



# Master Plan for the Red river - Thai Binh river basin for the 2021-2030 period, with a vision to 2050

TRẦN THỊ THANH TÂM

*Department of Water Resources Management*

The Red river - Thai Binh river basin is the largest river basin in the North with an area of 169,000 km<sup>2</sup>, of which its part in the territory of Vietnam is 88,680 km<sup>2</sup> accounting for 51.3% of the basin area, the rest belongs to territories of China and Laos. The water source of the Red river - Thai Binh river is the main water source for production, daily life and socio-economic activities of 16 Northern provinces, one of key economic regions of Vietnam. This is the largest river basin in the country, flowing through 25 provinces and centrally run cities with more than 30 million people living [1].

## 1. SOME CHALLENGES FOR WATER RESOURCES IN THE RED RIVER - THAI BINH RIVER BASIN

The Red river - Thai Binh river system is facing many difficulties and challenges due to the increasing demand for water for socio-economic development, making the water resource problem on the river basin increasingly complicated. The exploitation and use of water resources in the upstream part of the river basin will have a significant impact on the water source regime; together with the impact of climate change, it has caused challenges in developing plans for exploiting, using and regulating water sources. Water shortages during the dry season continuously occur in the downstream areas especially in recent years, the water level at some monitoring locations in the downstream has at times fallen to the lowest level in history. Along with competition in water use between sectors, especially between power generation and agricultural production, if water sources are not allocated reasonably, ensuring harmony of interests between water-using regions, sub-basins and sectors on the river basin, the exploitation and use of water source from the Red river - Thai Binh river will not ensure comprehensive economic, social and environmental effectiveness, the following are some challenges, specifically:

(i) Water resources are unevenly distributed in space and time, affected by upstream exploitation and effects of climate change. The Red river - Thai Binh river system is formed from large tributaries such as Da river, Lo river, Cau river, Thuong river and Luc Nam river. The total amount of surface water that can be exploited in the Red river - Thai Binh river basin is about 127 billion m<sup>3</sup>, the flood season accounts for about 75%, the dry season accounts for about 25% of the total annual flow, the underground water source that can be exploited stably on the river basin is about 7.1 billion m<sup>3</sup>. The average amount of water per capita in the dry season is about 1,600 m<sup>3</sup>/person. Because water resources are unevenly distributed in space and time, and are affected by upstream exploitation, the access to the water source is still difficult,

especially in high mountainous and remote areas leading to local water shortages in some areas during the dry season. In addition, the impact of climate change and the exploitation, use of water upstream beyond the border of the Red river - Thai Binh river basin caused water resource developments even more complicated.

(ii) There has been no general master plan for river basin, while it is the foundation for developing and implementing water exploitation and use master plans. In addition, a number of water exploitation and use master plans in localities have been and are being implemented, such as irrigation master plan, rural water supply master plan, urban water supply master plan, however these master plans had many shortcomings, were adjusted and expired when the provincial master plan was issued.

(iii) Pressure on socio - conomic development leads to an increasing demand for water exploitation and use, forecast to increase 1.2 times by 2050 compared to today. In addition, socio-economic development activities increase the discharge of waste water into water sources, polluting water sources, typically Cau river, Day river, Nhue river... some pollution parameters are exceeding allowable standards from 1.6 - 2.3 times (COD, BOD<sub>5</sub>, NO<sub>2</sub>-...). On the other hand, water exploitation and use without any master plan, without regulation on water source functions, and without regulation on minimum flow caused water sources to be increasingly degraded, seriously polluted, increasing the risk of losing water source security on the river basin.

(iv) Water scarcity in the dry season and lack of domestic water in high mountainous, remote areas are occurring in many places in the river basin. Access to water sources for people in high mountainous, remote areas is very difficult, water for daily life and production mainly depends on rainwater and underground water sources. This is a big challenge if there is no timely solution to manage, exploit and use water sources economically and rationally in the river basin in the future. Currently, the MONRE is coordinating with ministries and local authorities to survey, evaluate and find water sources to supply domestic water in 147

water-scarce areas and to build water supply works to serve essential needs of people in the planned area.

(v) Wasteful and ineffective exploitation and use of water resources is still happening on the river basin. Many water exploitation and use works have not been operated and exploited according to design, especially irrigation reservoirs, some reservoirs are only operating and exploiting at about 68% - 75% of construction design capacity.

From above challenges, on 6<sup>th</sup> February 2023, the Prime Minister issued Decision No. 50/QĐ-TTG approving the Master Plan for the Red river - Thai Binh river basin for the 2021-2030 period, with a vision to 2050. The Master Plan provides specific objectives, solutions, functions of water sources and management, regulation and allocation of water sources, contributing to ensuring water source security for exploitation and use purposes and socio-economic development goals in the planned area; develops solutions, stipulates specific responsibilities for each line ministry and local authority to organize the implementation the Master Plan effectively [1].

## 2. ENSURE WATER SOURCE SECURITY IN THE RIVER BASIN, STORE, REGULATE, AND ALLOCATE WATER RESOURCES FAIRLY AND REASONABLY

The Master Plan for the Red river - Thai Binh river basin for the 2021-2030 period, with a vision to 2050 was issued based on the viewpoint that water resources are managed in an integrated manner according to the river basin, with consistency in quantity, quality, between surface water and underground water, between upstream and downstream, between localities in the same basin; ensuring compliance with international treaties, bilateral cooperation that Vietnam has participated in. The Master Plan is developed on the basis of linking the current status, orientation of the use of water resources with land resources, land use structure and other natural resources, as a basis for formulating socio-economic development master plans and plans of localities, sectors

and fields that exploit and use water in the basin to ensure synchronization, consistency between master plans of sectors that exploit and use water on the river basin... Protect water resources on the basis of protecting water source functions to meet water quality for purposes of use, protect aquatic resources, consistent with socio-economic development conditions on the river basin. Prevent, control, remedy the consequences and harmful effects caused by water with the motto of proactive prevention as the key to minimize losses, stabilize social security, maintain national defence and security on the Red river - Thai Binh river basin.

The overall goal of the Master Plan is to ensure water source security on the river basin, store, regulate, allocate water resources in a fair and reasonable manner, exploit and use water economically and effectively associated with protection, sustainable development of water resources to meet water needs for people's living, socio-economic development, ensure national defence, security, and environmental protection. Protect water resources, prevent degradation, depletion, pollution of water sources and harmful effects caused by water, have a roadmap to restore degraded, depleted, and polluted water sources, meeting requirements of integrated management of water resources according to river basins and adaptation to climate change.

By 2030, store, regulate, allocate water sources to ensure harmony of benefits for localities and water users in the region, between the Northern midland and mountainous region and the Red river delta, exploit and use water

economically and effectively to improve the economic values of water, ensure water source security, adapt to climate change and in accordance with international treaties related to water resources that Vietnam has participated in... Strive to achieve basic targets of the Master Plan, including: 100% of locations that maintain minimum flow on rivers are monitored, with an appropriate automatic



▲ A section of the Red river flowing through Ha Noi City



and online monitoring roadmap; 100% of inter-provincial water sources with their capacity to receive wastewater and carrying capacity are announced; 100% of works exploiting, using water and works discharging wastewater into water sources are monitored for operation and system connection according to regulations; 100% of lakes, ponds with regulating functions, high biodiversity, historical and cultural values not filled are announced and strictly managed; 70% of water sources subject to the establishment of water source protection corridors are marked with protection corridors; 50% of the total amount of wastewater in urban areas of type II or higher and 20% of the total amount of wastewater in urban areas of type V or higher are collected, treated to meet standards, technical regulations before being discharged into the environment; 20% of important water sources degraded, depleted, polluted, especially river sections flowing through concentrated residential areas, important water sources for domestic water supply and socio-economic development activities are improved and restored.

Vision to 2050, maintain and develop water resources, regulate and allocate water sources to ensure water security, adapt to climate change and in accordance with international treaties and bilateral cooperation related to water resources that Vietnam has participated in. Strengthen the protection of water resources, ensure water quantity and quality to meet socio-economic development goals and minimize harmful effects caused by water. Management, exploitation, use and protection of water resources are carried out online on the basis of smart management. Restore degraded, depleted, and seriously polluted water sources and rivers in the river basin. Initially control the river bottom elevation in the delta, maintain water levels on the Red river, Duong river, and Cau river in the dry season, especially river sections flowing through urban areas such as Ha Noi, Bac Giang, Bac Ninh to create riverside landscapes...[2].

Main contents of the Master Plan include:

*Water source functions:* Inter-provincial and international water sources on the Red river - Thai Binh river basin have functions of being used for purposes of water supply for domestic use, industrial production, agricultural production, tourism, and service business, hydropower, water transportation. Groundwater sources on the Red river - Thai Binh river basin have functions of being used for the purposes of water supply for domestic use, industrial production, and service business...

*Managing, regulating, allocating water sources to contribute to ensuring water source security for the purposes of exploitation, use, and socio-economic development goals on the river basin:* Manage, regulate the amount of water that can be exploited, used throughout the basin corresponding to a frequency of 50% (about 133,930 million m<sup>3</sup>), corresponding to a frequency of 85% (about 102,210 million m<sup>3</sup>), of which the amount of water that can be exploited and used from outside the border flows in at a frequency of 50% (about 12,000 million m<sup>3</sup>), corresponding to a frequency of 85% (about 10,000 million m<sup>3</sup>) to meet the needs of water exploitation and use until 2030...

*Managing exploitation and use of surface water to ensure minimum flow on rivers:* Exploitation and use of surface water must ensure minimum flow value on rivers and streams specified in Appendix III attached to this Decision. In case of new construction of water exploitation and use works, based on actual conditions and water source characteristics, the MONRE and People's Committee of relevant provinces and centrally run cities shall consider deciding on the value of the minimum flow after construction works have been put into operation according to authority, ensuring minimum flow value on rivers according to regulations. Operate the system of works to create regular and continuous flow for the Bac Hung Hai, Nhue, Day and Ngu Huyen Khe rivers to ensure the environment, landscapes and socio-economic development purposes.

*Protecting water resources:* Water exploitation and use must be associated with protection of water resources, protection of aquatic resources, flow circulation, lakes and ponds that have regulating function and biodiversity value consistent with functions of water sources in the planned period. Strictly manage existing forest areas in provinces on the Red river - Thai Binh river basin. Maintain, protect and develop forest coverage rates to contribute to improving the capacity to adapt to climate change and promote mitigation of greenhouse gas emissions...

*Preventing, controlling landslides in riverbeds, banks, beaches:* Implement measures to protect, prevent, control landslides in riverbeds, banks, beaches; survey, evaluate, monitor flow developments, sedimentation, landslides in river beds, banks, beaches; research channel changes, natural laws affecting the stability of river beds, banks, beaches. Strictly manage sand, gravel mining activities in river beds according to regulations to ensure stability of river beds, banks, beaches and minimize water level decline on rivers. Sand, gravel mining areas in riverbeds in river sections with unstable terrain, geological conditions must be at a minimum safe distance from the edge of the bank consistent with the natural width of the riverbeds according to regulations [2].

### 3. SOLUTIONS TO IMPLEMENT THE MASTER PLAN

*Firstly, improving institutions, policies, standards on exploitation, use, reuse of water resources:* Review, amend, supplement regulations on management, protection of aquatic resources and protection, development of watershed forests; standards, technical regulations on water quality, water reuse. Amend, supplement financial mechanisms; mechanisms to attract, mobilize



financial resources in exploiting, using, protecting, preventing, controlling, remedying harmful consequences caused by water; supplement mechanisms for using cross-border water sources; adjust master plans related to exploitation, use of water resources, ensuring consistency, synchronization between master plans; encourage people to use water economically, improve water use efficiency, protect the water environment...

In addition, it is necessary to improve mechanisms, policies to encourage forest protection, forest regeneration, afforestation, forest services. Strengthen the implementation of policies to increase revenue from providing forest environment services in addition to electricity, water services that are being implemented to serve the management, protection and development of watershed protection forests.

At the same time, improve legal institutions, mechanisms, policies of the water sector, strengthen decentralization, transparency, reduce administrative procedures, create motivating conditions for organizations, individuals to participate in investment, management, operation of infrastructure of water sector, production and trading of clean water.

*Secondly, regulating, allocating, developing, protecting water resources, using water economically and effectively, reusing water to contribute to ensuring water source security:* Build, operate information systems, digital models, decision support tools to assess water sources in the basin under normal, water shortage conditions to support the regulation, allocation of water sources on the Red river - Thai Binh river basin. Build, complete the meteorological, hydrological and water resources monitoring system on the Red river - Thai Binh river basin. Control water exploitation, use, and wastewater discharge into water sources on the Red river - Thai Binh river basin through connecting, transmitting information, data to the water exploitation, use, and wastewater discharge monitoring system according to regulations.

Improve the water storage capacity of existing water reservoirs on the principle of ensuring safety; supplement, build new works to regulate, exploit, use and develop multi-purpose water resources, ensuring water supply for downstream as required by competent state management agencies in case of water shortages, in accordance with this Master Plan and other related specialized master plans...

Convert production, apply economical irrigation models, especially in areas where drought and water shortages often occur. Balance, adjust exploitation flow appropriately in accordance with actual conditions in water scarce areas, areas with low water levels on rivers and aquifers.

*Thirdly, science, technology and international cooperation:* Apply advanced, modern and smart science, technique, technology to use circulating water, save and reuse water, manage, protect water sources, develop and connect water sources.

Strengthen international cooperation in exchanging, providing information on cross-border water sources, research and transfer of science and technology to use circulating water, save and reuse water.

Regarding organization for implementation, the MONRE presides, coordinates with line ministries, ministerial-level agencies and related local authorities to organize the implementation of the Master Plan according to assigned state management functions; inspect, supervise implementation; periodically evaluate implementation, review, adjust the Master Plan according to regulations; build, complete information systems, digital models to connect information, data, monitor the exploitation, use of water resources and support decision-making to regulate, allocate water sources in the river basin according to regulations; manage activities of exploitation, use of water and discharge of wastewater into water sources according to authority, consistent with water source functions, water quality goals and minimum flow as prescribed in this Decision; inspect, examine the exploitation, use of water, discharge of wastewater into water sources to ensure water source functions, ensure minimum flow and other contents of the Master Plan; coordinate with line ministries, ministerial-level agencies and related local authorities to decide on plans to regulate, allocate water sources in inter-provincial river basins; carry out measurement, monitoring of flow, water quality; organize the sharing, regulating, allocating of water sources among water operators, users in the region, between the Northern midland and mountainous region and the Red river delta according to this Master Plan on the basis of annual forecast results of hydrometeorology, water sources, total amount of water stored at the end of the flood season and beginning of the dry season of important reservoirs, capable of regulation, and inter-reservoir operating procedures promulgated by the Prime Minister and related information, data on inter-provincial, inter-national, intra-provincial rivers to ensure coordination between ministries, ministerial-level agencies and local authorities in the basin...[2] ■

## REFERENCES

1. *Submission document on approval of the General Master Plan for the Red river - Thai Binh river basin for the 2021-2030 period, with a vision to 2050.*
2. *Decision on approval of the General Master Plan for the Red river - Thai Binh river basin for the 2021-2030 period, with a vision to 2050.*