Eurasian Development Bank

The Irtysh River Basin: Transboundary Challenges and Practical Solutions

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THE IRTYSH RIVER BASIN: TRANSBOUNDARY CHALLENGES AND PRACTICAL SOLUTIONS

KEY FINDINGS

ANALYTICAL REPORT '25/2

TRANS-BOUNDARY RIVER IRTYSH CONNECTS CHINA, KAZAKHSTAN AND RUSSIA IN A SINGLE HYDROLOGICAL SYSTEM

4,248 km
river length

91.5 km³
volume of average annual river runoff

1.65 mln km²
total area of the Irtysh basin

17 mln people
population living in the Irtysh basin

DEMOGRAPHY AND GEOGRAPHY — FACTORS INCREASING COMPETITION FOR WATER RESOURCES IN THE IRTYSH BASIN

China

1/3
of XUAR's* water resources

Kazakhstan

1/3
of the total water resources

Russia

90%
of water use — Omsk and Omsk region

Increase in water withdrawal amid population growth and vulnerability to water stress → Black Irtysh outflow at risk of complete withdrawal

Risk of environmental disaster in case of excessive water withdrawal in China → Setting limits on inflows from China and transit to the Russia

Tense water and environmental situation in the regions bordering Kazakhstan → Risk of water deficit spreading throughout the river basin in dry years

* XUAR — Xinjiang Uygur Autonomous Region

COORDINATION — BASIS FOR WATER BALANCE AND QUALITY IN THE IRTYSH BASIN

1 Strengthening of bilateral co-operation

- Inclusion in the bilateral agreements between Kazakhstan and China and Kazakhstan and Russia of key provisions of international conventions

2 Soft infrastructure development

- Joint monitoring
- Exchange of hydrological information
- Joint research
- Joint training

3 Investment projects coordination

- Shulbinsk HPP, 2nd stage
- Semipalatinsk HPP
- Modernisation of the Irtysh-Karaganda Canal
- Krasnogorsk hydrosystem

4 Russia-Kazakhstan-China corridor

- Restoring shipping
- Access to sea routes
- New ports
- New shipyards

TRILATERAL AGREEMENT — OPTIMAL SOLUTION

Eurasian Development Bank

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Abstract

The water resources of the Irtysh River and its tributaries play a key role in the livelihood of almost 30% of the population of Kazakhstan. For Russia, the basin is also of great importance, especially in the context of water supply for the steppe areas of the Omsk region and the city of Omsk. For China, the basin represents a strategic source of water to meet the growing needs of the Xinjiang Uygur Autonomous Region. In order to effectively use transboundary water resources, the three countries need to take comprehensive measures to maintain an ecologically safe level of natural flow in the face of increasing competition for water resources. The Irtysh basin needs comprehensive measures to maintain an environmentally safe level of natural flow throughout the basin under conditions of increasing competition for water resources. The main regulatory measure could be to strengthen bilateral co-operation between Kazakhstan and Russia, as well as Kazakhstan and China, while taking into account the key provisions of international conventions. It is recommended that joint monitoring be implemented, that hydrological information be exchanged, that data transparency be ensured, that joint studies be conducted, and that the use of transboundary water management and transport and logistics infrastructure be coordinated and planned. Of particular interest is the initiative to create a full-fledged multimodal transport corridor connecting Russia, Kazakhstan and China. This project could assist in maintaining the optimal water balance of the Irtysh River and preserving its ecosystem. It has the potential to serve as a foundation for the development of trilateral co-operation principles.

Keywords: Irtysh, transboundary water basin, water resources, transport corridor.

JEL: F50, N55, Q25, Q53, R41

The report is based on research conducted by leading institutions in Kazakhstan (the Institute of Geography and Water Security under the Science Committee of the Ministry of Science and Higher Education) and Russia (the Institute of Water and Environmental Problems at the Siberian Branch of the Russian Academy of Sciences). It also draws on strategic documents, concepts, and materials from bilateral meetings and discussions with relevant government officials.

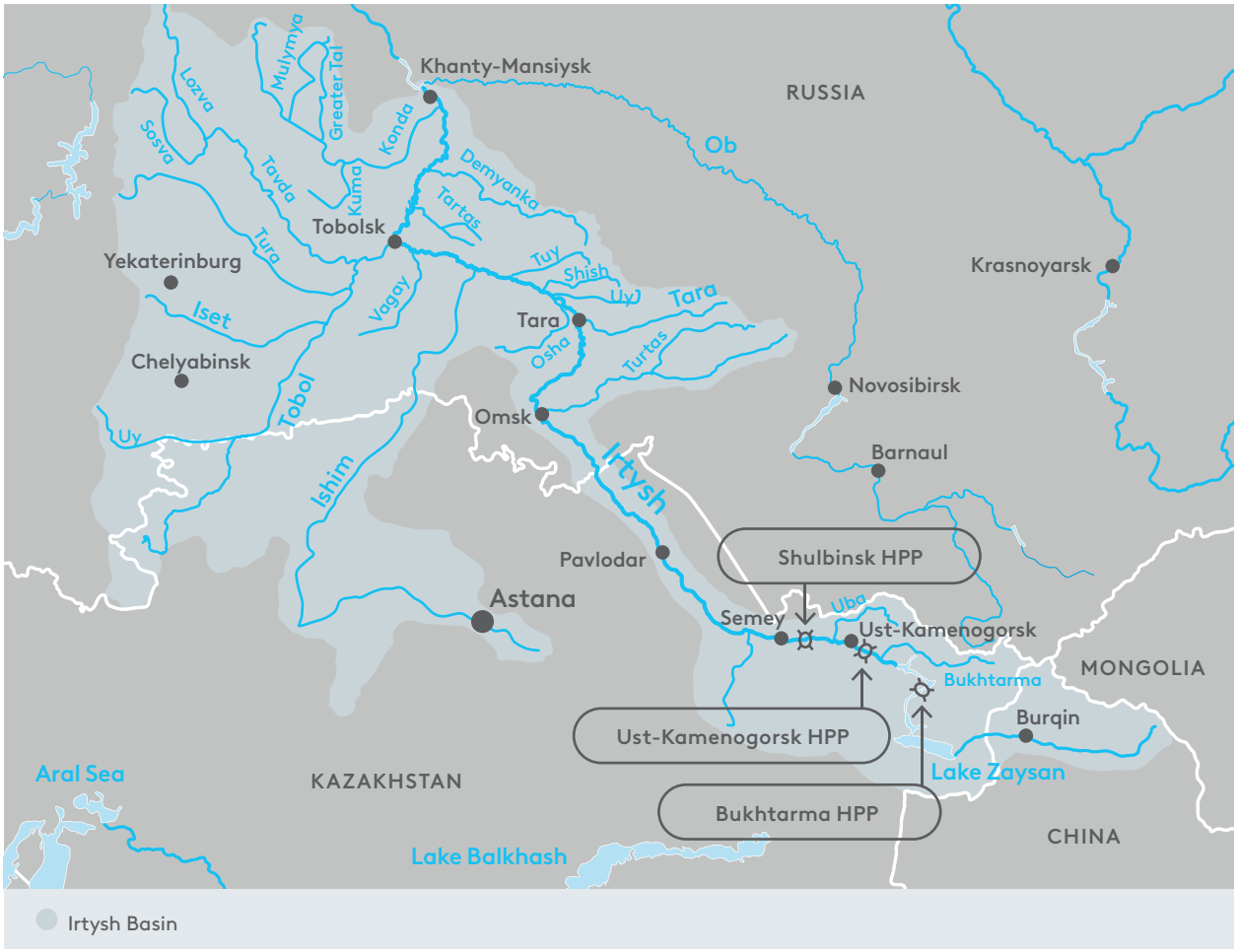
The electronic version of the report is available on the website of the Eurasian Development Bank: https://eabr.org/analytics/special-reports/

СОДЕРЖАНИЕ

ANALYTICAL SUMMARY

The Irtysh River, the chief tributary of the Ob, is the longest transboundary tributary river in the world. Its length is 4,248 kilometres. Together with the Ob, the Irtysh forms the longest waterway in Russia, the second longest in Asia and the seventh longest in the world (*5,410 kilometres*). The Irtysh traverses the territories of three countries: Kazakhstan, Russia and China. This geographic reality renders the river of immense significance for the aforementioned countries, as it profoundly impacts their respective interests in the realm of water management.

↓ Scheme of the Irtysh River basin



Source: EDB.

Irtysh's (*local toponym — Kara Irtysh or Black Irtysh*) water resources are vital to **China**'s northwestern regions. These regions are characterised by low water availability and rapidly increasing demand. In the Black Irtysh basin, the industrial and agricultural complex of the Xinjiang Uygur Autonomous Region (XUAR) is undergoing active development within the framework of the Greater Western Development Programme until 2050. The population of the XUAR increased from 15.2 million in 1990 to 25.87 million in 2022, and Gross Regional Product (GRP) per capita has grown 28 times over the same period. At the same time, the region is geographically one of the most vulnerable to "water stress".

The XUAR's own water resources are estimated at 26.3 km^3/year, which, according to the norms, can provide water for only 18 million people. In other words, the shortage of water is already evident today. It is anticipated that the population of XUAR will continue to grow in the future. This will inevitably lead to a significant increase in demand for water, food and electricity. Water withdrawal, according to various sources, may increase from the current 1.5–2.0 km^3 to 7 km^3 per year from 9.5 km^3 average annual natural flow. Moreover, projects aimed at transferring water to the XUAR from water-surplus regions of China, construction of new reservoirs, dams, irrigation canal systems, conduits, tunnels, and hydropower plants, and expansion of the capacity of existing reservoirs, dams, irrigation canals, tunnels, and hydropower plants are still likely to be implemented. There is a risk of complete withdrawal of runoff.

In **Kazakhstan**, the water resources of the Irtysh and its tributaries play a pivotal role in the country's economic development. It is a source of livelihood for almost 30% of the population. The basin produces about 45% of Kazakhstan's agricultural output. The Irtysh HPP cascade provides 10% of the country's total electricity generation (*80% of hydropower*). The projected increase in water withdrawal by China has a direct impact on the economic and environmental situation in the Kazakhstan part of the basin. Possible risks associated with flow withdrawal are significant. In the absence of adequate compensatory measures, an ecological catastrophe may occur: a drop in the level of Lake Zaisan, degradation of the unique floodplain, increased concentration of pollutants, worsening of the epidemiological situation, damage to fisheries and agriculture, industry, the energy sector and other sectors of the economy. In this regard, Kazakhstan in a bilateral format is strengthening co-operation in the Irtysh basin with China and Russia. At the national level, projects for the construction of new reservoirs and hydroelectric power plants are being developed, and water-saving technologies are to be introduced everywhere. An initiative to restore navigation is being promoted. Kazakhstan experts consider the possibility of introducing new principles and norms of water allocation in the basin aimed at fixing water allocation limits with China and Russia.

For **Russia** the active water policy of the upstream countries — Kazakhstan and China — is of decisive importance. It is expected that if China increases withdrawal volumes up to 4.35 km^3, in a low-water year with 95% water availability, the flow of the Irtysh River coming from the territory of Kazakhstan may decrease almost twice — up to 12.8 km^3. The flow deficit at the boundary gauging station will spread throughout the river. The predicted changes in the quantity and quality of resources in the next decade pose serious challenges to the socio-economic development of Russia's border regions. This especially concerns the main industrial centre — the city of Omsk and the adjacent Omsk municipal district, which account for 80% of total water withdrawal and 90% of water use in the region. Reduced water flow and increased wastewater disposal may reduce the physical self-purification potential of the Irtysh River water.

The transboundary nature of the Irtysh River means that effective water resources management requires strategic partnerships and co-operation between the three

countries — Kazakhstan, Russia and China — that share the river basin. Practical forms of interaction are needed that meet common interests in order to contribute to economic integration and the resolution of social and environmental problems in the basin. These practical measures can be structured in four main areas.

First of all, it is crucial to **strengthen bilateral interstate co-operation** between Kazakhstan and Russia, as well as between Kazakhstan and China. In this process, it will be vital to incorporate the **key provisions of international conventions into national water legislation and intergovernmental agreements**. The co-operation programmes could include such areas as: ensuring international navigation on the Irtysh River and further down the Ob River; combating water pollution and regulating the safe use of bodies of water; improving the efficiency and safety of water use in periods of floods, low water and drought. Consequently, this approach will establish the requisite legal framework and enable the signing of a trilateral agreement between the countries.

A trilateral agreement is the most optimal solution to strive for. It will create an institutional platform for co-operation, and subsequently allow for more effective transboundary water management and improved security of water use in the river basin. Important task of such agreement is to build mechanisms to maintain water quality in the river itself and a rational water balance for each party. There are prospects for such interaction. Globally, many states have made some progress in adopting watercourse agreements at the basin and sub-basin levels, establishing multilateral mechanisms for joint management. Such mechanisms have been established for more than 40% of international watercourses. One of the possible platforms for the formation of a trilateral agreement is the Shanghai Co-operation Organisation.

Second, within the framework of bilateral co-operation, it is important to **emphasise the development of soft infrastructure**. In transboundary river basins, water use and protection issues should be addressed from the perspective of the unity of the entire river basin and economic integration. It is necessary to establish a system of international integrated monitoring covering a number of issues: formation of water resources; functioning of hydraulic engineering structures (HES); spatial and temporal regimes of HES use, including passportisation of hazardous industries; and declaration of hydraulic safety. It is important that bilateral co-operation programmes be based on a unified and transparent system of monitoring of the Irtysh River flow, all data of which would be available to all parties for making rational decisions on water management. Such a monitoring system would facilitate the creation of a link for effective data exchange and information dissemination. The formation of a coordinated system of training and retraining of personnel seems expedient. It is strategically important to attract interdisciplinary researchers from Kazakhstan, China, and Russia, as well as to establish an interstate research centre on water resources of the transboundary Irtysh River basin.

Third**,** the **coordinated operation of existing hydraulic structures** (*HPPs, dams, reservoirs, irrigation canals, water supply systems, etc.*) and **planning of future**

structures deserve special attention; this is necessary to ensure an appropriate water level to restore the ecological diversity of the Irtysh basin. Priority projects should be aimed at ensuring stability of water supply in the Irtysh River basin without compromising water resources in other countries are also a priority. Such promising projects can be identified. Among them: construction of the 2nd stage of the Shulbinsk HPP in Kazakhstan; construction of the Semipalatinsk HPP (*formerly Bulak HPP*) in Kazakhstan; reconstruction and modernisation of the *Irtysh-Karaganda* Canal (*named after K. Satpayev*) in Kazakhstan and construction of the Krasnogorsk hydrosystem near the city of Omsk in Russia.

Fourth**,** a strategic dimension is the creation of a **full-fledged Russia–Kazakhstan–China multimodal transport corridor**, utilising the navigable potential of the rivers of the Ob–Irtysh basin. The Ob and Irtysh rivers can become a link between the Northern Sea Route and the Silk Road, and integrate Eurasian transport corridors into the global transport system. The new multimodal corridor will connect the landlocked countries of Central Asia and the north-western regions of China to Russia's inland territories and further to the Arctic Ocean. Such a transit route provides additional opportunities for increasing freight traffic and boosting mutual trade. As of today, Kazakhstan and Russia have already started preparing programmes to develop the corridor. A preliminary project for the creation of a Russia–Kazakhstan–China multimodal transport corridor has been jointly developed. Kazakhstan has approved at the national level a roadmap for the development of this corridor with a specific list of investment projects, which are part of the overall strategy for the development of transport and logistics infrastructure until 2029.

This initiative is of interest to all three countries of the Irtysh River basin and can become a basis for trilateral co-operation. An important condition for the integrated use of water transport potential of the Irtysh corridor is the achievement of trilateral agreements (*China–Kazakhstan–Russia*) on the regulation of the Irtysh water regime during the navigation period and the establishment of an international river navigation authority. Such co-operation will facilitate the formation of interstate mechanisms for coordinated water resources management in the Irtysh basin.

INTRODUCTION

The water resources of the Irtysh and its tributaries play a significant role in the economic development of Kazakhstan, supporting approximately 30% of the population, 45% of agricultural production, and 10% of total electricity generation (*80% of hydropower*). For the Russian Federation, the Irtysh River basin is of special importance, as it provides water to the steppe districts of the Omsk region and the city of Omsk, where the Irtysh is practically the only source of water (Vinokurov and Krasnoyarova, 2017a). For China, the water resources of the Black Irtysh River are very important, given the low water availability for the population and the growing water demand in the north-western regions of the country. The population of the XUAR grew from 15.2 million in 1990 to 25.87 million in 2022, and the Gross Regional Product (GRP) per capita increased 28-fold over the same period (Qin et al., 2021). At the same time, the region is considered as the one of the most vulnerable to "water stress".

The international legal status of the Irtysh River, which flows through the territories of three neighbouring countries — China, Kazakhstan and Russia — determines the nature of strategic partnership and co-operation in the river basin, including the development of navigation with access to the Northern Sea Route, based on the principles of international law.

Modern transboundary rivers are not only geographical objects; they are also involved in the policy sphere. At the same time, it is important that the legal and organisational conditions for joint water use and other water uses (*navigation, hydropower, fisheries, etc.*) on these rivers do not deteriorate, and that the national legislation of the parties in this area comes closer to international norms and rules, thus creating objective legal opportunities for strengthening co-operation in the international river basin.

In order to effectively manage shared water resources, states seek co-operation and develop forms of interaction representing common interests. These should contribute to the integration of the economies of the countries and the resolution of social and environmental problems in the transboundary river basin. Convergence of positions on the legal and economic aspects of co-operation in this area requires constant political dialogue, which should be based on international legal norms and the experience of bilateral and multilateral co-operation. This will contribute to reducing investment risks of financial institutions involved in water and hydropower projects in the transboundary river basin.

The impact of economic activity on water bodies is increasing at such a rate that the state of these systems is undergoing rapid and irreversible change as a result of anthropogenic causes, far beyond the capacity of scientific research to study these causes, adapt to them, and implement effective measures. The transformation of ecosystems due to pollution and the disorderly construction of water intake

structures in river basins is leading to significant qualitative and quantitative changes in river flow.

The ongoing climatic changes are increasingly manifested in changes in precipitation, affecting the hydrological characteristics of rivers and the frequency of floods, dry spells or droughts. The water balance in the Irtysh basin is increasingly affected by melting permafrost, glaciers and mountain snow in the upper reaches of the river. These natural phenomena are becoming key and can significantly alter the water security situation, putting the achievement of water-related Sustainable Development Goals at high risk.

For example, in April 2024, Russia and Kazakhstan faced abnormally high water levels and, consequently, severe flooding in the basins of the Ural, Tobol, Irtysh, and Emba rivers. This resulted in numerous floods and inundations in the Orenburg, Kurgan and Tyumen regions of Russia, as well as in the Atyrau, West Kazakhstan, Aktobe, Kostanai, North Kazakhstan, Akmola and Karaganda regions of Kazakhstan. Hundreds of settlements were flooded, infrastructure and protective structures were destroyed, and a critical sanitary and epidemiological situation developed in the flood areas. The consequences of the prolonged flood, which turned into the largest flood in the last 100 years, caused enormous economic damage to the population and economy of Russia and Kazakhstan.

Unfortunately, the lack of accurate and reliable forecasts hinders timely notification about the approach of such a dangerous natural phenomenon. The level of uncertainty in decision-making remains high for all states in the Irtysh basin, increasing investment risks in the water sector. Planning of preventive measures in transboundary river basins is mostly of an advisory nature for the following reasons: lack of interstate coordination of hydrometeorological institutions and water management services in reducing the risks of natural hazards; insufficient reliability of the methodology of operational flood forecasts based on available aerospace and information technologies; poor measuring instruments for various flood parameters at all stages of its passage; lack of organisational co-operation with the Ministry of Environment and Water Resources of the Republic of Tajikistan; and lack of information and communication technologies.

In the absence of coordinated measures on joint use and protection of the Irtysh and its tributaries, the basin is experiencing a difficult environmental situation caused by intensive water pollution by industrial and municipal wastewater, and uncoordinated construction of various hydraulic structures with transboundary impact. The issues of institutional regulation of water use, navigation regime and navigation in international and inter-regional segments of the basin's water management system remain unresolved. In this regard, it seems advisable to develop conceptual programmes for the joint use and protection of water resources in both bilateral (*Kazakhstan–Russia, Kazakhstan–China*) and multilateral (*China–Kazakhstan–Russia*) formats.

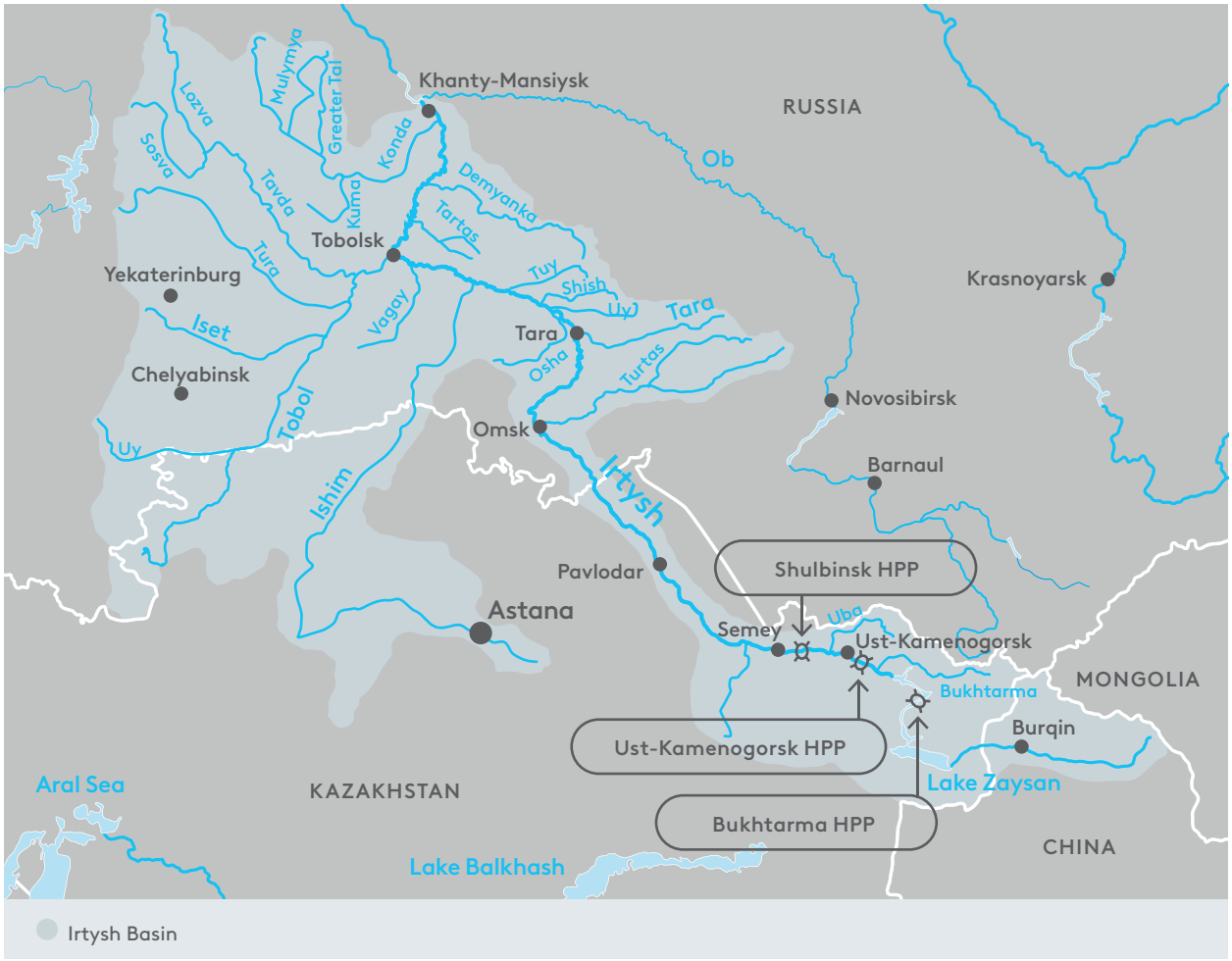
1 NATURAL AND GEOGRAPHICAL CHARACTERISTICS OF THE IRTYSH RIVER BASIN

The Irtysh River is the largest tributary of the Ob. The river basin has a transboundary character. It originates on the western slopes of the Mongolian Altai, capturing a very small and unpopulated part of its territory. Further within the Xinjiang Uygur Autonomous Region (*the XUAR*) under the name Kara-Irtysh (*Black Irtysh*), the river crosses the Chinese Altai and flows into the Lake Zaisan in the Republic of Kazakhstan. This part of the basin is located in the Altai, Saur-Tarbagatai, Dzungaria and Tien Shan mountain systems. Further from this lake the river flows out under the name of Irtysh (*Ertis is a Kazakh toponym*) and becomes a plain river, crossing from south to north the East Kazakhstan and Pavlodar regions of Kazakhstan, the Omsk and Tyumen regions of Russia, and near the city of Khanty-Mansiysk it flows into the Ob River. Here the Irtysh practically does not receive tributaries (*from the Shagan River to the mouth of the Om*), but, on the contrary, loses water through evaporation.

The total length of the river is 4,248 kilometers (*in China 525; in Kazakhstan 1,835; in Russia 2,010 kilometres*). The total area of the Irtysh basin is 1.65 million km^2, including a flow-forming area of 1.12 million km^2 (Table 1). Within Russia, the flow-forming area of the basin is about 0.7 million km^2; the fullness of the Irtysh increases almost twofold after the Tobol flows into it (Rybkina, 2019).

There are twenty-eight transboundary rivers in the Irtysh basin. Six of them mark the border, the remaining twenty-two cross it. For example, the Black Irtysh and two major left tributaries of the Irtysh, the Tobol (*Tobyl*), and Ishim (*Yesil*), are transboundary, with the Tobol River crossing the Russian-Kazakh border twice (Figure 1) (Krasnoyarova et al., 2022). Within the transboundary Irtysh River basin, seven national segments can be identified as potentially significant from both water management and transboundary perspectives. Three of them are on the Irtysh River proper within the national borders of Kazakhstan, China, and Russia, and two more are on the Ishim and Tobol tributaries within the borders of Kazakhstan and Russia (Vinokurov and Krasnoyarova, 2017a).

↓ Figure 1: Scheme of the Irtysh River basin



Source: EDB.

↓ Table 1: Surface runoff characteristics of the transboundary Irtysh River basin

River section	Watershed area, km²	Flow rate, m³/s	Runoff modulus, l/s km²	Coefficient of variation, C_v
Irtysh R. — border of China and Republic of Kazakhstan	55,900	300	5.4	–
Irtysh R. — border of Republic of Kazakhstan and Russian Federation	246,000	885	3.6	0.25
Irtysh R. — Omsk (above Omi River)	268,400	891	3.3	0.25
Irtysh R. — border of Omsk and Tyumen Regions	568,800	1,250	2.2	0.29
Irtysh R. — border of Tyumen Oblast and Khanty-Mansiysk Autonomous Okrug	1,040,000	2,340	2.3	0.25
Irtysh — Khanty-Mansiysk I	1,122,000	2,800	2.5	0.25

Note: Cv characterises the variability of annual values of river flow relative to its norm (average value for a multi-year series of observations).

Source: Vinokurov and Krasnoyarova, 2017a.

The ratio of the catchment areas in Russia, Kazakhstan and China is approximately 63:26:11; that of the average annual runoff is 62:29:9; and that of the population living in these territories is 53:29:18 (Table 2). These indicators demonstrate disproportions in the formation of water flow and water demand. About 17 million people live in the basin and its zone of influence, including about 9 million in Russian regions and almost 5 million in Kazakhstan. About 3 million people live in the Altai District of the XUAR and the zone of influence of the Irtysh-Karamay Canal, while 10 years ago the number of inhabitants was estimated at 700,000. The territory in Mongolia is practically unpopulated and is used for seasonal pastures (Puzanov et al., 2017).

↓ Table 2: Transboundary rivers in the basin

River	Indicators	Total	Distribution by State		
			China	Kazakhstan	Russia
Irtysh (entire basin)	Basin area, thousand km^2	1,691	48	917	726
	Length of river, km	4,248	512	1,696	2,040
Ishim	Basin area, thousand km^2	163	–	129.2	33.8
	Length of river, km	2,450	–	1,783	667
Tobol	Basin area, thousand km^2	426	–	99	327
	Length of river, km	1,591	–	583	1,008
Other indicators					
Mean annual flow (km^3 estimate for "Irtysh — SE Khanty-Mansiysk I")		91.5	8.3*	26.5*	56.7
Population in the Irtysh River Basin (million people, estimate)		17.0	3.0	5.0	9.0

Note: * — according to the Concept of Development of Water Resources Management System of the Republic of Kazakhstan for 2023–2029 (MJ RK, 2024).

Source: FSBI RusRIIUPWR (2014), Puzanov et al., 2017, Puzanov et al., 2021.

2 STATE OF WATER RESOURCES IN THE IRTYSH RIVER BASIN

Chinese part of the Irtysh basin

The sources of the Irtysh River are located on the border of Mongolia and China, on the eastern slopes of the Mongolian Altai Range at an altitude of 2,500 metres above sea level in the western part of China's Xinjiang Province. The length of the Black Irtysh across China is 512 kilometres.

The actual average annual flow volume (*taking into account anthropogenic withdrawal*) of the Black Irtysh varies quite strongly and depends on the degree of water consumption on the territory of China and on natural and climatic conditions in its catchment area. Transboundary inflow is recorded at the Irtysh hydrological post on the border, Boran village; its actual average annual value is 8.32 km^3. This indicator is recorded in the Concept of Development of the Water Resources Management System of the Republic of Kazakhstan for 2023–2029. According to the data of the institute "Kazgidromet", the minimum average annual natural flow volume of the Black Irtysh is 4.74 km^3, the maximum is 11.5 km^3 with an average annual value of 7.2 km^3, which was previously defined as 9.6 km^3 (Vinokurov and Krasnoyarova, 2017a).

The XUAR industrial and agricultural complex is intensively developing in the Black Irtysh basin. This is facilitated by the programme "Greater Development of China's West", which will continue until 2050. The Black Irtysh meets the needs of the population, industry, agriculture, energy and tourism (Vinokurov and Krasnoyarova, 2017a).

The region is one of the fastest growing regions in China. From 1990 to 2022, the XUAR witnessed an absolute population growth of 10.7 million, with the population rising from 15.2 million to 25.87 million. A substantial increase in population is anticipated in the forthcoming years. Concurrently, the region is recognised as being particularly vulnerable to "water stress". The XUAR has its own water resources of only 26.3 km^3/year, which, according to norms, can only provide water for 18 million people (Zonn et al., 2018). Hence China's grandiose plans for water development in the region should ensure the expansion of irrigated areas and the growth of livestock production (*in the future, the XUAR should become a centre for cotton and wheat production*), the

development of various industries, primarily oil and gas, as well as a stable water supply for the population.

↓ **Table 3. Average annual flow volume of the Irtysh River by 2010, 2020 and a forecast for 2030 according to the linear trend of average annual discharge, km³**

Hydrological post	Calculation		Forecast		
	2010	2020	*2030*	changes over 10 years	
				km³	%
Boran (from China)*		8.32	*5.82*	-2.5	-30.0
Novaya Stanitsa (RF)	24.42	25.31	*26.17*	+0.77	+3.05
Omsk (RF)	27.38	27.72	*27.61*	-0.11	-0.40
Ekaterinskoye (RF)	28.52	29.69	*30.85*	+1.04	+3.51
Tobolsk (RF)	68.17	68.15	*68.13*	-0.02	-0.03
Khanty-Mansiysk (RF)	88.96	91.54	94.11	+2.31	+2.52

Note: * according to the Concept of Development of Water Resources Management System of the Republic of Kazakhstan for 2023–2029 (MJ RK, 2024).

Source: Puzanov et al., 2021.

The water resources use has been extensive in recent years, resulting in significant increase in withdrawal of river flow. This includes transfers to neighbouring areas experiencing water scarcity. Thus, in the middle reaches of the Black Irtysh, there is a large hydroelectric complex with the Karasuy's reservoir, from which the largest water diversion canal Black Irtysh–Karamay–Urumqi originates. Its construction was started in February 1994. It is an irrigation canal designed to exploit oil fields in the west of the country. It is over 300 kilometres long and 22 metres wide. After passing the general section of about 139 kilometres, the canal splits into two directions: to the city of Karamay, 335 kilometres long, and to the city of Urumqi, about 470 kilometres long.

More than 2.5 km³ of the Black Irtysh's flow is already being transferred through the canal, and projections suggest that water withdrawals could rise to as much as 7 km³ per year (Medeu et al., 2023). Given that the canal's project capacity ranges from 5.0 to 7.0 km³, China has the potential to fully utilize its maximum capacity. However, with the anticipated significant population growth in the XUAR and the region's limited water resources, the current projects are likely to be insufficient in meeting future water demands. As a result, there is a high probability that new initiatives will be launched to further augment water transfers to the XUAR. These may include diverting water from surplus regions within the framework of China's new integrated water resources management system, as well as constructing new reservoirs, expanding the capacity of existing dams, developing irrigation canal systems, conduits, tunnels, and HPPs on the Irtysh and other smaller transboundary rivers. Ultimately, this would lead to an even greater volume of water withdrawals.

The Black Irtysh Basin faces a severe problem of water depletion and pollution due to increasing industrial consumption, the expansion of irrigated land, and population growth. If all of China's planned projects are implemented, water withdrawals could account for at least 50% of the total river flow, leading to a critical level of water stress during dry years. In the worst-case scenario, complete withdrawal of the river's flow is possible. Despite these concerns, interstate water allocation in the basin remains unresolved. China has not signed any international agreements on the regulation of water use in transboundary river basins, instead favouring bilateral agreements. Furthermore, under Chinese law, Russia is not recognized as a party to transboundary co-operation in the Irtysh Basin, as the river does not directly cross the China-Russia state border (Vinokurov et al., 2012).

↓ Figure 2. Black Irtysh–Karamay–Urumqi canal system

Source: EDB based on Wikipedia.

Kazakhstani part of the Irtysh basin

For Kazakhstan, the Irtysh basin is one of the main sources of water supply for a significant part of the population and economy of the eastern and northern regions of the country, including the capital city of Astana. The actual river flow resources of the basin (*with tributaries*) account for 33.5% of Kazakhstan's total available water resources (*33.5 km^3 out of 102.3 km^3 for 2023*). The Irtysh basin is considered one of the basins in the country that is most endowed with its own surface water resources. It acts as a donor for industrial and drinking water needs of other regions. The basis of the water management system is the Irtysh itself, the flow of which is controlled by reservoirs of multi-year and seasonal regulation.

From China, the Black Irtysh enters Kazakhstan in the Zaisan Basin, where it flows into the Lake Zaisan. The Irtysh hydrographic basin covers the territory of East Kazakhstan, Abay and Pavlodar oblasts, with the exception of the Ayaguz and Urjar districts. More than 5 million people live in the basin. There are 986 rivers with a total length of 29,000 km in the East Kazakhstan and Pavlodar oblasts. Of these, 198 rivers with a total length of 6,100 kilometres belong to the Balkhash-Alakol basin and 788 rivers belong to the Irtysh basin (Vinokurov and Krasnoyarova, 2017a).

The Irtysh enters Kazakhstan as a navigable river with an average monthly flow of about 300 m^3/s. There is a large delta at the mouth of the river. Many rivers from the Ore Altai, Tarbagatai and Saur ranges flow into the Zaisan. The Irtysh flows out of Lake Zaisan, north-west through the Bukhtarma HPP (*1966, capacity 750 MW, reservoir volume 53 km^3*) and then the Ust-Kamenogorsk HPP (*1959, capacity 331.2 MW, daily regulation reservoir volume 0.65 km^3*). A large industrial centre, Ust-Kamenogorsk city, is located here. Downstream are the Shulbinsk HPP (*1994, 1st stage, capacity 702 MW, seasonal regulation reservoir volume 1.8 km^3*) and the city of Semey. The basin provides about 10% of Kazakhstan's electricity (Vinokurov and Krasnoyarova, 2017a).

The Irtysh-Karaganda Canal (*now called the Kanysh Imantaevich Satpayev Canal*) near Pavlodar takes Irtysh water to transfer part of the Irtysh River flow to the basins of the Nura, Kengir, Sary-Su, and Shiderty rivers. Construction of the canal started in 1962, and it was put into operation in 1974. The head intake is located near Aksu city. The total length of the canal (*up to Karaganda*) is 458 km, width on the bottom 4 m, width on the top 40 m, depth 5–8 m. The design capacity is 2.0 km^3/y, water flow in the area of the head intake: 75 m^3/s in summer, 55 m^3/s in winter (Vinokurov and Krasnoyarova, 2017a).

Creation of the Irtysh-Karaganda Canal met the water needs of the industrial centres of Karaganda, Temirtau, Ekibastuz and gave impetus to the development of agriculture — the area of irrigation with water supplied by the canal was 50,000 ha. The main problem of the transfer is the change in water quality along the length of the canal: most of it uses the channel of the Shiderty River, which flows through salt flats and salt marshes. Its waters are characterised by significant mineralisation. One of the additional branches (*a water pipeline*) provides water to the city of Astana (Ratkovich, Romanova, 2014).

↓ **Figure 3. Irtysh-Karaganda Canal (named after K. Satpayev)**

Source: EDB based on Wikipedia.

Water resources of the Irtysh tributary of the Ishim River are formed mainly within Kazakhstan. Until the 1990s, more than 65% of the Ishim's flow went to Russian territory, to the south of Tyumen Oblast, but nowadays the structure of water allocation has changed. Ishim water is oriented towards Astana, Petropavlovsk, and other cities in Northern Kazakhstan, as well as for agricultural water supply in the central parts of the country. The river flow is regulated by a number of reservoirs (*more than 50 structures of different capacities and different filling regimes*). The largest of them is the Astana (*former Vyacheslavskoye*) reservoir, with a usable volume of 375.4 million m^3. It is the main source of water supply for Astana, but its volume does not cover the growing needs of the city. The growth of water withdrawals also increases the pollution of bodies of water, some of which are classified as "moderately polluted" and "polluted". Even the waters of the Nura-Ishim Canal, built for the purposes of water supply to Astana, are characterised as polluted (Vinokurov and Krasnoyarova, 2017a).

The Tobol River, a tributary of the Irtysh, is regulated within Kazakhstan by seven reservoirs with a total volume of 1.46 km^3. The largest of them — Verkhnetobolsk reservoir (*816.6 million* m^3) and Karatomarsk reservoir (*586 million* m^3) — are perennial, and the rest perform seasonal flow regulation. The peculiarity of the Tobol basin water management system functioning within the boundaries of Kazakhstan is a strong flow regulation with significant withdrawal of water resources for the needs of mining and processing plants, cities and towns. At the same time, a high level of wear and tear on existing hydraulic structures should be noted. Water quality in the Tobol and the reservoirs in its basin is characterised mainly as moderate pollution (Vinokurov and Krasnoyarova, 2017a).

In the long term, the inflow from China is expected to decrease and the internal flow is expected to decrease slightly as a result of climatic changes in the Irtysh basin. Under the most unfavourable conditions, of the 9.45 km^3 of water coming from China, more than 7 km^3 will be irretrievably withdrawn by 2030; accordingly, Kazakhstan will receive only 2.03–2.0 km^3 in an average water year, 3.3–3.26 km^3 in high-water years, and 1.06–1.05 km^3 in low-water years (Medeu et al., 2023).

Projected increase of water withdrawals from the Black Irtysh on the territory of China will affect the economic and ecological situation in the Kazakhstan part of the basin, and in the absence of adequate compensatory measures may cause ecological catastrophe: a drop in the level of Lake Zaisan with subsequent separation of it and the Bukhtarma reservoir, reduction of power generation by the Irtysh HPP cascade, cessation of navigation along the whole length of the Irtysh. In low-water years, degradation of the unique floodplain is predicted, along with damage to fishery, agriculture, and industry, increase of pollutant concentration due to runoff reduction and, as a consequence, deterioration of the epidemiological situation, including possible transition of water resources to the category of unsuitable for drinking and economic consumption, and groundwater pollution.

In the future, water consumption is expected to increase in the Irtysh basin. Thus, Kazakhstan, under conditions of increasing water stress and water resources deficit in the southern regions of the country, is developing a long-term state programme to solve both the problem of providing drinking water to the population and the problem of irrigation. In the Water Security Strategy of the Republic of Kazakhstan for the period up to 2050, the Irtysh basin is considered as a possible donor of water resources (Medeu, Malkovsky and Toleubaeva, 2012). The document proposes principles and norms of water allocation in transboundary basins, according to which the share of the Irtysh flow entering Russia should be set at the rate of half of the flow formed on the territory of Kazakhstan, which is about 12.5 km^3/year (in average annual value) and to set a limit of river inflow to Kazakhstan from China in the Irtysh basin in the amount of at least 4.5 km^3/year, which is half of the flow formed in the Chinese part of the Black Irtysh basin.

Russian part of the Irtysh basin

In the Russian segment of the transboundary basin of the Irtysh River there are three major water management systems: the Irtysh proper from the border with Kazakhstan to its confluence with the Ob, and the tributaries Tobol and Ishim. Each of them has its own functional structure and its own set of specific tasks to be solved, both in terms of preserving bodies of water and ensuring their optimal functioning (Vinokurov and Krasnoyarova, 2017a).

The Irtysh water system includes the Irtysh proper and its tributaries: Tobol, Om, Tara, Uy, Shish, Ishim, Osha, and Konda; and the main coastal cities on the Irtysh: Omsk, Tara, Tobolsk, and Khanty-Mansiysk. Below Khanty-Mansiysk, the Irtysh flows

into the Ob. Navigation in the Irtysh water area is open from April to November from its mouth to the Russia-Kazakhstan border. The system also includes a number of hydrosystems, dams, dikes and other structures, the main purpose of which is to regulate flow for water supply and irrigation purposes. However, the available reservoirs are not sufficient to ensure uninterrupted water supply to the city of Omsk, increase the average annual water level, and improve the ecological and sanitary condition of the Irtysh River (Vinokurov and Krasnoyarova, 2017a).

The situation in the Russian segment of the Tobol River basin is the most stressed. In some parts of the basin (*Tagil and Miass rivers*), the share of water withdrawal reaches 50–70% of the flow volume, which creates a tense water balance for the Sverdlovsk and Chelyabinsk Oblasts. More than 600 reservoirs have been created in the basin to solve water supply problems; some of them were built as early as the 17th to 19th centuries. Many reservoirs are used as sources of drinking and industrial water supply, for recreation, and function as water coolers and water reservoirs for power enterprises — GRES, TPPs and small HPPs. In addition, located at the source of the Techa River (*right tributary of the Iset River*) in the north of Chelyabinsk Oblast, PA Mayak remains an active nuclear waste-processing facility, which should also be taken into account in the implementation of water policy in the Oblast. In 2018, the water in the Tobol River at the Tobolsk–Khanty-Mansiysk section was assessed as "dirty" (Vinokurov and Krasnoyarova, 2017a).

The Ishim, the least stressed river of the Irtysh basin in Russia, is the source of water supply for the city of Ishim, the Ust-Ishim district and six reservoirs, the main purpose of which is to regulate flow and accumulate water resources for irrigation and domestic consumption. The main problems in the basin are related to strong water level fluctuations in the river, as well as to water withdrawals in Kazakhstan, which increased significantly after the capital of the country was moved to Astana. The quality of water in the river has also decreased significantly: its self-purification capacity is insufficient to cope with the load in the Kazakhstan segment of the basin, and there are practically no additional inflows into the Russian territory (Vinokurov and Krasnoyarova, 2017a).

In the long term, river flow in the Russian part of the Irtysh basin is projected to increase by 2.6 km^3 per year by 2030 (Table 3, Puzanov et al., 2021). However, the hydrological situation is not uniform. At a number of hydrological posts, the runoff is forecasted to decrease by 0.03–0.4% and increase by 2.52–3.51%. In the rivers of the taiga region of the Irtysh basin, water availability is increasing, and in the forest-steppe and steppe zone it is decreasing. Flow reduction as a result of climatic changes is expected in the sections in front of the cities of Omsk and Tobolsk.

The reduction of flow upstream of Omsk will be particularly sensitive in case of increased flow withdrawal in the upper reaches of the river from the territory of China. The withdrawal of flow in China will have a negative impact on the Kazakh part of the Irtysh. Kazakhstan is already currently making efforts to compensate

for this withdrawal and, in turn, plans to increase intake on its territory. Moreover, the flow of the Irtysh after crossing the Russia–Kazakhstan border is fed by almost no tributaries all the way to Omsk. As a result, according to official estimates (FSBI RusRIIUPWR, 2014), in the case of a withdrawal of 4.35 km^3 in a low-water year with a 95% water availability, the flow of the Irtysh River coming from Kazakhstan will decrease from 19.31 km^3 to 12.8 km^3. Discharges of the river in the winter according to the balance will be 60–113 m^3/s at the established minimum flow for this period (*ecological release*) of 310 m^3/s. The flow deficit at the boundary gauging station will amount to 3.68 km^3 and will spread *(with a decrease to 2.94 km^3)* along the whole river, up to the confluence of the Konda River. This situation creates a tense water situation on the Irtysh River on the territory of the Russian Federation and requires appropriate compensation measures.

The predicted change in the quantity and quality of the Irtysh river flow resources in the next decade becomes a serious challenge to the socio-economic development of Russia's border regions (Puzanov et al., 2021). This primarily concerns the main industrial centre (*the city of Omsk*) and the adjacent Omsk municipal district, located within the West-Barabinsk province, with its forest-steppe landscape. These centres account for 80% of total water withdrawal and 90% of water use in the region.

Taking into account the plans for growth of agricultural and industrial production and mining in China, Kazakhstan, and Russia, one can expect an increase in the volume of pollutants generated in the Irtysh River basin, which will also affect water availability in the regions. Moreover, the projected insignificant increase in water availability and water supply in the basin by 2030 is likely to be overridden by increased water withdrawal for irretrievable consumption (irrigation) and redistribution of flow to other water basins, both in China from the Kara-Irtysh River and in Kazakhstan through the Irtysh-Karaganda-Astana Canal to supply water to the actively growing Kazakhstan capital.

Thus, the projected increase in wastewater inflow and reduction of water flow at certain sites may lead to a decrease in the physical potential of self-purification and increased water pollution of the Irtysh River. At the same time, the observed heavy pollution of surface waters with easily oxidisable organic substances leads to a decrease in dissolved oxygen content and, as a consequence, to a decrease in the chemical potential of self-purification, while pollution with toxic heavy metals reduces the biological self-purification potential of aquatic ecosystems. All this may contribute to further degradation of aquatic ecosystems, reduction of their biological productivity, and deterioration of the quality of water resources (Vinokurov and Krasnoyarova, 2017a).

3 INSTITUTIONAL PARTNERSHIPS IN THE IRTYSH RIVER BASIN

Insufficient development of the institutional environment for transboundary water resources management in the transboundary Irtysh River basin is among the important systemic problems. This problem is multicomponent and should be considered more broadly than only from the perspective of water use management (Vinokurov et al., 2018).

It includes primarily international regulatory issues because, firstly, China is not a subject of international relations in the field of transboundary water use, having not yet signed the fundamental agreements in this field (Table 4): Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992) and Convention on the Law of the Non-Navigational Uses of International Watercourses (1997). China acts only within the framework of its own legislation, actively increasing the withdrawal of water resources of the Black Irtysh for irrigation, industrial and drinking water supply.

In the doctrine of international law, co-operation in transboundary water basins is based on a number of universally recognised principles, which are reflected in the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992) and the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (1997). Safe water use in transboundary basins from the point of view of conflict-free resolution of possible problems can be ensured only under co-operative conditions. It is important to support the environmental sustainability of the entire river system, including not only rivers and lakes (surface water), but also groundwater, and to jointly organise monitoring of water resources distribution, taking into account the variability of river flow and water demand.

These international conventions have the status of global documents, which gives wide opportunities for their application in bilateral and multilateral co-operation in transboundary river basins and strengthening of the national water sector. The global status of the Conventions is the result of great diplomatic work and expression of political will of the world's states to strengthen international co-operation on water conservation and rational water resource management. Forming a single set of codified

norms of international water law, these documents create a comprehensive legal framework for co-operation on rational use and protection of transboundary waters and implementation of sustainable investment policy in this area by international financial institutions.

↓ **Table 4: Status of international conventions and agreements regulating relations in the transboundary Irtysh River basin**

International conventions and agreements	China	Kazakhstan	Russia
	Year of signature (ratification)		
Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the Joint Use and Protection of the transboundary bodies of water	-	1992	1992
Convention on the Protection and Use of Transboundary Watercourses and International Lakes	-	2000	1993 (1996)
Convention on the Law of the Non-Navigational Uses of International Watercourses	1997: entered into force in 2014		
	-	2024	1997
Treaty on Good Neighbourliness, Friendship and Co-operation between the Russian Federation and the People's Republic of China	2001	-	2001
Agreement between the Government of the Republic of Kazakhstan and the Government of the People's Republic of China on co-operation in the use and protection of transboundary rivers	2002	2002	-
Agreement between the Government of the Russian Federation and the Government of the People's Republic of China on the Rational Use and Protection of Transboundary Waters	2008	-	2008
Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the Joint Use and Protection of Transboundary Bodies of Water	-	2010	2010
Agreement between the Government of the Republic of Kazakhstan and the Government of the People's Republic of China on Protection of Water Quality of Transboundary Rivers	2011	2011	-

Source: Krasnoyarova et al, 2019.

Bilateral and multilateral agreements adopted on the basis of these two conventions increase the potential for co-operation, contribute to the settlement of relations between states using the same international watercourse, and development of investment policy by international financial institutions on priority areas of water resources use and protection (Yasinsky et al., 2015).

Secondly, transboundary co-operation in the Irtysh River Basin is conducted on a bilateral basis. Co-operation takes place separately between Kazakhstan and China, and Kazakhstan and Russia. However, the existing bilateral agreements do not specify concrete water allocation volumes, leaving key issues such as equitable water distribution, water scarcity, and pollution control unaddressed.

The basis of interstate co-operation in the sphere of water relations between Kazakhstan and China is the "Agreement on Co-operation in the Use and Protection of Transboundary Rivers" of 12 September 2001 (Astana) (appendix №2), as well as two intergovernmental agreements (*February, June 2011*) in the fields of quality control of transboundary rivers and of environmental protection. They include the obligations of the two states to co-operate to ensure water quality, protection, control and monitoring of transboundary rivers and other environmental objects. They also include norms on co-operation in taking measures to prevent and eliminate water pollution in transboundary rivers. A Kazakh–Chinese Commission for Co-operation in the field of environmental protection has been established, but the parties have not been able to develop a common position on water withdrawal limits (Krasnoyarova et al, 2019).

Kazakh–Russian water relations are regulated by the Agreement between the Government of the Republic of Kazakhstan and the Government of the Russian Federation on the Joint Use and Protection of Transboundary Bodies of Water of 7 September 2010 (appendix №1), adopted to replace the 1992 Agreement of the same name. Within the framework of this Commission, working groups have been established for individual river basins. The establishment of a Kazakh-Russian Commission was imperative for the implementation of the agreed provisions. The commission is responsible for organising and carrying out joint activities with the aim of ensuring the rational use and protection of water resources. The Commission establishes water flow parameters at agreed boundary sites and monitors their observance. Furthermore, the Commission is tasked with the responsibility of evaluating the distribution of water resources, utilising a combination of economic and economic calculations, in instances where alterations occur within the context of transboundary river basins. Furthermore, the Commission considers water management projects planned for implementation in Kazakhstan or Russia that may have a transboundary impact and agrees on the procedure for assessing their environmental impact.

Despite the close co-operation within the commission and working groups, not all issues have been resolved. There are no agreed water allocation limits, which is especially important in dry years and seasons. There are no strictly agreed schedules of transboundary water releases, taking into account the safe operation of existing hydrotechnical systems and water management systems. There is no or low technological discipline of water use at enterprises — the main consumers of water resources — and in housing and communal services of large cities. The losses of water resources in open bodies of water and canals are high (Vinokurov and Krasnoyarova, 2017b). Each country works within the framework of its own national legislation, which is not harmonised with other states.

The main problem areas of interstate regulation in the transboundary Irtysh basin are: insufficient official information on the intentions of the People's Republic of China regarding the development of the transboundary basin of the Irtysh River; China's non-participation in international "water conventions" (Helsinki, 1992 and New York, 1997); absence of a trilateral agreement on the Irtysh River between the Republic of Kazakhstan, the Russian Federation and the People's Republic of China; lack of agreed methodologies for water quality assessment in a watercourse, given the availability of these positions in interstate bilateral agreements; absence of an interstate research centre on water resources of the transboundary Irtysh River basin.

4 PRACTICAL RECOMMENDATIONS

The transboundary basin of the Irtysh River is a complex natural and economic system with a whole set of problems related to the quantity and quality of water flow, as well as the regime of its formation and use in the territory of neighbouring countries. The state of the basin's hydrological balance can be assessed as conditionally stable. At the same time, multidirectional processes are taking place in the basin. On the one hand, an increase in water consumption in the upper reaches of the basin and further growth of water pollution are forecasted. On the other, there is a trend towards increased snowmelt and precipitation, which leads to an increase in runoff in the medium term.

The water situation in the Irtysh River Basin is highly complex, particularly due to the overlapping interests of Kazakhstan, Russia and China. The situation is aggravated by the presence of water management interests of China in the basin of the Black Irtysh river, the source of the main Irtysh, which is formed on the territory of the XUAR in China. The challenges within the basin vary in intensity across different segments, influenced by hydrological, geopolitical, and economic factors. Additionally, socio-economic changes in the Kazakh–Russian region significantly impact water consumption patterns, resource availability, and overall efficiency of use. These dynamics highlight the urgent need for stronger regional co-operation and greater Chinese engagement in transboundary water management efforts.

The key objective of water management in the Irtysh Basin is to ensure a reliable and sustainable freshwater supply to meet the needs of both the population and the economy. This is a complex challenge due to the significant temporal and spatial variability of surface runoff. Effective integrated water resources management in the basin should be built on the principles of efficient water use across all sectors and the strengthening of regional co-operation. To achieve this, a comprehensive set of measures is proposed, structured around four key priority areas.

I. Regulatory solutions

The most effective regulatory solution is the **incorporation of key provisions from international conventions into national water legislation and bilateral intergovernmental agreements**. This approach aims to enhance the effectiveness of joint commissions responsible for managing water resources in the Irtysh River Basin, fostering more efficient and coordinated transboundary co-operation.

In this regard it should be noted that the *Water Convention* aims to establish a legal framework for co-operation on the protection and use of transboundary waters. It can be seen as a tool for conflict prevention and dispute resolution in transboundary environmental issues. By design, the provisions and norms of the Convention are mostly preventive — i.e., conflict prevention and ensuring the safety of water use should be based on appropriate measures to prevent, control and reduce pollution of waters with transboundary impact and, as far as possible, at the source of pollution. Measures to prevent conflicts between the parties may include environmentally sound and rational water management, conservation and environmental protection; use of transboundary waters in a reasonable and equitable manner, taking into account their special transboundary character; and ensuring the preservation and, where necessary, restoration of ecosystems.

The Convention provides a legal framework for addressing water quality and quantity problems related to transboundary waters and their pollution. Parties to the Convention are invited to be guided by:

- the precautionary principle: measures to prevent the possible transboundary impact of the diversion of hazardous substances should not be delayed on the grounds that scientific research has not fully established a causal link between those substances and possible transboundary impact;

- the "polluter pays" principle: the costs associated with pollution prevention, control and reduction measures are covered by the polluter;

- the principle of managing water resources in such a way that the needs of the present generation are met without compromising the ability of future generations to meet their own needs.

The *Water Convention* has a Protocol on Water and Health, adopted in 1999 in London at the 3rd Ministerial Conference on Environment and Health. It was the first legally binding international agreement to outline the link between water management, drinking water supply and sanitation, and human health problems. According to article 1 of the Protocol, its objective is "to promote, at all appropriate levels, in national, transboundary and international contexts, the protection of human health and well-being, both individual and collective, within the framework of sustainable development, by advancing water resources management, including the protection of aquatic

ecosystems, and by preventing, controlling and reducing water-related disease". A key provision of the Protocol is the existence of early warning and notification systems for outbreaks of water-quality related diseases in the context of climate change, and ways to improve surveillance systems.

Another important instrument reinforcing the role of the Convention is the Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters, adopted in 2003 to complement the Convention on the Protection and Use of Transboundary Watercourses and International Lakes and the Convention on the Transboundary Effects of Industrial Accidents (1992). The purpose of the Protocol is to provide a comprehensive regime of civil liability and adequate and prompt compensation for said damage. The Protocol has annexes I, II and III: "Hazardous substances and their threshold quantities for the purposes of defining hazardous activities", "Limits of liability and minimum financial security requirements" and "Arbitration".

The UN Convention on the Law of the Non-Navigational Uses of International Watercourses (1997), as a framework international agreement, offers general approaches and legal principles. Its provisions provide guidance for the development of more detailed agreements on specific watercourses. The principles of equitable and reasonable utilisation, non-significant harm, and the obligation to co-operate reflect generally accepted customary law. On their basis, bilateral or multilateral agreements on specific international watercourses can be negotiated and formulated. The Convention includes a number of important provisions concerning the co-operation of international watercourse states. Thus, these states may conclude one or more agreements to apply and adapt the provisions of the Convention to the characteristics and uses of a given international watercourse or part thereof. If an agreement is concluded between two or more watercourse states, it must specify the waters to which it applies. Such an agreement may be concluded in respect of the whole or any part of an international watercourse or a particular project, programme or use, except where the agreement adversely affects to a significant extent the use of the waters of that watercourse by one or more states without their express consent.

The UN Conventions (1992, 1997) form a comprehensive legal framework for the resolution of various issues related to environmental protection. The interrelationship and complementarity of these conventions provide a political and legal basis for integrated management of the environment, including transboundary watercourses, contributing to the strengthening of international co-operation. The application of the principles of general international law in terms of the elaboration of a framework agreement (model specific agreement) makes it possible to identify agreed positions, taking into account the conditions of each international river that need to be taken into account in order to reach an agreement on a bilateral and multilateral basis.

Incorporation of key provisions of international conventions into national water legislation and intergovernmental agreements **will subsequently facilitate**

the transition to a trilateral format of relations between the countries. The development and signing of trilateral agreements is an important stage for preserving environmental and water management stability in the transboundary Irtysh basin. The institutional mechanism of international co-operation in modern conditions is one of the main ones in regulating water management activities in transboundary territories. Only by taking into account the interests of each state will it be possible to form a system of sustainable water use in the transboundary basin of this river.

The strategic nature of relations among the three countries as geopolitical partners will contribute to more constructive interaction in the transboundary basin of the Irtysh River in the future. It should be noted that there are prospects for such interaction. Globally, many states have made some progress in adopting watercourse agreements at the basin and sub-basin levels, establishing multilateral mechanisms for joint management. Such mechanisms have been established for more than 40% of international watercourses. The Shanghai Co-operation Organisation could be one of the platforms for the formation of a trilateral agreement.

Co-operation between countries, based on an institutional platform, can make a significant contribution to solving the problems of water resource use and protection in the transboundary Irtysh River basin. Difficulties in developing and implementing international agreements are an inherent part of international co-operation. The development of a trilateral agreement among Kazakhstan, Russia and China at the present stage is the only way out of the current situation in the transboundary Irtysh River basin and an opportunity to further implement sustainable transboundary water management.

An important regulatory solution thus is the **expansion of bilateral interstate co-operation** between Kazakhstan and Russia, Kazakhstan and China. It seems expedient to develop joint bilateral complex programmes, in which priority should be given to issues of scientific, methodological, normative, design, and technical, basin and environmental co-operation in order to improve the reliability of national water management complexes and transboundary bodies of water and facilities in the Irtysh River basin.

The following areas of bilateral and multilateral co-operation could be contained in integrated programmes:

- ensuring international navigation on the Irtysh River and further down the Ob River;
- fight against water pollution and regulation of a safe regime for use of bodies of water;
- improving the efficiency and safety of water use during floods, dry spells and droughts.

The basin countries should pay special attention to **water pollution**, both historical and permanent. This requires appropriate reclamation programmes and implementation of restrictive legislation.

National strategies for the protection and use of water resources in each of the Irtysh River basin countries should provide for a transition to ecosystem- based resource management, unification of water quality criteria and targets, application of harmonised data collection methods, and information exchange. To coordinate all these issues, basin bodies should be strengthened or established that can facilitate interstate co-operation and common water policies in the river basin.

II. Development of soft infrastructure

Co-operation in transboundary river basins implies that water use and water protection issues should be addressed from the perspective of the unity of the entire river basin and economic integration. In this regard, it is necessary to establish an **international integrated monitoring system** covering the following issues:

- formation of water resources;
- functioning of hydraulic engineering structures (HES);
- spatial and temporal regimes of HES use, including passportisation of hazardous industries;
- declaring the safety of hydraulic structures located on transboundary rivers.

It is important that bilateral co-operation programmes be based on a unified and transparent system of monitoring the flow of the Irtysh River, where all data would be available to all parties to make reasonable decisions on water management. Such a monitoring system would facilitate the establishment of **a link for effective data exchange and information dissemination.**

It is expedient to establish **a coordinated system of training and retraining of personnel.** Such a system should train specialists able, firstly, to assess the processes of formation and use of water resources in the transboundary region taking into account the established national practices and experience of foreign countries; secondly, to know the legal and regulatory framework for water use management in the countries of the transboundary basin; and thirdly, to ensure the introduction of modern technologies in the practice of designing water use facilities and water management. At the same time, it is essential to adopt and implement the most effective methodologies and technological solutions, drawing from both domestic best practices and international experience in successful transboundary river basin co-operation.

It is strategically important **to involve interdisciplinary researchers from Kazakhstan, China and Russia**. This will make it possible to assess the complex system of the river basin and subsequently make scientifically sound proposals for key stakeholders on sustainable river management.

A possible solution is **the establishment of an interstate research centre** on water resources of the transboundary Irtysh River basin.

III. Agreed investment decisions

The coordinated operation of existing hydraulic structures (HPPs, dams, reservoirs, irrigation canals, water supply systems, etc.) and the planning of future structures deserve special attention when it comes to ensuring appropriate water levels to restore the ecological diversity of the Irtysh basin. Projects aimed at ensuring stability of water supply in the Irtysh River basin without affecting water resources in other countries are also a priority.

Two projects, which are subject to approval by the countries of the Irtysh basin — construction of the **2nd stage of the Shulbinsk HPP** and construction of the **Semipalatinsk HPP** (*formerly Bulak HPP*) in Kazakhstan — can be considered as **promising**. Within the framework of the working meeting of the co-chairmen of the joint Kazakhstan–Russia Commission on the Joint Use and Protection of Transboundary Bodies of Water, an agreement was reached on these projects to assess the possible impact of their construction on the territory of the Russian Federation, as well as on the development of a master plan for water management and water and energy use of the Irtysh River. Both projects are included in the hydropower development plan of the Republic of Kazakhstan for 2020–2030.

The project for the construction of the 2nd stage of the Shulbinsk HPP involves increasing the generating capacity of the existing HPP by 348 MW to 1,050 MW. The project provides for an increase in the normal backwater level from the current 240 to 260 metres. Raising the reservoir elevation will increase its usable volume from 1.8 to 7.1 km^3 and, accordingly, increase the variable level and provide additional regulated capacity and output of the HPP. The preliminary cost is 450 billion tenge.

The Semipalatinsk HPP construction project, with a manoeuvrable capacity of 300 MW, is being considered together with the previous project. The preliminary cost is 420 billion tenge. The Semipalatinsk HPP is seen as a counter-regulator to the Shulbinsk HPP and is expected to appear close to the Russian border, near the Omsk region. Its construction is expected to free up the regulating capacities of the Shulbinsk HPP and to transfer it to the mode of covering the peak and semi-peak parts of the electric load schedules of the unified electric network in the morning and evening hours.

Regulating dams make it possible to stabilise the water level, minimising the negative effects arising from the operation of upstream hydroelectric facilities. In this regard, the Semipalatinsk HPP will not only increase the energy capacity of the entire Irtysh cascade — it will make it possible to maximise the alignment of the operation of the peak HPPs with the use of *Irtysh* water resources for water transport (*in summer it will be possible to increase and maintain the Irtysh level at acceptable values*

for navigation), irrigation, water supply, and artificial flooding of downstream floodplain hayfields. This project has the potential to reduce the water supply problem in Omsk Oblast and will contribute to effective flood water management.

Strategically important projects are the **reconstruction and modernisation of the Irtysh-Karaganda Canal** (*named after K. Satpayev*) in Kazakhstan and the construction of the **Krasnogorsk hydrosystem** near Omsk.

In 2025, the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan plans to start large-scale modernisation of *the Irtysh-Karaganda Canal* (*named after K. Satpayev*). The main technological equipment installed on the canal was manufactured in 1965–1970 and has not been updated during the operation of the canal. The terms of its technical operation have already expired; moral and physical deterioration is estimated at 90%. Works on modernisation of the canal are planned to start in 2025 and to be completed in 2029. The roadmap developed by the ministry includes repair of pumping units and power grids, as well as other measures. The investment programme is estimated at 80.5 billion tenge. The canal is of strategic importance for the Central Kazakhstan region, ensuring the functioning of vital economic sectors: industry, utilities, and agriculture. It is included in Concept of Development of the Water Resources Management System of the Republic of Kazakhstan for 2024–2030.

Krasnogorsk hydrosystem is located near the village of Krasnaya Gorka, Omsk District, Omsk Region. The hydrosystem is designed to regulate the water level in the Irtysh River within the Omsk city limits and to solve the expected future water shortage problem. Construction was supposed to be completed in 2016, but the project was frozen due to lack of funds. In 2022, work resumed. The second phase of the dam construction is planned to create a 65-km-long reservoir and commission the hydrosystem in 2027. Implementation of the project is estimated to cost the regional budget 8.3 billion roubles.

It should be noted that large investment projects concerning the Irtysh basin, launched in the Soviet period, continue to be discussed. Under current conditions, these projects are characterised by ambiguous effects on water supply in the Irtysh River basin, if the interests of all countries are taken into account. Many of them require broader studies.

For example, taking into account the growing demand for water in the southern and western regions of Kazakhstan, which already today provide about 70% of the country's water consumption, it is proposed to direct inter-basin and transboundary transfers of river runoff to water-deficient regions, namely the construction of the Trans-Kazakhstan Canal with water intake from the Shulbinsk reservoir (2nd stage), with one main route and four additional branches — Astana, Petropavlovsk, Kostanay and Aktobe. It is envisaged to transfer up to 7 km^3 from 1,400 km to 3,100 km by gravity flow, as well as with water lifting by machine. The cost of the project

is estimated from $14.4 to $28.2 billion depending on the choice of the route. The Irtysh is considered as a donor basin. In addition, in order to preserve the freshwater part of Lake Balkhash, a scenario of transferring part of the Irtysh River flow in the direction of the Bukhtarma-Balkhash River is proposed.

VI. Multilateral co-operation in the Kazakhstan–Russia–China format to increase the water transport potential of the Ob–Irtysh basin

The creation of a full-fledged **Russia–Kazakhstan–China multimodal transport corridor,** utilising the navigable potential of the rivers of the Ob– Irtysh basin, is a strategic orientation. This initiative is potentially of interest to all three parties and could become the basis for trilateral co-operation. Such co-operation, in turn, can facilitate the formation of interstate mechanisms for coordinated water resource management in the Irtysh basin. In this case, all parties will be interested in maintaining water levels necessary for navigation.

As of today, Kazakhstan and Russia have started to create programmes for the development of the corridor. A preliminary project for the creation of a Russia–Kazakhstan–China multimodal transport corridor has been jointly developed. Three stages are planned for its implementation:

- The first stage includes construction of the Semipalatinsk and Donskoy hydroelectric complexes and channel correction works on the Upper Irtysh, which will result in deepening it by 1.5 metres.

- The second stage is the construction of cascades of hydroelectric complexes in Pavlodar region, resulting in a water depth of 2.2 metres.

- The third stage is the development of a waterway on the middle and lower Ob River, which will open access to the Trans-Siberian Railway and the Northern Sea Route (NSR). Among other things, this should provide additional energy and flood control capacities.

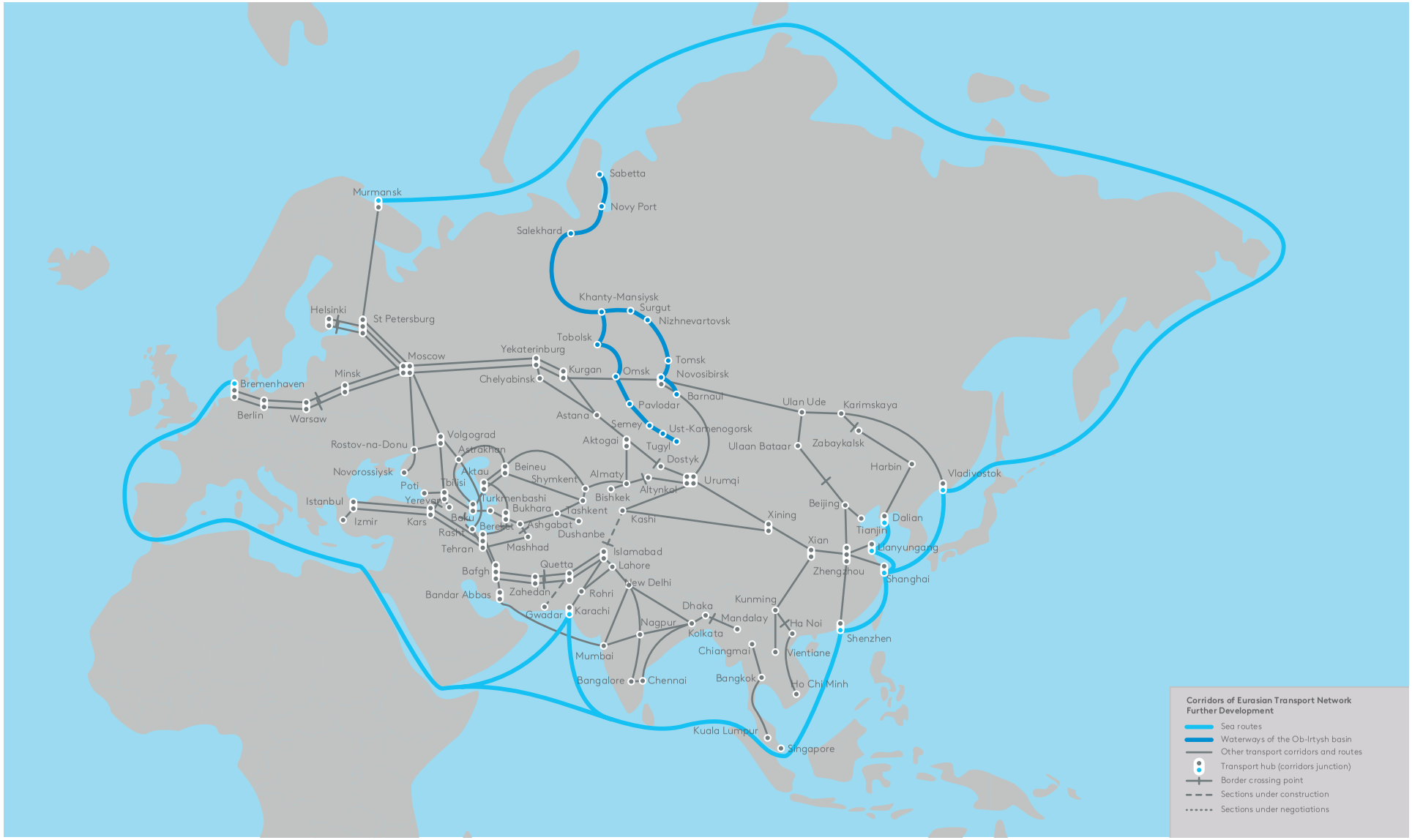
One of the major projects being implemented by Russia is the creation of a new multimodal logistics hub based on a river port in the Omsk Region. In the region, most cargo is transported by road and rail. However, the Ob–Irtysh basin has the potential to serve transit cargo. The capacity of waterways in the Omsk region is 45 million tonnes (*today the volume of freight traffic in the region is estimated at up to 20 million tonnes*). The Omsk River Port is located at the intersection of the Trans-Siberian Railway with waterways and motorways. Thus, it can be integrated into logistics chains, which will increase the volume of export cargo shipped to Kazakhstan and China. The project will make it possible to use river arteries more actively for domestic and international transport, including cargo exchange with China and Kazakhstan, and thus relieve some of the load from railways. The project will be implemented by 2030.

Kazakhstan is considering the prospect of access to Russia's northern seas via the Ob–Irtysh basin. Kazakhstan's expected traffic volume along this route is 2–2.5 million tonnes (*1.2 million tonnes in 2023; during the Soviet period the figure reached 9–12 million tonnes*). As part of the project, it is necessary to create additional coastal infrastructure, as the existing Pavlodar river port is not sufficient for the full-fledged functioning of the new corridor. Construction of additional facilities is planned in Semey and Ust-Kamenogorsk. In addition, a 5.6 billion tenge shipping lock is planned to be built near the city of Semey. In the area of the village of Tugyl on Lake Zaisan, it is planned to build a river port and lay a railway to the border with China, with a length of 99 km (*to Maikapchagai*) and the construction of the fourth border crossing on the Kazakh– Chinese border. Modernisation of the port infrastructure is planned, as well as the launch of new shipyards.

The Irtysh basin, being a part of the Ob basin, has extremely diverse natural and navigational conditions. The Irtysh is not the same everywhere as a route for water traffic. Its upper reaches are characterised by a large number of obstacles to navigation, while its lower reaches are deep and accessible throughout the navigation period for large vessels at full draught. In some parts it is intensively used for navigation (*Ust-Kamenogorsk–Semey*), in other parts it is completely abandoned (*Black Irtysh*). Among the tributaries of the Irtysh, the Tobol and its tributaries Tura, Tavda, Sosva and Lozva, then Konda, Ishim, Tara, Shish, Uy and Tui are used for navigation. The total length of all navigable waterways of the Irtysh basin is 9,322 kilometres and 10,283 kilometres of rafting waterways. The busiest rafting is on the upper section of the Irtysh from the Gusina wharf to Semipalatinsk, then on the Tura (*above Tyumen*), on the Tavda, Sosva, Shish, Tuy, Uy and other smaller rivers.

The Ob basin (*without the Irtysh River basin*) covers a vast area from the southern slopes of the Altai Mountains, where the Ob River originates, to the shores of the Arctic Ocean, into which it flows. The main river of the Ob basin is the Irtysh. The natural and navigational conditions of the Ob basin are as diverse as those of the Irtysh basin. The total length of the Ob from the confluence of the Biya and Katun rivers to its confluence with the Ob Bay (*Cape Yamsale*) is 3,635 kilometres. The Ob is navigable throughout the entire navigation period. The most intensive navigation is on the upper section of the Ob (Biysk — the mouth of the Tom); the middle and lower parts are less suitable for navigation and are not so intensively used. The Ob River network includes (*without the Irtysh*) 9,929 km of navigable and 7,334 km of rafting routes. Of the navigable tributaries of the Ob, the following are used for a) permanent navigation: Charysh, Tom, Chulym, Irtysh; b) occasional irregular voyages: Biya above Biysk, Chaya, Ket, Vakh, Tym, Vasyugan, Severnaya Sosva, Yugan, Shchuchya, Kazym. Rafting is developed on the Biya, Upper Ob, Tom, Chulym and their small tributaries.

↓ Figure 4: Ob and Irtysh waterways linking Central Asia and China with the Northern Sea Route



Source: EDB.

The Ob and Irtysh rivers can become a link between the Northern Sea Route (NSR) and the Silk Road and integrate these transport corridors into the global transport system. The Irtysh and Ob create a water transport corridor, which in the future will allow the countries of South-East Asia to access the NSR. Such a transit highway provides additional opportunities to increase freight traffic for landlocked countries. Given that a significant part of the route (*1,700 kilometres, part of the Irtysh River*) passes through Kazakhstan, its role in ensuring the navigability of the route appears to be significant. In particular, there are three large reservoirs (*Bukhtarma, Ust-Kamenogorsk and Shulbinsk*) and Lake Zaisan on the Kazakh section of the Irtysh, which can be effectively used to regulate the river regime necessary to maintain navigability.

It is expected that the restoration of navigation on the Irtysh and Ob with access to the NSR will allow Kazakhstan and other landlocked Central Asian countries to gain access to new transport routes and ports, as well as to the western regions of China (Kozlov, Belyakov, 2009).

Due to the unique combination of waterways of the Ob–Irtysh basin system and the NSR, river navigation acquires new significance. This opens up new prospects for expanding maritime transport from Kazakhstan to both Europe and East Asia. The NSR links the Russian port of Sabetta with the sea lanes of Northeast Asia, passing through the ports of Dalian, Qingdao, Zhoushan, Yokohama, Busan and Kaohsiung. It also connects to the ports of Northern Europe: Rotterdam, Hamburg, Bremerhaven, Antwerp, Zeebrugge and Le Havre.

The water transport corridor can link North-West China with Russian cities located on the Trans-Siberian Railway and cities in Central Asia adjacent to the Turksib. Moreover, the Irtysh is of interest as one of the shortest routes for China's access to the NSR: previously, river-sea class vessels reached from its borders to the northern seas.

The Russia–Kazakhstan–China multimodal transport corridor has great potential for organising transportation from Europe, East and South-East Asia to the Central Asian countries, especially for those cargoes that are impossible or economically inefficient to transport by rail and road. This route represents an alternative option for the delivery of hydrocarbon resources from the Arctic region to China, Central Asian countries, and India (Voronenko, 2017). The economic benefits of using the NSR for transit transport will be primarily related to savings on fuel due to shorter distances, as well as shorter voyage duration and reduced labour costs and lower vessel charter costs. In addition, the problem of vessel passage fees and queues (*as in the case of the Suez Canal*) will be eliminated.

In order to effectively use the water transport potential of the Ob–Irtysh basin and the NSR, it is necessary to expand transshipment port facilities in the Gulf of Ob, and to create a continuous cascade of submerged embankments (*reservoirs*) on the Irtysh River, which will ensure navigable depths of at least 5 metres along the entire route

during the navigation period. This will require the construction of additional hydraulic structures. It is also necessary to modernise the fleet and replenish it with new vessels with a higher ice class; this will increase the navigation window and, as a result, the amount of cargo transported, as well as, if necessary, expanding the geography of transportation. The solution of the above issues could lead to the development of river ports and ports at the mouths of rivers, as well as the adjacent infrastructure (*railway and road approaches*), which will allow for a more rational use of Siberia's inland waters to organise transport, both domestic and to the Asia-Pacific region.

In this connection, river-sea mixed vessels capable of transporting cargo both along rivers and the NSR are promising. They do not require transshipment of cargoes in estuary ports to large sea-going vessels. Over relatively short distances, the use of mixed vessels saves time and resources for cargo delivery. With the same operational indicators, the cost of transportation by multimodal vessels is 90% lower than that of large sea-going vessels (Grebenets et al., 2024).

An important condition for the integrated use of the water transport potential of the Irtysh corridor is the achievement of trilateral agreements (*China–Kazakhstan–Russia*) on the regulation of the Irtysh water regime during the navigation period and the establishment of an international river navigation authority. A continuous deep-water route from China to the Arctic Ocean will enable direct, uninterrupted waterway transport between China, Kazakhstan, East Asia, and Northern Europe. According to official information, the three parties have held preliminary talks that should lead to a trilateral agreement on the use of the Irtysh River. This was announced by Andrey Tarasenko, head of the Federal Agency for Maritime and River Transport of the Russian Federation, at a panel session of the IV Forum of Heads of Regions of the Shanghai Co-operation Organisation (*SCO*) member states in Omsk in September 2024 (RBC, 2024).

It should be noted that China also proposes deeper integration of international transport corridors with the EAEU based on a coordinated policy aimed at eliminating administrative, technological, technical and economic barriers through harmonisation, standardisation, and system planning. China strives to create an efficient transport infrastructure taking into account the interests of the participating countries, including within "One Belt, One Road" initiative (Xu Guangmiao, 2017; Mikhailichenko, 2019).

In June 2017, China's "Concept of Maritime Co-operation under the One Belt, One Road Initiative" proposed to "actively promote the construction of the Blue Economic Channel connecting the Arctic Ocean to Europe". It also notes that the Ice Silk Road is included in the "One Belt, One Road" development plan. With the acquisition of its first icebreaker, the Xuelong-1, in 1993, China began independently building its own icebreakers. China General Nuclear Power Group intends to commission the world's largest icebreaker, with two nuclear propulsion systems in 2025. To ensure transport links and the export of non-renewable natural resources (*gas from Yamal and the Barents Sea, oil from the Timan-Pechora Basin, mineral resources from the Kola*

Peninsula, nickel, and timber), China plans to build modern port infrastructure along the Northern Sea Route.

The White Paper "China's Arctic Policy", published in January 2018, noted that "relying on the development and exploitation of the Arctic Sea Route, China is ready to jointly build the Ice Silk Road together with everyone." "The Ice Silk Road is a model of "One Belt, One Road" co-operation in the Arctic Ocean. The construction of ports along the coastline and related inland economic areas is part of another joint programme of the Ice Silk Road. The integration of the NSR into global transport networks will enhance the role of maritime trade and contribute to the economic recovery of regions adjacent to this strategic transport route (Xu Guangmiao, 2020). China's participation in the development of the Russia–Kazakhstan–China multimodal transport corridor will allow the XUAR to gain access to the NSR.

APPENDIX

№1. AGREEMENT

between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the joint use and protection of transboundary bodies of water

The Government of the Russian Federation and the Government of the Republic of Kazakhstan, hereinafter referred to as the Parties,

Wishing to strengthen and develop co-operation relations in the field of water management in order to further improve bilateral relations in the sphere of joint use, protection and restoration of transboundary bodies of water,

Guided by the need to pursue a coordinated policy on joint management, use and protection of transboundary bodies of water in the interests of economic development and improvement of the living standards of the population,

Considering that only unification and joint coordination of actions will contribute to the creation of favourable conditions for solving social and environmental problems,

based on the Convention on the Protection and Use of Transboundary Watercourses and International Lakes of 17 March 1992,

have agreed as follows:

Article 1: The terms used in this Agreement shall mean the following:

"transboundary bodies of water" — any surface and underground bodies of water along which the state border between the Russian Federation and the Republic of Kazakhstan passes and/or crosses;

"transboundary impact" — any significant adverse effects arising from changes in the state of transboundary waters caused by human activities, the physical source of which is located wholly or partly within the territory of the State of one Party, on the environment of the State of the other Party;

"emergency situation" means the situation in a certain territory, resulting from an accident, natural hazard, catastrophe, natural or other disaster, which has caused or may cause human casualties, harm to human health or the environment, lead to significant material losses and disruption of people's livelihoods.

Article 2: Recognising the commonality and unity of water resources of transboundary bodies of water, the Parties shall co-operate in a spirit of equality and partnership to conserve, protect and restore these resources.

In accordance with the principles of international law, the Parties shall rationally use and protect transboundary bodies of water and shall be responsible for ensuring that their activities do not damage the transboundary bodies of water of the State of the other Party.

Article 3: In order to prevent transboundary impact, the Parties shall:

refrain from actions or cases of inaction that may lead to the deterioration of the hydrological and hydrochemical regime of transboundary bodies of water and the condition of associated ecosystems;

take measures to prevent, limit, reduce and eliminate pollution of transboundary water

bodies;

take measures to prevent or mitigate negative consequences resulting from changes in the condition of transboundary bodies of water, including floods, ice jams, waterborne infections, siltation of channels, and bank erosion;

take measures to ensure that hydraulic structures, wastewater and liquid waste accumulators, which are potential physical sources of transboundary impact, are maintained in good technical condition.

Article 4: The competent authorities of the Parties for the implementation of this Agreement shall be:

from the Russian Party — the Ministry of Natural Resources and Ecology of the Russian Federation and the Federal Water Resources Agency;

from the Kazakhstan Party — Water Resources Committee of the Ministry of Agriculture of the Republic of Kazakhstan.

The Parties shall inform each other in a timely manner through diplomatic channels about changes in the names or functions of the competent authorities.

Article 5: The Parties recognise earlier agreements, treaties and adopted decisions on the allocation of water resources of transboundary bodies of water, including irrigation systems, canals and water conduits, as well as decisions on these issues of the Joint Russia–Kazakhstan Commission on the Joint Use and Protection of Transboundary Bodies of Water, established in accordance with the Agreement between the Government of the Russian Federation and the Government of the

Republic of Kazakhstan on the Joint Use and Protection of Transboundary Bodies of Water of 27 August 199.

Water supply through water management systems of the Parties' states related to mechanical water supply and transportation shall be regulated by contracts concluded by economic entities and organisations that are authorised by the competent authorities of the Parties, with compensation of operational costs for water supply and transportation services.

Article 6: A Party planning any activities likely to have a transboundary impact shall, prior to the implementation of such activities, notify the other Party and inform the Joint Commission referred to in Article 12 of this Agreement.

If necessary, the Parties shall independently or jointly assess the environmental impact of the planned activities.

If necessary, the Joint Commission shall hold consultations on planned activities. During the period of consultations, the Parties shall refrain from carrying out the said activities, unless otherwise agreed.

Article 7: Each Party within the territory of its state shall independently implement water management and water protection measures on transboundary bodies of water.

Activities carried out in the interests of one Party in the territory of the state of the other Party shall be financed by the Party concerned on the basis of separate agreements between the Parties.

Article 8: If the implementation of any activities by one Party causes harm to the other Party, the Party that implemented such activities shall be responsible for compensating the injured Party.

In each case, the extent of the harm shall be determined by joint expert groups established by the Joint Commission referred to in Article 12 of this Agreement.

Article 9: Parties shall exchange hydrochemical, hydrological, water management and other information in the field of use and protection of transboundary bodies of water and promote co-operation on scientific and technical progress in the field of water management, integrated use and protection of water resources of transboundary bodies of water, operation of hydraulic structures, prevention of water pollution and depletion, as well as their harmful effects.

Article 10. In order to obtain information on the condition of transboundary bodies of water and sources of their pollution, as well as to forecast possible changes in the condition of transboundary bodies of water, the Parties shall monitor the condition of transboundary bodies of water and exchange monitoring data according to agreed programmes.

The Parties shall jointly assess on a regular basis the status of water resources in the basins of transboundary bodies of water, as well as assess the effectiveness of measures taken to prevent, limit and reduce transboundary impact.

Article 11. The Parties shall develop and agree on plans of measures in case of emergency situations on transboundary bodies of water, criteria for their determination, and shall establish coordinated or joint communication, warning and signalling systems based on the use of compatible technical means.

In the event of an emergency that may cause transboundary impact, the Parties shall: immediately inform each other about it;

co-operate, if necessary, in promptly studying and forecasting the development of such a situation;

take measures to localise, mitigate and eliminate the consequences of emergency situations.

At the request of the Party concerned, the other Party shall provide it with appropriate assistance in preventing, mitigating and eliminating the consequences of the said situation.

Article 12. In order to fulfil this Agreement, the Parties shall establish, on parity terms, a Joint Russia–Kazakhstan Commission on the Joint Use and Protection of Transboundary Bodies of Water (hereinafter referred to as the Joint Commission), which shall work under the leadership of two co-chairs, one from each Party.

The composition of the Joint Commission shall be determined by the Co-Chairs based on the principle of equal representation of the Parties.

The procedure of work of the Joint Commission and its working bodies shall be regulated by the Regulations adopted by the Joint Commission.

Meetings of the Joint Commission shall be held at least once a year, alternately on the territory of the states of the Parties. Decisions of the meetings shall be formalised in minutes.

The Joint Commission shall establish working groups and expert groups to address specific issues related to the implementation of this Agreement.

Article 13. The functions of the Joint Commission shall be:

coordination of actions for the implementation of this Agreement;

organising the development of joint activities of the Parties in the field of rational use and protection of transboundary bodies of water;

establishing flow parameters in agreed boundary sections of transboundary bodies of water and ensuring their observance by the Parties;

changing water allocation parameters on the basis of jointly performed water management and economic calculations under changing water situation in the basins of transboundary bodies of water;

consideration of water management measures on transboundary bodies of water planned for implementation in the territories of the Parties' states, which may have a transboundary impact, as well as the procedure for joint assessment of the environmental impact of the planned measures;

development of joint action plans for prevention of emergencies on transboundary bodies of water and mitigation of their consequences, procedures for warning and notification of the Parties about the threat and occurrence of emergencies;

coordination of actions of the Parties on prevention of negative water impact and mitigation of its consequences;

organisation of joint research on rational use and protection of water resources of transboundary bodies of water, development of water management in the basins of transboundary bodies of water;

organisation of monitoring of transboundary bodies of water according to agreed programmes and methods;

organisation of regular exchange of hydrological forecasts, information on water quality and water situation in the basins of transboundary bodies of water;

assistance in the settlement of disputes between the Parties; other functions related to the fulfilment of this Agreement.

Article 14. The costs associated with the organisation and holding of meetings of the Joint Commission, working groups and meetings of experts shall be borne by the Party in whose territory the said events are held.

The costs of secondment of members of the Joint Commission, working groups and experts shall be borne by the seconding Party.

Article 15. Any disagreements or disputes arising in connection with the use and protection of transboundary bodies of water may be referred by the Parties to the Joint Commission for consideration. In the absence of satisfactory resolution, the Joint Commission shall submit its conclusions and recommendations to the Parties. Disagreements and disputes not settled within the framework of the Joint Commission, as well as those concerning the interpretation of this Agreement, shall

be resolved through negotiations or other means of peaceful settlement as agreed by the Parties.

Article 16. This Agreement may be amended and supplemented by mutual agreement of the Parties.

Article 17. This Agreement shall enter into force on the date of its signature.

This Agreement shall remain in force for a period of five years and shall, at the expiration of that period, be automatically renewed for successive five-year periods until either Party notifies the other Party at least one year prior to the expiration of the current five-year period of its intention to terminate it.

Unless the Parties agree otherwise, termination of this Agreement shall not affect the agreements of the competent authorities of the Parties, decisions of the Joint Commission, or agreements between economic entities and organisations of the Parties concluded on the basis of this Agreement.

Nothing in this agreement shall affect the rights and obligations of each Party arising from other international treaties to which its state is a party.

From the date of entry into force of this Agreement, the Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the joint use and protection of transboundary bodies of water of 27 August 1992 shall cease to have effect.

Done in the city of Ust-Kamenogorsk on 7 September 2010 in duplicate, in the Russian and Kazakh languages, both texts being equally authentic.

For the Government of The Russian Federation	**For the Government of The Republic of Kazakhstan**

№2. AGREEMENT

between the Government of the Republic of Kazakhstan and the Government of the People's Republic of China on co-operation in the use and protection of transboundary rivers

The Government of the Republic of Kazakhstan and the Government of the People's Republic of China (hereinafter referred to as the Parties),

with a view to further developing and strengthening friendly and good-neighbourly relations between the two states;

co-operating in the use and protection of water resources of transboundary rivers of the two states;

guided by the generally accepted principles and norms of international law, on the basis of the principles of mutual respect for independence, sovereignty and territorial integrity, non- interference in each other's internal affairs, equality and mutual benefit, peaceful coexistence, in a spirit of mutual understanding, mutual accommodation and friendly consultation;

equitably and rationally resolving issues between the two states in the sphere of use and protection of water resources of transboundary rivers;

have decided to enter into this Agreement and have agreed as follows:

Article 1: In this Agreement, the term "transboundary rivers" means all rivers and river discharges crossing the state border line or located along the state border line between the Republic of Kazakhstan and the People's Republic of China.

Article 2: In the use and protection of transboundary rivers, the Parties shall adhere to the principles of equity and rationality, and closely co-operate from the position of sincerity, good neighbourliness and friendship.

Article 3: The Parties will take appropriate measures and endeavour to prevent or mitigate possible serious damage caused by flood disasters and man-made accidents to the state of one of the Parties.

Article 4: Neither Party shall restrict the other Party from rationally using and protecting water resources of transboundary rivers, taking into account mutual interests.

Article 5: The Parties may co-operate in the following areas:

- agreeing and determining the locations of observation and measurement posts for water volume and quality;
- researching common methods of observation, measurement, analysis and assessment;
- analysing and compiling hydrological observation and measurement data at the posts agreed upon by the Parties;
- possible joint studies on preventing or mitigating the impacts of floods, glaciers and other natural hazards;
- studying trends of future changes in water availability and water quality of transboundary rivers;
- if necessary, joint research and exchange of experience in the use and protection of transboundary rivers.

Article 6: The Parties shall agree and determine the content, quantity and time of data and information exchange. In the event of a request by one of the Parties from the other Party for the provision of extremely important hydrological information, which does not contradict Article 7 of this Agreement and is not the subject of an agreed exchange, the latter shall meet this request, subject to availability of opportunities and under certain conditions.

The Parties undertake to keep the above exchanged or provided information confidential and not to disclose it to any third party, unless otherwise agreed between the Parties.

Article 7: No provisions of this Agreement shall in any way serve as a basis for the provision to either Party of extremely sensitive information or data relating to the defence and security of its state.

Article 8: The Parties shall establish a Kazakh-Chinese Joint Commission on the Use and Protection of Transboundary Rivers (hereinafter referred to as the Joint Commission), responsible for developing Regulations on its activities and resolving relevant issues on the implementation of this Agreement.

The Joint Commission shall consist of one representative and two alternates appointed by each Party.

Article 9: Meetings of the Joint Commission shall be held alternately on the territory of the states of the Parties once a year, at which issues related to the implementation

of this Agreement, as well as issues related to the use and protection of transboundary rivers, shall be discussed. The meetings shall be convened and chaired by a representative of the host Party. Representatives of the Parties may use the assistance of experts and invite them to meetings of the Joint Commission.

If necessary, one of the Parties may propose an extraordinary meeting of the Joint Commission. The Minutes of each meeting shall be drawn up in two copies, each in Russian and Chinese.

Article 10. The Party responsible for holding the meeting of the Joint Commission shall provide premises and means of transport. Each of the Parties shall bear its own expenses for meals and accommodation. Other expenses not related to the holding of meetings shall be decided by agreement between the Parties.

Article 11: This Agreement shall not affect the rights and obligations of the Parties arising from other international treaties to which they are parties.

Article 12. Should any disagreement arise on the interpretation and application of the provisions hereof, the Parties shall resolve them through consultations.

Article 13. By mutual agreement of the Parties, this Agreement may be amended and supplemented by separate Protocols, which are integral parts of this Agreement.

Article 14. This Agreement is concluded for a period of 8 years and shall enter into force on the date of the last written notification that the Parties have completed the domestic procedures required for its entry into force.

If either Party fails to notify the other Party in writing 6 months prior to the expiry of this Agreement of its desire to terminate it, this Agreement shall be automatically renewed for a further four years and termination shall be effected in consecutive order.

Done **"12" September 2001** in Astana in duplicate in the Kazakh, Chinese, and Russian languages, all texts being equally authentic.

In case of any disagreement in the interpretation of the provisions of this Agreement, the Parties shall be guided by the texts in the Russian and Chinese languages.

For the Government of The Republic of Kazakhstan	**For the Government of The People's Republic of China**

REFERENCES

Federal State Budgetary Institution Russian Research Institute for Integrated Use and Protection of Water Resources (FSBI RusRIIUPWR) (2014) Shema kompleksnogo ispol'zovanija i ohrany vodnyh ob'ektov bassejna reki Irtysh. Nizhne-Obskoe bassejnovoe vodnoe upravlenie. Available at: https://nobwu.ru/index.php/ndvskiovo (Accessed 26 December 2024).

Grebenets, A., Vasekha, M., Vasilievna, J. (2024) Analiz perevozok sudami smeshannogo tipa plavanija po sibirskim rekam s ispol'zovaniem marshrutov Severnogo morskogo puti. *Problemy prognozirovanija*. № 2. Available at: https://ecfor.ru/publication/perevozki-sudami-reka-more-po-sibirskim-rekam-i-smp/ (Accessed 26 December 2024).

Kenderdine, T. (2021) Northern Corridor for Central Asia-Arctic Ocean Transport Access. November 9. The Arctic Institute. Center for Circumpolar Security Studies. Avalaible at: https://www.thearcticinstitute.org/northern-corridor-central-asia-arctic-ocean-transport-access/ (Accessed 26 December 2024).

Kozlov, L., Belyakov, A. (2009) Transportno-jenergeticheskaja vodnaja sistema (TJeVS) Evrazii i ee pervoocherednye proekty. *Evrazijskaja jekonomicheskaja integracija*. №1 (2). Available at: https://cyberleninka.ru/article/n/transportno-energeticheskaya-vodnaya-sistema-tevs-evrazii-i-ee-pervoocherednye-proekty.pdf (Accessed 26 December 2024).

Krasnoyarova, B., Antyufeeva, T., Myrzagalieva, A., Samarkhanov, G. (2019) Problemy mezhdunarodno-pravovogo regulirovanija sotrudnichestva gosudarstv v transgranichnom bassejne reki Irtysh. *Geografija i prirodopol'zovanie Sibiri*. №26. Available at: https://www.elibrary.ru/download/elibrary_42428758_89613473.pdf (Accessed 26 December 2024).

Krasnoyarova, B., Vinokurov, Y., Puzanov, A. (2022) Transgranichnyj Irtysh: osobennosti nacional'nogo vodopol'zovanija i mezhdunarodnoe sotrudnichestvo. *Tihookeanskaja geografija*. № 1. Available at: https://tigdvo.ru/assets/files/publications/Pacific_Geography_journal/2022_1/59–67.pdf (Accessed 26 December 2024).

Medeu, A., Malkovsky, I., Toleubaeva, L. (2012) Vodnaja bezopasnost' Respubliki Kazahstan. *Vodnye resursy Kazahstana: ocenka, prognoz, upravlenie*. T. IV. Available at: https://cyberleninka.ru/article/n/vodnaya-bezopasnost-respubliki-kazahstan-problemy-i-resheniya (Accessed 26 December 2024).

Medeu, A., Alimkulov, S., Zagidullina, A., Baspakova, G. (2023) Ocenka transgranichnogo pritoka po r. Kara Ertis pri razlichnyh scenarijah antropogennogo vlijanija na territorii Kitaja. *Issledovanija, rezul'taty*. №3 (99). Available at: https://journal.kaznaru.edu.kz/index.php/research/article/view/320/229 (Accessed 26 December 2024).

Ministry of Justice of the Republic of Kazakhstan (MJ RK) (2024) Koncepcija razvitija sistemy upravlenija vodnymi resursami Respubliki Kazahstan na 2024–2030 gody (Koncepcija — v redakcii postanovlenija Pravitel'stva RK ot 28.08.2024 № 695). Available at: https://adilet.zan.kz/rus/docs/P2400000066 (Accessed 26 December 2024).

Mikhailichenko, K. (2019) Proekt «Ledovyj Shelkovyj put'» v ramkah iniciativy «Odin pojas i odin put'» kak realizacija interesov Rossii i Kitaja v Arkticheskom regione. Vestnik Rossijskogo universiteta druzhby narodov. Serija: Politologija. T. 21. № 2. Available at: https://cyberleninka.ru/article/n/proekt-ledovyy-shelkovyy-put-v-ramkah-initsiativy-odin-poyas-i-odin-put-kak-realizatsiya-interesov-rossii-i-kitaya-v-arkticheskom-regione (Accessed 26 December 2024).

Puzanov, A., Bezmaternykh, D., Vinokurov, Y., Zinoviev, A., Kirillov, V., Kotovshchikov, A., Krasnoyarova, B., Rybkina, I., Dyachenko, A. (2017) Sovremennoe sostojanie vodnyh resursov i vodohozjajstvennogo kompleksa Ob'-Irtyshskogo bassejna. *Vodnye i jekologicheskie problemy Sibiri i Central'noj Azii: trudy III Vserossijskoj nauchnoj konferencii s mezhdunarodnym uchastiem*: v 4 t., Barnaul.

Puzanov, A., Bezmaternykh, D., Rybkina, I., Zinoviev, A., Kosheleva, E., Lovtskaya, O. (2021) Transboundary problems of the Irtysh River: current state and forecast up to 2030. *Transboundary water bodies: use, management, protection. Collection of materials of the All-Russian scientific-practical conference with international participation*. Novocherkassk. Available at: https://www.elibrary.ru/download/elibrary_47479905_98826882.pdf (Accessed 26 December 2024).

Qin, X., Zou, H., Wang, L. (2021) Changing Regional Inequality Patterns in Western China: A Case Study of Xinjiang. Hindaway Complexity. Volume 2021. Avalaible at: https://onlinelibrary.wiley.com/doi/10.1155/2021/9160354 (Accessed 26 December 2024).

Ratkovich, L., Romanova, Y. (2014) Vodohozjajstvennyj balans reki Irtysh v predelah Respubliki Kazahstan s uchetom proektnyh meroprijatij v Kitajskoj Narodnoj Respublike. *Prirodoobustrojstvo*, № 2. Available at: http://elib.timacad.ru/dl/full/gmgup-17-2014-02.pdf/download/gmgup-17-2014-02.pdf?lang=en (Accessed 26 December 2024).

RBC (2024) RF nachala peregovory s Kazahstanom i KNR naschet Irtysha v Omske. Avalaible at: https://omsk.rbc.ru/omsk/21/09/2024 (Accessed 26 December 2024).

Rybkina, I., Sivokhip, J. (2019) Vodnye resursy rossijsko-kazahstanskogo transgranichnogo regiona i ih ispol'zovanie. *Jug Rossii: jekologija, razvitie*. Tom 14. №2. Available at: https://www.elibrary.ru/download/elibrary_38533670_40413949.pdf (Accessed 26 December 2024).

Vinokurov, Y., Puzanov, D., Bezmaternykh, Y. (2012) *Sovremennoe sostojanie vodnyh resursov i funkcionirovanie vodohozjajstvennogo kompleksa bassejna Obi i Irtysha*. Ros. Ros. Akademija nauk, Sibirskoe otdelenie, Institut vodnyh i jekologicheskih problem SO RAN. Novosibirsk. Available at: https://bezmater.narod.ru/Mono2013.pdf (Accessed 26 December 2024).

Vinokurov, Y., Krasnoyarova, B. (2017a) Transgranichnyj bassejn reki Irtysh: problemy i reshenija. *Region: jekonomika i sociologija*. №3 (95). Available at: https://www.elibrary.ru/download/elibrary_30109944_52012765.pdf (Accessed 26 December 2024).

Vinokurov, Y., Krasnoyarova, B. (2017b) Transgranichnyj bassejn reki Irtysh v uslovijah sovremennyh vyzovov. *Vodnye i jekologicheskie problemy Sibiri i Central'noj Azii: trudy III Vserossijskoj nauchnoj konferencii s mezhdunarodnym uchastiem*: v 4 t., Barnaul. Available at: https://www.elibrary.ru/download/elibrary_30109944_52012765.pdf (Accessed 26 December 2024).

Vinokurov, Y., Krasnoyarova, B., Baryshnikov, G., Baryshnikova, O., Antyufeeva, T., Sharabarina, S. (2018) Institucional'noe partnerstvo v transgranichnom bassejne reki Irtysh. *Izvestiya AO RGO*. № 1 (48). Available at:https://cyberleninka.ru/article/n/institutsionalnoe-partnerstvo-v-transgranichnom-basseyne-reki-irtysh (Accessed 26 December 2024).

Voronenko, A. (2017) Transportno-logisticheskie vozmozhnosti Severnogo morskogo puti v obespechenii evroaziatskih torgovyh svjazej. *Vestnik Habarovskogo gosudarstvennogo universiteta jekonomiki i prava*. № 6 (92). Available at: https://cyberleninka.ru/article/n/transportno-logisticheskie-vozmozhnosti-severnogo-morskogo-puti-v-obespechenii-evroaziatskih-torgovyh-svyazey

Xu Guangmiao (2017) K voprosu o podkljuchenii proekta razvitija Severnogo morskogo puti k kitajskomu strategicheskomu planu «Odin pojas, odin put'» (vzaimodopolnjaemost', prepjatstvija i vozmozhnye napravlenija). *Kitaj v mirovoj i regional'noj politike. Istorija i sovremennost'*. T. 22. № 22. Available at: https://cyberleninka.ru/article/n/k-voprosu-o-podklyuchenii-proekta-razvitiya-severnogo-morskogo-puti-k-kitayskomu-strategicheskomu-planu-odin-poyas-odin-put (Accessed 26 December 2024).

Xu Guangmiao, Kulintsev, Y. (2020) Ledovyj Shelkovyj put'»: kitajsko-rossijskoe sotrudnichestvo na fone pereustrojstva mezhdunarodnogo porjadka v Arktike. *Vostochnaja Azija: fakty i analitika*. №2. Available at: https://cyberleninka.ru/article/n/ledovyy-shyolkovyy-put-kitaysko-rossiyskoe-sotrudnichestvo-na-fone-pereustroystva-mezhdunarodnogo-poryadka-v-arktike (Accessed 26 December 2024).

Yasinsky, V., Mironenkov, A., Sarsembekov, T. (2015) *Mezhdunarodnoe sotrudnichestvo i investicionnaja politika v upravlenii vodnymi resursami*. Evrazijskij bank razvitija.

Zonn, I., Zhiltsov, S., Semenov, A., Kostyanoy, A. (2018) Transgranichnye reki Kazahstana i Kitaja. Jekonomika prirodopol'zovanija. *Vestnik Moskovskogo universiteta im. S.Ju. Vitte*. Serija 1. Jekonomika i upravlenie. №4 (27). Available at: https://cyberleninka.ru/article/n/transgranichnye-reki-kazahstana-i-kitaya (Accessed 26 December 2024).

ACRONYMS AND ABBREVIATIONS

EAEU, Union	Eurasian Economic Union
EDB, Bank	Eurasian Development Bank
GRES	state district power plant
GRP	gross regional product
HES	hydraulic engineering structures
HPP	hydroelectric power plant
NSR	Northern Sea Route
RK	Republic of Kazakhstan
RF	Russian Federation
SCO	Shanghai Co-operation Organisation
TPP	thermal power station
UN	United Nations Organisation
UNECE	United Nations Economic Commission for Europe
XUAR	Xinjiang Uygur Autonomous Region
%	percentage
ha	hectare
km	kilometre
km^2	square kilometre
km^3	cubic kilometre
km^3/year	cubic kilometres per year
m	metre
m^3	cubic metre
m^3/year	cubic metres per year
m^3/s	cubic metres per second
MW	megawatt

RESEARCH AT THE EDB WEBSITE

Macroeconomic Outlook
(RU/EN)

Macroeconomic Outlook 2025–2027

The Eurasian Development Bank (EDB) has published its Macroeconomic Outlook, summarising a preliminary overview of economic developments in the Bank's member states in 2024, along with key macroeconomic projections for countries in the region for 2025, as well as for 2026 and 2027.

Report 25/1
(RU/EN)

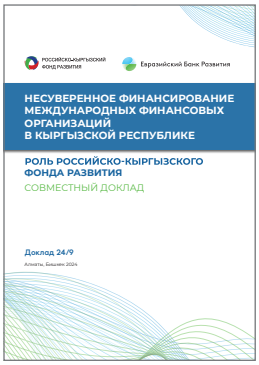
Mutual Investments on the Eurasian Continent: New and Traditional Partners

The report contains detailed information on the scale, dynamics, geographical and sectoral structure of mutual direct investment stock between the countries of the Eurasian region, on the one hand, and China, Türkiye, Iran, and the Gulf states, on the other hand, for the period from 2016 to the first half of 2024.

Report 24/10
(RU/EN)

EDB Monitoring of Mutual Investments — 2024. Eurasian Region

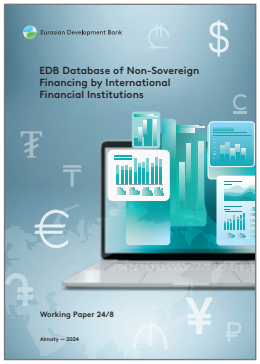
The report contains detailed information on the scale, dynamics, geographical and sectoral structure of mutual direct investments of the Eurasian region from 2016 to 1H of 2024.



Report 24/9
(RU)

Non-sovereign financing of international financial organizations in the Kyrgyz Republic

The report contains a comprehensive analysis of non-sovereign financing operations by international financial institutions in the Kyrgyz Republic over the last decade.



Report 24/8
(RU/EN)

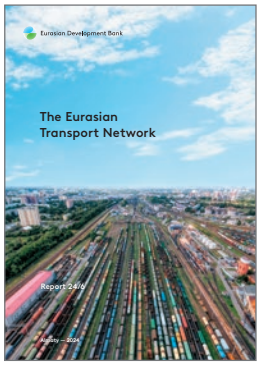
EDB Database of Non-Sovereign Financing by International Financial Institutions

Non-Sovereign Financing (NSF) Database is EDB's new analytical project. The EDB Database is a dynamic tool for timely monitoring and analysis of non-sovereign operations of IFIs in the Eurasian region.

Report 24/7
(RU/EN)

Capital in Multilateral Development Banks

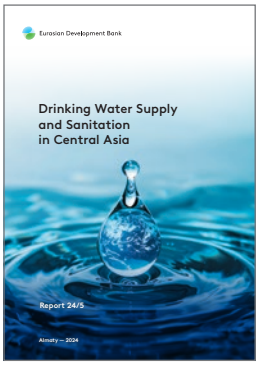
This paper covers the whole 'MDB family' of institutions but highlights regional and sub-regional MDBs because of their specifics of raising shareholders' capital. The study discusses seven standard and novel options for increasing capital



Report 24/6
(RU/EN)

The Eurasian Transport Network

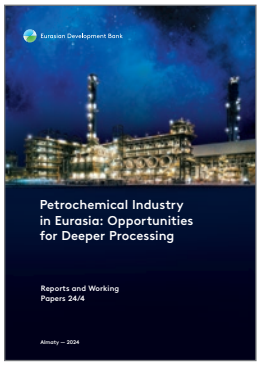
The report examines ten system elements of the Eurasian transport framework concept. Among them are the formation of a transport crossroads in Central Asia, priorities for intraregional transport connectivity, an impetus for realizing the agro-industrial potential of the countries of the region, and improvement of soft infrastructure.



Report 24/5
(RU/EN)

Drinking Wateer Supply and Sanitation in Central Asia

In Central Asia, 10 million people do not have access to safe drinking water. Given the priority importance of drinking water for public health and the scale of the challenges, a comprehensive approach is required in the region. A new EDB report presents a set of practical steps that shape such an approach.



Report 24/4
(RU/EN)

Petrochemical industry in Eurasia: Opportunities for Deeper Processing

The analytical report uses a balance approach to assess the production and export potential of the petrochemical complex of the Eurasian region (Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan) in the perspective up to 2035.

Report 24/3
(RU/EN)

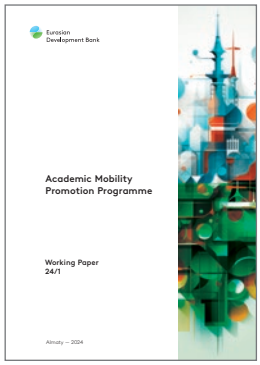
Infrastructure in Eurasia: short-term and medium-term trends

The EDB's report highlights ten important short- and medium-term investment and institutional trends in the region's energy, transportation, logistics, water supply and telecommunications sectors.

Report 24/2
(RU/EN)

Economic Cooperation in Eurasia: Practical Solutions

The EDB's report "Economic Cooperation in Eurasia: Practical Solutions" contains a "menu" of pragmatic applied solutions that can be enabled relatively fast and with flexible configurations among participating countries aimed at fostering mutually beneficial economic cooperation among Eurasian countries.



Report 24/1
(RU/EN)

EDB Monitoring of Mutual Investments — 2023

Eurasian countries' FDI stock reached $48.8 billion by mid-2023, following a 5.4% increase in 2022 and with continued growth in 2023.

Report 23/5
(RU/EN)

EDB Monitoring of Mutual Investments — 2023

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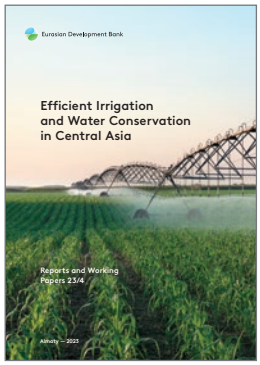
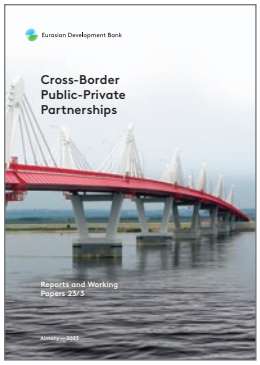


Report 23/4
(RU/EN)

Efficient Irrigation and Water Conservation in Central Asia

A new EDB study outlines ten practical steps for preserving irrigated land potential and promoting water conservation. The list includes four recommendations for adoption at the regional level and six at the national level.



Report 23/3
(RU/EN)

Cross-Border Public-Private Partnerships

The report outlines the criteria and scope of cross-border PPP projects, evaluates their potential for fostering cross-border infrastructure development in the EAEU, Central Asia, and the South Caucasus, and suggests guidelines for the successful implementation of cross-border PPPs in the region.

Report 23/2
(RU/EN)

Global Green Agenda in the Eurasian Region. Eurasian Region on the Global Green Agenda

The report provides a comprehensive analysis of the challenges and prospects for low-carbon transition in Eurasia, covering EAEU countries, Tajikistan, and Uzbekistan.

Eurasian Development Bank

RESEARCH DEPARTMENT
EURASIAN DEVELOPMENT BANK

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this document are welcome at:
pressa@eabr.org

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