of annual rainfall manifests itself in inter-year fluctuations and uneven distribution within the year. Viet Nam has an average annual rainfall of about 1,950 mm, among the countries with the largest amount of rain in the world.

Groundwater resources are very unevenly distributed in space; quite abundant, such as in the Northeast region, the Southern Delta; extremely low in the Southeast and the South-Central region and tend to decline.

Declining forest area and quality

Under pressure from population growth and economic development in many regions, many natural and protected forest areas have been reduced. The proportion of watershed protection forest area, which is young forest, poor and exhausted forest with reserves of less than 50m³ still accounts for a high proportion compared to the total existing forest area (about 30%). The efficiency of creating aquatic resources is limited. Most of the watershed forest area is distributed in highland and remote areas, so the management and protection of forests face many difficulties.

Increasing levels of water pollution

Water pollution is mainly concentrated in the middle and lower reaches of river basins (Nhuệ, Đáy, Cầu, Đồng Nai), and irrigation works (Bắc Hưng Hải, Bắc Đuống...). Pollution sources from domestic, industrial, agricultural, craft villages, health care wastewater and solid waste are not controlled, which domestic, agricultural, and industrial wastewater account for a large proportion.

The quality of groundwater sources in some areas in recent times is facing salinization and pollution. The situation of saline groundwater is common in the Northern and the Southern coastal plain areas. In addition, heavy metal and ammonium pollution in groundwater has been recorded in most localities with large groundwater exploitation and use.

Increasing demand for water

Viet Nam has an average water volume per capita of 9,000m³/year if the total wa-



ter volume is calculated. However, if only the endogenous surface water in the territory is considered, the per capita water volume is only approximately 3,300m³/year, lower than the Southeast Asian average (about 4,900m³/year) and at the water shortage threshold (< 4,000m³/year).

Increasing risks of natural disasters and climate change

According to the report of the Intergovernmental Panel on Climate Change, Viet Nam is one of the five countries in the world most affected by climate change and sea level rise. Climate change and sea level rise will increase the number of extreme, uncertain, and irregular weather patterns, such as prolonged hot weather, reduced dry season rainfall, increased excessive daily rainfall, and increased intensity and frequency of big storms and super typhoons, together with the impact of forest cover loss and inability to adapt to natural disaster risks that will directly and seriously affect water security, the safety of dams, water reservoirs and socio-economic development of the country.

Capacity of the building system

Industrial activities and urban development have been putting tremendous pressure on irrigation infrastructure, increasing service and protection requirements. The demand for drainage of rainwater and flood water is increasing day by day. Hồ Chí Minh City is constantly inundated by high tides; due to the development of urban infrastructure, which reduces the ability to store and drain water. The heavy rain at the end of October 2008 caused severe flooding in Hà Nội City, disrupting operations for many days and causing significant damage.

Risks of unsafety of dams and reservoirs

The implementation of regulations on the safety of irrigation dams and reservoirs has initially changed, however, many local authorities have not yet paid attention to allocating funds for implementation, focusing on small and medium-sized reservoirs. Human resources to manage and exploit dams and reservoirs for irrigation from the provincial level to grassroots irrigation organizations have not yet met the requirements. The force of officials and workers to manage and operate is still insufficient and needs more professional capacity, so the efficiency in performing tasks or advising for directing is low.

The risks of unsafety of dams and reservoirs increase due to extreme rain and floods under the impact of climate change, the decline of watershed forests, and vegetation cover on reservoir basins. From 2010 to the present, there were seventy incidents of dams and reservoirs nationwide. The cause of the incident was due to the influence of rain and flood. The flow to the lake exceeded the design frequency, the main works were damaged or degraded; the capacity of the management units has not met the requirements; most of the dam safety inspection has not been carried out, visual in-

spection of the dams and reservoirs has been conducted so the hidden dangers in the dam have not been detected.

Institutions, policies

The legal system has been basically completed, the Law on Water Resources, the Law on Irrigation, the Law on Natural Disaster Prevention and Control, the Law on Electricity, the Law on Dykes, the Law on Environmental Protection, the Law on Land, the Law on Forestry... to guiding documents, together with international treaties create an important legal basis for water resource management and safety of dams and reservoirs. However, many Ministries and sectors are jointly managing water sources and the coordination mechanism among Ministries and sectors in water management, exploitation and use are still limited. Sanctions to handle violations are not severe. Conflicts in management, exploitation, and use of water, such as flood control with power generation; power generation with water supply for downstream, pushing salinity; granting permits to discharge wastewater into water sources, irrigation work systems..., increase the risks of water shortage, flooding, waterlogging, and water pollution.

At the Central level, the MONRE performs the role of state management of water resources; The Ministry of Agriculture and Rural Development conducts the role of state management of irrigation, natural disaster prevention and control, and rural clean water; The Ministry of Industry and Trade develops hydropower projects; The Ministry of Transport conducts the role of state management of inland waterways; The Ministry of Construction conducts the role of state management of urban domestic water; The Ministry of Health conducts the role of state management of domestic water quality... leading to the interlacing, lack of synchronization in the process of implementing and performing specific tasks, especially at the local level.

3. RECOMMENDATIONS TO ENSURE WATER SECURITY

Improvement of institutions and policies

Review and improve the legal system, mechanisms, and policies related to water in the direction of demand management, economization, socialization and digital transformation. Perfect the coordination mechanism among ministries and sectors



and local authorities to strengthen decentralization, reduce administrative procedures and be transparent; mobilize resources, create favourable conditions and motivation for organizations and individuals to participate in investment, management, and operation of infrastructure of the water sector, seawater purification, and wastewater treatment; develop and implement mechanisms to encourage people to use water sparingly, improve water use efficiency, reuse water, and protect the water environment.

Resource mobilization

The state budget continues to prioritize investment in the works that are difficult to mobilize social resources and in the construction of large and particularly important works, works in ethnic minority areas, mountainous areas, islands, areas with extremely difficult socio-economic conditions, areas with water scarcity, and areas heavily affected by climate change.

Public investment capital is a guide, a primer to attract spillovers of social capital and supports less attractive but practical projects for disadvantaged areas to share risks with investors.

Attract ODA capital to invest in water storage works, connection of water sources, and works to ensure social security.

Basic survey and planning

Develop visions and development scenarios. Deal with extreme impacts of drought, water shortage, salt-water intrusion, flood, inundation, waterlogging, pollution, water degradation and water environment protection; propose long-term solutions for the Red River Delta, the Mekong River Delta and areas at high risk of water security.

Ensuring the quality of the water environment

Strictly control waste sources; assess load carrying capacity, conduct discharge zoning, allocate wastewater discharge quota; determine the target and roadmap to reduce discharge into the surface water environment, into irrigation works that are no longer able to bear the load; restore rivers and water sources that are seriously degraded and polluted; complete announcement and control of minimum flow in rivers, streams and downstream of reservoirs; strengthen the establishment and management of corridors to protect water sources and the scope of protection of irrigation works.

Increase the ratio of wastewater connection from households and production facilities to the centralized wastewater collection and treatment system. Strictly manage and control the collection and treatment of wastewater and supervise and monitor wastewater, especially for industrial production with pollution risks; increase the wastewater reuse rate after treatment.

Research and propose to develop a project on the Law on Water Pollution Control.

Safety of dams and reservoirs

Non-structural solutions: Review and re-evaluate the functions, tasks, and operating procedures of dams

and reservoirs compared with the original design to have solutions to upgrade water storage capacity and respond to extreme floods, operate in real time and aim to serve multiple purposes; Improve the efficiency of using reservoir capacity, including the use of anti-flood power, dead volume in participating in regulating, cutting, reducing flood and supplying water for downstream in drought conditions, water shortage, saline intrusion; Complete the system of management and exploitation of dams and reservoirs in terms of quality of human resources and equipment, apply science and technology, and modernize management and operation.

Structural solutions: Focus on completing repair and upgrading of damaged, degraded, and inadequate dams and reservoirs by 2025, especially for dams and reservoirs with high risks of unsafety, the basin with the flood flow to the lake quickly; ensure the maintenance funding according to regulations; accelerate the completion of ongoing projects. Repair and upgrade to ensure safety for damaged and degraded dams and reservoirs in the 2021-2025 medium-term public investment plan with state budget funds, ODA and other legal capital sources; implement the construction of new water reservoirs in areas prone to frequent droughts, water shortages, salinity intrusion, floods, inundation to store water, transfer water for daily life, production, push salinity, reduce floods to ensure safety for downstream areas.

Prevention, combat, and mitigation of adverse impacts caused by natural disasters and climate change

Strengthen capacity for forecasting and warning of water sources and natural disasters in real-time, provide data in a timely manner, take the initiative in arranging production and daily life activities, and support decision making. Invest in, upgrade, and modernize the monitoring network of hydrometeorology, earthquake, and tsunami; pay attention to upgrading the network of salinity measurement stations and points.

Forest protection and development

Manage, protect and restore natural forests in association with biodiversity conservation, landscape and ecological environment protection. Improve the quality of planted forests, develop high-quality forest; develop large timber forests and non-timber forest products.



Building a monitoring and evaluation system for water security

Strengthen supervision of exploitation and use of surface water, underground water, and discharge of wastewater into water sources. Closely monitor and supervise inter-country water sources.

Science and technology

Promote research, development and application of new, breakthrough, advanced, modern, smart scientific and technological solutions, artificial intelligence, especially achievements of the Industrial Revolution 4.0, step by step implement digital transformation to proactively respond to water-related disasters and adapt to climate change; actively develop, create new water sources, collect, store, regulate, transfer water, link water sources; treat saltwater and brackish water into fresh water on the spot serving the domestic water supply in coastal and island areas; control saltwater intrusion, keep freshwater and store water in rivers, especially in 5 large river basins including Red River, Mã River, Cà River, Đồng Nai River and Mekong River.

International cooperation

Effectively implement international commitments and agreements to which Vietnam participates; actively participate in and expand effective international cooperation on water security, dam and reservoir safety management, with a focus on cooperation in prevention, combat and mitigation of water-related disasters; research and establish mechanisms to settle disputes and conflicts over transboundary water sources, especially in the international river basins of the Mekong, Hồng - Thái Bình.

Communication, awareness raising

Disseminate and educate the legislation to raise awareness and participation of leaders at all levels, the people, and the whole society on ensuring water security and safety of dams and reservoirs, promote the supervision role of people, the participation of stakeholders in proactively storing and using water economically and efficiently.

Renovate the contents and methods of propaganda, combine the traditional methods with propaganda through social networks, integrate into some training curricula ■

The plastic value chain faces two critical challenges: curbing plastic waste and reducing greenhouse gas emissions. Cohesive regulations are needed to eliminate unnecessary plastics and reuse plastics, develop new delivery models and ensure circularity.

The perspectives in this article, which range from business to supply and demand and youth activism, highlight the significant role of the informal waste sector in addressing plastic pollution.

Global coordination is essential, as plastic use is projected to triple by 2060, requiring a 3% reduction in annual fossil plastic use to meet climate targets. On the World Environment Day, 5th June 2023, it is important to recognize that cohesive regulations are needed to eliminate unnecessary plastics and reuse plastics, develop new delivery models and ensure circularity. Voluntary actions alone are insufficient. A robust treaty with globally binding rules is necessary to combat plastic pollution effectively.

The plastics and chemicals industries will require the most support to build markets for low-carbon products and intermediaries. Currently, there is a high supply scarcity risk for near zero plastic products, based on decarbonization commitments and announced capacity to 2030. At the same time, recycling volumes and demand are projected to skyrocket with growing pressure on industry to reduce the carbon footprint of recycled material. A robust treaty with globally binding rules is necessary to combat plastic pollution effectively.

The perspectives in this article, which range from plastic suppliers to buyers and youth activism, highlight the need for collaboration across industries and sectors. Together, we can drive transformative change and create a sustainable future, where plastic pollution and climate change are effectively addressed. This cannot happen without acknowledging the significant role of the informal waste sector in addressing plastic pollution in regions such as Africa and Southeast Asia. Investors in these regions should prioritise their needs, integrate them into municipal structures and enhance their capacity for collection and value addition.

The plastics value chain is complex and there is a need for collaboration across industries and sectors. Together, we can drive transformative change and create a sustainable future where plastic pollution and climate change are effectively addressed.