

# **CHINA** **EUROPE** **Water Platform**

**CEWP PI Lot1**

**Water Management  
and Ecological Security**

**Policy Report for the Integrated Water  
Resources Management-Based Lake  
Restoration**



Co-funded by  
the European Union and P.R. China

# TABLE OF CONTENTS

<b>INTRODUCTION</b> .....	1
<b>KEY FINDINGS</b> .....	1
<b>RECOMMENDATION 1: IMPROVE THE COMPREHENSIVE MANAGEMENT OF THE WATER ENVIRONMENT IN THE BASIN</b> .....	ERRO! MARCADOR NÃO DEFINIDO.
1.1 Further reduce external pollution load.....	Erro! Marcador não definido.
1.2 Conserve spaces for rivers and lakes .....	6
1.3 Build a high-standard water-saving society .....	7
1.4 Promote compensation mechanisms and related policies.....	7
<b>RECOMMENDATION 2: CONTINUE AND IMPROVE LAKE MONITORING</b> .....	8
2.1 Improve the comprehensive monitoring system of basic water resources information .....	8
2.2 Strengthen the routine continuous monitoring.....	8
<b>RECOMMENDATION 3: IMPROVE UNDERSTANDING AND KNOWLEDGE OF SHALLOW LAKES</b> .....	9
3.1 Increase the attention and research on the systems knowledge of shallow lakes .....	9
3.2 Innovate and apply water environment treatment technologies .....	9
3.3 Build science and technology innovation platforms.....	9
<b>RECOMMENDATION 4: IMPROVE WATER MANAGEMENT CONSULTATION AND COORDINATION MECHANISMS</b> .....	9
4.1 Improve the coordination mechanisms.....	9
4.2 Set up a sound pragmatic, functional and efficient regulatory and supervision system.....	10
<b>RECOMMENDATION 5: STRENGTHEN STAKEHOLDER PARTICIPATION AND INFORMATION SHARING</b> .....	11
5.1 Encourage broad community participation.....	Erro! Marcador não definido.1
5.2 Promote the establishment of information-sharing mechanisms...Erro! Marcador não definido.	2
<b>RECOMMENDATION 6: DEAL WITH WATER-RELATED ISSUES BY ECONOMIC MEANS</b> ERRO! MARCADOR NÃO D	
6.1 Establish a flexible and diversified water investment and financing system.....	12
6.2 Initiate reforms in water rights, water price and the water market.....	12
6.3 Promote the application of the PPP model.....	13
6.4 . Develop circular economy .....	13

## Introduction

The collaboration for this project is based on the Memorandum of Understanding (MOU) between the Ministry of Agriculture and Forestry of the Republic of Finland and the Ministry of Water Resources of People's Republic of China. In May 2015, the first meeting of the Joint Steering Committee (JSC) agreed that cooperation projects would be an important way to launch practical cooperation within the framework of the MOU. At the JSC meeting, the integrated water resources management-based lake restoration was one of the accepted cooperation projects. According to the Minutes of the JSC, the cooperation partners are the Finnish Environment Institute (SYKE) and the Taihu Basin Authority of MWR. The Pyhäjärvi Institute of Finland is participating the project as well.

Both Lake Taihu and Lake Pyhäjärvi have a history of water management and experiences in its effective implementation. The Master Plan for the Comprehensive Management of Water Environment in the Lake Taihu Basin was approved for implementation in 2008. This plan sets the short term and long-term objectives of water management in Taihu Basin, and was revised in 2013. Currently, research for the development of new master plan is underway. Lake Pyhäjärvi is included in the Eurajoki river systems River Basin Management Plan, which was updated in 2015. The Pyhäjärvi Protection Programme for 2014-2020 is being used to guide the work.

The research targets of this project are Lake Taihu in China and Lake Pyhäjärvi in Finland, and it aims to address the common challenges faced by China and Finland in achieving sustainable water resources management from the perspectives of research and management, as well as to strengthen communication and cooperation in the process. During 2016-2019, both sides of the project carried out a series of mutual visits to exchange information and experiences and hold technical seminars and project promotion meetings. At the end of 2019, a report was jointly prepared based on the comparative study of the lakes.

As one of the pilots under the China-Europe Water Platform (CEWP) Partnership Instrument (PI) Lot 1 considering the research tasks of PI, the project proceeded to the second phase of cooperation in 2020-2021 as agreed in the sixth meeting of JSC in June 2019. Based on the existing research results and findings (from the first phase of the project), the second phase of the project proposed policy recommendations from the perspectives of further decreasing the knowledge gap and improving water environment management and management. Due to the impact of the COVID-19 pandemic, the communication and cooperation between the two sides of the project has been via video conferencing, teleconferencing and emails, to jointly prepare and complete the policy recommendation.

## Key findings

This report proposes recommendations on the planning and implementation of the management of Lake Taihu basin, in order to facilitate the more comprehensive, effective and

sustainable water environment management of water resources. The recommendations are based on the research conducted during the cooperation period from 2016 to 2019, on the results of review and comparative studies on water management policies, basin characteristics and methods of water environment monitoring in China and Finland, as well as on the analysis results based on the DPSIR framework, and a comprehensive review and analysis of the current management measures and planning measures. The recommendations also provide a reference for the global water environment management of shallow lakes.

## **1. Water management policy**

### **1.1 Lake comparison**

Both lakes have a strong network of participating stakeholders. In Taihu, the coordination mechanism of watershed management has different levels of participation from provincial and inter-ministerial level to municipal level. At Lake Pyhäjärvi, stakeholder participation is strong, both in the regional cooperation group of Southwest Finland, and in local stakeholder groups including local municipalities, companies and other interested parties.

In addition, a regulative framework for water environment protection has been established in both countries. At Lake Taihu, the national water law, water pollution prevention and control law, and environmental protection law are complemented by regional regulation by the Taihu Basin Management and Permit System. Meanwhile, full implementation of the system has a great influence on the management and regulatory supervision of rivers and lakes in the Taihu Basin. At Lake Pyhäjärvi, EU legislation has put into national legislation as the basis for standard setting, with strict permit procedures.

### **1.2 Challenges**

To realize the environmental objectives of watershed management, there is still a need to enhance legal and regulatory frameworks. This is needed to re-evaluate the current environment and water permit system, and to review and revise existing law and regulations in order to further improve the water resource environment regulatory system.

Agricultural producers are reluctant to actively participate in reducing non-point source pollution, so more effective targeted measures are needed to reduce such pollution by improving management refinement. At the same time, it is necessary to re-evaluate the standards of wastewater discharge and enhance the capacity of wastewater collection and treatment.

To promote the PPP model in China, the challenge of communication and the differences in the systems between the two countries need to be overcome. More effective measures need to be taken to get the social capital and private companies involved in understanding the indirect benefits related to the “investment”. The private sector must be more tightly engaged through discussion and stakeholder groups.

Another challenge is information sharing between stakeholders. Even within the state administration, it is difficult to get sufficient information from the different departments, not to mention third parties like private companies, universities, research institutions and NGOs.

## **2. Water basin and lake characteristics**

### **2.1 Lake comparison**

The ecosystems of Taihu and Pyhäjärvi are well studied and there is a good knowledge base for the actions. According to monitoring data, the ecological status of Lake Pyhäjärvi is classified between good and moderate. The ecosystem of the lake is excellent, with high fish production. For the Lake Taihu basin since the comprehensive implementation of water environment management from 2008, the main water quality indicators of the lake (except total phosphorus) have been improved, but the density of cyanobacteria in the lake is still on the rise, and the water ecological condition of the lake shows gradual degradation.

### **2.2 Challenges**

Both Taihu and Pyhäjärvi have been affected by human activities for centuries. Shallow lakes are vulnerable to eutrophication. In addition, shallowness magnifies the role of internal nutrient loading and resuspension. Macrophytes could attenuate the endogenous resuspension caused by wind erosion, but the coverage of macrophytes has decreased in Taihu due to human factors. The total phosphorus concentration in Taihu is not decreasing, despite all the restoration efforts that have been made.

Phytoplankton is the most visible and significant indicator of eutrophication in both lakes. Annually, there are massive cyanobacterial blooms in Taihu, which are matter of public concern. The increased occupancy of cyanobacteria in Pyhäjärvi has disrupted the original zooplankton-phytoplankton food chain, the basis for the biological regulation of the lake's restoration.

There are gaps in knowledge and understanding related to the impacts of climate change on the lake ecosystems. The indirect impacts of climate change, which result from temperature increase, changes in food web, or physical environment change, still cannot be evaluated. .

## **3. Water environmental monitoring and evaluation method**

### **3.1 Lake comparison**

The monitoring of both Lake Pyhäjärvi and Lake Taihu has been reasonably good. Through decade-long monitoring activities, good long-term time series data have been collected for both lakes. The monitored data have been well applied in evaluating the ecological status of the lakes, which facilitates the good development of the evaluation system on the lakes' ecological status. The evaluation system is well developed both in China and in EU. Currently, the monitoring methods include remote sensing, automatic measurements and water sampling in both countries. In Finland, there is a common database where Pyhäjärvi data can be stored and shared.

### **3.2 Challenges**

In the case of Taihu, the tasks of lake monitoring are under budget limitations and the budgets are gradually being reduced by the administration. Currently, not all collected data of Taihu are shared between stakeholders and there is no common database to store the monitoring data .

It is still difficult to comprehensively monitor the lake ecosystem, especially as there are not enough resources for monitoring the spatial and temporal variation of micro indicators (e.g.: nutritive salts, cyanophyte). At Lake Pyhäjärvi, monitoring is done over a deeper pelagic area but the monitoring of large shallow areas is neglected. At Lake Taihu, establishing algae bloom forecasting and a warning system is a big challenge.

In the Finnish WFD classification, Pyhäjärvi is a large, oligotrophic and non-humic lakes. In the EU's WFD, the estimated ecological state is based on the typing and reference sites defined by the environmental administration. Large oligotrophic and deep lakes are used as a standard reference for the ecological status of Pyhäjärvi, but is not suitable for its actual situation, making the estimation controversial. Meanwhile, the standard reference is 'too strict' from a local restoration point of view to reach the status of recovery.

#### **4. Analysis and evaluation based on DPSIR model**

##### **4.1 Lake comparison**

Both lakes and their watersheds have taken multi-faceted and multi-level measures on lake restoration and management, and the water environment conditions of the lakes have been improved to some extent. Analysis through the DPSIR model shows that the stress factor (P) has a good correlation response with the external loading. The pollution in both lakes was reduced through exogenous pollution treatment. In the Lake Pyhäjärvi basin, a circular economy system has been set up and is working. The system circulates nutrients and carbon within the basin to give the resources added value out, instead of ending up in the lake. The agricultural primary production and the fish catch from the lake are used for food production. The side streams from food production and agricultural residues and manure are used for energy (biogas), and fertilizer and compost production, which could be put back to the fields. This circular system also benefits the water quality of the area.

##### **4.2 Challenges**

The challenges include quick changes in land use and population especially in Taihu Basin. In addition, high external loading exists in both basins, which may be related to airborne deposition and the effect of rainfall (especially in Taihu, due to its huge surface area). The quantification of internal loading and resuspension is currently not well known in either lake.

On the implementation of the measures, challenges are related to knowledge gaps in the effective evaluation of the measures. Especially for diffuse loading, evaluating the effectiveness of measures is difficult, and the analysis of effectiveness cannot solely rely on monitoring data. This also makes it difficult to link the measures to the most significant pressures. In addition, financial resources for the implementation of the measures are limited. Meanwhile, new technical innovations and applications need to be further promoted.

On top of these challenges, climate change brings its own challenges and needs for adaptation. There are still knowledge gaps related to how precipitation will change, and how the changes in precipitation and increasing water temperature will affect the aquatic ecosystems. Related to internal loading, changes in wind speed may affect resuspension in the future. Extreme events, such as flooding, drought and storms happen frequently, not to mention

the changes in ice cover on Lake Pyhäjärvi. These complex mechanisms and their effect on the ecosystem need to be assessed by some appropriated approaches, in order to take actions to improve the status of the water environment that is being influenced by climate.

## Recommendation 1: Improve the comprehensive management of the water environment in the basin

### 1.1. Further reduce external pollution load

1. Synergetic management of water and land-based pollution. Before lake treatment, rivers must first be treated; the comprehensive improvements in the management of the main rivers flowing into the lake, the backbone river network and tributary are needed to enhance the water quality upstream in the rivers flowing into the lake; for total phosphorus, total nitrogen and other key indicators, the assessment system that controls both pollutant concentration and total pollutant amount in the main rivers flowing into the lake need to be implemented. Before the treatment of rivers, treatment on land must be prioritized; pollutant emissions should be reduced from the source, focusing on promoting the adjustment of the industrial structure and industrial distribution in the region around the lake, especially upstream in the region, to strengthen the prevention and control of pollution at source and emission reduction.

2. Control non-point source pollution as the key direction of phosphorus control in the watershed. Divide the priority control unit of agricultural non-point source pollution, and popularize rural domestic sewage treatment and pollution control facilities in livestock and poultry husbandry, to improve fertilizer reduction in agriculture and reduce non-point source pollution in farming and animal husbandry. Focus on black, foul-smelling rivers and cut-off rivers, take such measures as pollutant interception and treatment, dredge benthic substrate, shoreline treatment and reasonable dredging to restore river waterways, to improve the sewage collection rate and reduce the accumulation of pollutants in the river network.

3. Strengthen the waste water material collection and treatment capacity. Troubleshoot and improve the urban sewage network, construction of sewage collection and treatment facilities, and renewal and restoration of pipe networks, to improve the effectiveness of sewage collection. Promote system transformation to separate rainwater and sewage as well as the collection and treatment of initial rainwater, together with strengthening the collection of sewage from car washing and other service industries, to gradually achieve full coverage of the sewage network, thus achieving full collection and treatment; perform deep treatment for wastewater from the textile, chemical, paper, steel and other industries. Advance the construction and transformation of sludge treatment and disposal facilities, to promote the centralized incineration and harmless treatment of sludge, which can further steadily facilitate the recycling and utilization of sludge in a harmless way.

4. Increase supervision and administration efforts. Implement stricter requirements for key indicators such as total nitrogen and phosphorus emissions in upstream areas. Shift the management focuses of urban sewage treatment from the construction of sewage treatment facilities to the supporting facilities and the establishment of long-term operating and management mechanisms. For the new urban districts, propose more stringent sewage treatment and discharge standards. Improve rural environmental infrastructure construction, operating standards and regulation. Strengthen the scale of rural domestic sewage treatment, professional maintenance and integration. Enhance control and management of phosphorus-containing detergents to reduce non-point source pollution.

5. Implement ecological restoration projects to improve the capacity of the water environment. Promote the protection of wetlands around the lakeshore zone and restore the upstream water ecology, to restore lake regulation and storage space and ecological space. Take comprehensive measures in water ecology restoration such as dredging the river network, lake and wetland, upgrading the shoreline, construction on ecological revetment, establishing the connectivity of the water system, restoration of aquatic vegetation, etc., to enhance river and lake connectivity and improve the self-purification capacity of water bodies, to gradually restore the water ecology of rivers and lakes.

## **1.2 Conserve spaces for rivers and lakes**

1. Scientifically delineate the spatial scope of river and lake waters. Considering the integrity and continuity of the ecosystem, carry out the delineation of water-related spaces such as river and lake water shorelines, flood storage areas, drinking water sources, water conservation and soil erosion control areas. Strengthen communication and coordination among different industries such as water, natural resources, housing construction, ecological environment, transportation, cultural tourism and to clarify management boundaries and the requirements of various types of space.

2. Strengthen the management and restoration of damaged areas. Restore and increase the water surface area of rivers and lakes as well as natural ecological shorelines. For the important rivers and lakes whose ecosystems are damaged, restore fields to lakes and wetlands, carry out water ecological management, shore zone restoration and wetland ecological protection, to gradually restore and enhance the ecological functions of rivers, lakes and wetlands. For the source of rivers and lakes and important water sources, carry out water conservation and soil conservation work to implement ecological clean small watershed construction according to local conditions, and reduce farmland non-point source pollution.

3. Strengthen the spatial control of rivers and lakes waters. Define watershed protection objectives and control requirements in different classifications and regions, develop plans for key rivers and lakes for protection and utilization, delineate the functional zoning of shoreline, carry out limited but effective use of shoreline according to the requirements of the classification and zoning, control the land use intensity of important rivers and lakes shoreline.

Establish and improve cross-regional and cross-sectoral coordination mechanisms for the protection and utilization of water-related spaces.

### **1.3 Build a high-standard water-saving society**

1. Establish a coordinated and unified water conservation regulation system and quota standards and build a system of water intake quotas and water conservation standards that cover key industries and conform to the characteristics of the river basin and regional synergy. Establish and improve the policy system of water conservation system, carry out preliminary research on water conservation legislation, revise and improve water conservation regulations, and promote the establishment of local water conservation regulations and rules. Strengthen water quota management, continuously improve the quota standard system, carry out water quota evaluation, and strictly apply the quota standard in key water users and key water-saving phases. Implement regular supervision of water conservation; explore the establishment of a coordination mechanism for the supervision of water conservation through collaboration in the basin region, cross-industry, and multi-department; explore the credit rule system for water use supervision and management. Build a water conservation supervision information platform, improve water conservation information management, and facilitate the transformation of water conservation supervision; at the same time, rely on the national water resources information management system to strengthen the supervision and management of key water users and to monitor water users in special industries.

2. Strengthen the strictest assessment system on water resources management , and comprehensively promote water conservation in various industries. Implement management throughout the process of water use, control the intensity of water resources development and utilization, demonstrate what water resources can do and carry out water conservation evaluation for planning and new projects. Promote industrial water-saving reform, improve the water supply measurement system and online monitoring system, and promote the recycling and gradient utilization of water in enterprises and communities. Adjust and optimize the structure of agriculture, promote water-saving irrigation technology, and build modern agriculture that is in water-saving mode. Launch water conservation in the public sector, strictly control the use of water in the service industries with high water consumption, and strengthen the use of recycled water, rainwater and other unconventional water sources. Emphasize the market's role in water allocation, establish and improve a unified inter-regional water conservation incentive mechanism, promote the trial implementation of contract water conservation, and form market-based solutions.

### **1.4 Promote compensation mechanisms and related policies**

1. Promote the establishment of ecological compensation mechanisms and improve cross-provincial environmental protection collaboration. Coordinate the comprehensive needs of flood control, water supply and ecological water environment improvement in the basin, take important inter-provincial border rivers and lakes as targets of protection, improve the market-oriented and diversified long-term ecological compensation mechanism for transboundary rivers

and lakes, explore the establishment of a compensation model combining funds, technology, talents, industries, etc., and promote positive interaction between ecological protection areas and benefitting areas, while improving inter-regional interest balance mechanisms such as ecological protection compensation and resource development compensation. Establish ecological compensation mechanisms in key regions and key fields like the protection of important water sources and comprehensive management of soil erosion; explore the establishment of a wetland eco-efficiency compensation system, adjust the balance between nature and society, and between the responsibility and interests of the victims of ecological and environmental damage and those who benefit economically.

2. Construct an ecological product value accounting system, ecological product price system and ecological product trading system in watersheds. Promote the unification of the basin's emission rights allocation system, encourage the development of green finance, establish a market-oriented mechanism to attract social capital investment, and gradually improve the trading market for environmental rights and interests such as emission rights, forest rights and water rights. Research an ecological resource value assessment system and an ecological product supply and demand trading mechanism, and explore ecological industrialized operation, ecological product quality certification, the ecologically sustainable manufacture of products and ways of developing them.

## Recommendation 2: Continue and improve lake monitoring

### 2.1 Improve the comprehensive monitoring system of basic water resources information

Focus on water allocation, administrative boundaries, ecological flow control, important flood control areas, important water intakes and outlets, key water-related spaces and damaged water-related spaces, strengthen the construction of a hydrological and water resources monitoring station network with forecasting and early warning, which includes strengthening online monitoring, automatic monitoring and emergency monitoring. Use satellite remote sensing, unmanned aerial vehicles, mobile terminals, IOT perception and other technologies, to coordinate the collection of monitored objects and indicators, construct a space-air-ground integrated monitoring system to make monitoring more systematic, scientific and accurate. Implement the "Internet + application" to promote the deep integration of AI, big data, cloud computing, machine learning systems and other advanced technologies into the management and management of rivers and lakes to enhance the levels of information technology and intelligence in basin water environment management .

### 2.2 Strengthen the routine continuous monitoring

Strengthen the routine continuous monitoring of low lake nutrients and cyanobacteria density on permeant lakes, monitor bacteria density and water quality along important river and

lake water resources. Strengthen the monitoring and early warning of cyanobacteria in Lake Taihu and improve the accuracy of early warning and forecasting of the impact of cyanobacteria bloom. Strengthen the monitoring and assessment of algal toxins, heavy metals and antibiotics at important drinking water sources. Carry out monitoring of water ecosystems and species diversity, to support understanding of the changes in ecological water levels and hydrological patterns in shallow lakes under global climate change, as well as assessing the impact and effectiveness of ecological restoration measures on lakes.

## Recommendation 3. Improve understanding and knowledge of shallow lakes

### 3.1 Increase the attention and research on the systems knowledge of shallow lakes

For example, carry out research on lake circulation systems to master their basic characteristics and to reveal the physical causes of the spatial heterogeneity of lakes. Carry out basic research on the mechanism of cyanobacterial bloom in lakes, the evolution of algae-grass interaction in them, their internal circulation mechanism, the influence of climate change on the dynamics of lakewater environment, the role of aquatic plants in the substrate and water body, and other ecosystem processes related to eutrophication, especially those related to endogenous sources, total phosphorus, phytoplankton and climate change.

### 3.2 Innovate and apply water environment treatment technologies

Focus on the key scientific and technological issues of comprehensive water environment treatment in the basin, promote the transformation of major scientific research results, especially the reduction of nutrients such as total phosphorus and total nitrogen, the prevention, control and utilization of cyanobacterial blooms, silt utilization and other practical scientific research results of the water environment and water ecology, promote the application of relevant applicable technologies, and further promote the accurate integration of scientific research results with water production practices in the basin.

### 3.3 Build science and technology innovation platforms

Promote scientific research exchange and cooperation. Promote the sharing of scientific research results and information, share information and knowledge to the relevant stakeholders and public. Explore multiple funding sources for research through market mechanisms to guide social investment in water science and technology innovation.

## Recommendation 4: Improve water management consultation and coordination mechanisms

### 4.1 Improve the coordination mechanisms

1. Improve the coordination mechanism of water resources management in the basin.

Promote the interaction of cross-regional deliberative river and lake institutions, facilitate interaction and experience-sharing among different actors and administrative departments in the basin, and improve management effectiveness. In the case of the Lake Taihu basin, deepen the basin's established deliberative regional coordination platforms and working mechanisms such as the Provincial-Ministerial Joint Conference on Comprehensive Management of the Basin Water Environment, the Yangtze River Delta Regional Collaboration Mechanism, the consultation and collaboration mechanism of the Governor of Taihu Dianshan Lake, inter-provincial collaboration on the protection of water resources in the Taipu River, and the comprehensive treatment of the water environment in Dianshan Lake, improve the rules of procedure, promote the establishment of more flexible and effective deliberation and coordination, and build a regular exchange and coordination deliberation mechanism to improve the efficiency and binding force of decision-making. Strengthen consultation and collaboration between water resources and natural resources, ecological environment, transportation and other related industries, and explore the formation of a new cross-regional, cross-industry model on the collaborative treatment of water-related matters.

2. Explore upstream and downstream basin linkage and flood mechanisms and enhance negotiations for water allocations. Explore the basin water resources scheduling consultation mechanism, coordinate basin water demand, and carry out joint scheduling of cross-basin regional water projects. Optimize and improve the scheme of basin flood and water scheduling and promote the effective implementation of the basin water allocation scheme and the scheduling scheme. Promote common protection and joint treatment of water environment across regions, promote the integration of river and lake management, and promote the formation of a joint prevention and control mechanism for cyanobacteria bloom in the region around Lake Taihu.

**4.2. Set up a sound pragmatic, functional and efficient regulatory and supervision system**

1. Promote joint control and management of transboundary water bodies. Implement regional coordination in the basin, to shape regulatory cooperation among transboundary rivers upstream and downstream, on the left and right banks, in the main river and tributaries of the lake to promote the management and protection of key transboundary water bodies. Relevant local governments in the basin must jointly negotiate and develop joint water environmental protection and treatment programs, further optimize and adjust the regional economic structure and industrial layout along the river and around the lake, develop zonal pollutant discharge control indicators, carry out wastewater recycling and the centralized treatment of pollutants, and promote continuous improvement of water environment quality in transboundary water bodies. Negotiate to enhance the assessment and management of the water quality of transboundary cross-sections, collaborate to manage rivers and lakes with substandard cross-sectional water quality, and jointly control and deal with major pollution incidents in transboundary waters in emergency.

2. Deepen the implementation of the river and lake chief system. Local governments across

the basin should further coordinate and unify the organizational system, institutional system, task implementation, supervision and assessment under the river and lake system. Effectively use the coordination and linkage mechanism of river and lake chiefs of transboundary rivers and lakes to strengthen interaction between transboundary river and lake chiefs, coordinate top-level design, organization and implementation, supervision and enforcement, etc., and promote the comprehensive management and protection of transboundary rivers and lakes and surrounding land areas. Further play the role of river and lake chiefs in the control of pollutants entering the lake, industrial transformation and upgrading, water and land joint management, etc., to force the implementation of industrial restructuring, pollution source management and other key measures of water environment treatment and promote the continuous improvement of water quality in the basin. Implement "joint management, joint monitoring, joint river patrol, joint law enforcement, joint cleaning" among river chief office members to promote the shaping of a work pattern of close collaboration among multiple departments featuring shared responsibility, information-sharing, problem consultation, joint prevention and control.

3. Strengthen the regulatory base to support supervision. Strengthen the local water regulations system, to carry out research on cross-regional legislation in key areas of water conservancy, strengthen the water industry in accordance with the law and regulation. Explore the establishment of co-operative law enforcement and regulatory mechanisms attended by multiple local government departments with coordinated and joint efforts and promote joint law enforcement and the supervision of water resources and natural resources, ecology and environment, agriculture, shipping and other departments. Promote the unification of the benchmarks for water-related violations within the basin and strengthen the implementation of transregional river and lake water-related regulations and the supervision of the implementation of management tasks. Explore the establishment of mechanisms of regular mutual visits in key regulatory areas, explore the implementation of public water protection mechanisms and unblock public feedback channels.

## Recommendation 5. Strengthen stakeholder participation and information-sharing

### 5.1 Encourage broad community participation

Build a well-functioning water management network covering different levels of participants and establish open information channels to enable effective stakeholder consultation, dialogue and decision-making. Strengthen public participation in watershed management, use the media to disseminate multi-level and multi-channel information to increase the public's knowledge and right to know; adopt different channels to listen to the public's suggestions and opinions on watershed management, and incorporate them into relevant planning or work programs as appropriate. On the basis of enhancing public awareness, strengthen the publicity of water-related laws, cultivate public awareness of rights, encourage citizen participation, and strengthen relevant regulations and procedures and institutional support, and improve judicial

safeguards. Encourage the development of legal water-related NGOs to play an active and professional role in environmental protection and group affairs, deepen the public's understanding of information, and encourage the public to demand a greater voice in the deliberation process.

### **5.2. Promote the establishment of information-sharing mechanisms**

Establish an information-sharing platform for transboundary rivers and lakes, unify hydrological and water resources monitoring methods and technical specifications, strengthen unified monitoring, improve effective coordination and communication mechanisms among monitoring departments, and obtain comprehensive, accurate and timely monitoring information on hydrology, water resources, water ecology, etc. for sharing. Utilize cloud computing, mobile internet and other technologies, integrate the relevant system platforms of water administrative departments at basin level, local provincial (municipal) level, etc., and establish a unified water information-sharing service platform relying on digital, networked and intelligent construction of water resources. Establish water-related information sharing and exchange mechanisms in the basin and promote the exchange and sharing of water-related information in water conservancy, meteorology, ecology and environment, natural resources and other departments.

## **Recommendation 6. Deal with water-related issues by economic means**

### **6.1 Establish a flexible and diversified water investment and financing system**

Adopt effective policy support and incentive mechanisms through low-interest loans, tax breaks, etc. to mobilize and promote social investment in water conservancy, improve project operation, management, maintenance and repair, enhance investment in reinforcement, introduce credit and other policies to facilitate the financing of water conservancy, and encourage social capital to participate in water conservancy construction in a variety of ways, such as sole proprietorship, joint ventures, joint-stock cooperative system. Drawing on China's Yangtze River protection and other modes, introduce strategic investment from central enterprises and large private enterprises, explore new models of cooperation between government and enterprises, and establish assets, capital and project construction linkage mechanism.

### **6.2 Initiate reforms in water rights, water price and the water market**

Explore the establishment of a system for the initial allocation of water rights, implement the registration of water resources use rights, and scientifically approve the permitted water volume for each water user. Innovate water market mechanism, explore the trading flows of inter-basin, inter-regional, inter-industry, inter-user and other forms of water rights. Establish and improve water rights, the water market trading platform, and gradually share data with the natural resources assets trading platforms. Deepen the regional water price reform, co-ordinate the role of government and the market, and accelerate domestic and industrial water price

reform. Promote the comprehensive reform of agricultural water prices, promote agricultural water price formation mechanisms, precise subsidies and water-saving incentives, engineering construction and management mechanisms and water management mechanisms to promote agricultural water conservation and sustainable development. Steadily promote the reform of a water resources tax.

### **6.3 Promote the application of the PPP model**

Activate companies to participate in lake and river restoration through a Public-Private Partnership model. Implement concrete measures based on background research to solve the problems. Monitor the measures to ensure that the measures are working and the direction of development is correct.

Encourage companies to join these partnerships. There are many benefits of the PPP-model for private companies. They have possibilities to do business in clean-tech solutions. Companies can utilize the fish or vegetation biomass or nutrients as a raw material and as an important component of circular economy. Such co-operation gives companies partnerships in projects and possibilities to build networks and co-operate with research institutes, including access to new challenges, solutions and innovations. Companies can negotiate other benefits for them as well. For example, for companies that use raw water in their processes, there could be savings in water purification costs, if the water quality stays good. Companies can show the environmental footprint of their products, which is needed for certificates, green brands and to improve the company image for environmentally aware customers. If the company has already caused some pollution or general harm to the water quality in past, PPP co-operation gives the possibility to compensate for environmental pollution or harm already caused, and it can improve public image in a sustainable way.

Encourage public sector actors to join the partnerships. The benefits for the public sector are additional funding resources, a wide co-operation network and improved possibilities to reach the targeted status of the lake.

### **6.4 Develop circular economy**

Link the lake and river restoration to the local circular economy. This has many benefits not only for the environment, but also economically, as the excess nutrients and biomasses of the aquatic systems are increasingly being seen as a valuable resource for industry. Develop funding schemes between companies and institutions that work for restoration. Biomanipulation can be linked to commercial fishery, and food companies can utilize the fish biomass in their products. In this way, biomanipulation is self-funded from the lake management perspective. It is an effective way of removing nutrients from the system and reducing the internal load caused by benthic fish species. Lake fish has high nutrition content and is valuable protein source for humans.

Link the control of the external nutrients to sustainable food production. Use technology to improve the structure and growth conditions of the soil to retain the nutrients and water in the field soil.

Encourage large-scale food processing companies to invest in sustainable food production and circular economy. Companies currently face pressure from retail chains and customers to

produce food sustainably and use, for example, environmental certificates, carbon/water foot prints, etc.

# CHINA EUROPE Water Platform



This action is co-funded by the European Union and P.R. China.  
The project partners are solely responsible for the contents, which  
do not necessarily reflect the views of the funding parties.

 Twitter @ChinaEUwater #CEWP  
[www.cewp.eu](http://www.cewp.eu) [cewp.mwr.gov.cn](http://cewp.mwr.gov.cn)