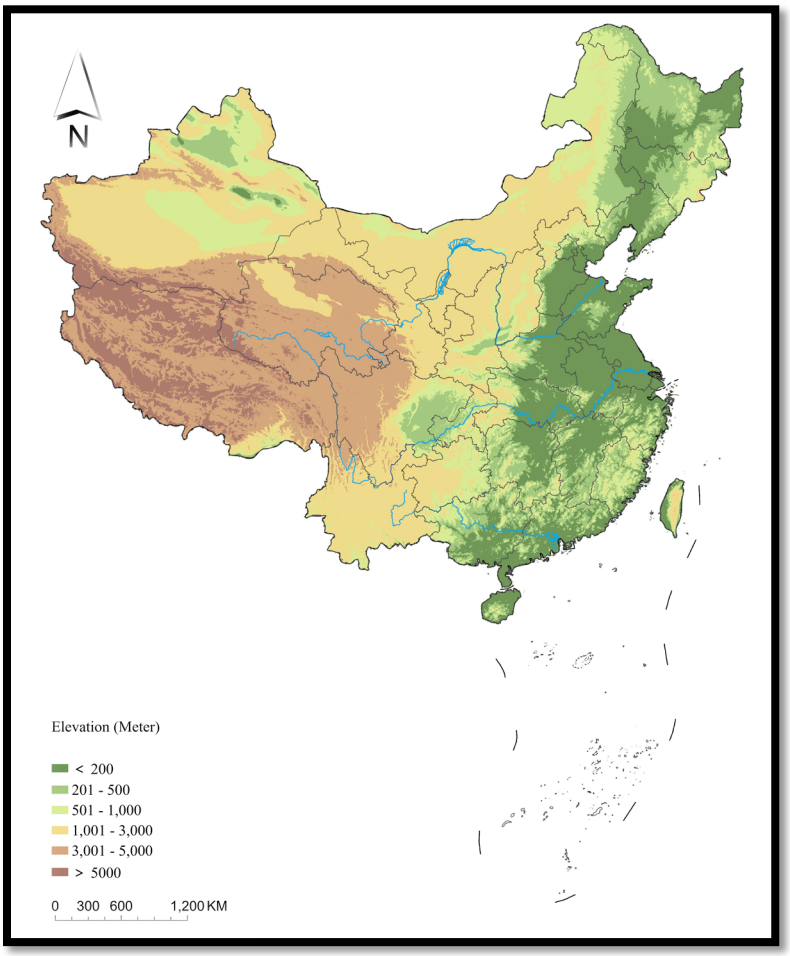
# Our Country's Major Rivers: Chang Jiang, Huang He, Zhujiang

## I. Overview

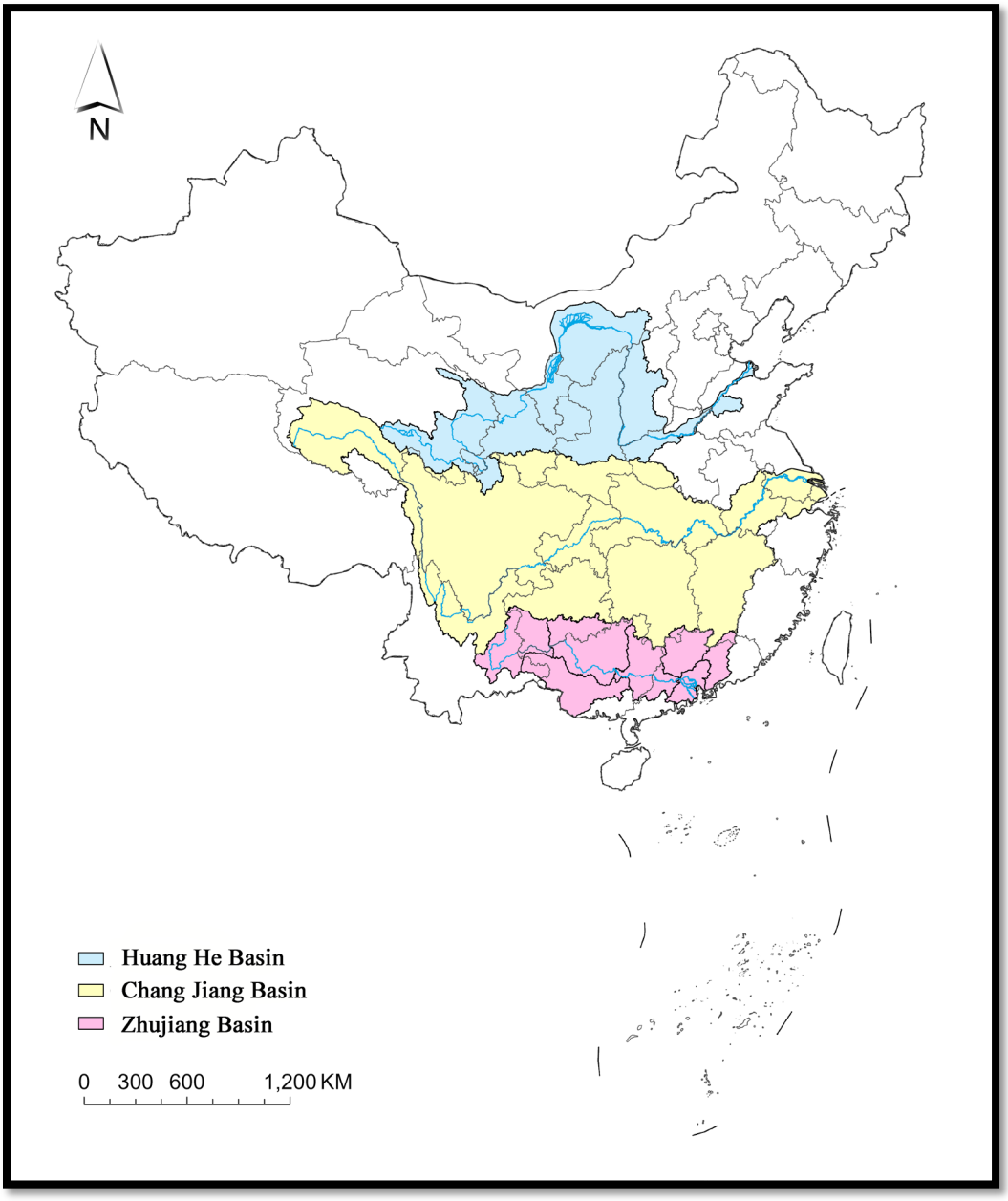
Our country is the home to three of the most significant river systems in the world: Chang Jiang, Huang He, and Zhujiang (Figure 1). These rivers not only shape the country's diverse geography but also play crucial roles in its socio-economic development, cultural history, and natural ecosystems. Chang Jiang, the longest river in our country and the third longest globally, originates from the Geladandong Snow Mountain on the Qinghai-Tibet Plateau and flows through eleven provinces, autonomous region and municipalities before reaching the East China Sea. Huang He, our country's second-longest river, is renowned as the "Cradle of Chinese Civilisation" due to its historical significance. Meanwhile, Zhujiang sustains vibrant agricultural and economic activities across its vast basin, including the dynamic Zhujiang Delta. Together, these rivers exemplify the intricate relationship between our country's natural landscapes and its cultural and economic prosperity.

Figure 1: Major rivers in our country



Map reference: 中華人民共和國自然資源部審圖號 GS（2024）0650 號 (Date of reference: 27 January 2025)

Figure 2: Drainage basin of major rivers in our country

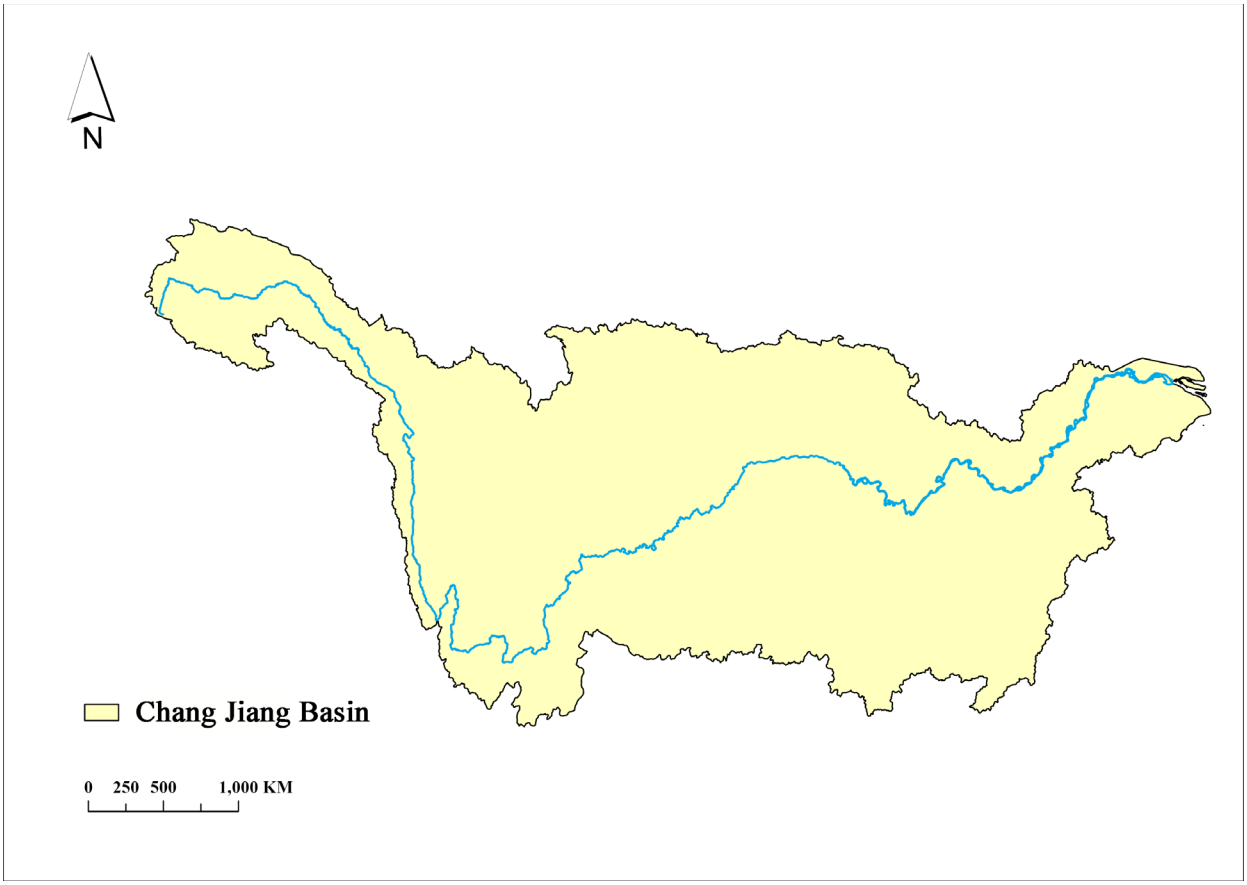



Map reference: 中華人民共和國自然資源部審圖號 GS（2024）0650 號 (Date of reference: 27 January 2025)

## I. Chang Jiang

Chang Jiang is the longest river in our country and the third longest in the world. It originates from the southwestern slope of Geladandong Snow Mountain, the main peak of the Tanglha Mountains on the Qinghai-Tibet Plateau. The river flows through eleven provinces, municipalities, and autonomous region, including Qinghai, Xizang, Sichuan, Chongqing, Yunnan, Hubei, Hunan, Jiangxi, Anhui, Jiangsu, and Shanghai, before emptying into the East China Sea. Spanning a total length of approximately 6,300 km, the Chang Jiang basin lies between 24°30′–35°45′N latitude and 90°33′–112°25′E longitude, covering an area of over 1.8 million km², which represents about one-fifth of our country's total land area (excluding the Huai River basin) (Figure 3) (中國科學院地理科學與資源研究所, 2007a).

Figure 3: Map of the Chang Jiang basin




(Details refer to 中華人民共和國自然資源部地圖 GS(2019)4345, http://bzdt.ch.mnr.gov.cn/browse.html?picId=%224o28b0625501ad13015501ad2bfc0433%22 )

1. Geography
   - Chang Jiang is divided into distinct sections, each with its own name:
     - Tuotuo River: From its source to Dangqukou, the river is called the Tuotuo River, the true source of the Chang Jiang, spanning 358 km.
     - Tongtian River: From Dangqukou to the Batang River Estuary in Yushu County, Qinghai Province, it is known as the Tongtian River, spanning 813 km.
     - Jinsha River: From the Batang River Estuary to the Min River Estuary in Yibin, Sichuan Province, it is referred to as the Jinsha River, with a length of 2,308 km.
     - Chang Jiang: From the Min River Estuary in Yibin to the river's estuary, a distance of about 2,800 km, it is generally called the Chang Jiang. Within this stretch, the section from Yibin to Yichang in Hubei Province is known as "Chuanjiang," the section from Zhicheng in Hubei to Chenglingji in Hunan is referred to as "Jingjiang," and below Yangzhou and Zhenjiang in Jiangsu Province, it is called "Yangzi Jiang."
   - The Chang Jiang basin comprises 65.6% plateaux and mountains, 24% hills, and 1.4% plains and lowlands. Among its tributaries, 48 have a drainage area exceeding 10,000 km², while 9 exceed 50,000 km². These include the Yalong River, Min River and its tributary, the Dadu River, Jialing River, Wu River, Yuan River, Xiang River, Han River, and Gan River. Of these, the Yalong, Min, Jialing, and Han rivers each exceed 100,000 km² in drainage area, with the Jialing River being the largest at approximately 160,000 km².
   - Most of our country's freshwater lakes are located in the middle and lower courses of the Chang Jiang. The largest lakes in this region include Poyang Lake, Dongting Lake, Taihu Lake, and Chaohu Lake.
   - The upper and middle courses of the Chang Jiang are home to two world-famous gorges: Tiger Leaping Gorge and the Three Gorges.
   - Chang Jiang Delta is located at the estuary of Chang Jiang which drains into East China Sea. Due to heavy sedimentation, the present-day bed of the river is above the flood plain. Dams and levees are built for flood prevention.

2. Climate and hydropower
   - Most of the Chang Jiang basin has a subtropical monsoon climate. The river's water volume is extremely abundant, with an annual average flow rate of 29,000 m³ per second, equivalent to an annual water volume of 914.5 billion m³. After merging with additional tributaries and parts of the Huai River below Datong, the total water volume entering the sea reaches 1 trillion m³.
   - The river flow comes primarily from rainfall, which accounts for 75–80% of the annual runoff, while groundwater contributes 20–25%, and a small amount from melting snow and ice. The flood season, from April to October, contributes approximately 80% of the annual water volume, while the dry season, from November to March, accounts for only 20%. Floods in the mainstream depend on the timing of tributary floods, usually occur

between June and September, with peaks in July and August. Mainstream floods are characterised by high peaks, large volumes, and long durations, while tributary floods tend to rise and fall rapidly over shorter periods.

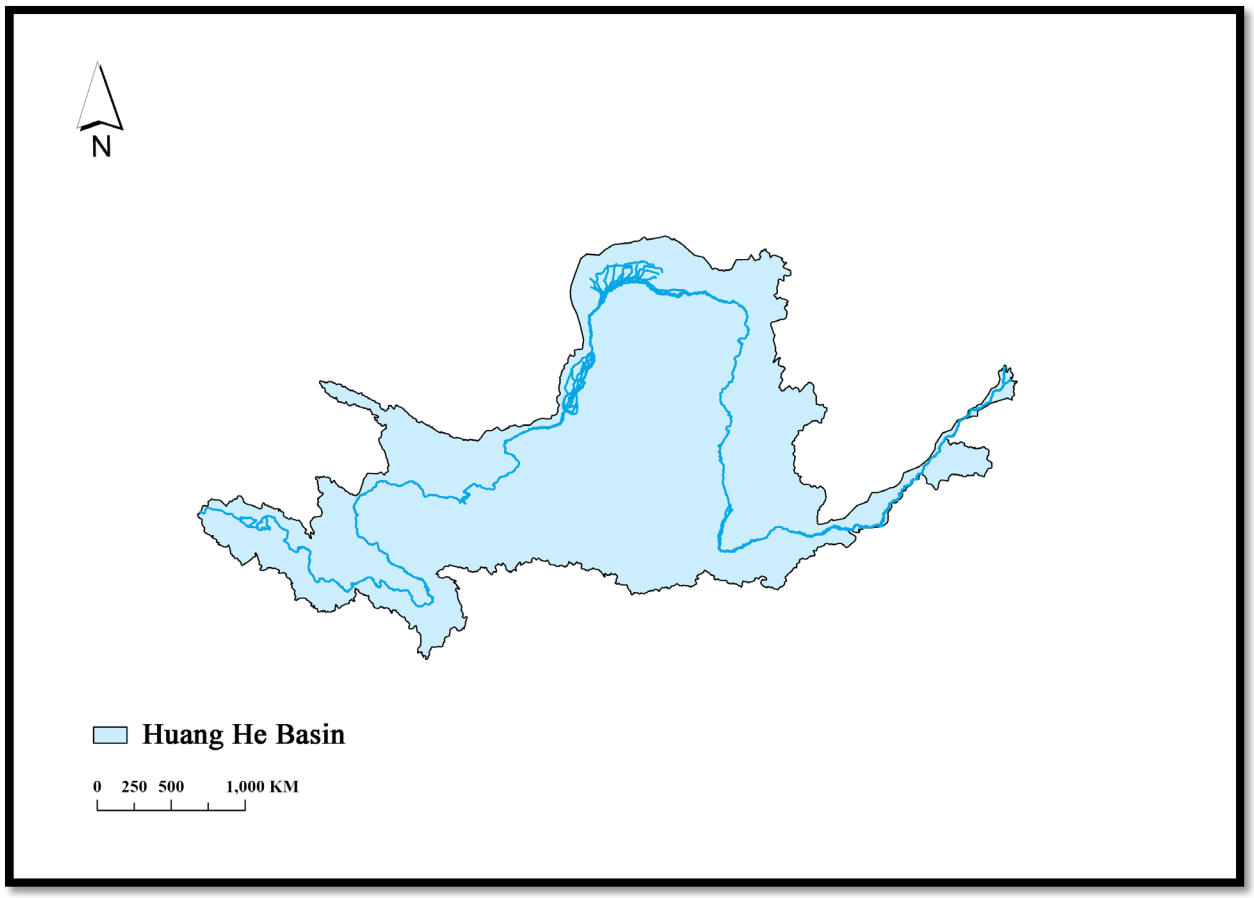
- The basin is rich in hydropower resources, with a theoretical potential of 268 million kilowatts and an estimated exploitable capacity of 197 million kilowatts, generating 1 trillion kilowatt-hours annually. This accounts for 53.4% of our country's total exploitable hydropower resources. 86.3% of the river's hydropower potential are at the upper reaches of the Chang Jiang. The Three Gorges Dam generates 95 TWh of electricity per year, with the amount fluctuates with the amount of precipitation received.

3. Socio-economic significance
   - Chang Jiang is our country's most important inland waterway, with a navigable network exceeding 70,000 km, including 30,000 km navigable by motorised vessels, accounting for 70% of the country's total inland navigation mileage. The river's mainstream is navigable for over 2,900 km from Xinshizhen in Sichuan Province to the river's estuary.
   - The Chongqing to Yichang section can accommodate vessels of up to 1,500 tonnes. The Yichang to Hankou section is navigable for vessels of up to 3,000 tonnes. The Hankou to Nanjing section supports vessels of up to 5,000 tonnes. The Nanjing to Wusongkou section allows for the passage of 10,000-tonne ocean-going ships.
   - During medium and high-water levels, 10,000-tonne ocean-going ships can reach Hankou, and 20,000-tonne vessels can navigate to Nanjing with the aid of tidal currents.
   - Chang Jiang River Delta covers only 1% of total area of our country, 6% of total population but its GDP accounts for 20% of the whole country. With its prominent coastal location at the estuary of Chang Jiang, it is one of the largest comprehensive economic zones of our country with a long history of foreign investment and trade. It is also rich in cultural heritage.

## II. Huang He

Huang He, our country's second-longest river, takes its name from the yellowish, silt-laden waters it carries in the middle and lower course of the river. It originates in the Yueguzonglie Basin, situated on the northern slopes of the Bayan Har Mountains. Flowing through nine provinces and autonomous regions—Qinghai, Sichuan, Gansu, Ningxia, Nei Mongol, Shaanxi, Shanxi, Henan, and Shandong—it empties into the Bohai Sea in Kenli County, Shandong Province. The river stretches 5,464 km and covers a drainage area of 752,773 km² (Figure 4) (中國年鑑,2024) (中國科學院地理科學與資源研究所, 2007b).

Figure 4: Map of the Huang He basin




(Details refer to 中華人民共和國自然資源部地圖 GS(2019)4345, http://bzdt.ch.mnr.gov.cn/browse.html?picId=%224o28b0625501ad13015501ad2bfc0433%22 )

1. Geography
   - The Huang He basin lies between 32°–42°N latitude and 96°–119°E longitude. It begins in the Bayan Har Mountains in the west, with the Bohai Sea to the east, the Yin Mountains forming its northern boundary, and the Qinling Mountains marking its southern edge. The terrain slopes downwards from the west to the east.
     - Western Section: The Qinghai Plateau dominates this region, with elevations ranging from 3,000 to 4,000 m.
     - Central Section: This area includes the Loess Plateau, Ordos Plateau, Hetao Plain, and mountain ranges such as the Xiaoshan, Xionger, Zhongtiao, and Taihang Mountains, with elevations between 1,000 and 2,000 m.
     - Eastern Section: This comprises the North China Plain and the central Shandong Hills. Most of the North China Plain lies below 100 m, while the Shandong Hills range between 400 and 1,000 m.

- Upper Course – The upper course of Huang He extend from its source to Hukou Town in Tuoketuo County, Nei Mongol Zizhiqu. This section spans 3,472 km, with a drainage area of 386,000 km² and a drop of 3,464 m. Major tributaries include the White River, Black River, Daxia River, Tao River, Huangshui River, Zuli River, Qingshui River, and Dahei River. The initial source of Huang He is known as Maqu, with Kariqu being the true origin. After emerging from Xingxinghai, the river flows through Zhaling Lake and Eling Lake, two significant freshwater lakes on the Qinghai-Tibet Plateau. Zhaling Lake covers 526 km² with an average depth of 9 m, while Eling Lake spans 610 km² with an average depth of 17.6 m.
- Middle Course – The middle course of Huang He extend from Hukou Town to Taohuayu near Zhengzhou, Henan Province, covering over 1,200 km with a drop of more than 880 m. In this section, the river flows through deep gorges, forming a natural boundary between Shaanxi and Shanxi provinces. The riverbanks in this region are mostly steep cliffs, rising tens to over a hundred metres above the water. The river channel is generally 200–400 m wide and is characterised by numerous rapids and shoals. This section is also home to the famous Hukou Waterfall, one of the river's most iconic features.
- Lower Course – The lower course of the Huang He extend from Taohuayu to its estuary, spanning over 780 km with a drop of 95 m and a drainage area of more than 20,000 km². This section is characterised by a flat riverbed and slow water flow, leading to significant sediment deposition. Around three-quarters of the sediment carried by the river is deposited at the estuary, while the remaining quarter accumulates within the river channel. This annual sediment build-up causes the riverbed to rise, creating the world-famous "suspended river", where the riverbed is generally 3–5 m higher than the surrounding ground outside the levees, with some sections exceeding 10 m.
- The lower course of Huang He has shifted 11 times since 1855. The present estuary, which is formed in 1976 is situated between Bohai Bay and Laizhou Bay, is a weak tidal river mouth with high sediment loads. In recent years, with control of various measures, the magnitude of shifting of the channel of the lower course reduces.
- The Huang He Delta is expanding rapidly, with an annual increase in land area of 30,000 – 40,000 mu. The river carries the sediments farther outwards at a rate of 1.6km/year. The modern delta, with Lijin Ninghai as its apex with the north, forms a fan-shaped area of more than 5,400 km². The Huang He Delta is still pushing further into Bohai Bay.

2. Climate and hydropower
   - The middle and upper reaches of the Huang He basin experience an arid to semi-arid continental monsoon climate, with an average annual precipitation of 478 mm.
   - Huang He ranks first globally in terms of sediment load and sediment concentration. Its average annual sediment transport is 1.6 billion tonnes, with an average sediment concentration of 37.7 kg/m³ (measured at Shanxian Station).

- The basin is also rich in hydropower resources, ranking second in China. The hydropower potential of the main stream and tributaries is 40 million kilowatts, with an estimated annual electricity generation capacity of over 350 billion kilowatt-hours. The main stream alone has a developable hydropower capacity of 25 million kilowatts.
- Notable hydropower stations include those at Liujia Gorge, Yanguo Gorge, Bapan Gorge, Qingtong Gorge, and Longyang Gorge.

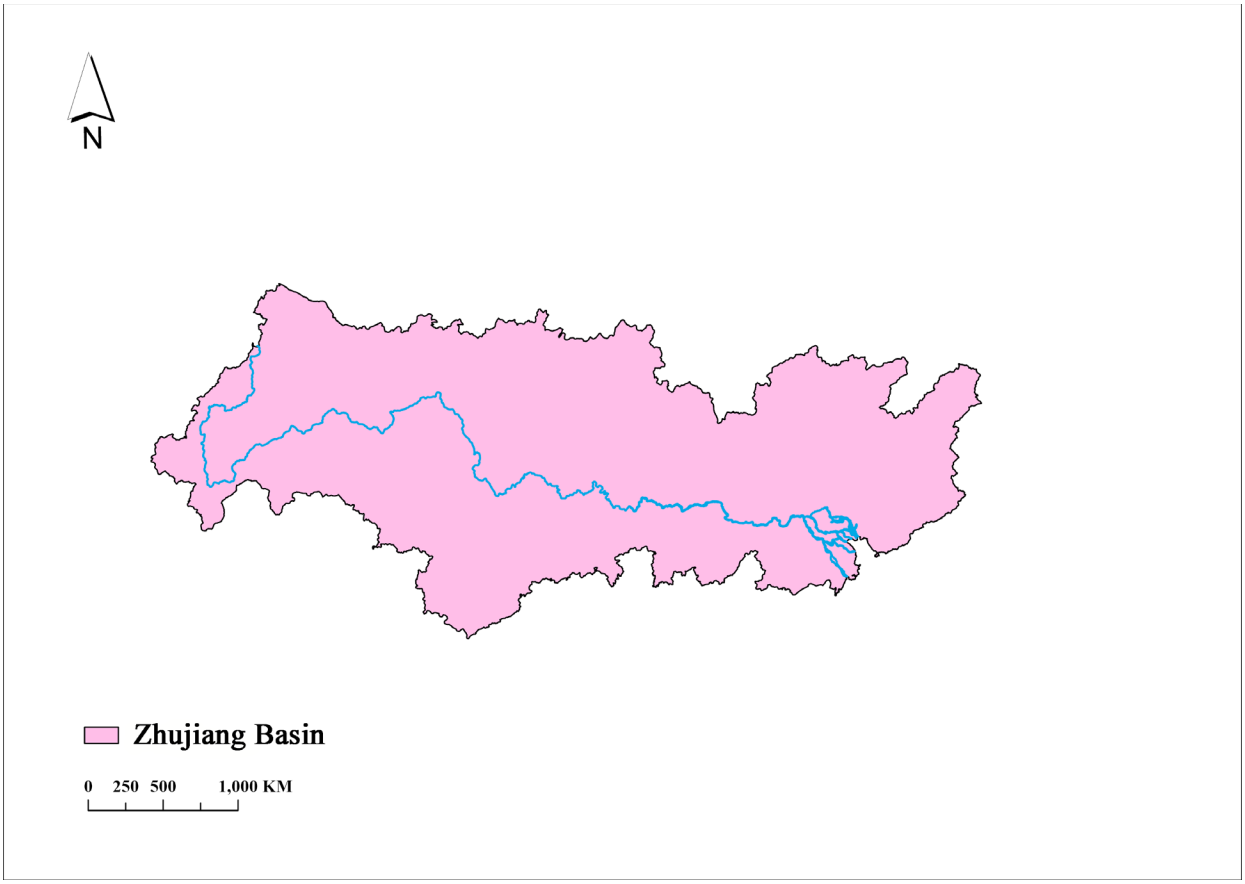
3. Socio-economic significance

- Often referred to as the "Cradle of Chinese Civilisation," the Huang He basin has been home to human activities for over 800,000 years. Settled agriculture emerged during the Neolithic period, and around 3,500 years ago, the Shang Dynasty Huang He basin became one of the world's three greatest civilisation centres. From the Xia Dynasty to the Northern Song Dynasty, the basin remained the political, economic, and cultural centres of our country.
- The upper course of Huang He feature vast grasslands, making the region a major producer of wool, leather, and other livestock products. The middle and lower reaches include the extensive Loess Plateau and alluvial plains, which are among the cradles of our country's agriculture. Provinces such as Shaanxi, Henan, and Shandong are key growing regions of wheat and cotton.
- Carp is a renowned fishery produce, while the estuarine and coastal areas yield over 20 types of aquatic produces, including prawns.
- The basin is rich in mineral resources, including coal, petroleum, iron, copper, aluminium, lead, gold, silver, tungsten, chromium, and magnesium. It has become a vital energy base, with hydropower development in the upper reaches, coal production in the middle reaches, and petroleum extraction in the lower reaches.

## III. Zhujiang

Originally, Zhujiang referred to the section of the river between Guangzhou and the Dongjiang Estuary, named after Haizhu Island, which is located at the estuary of the river. Over time, the name came to represent the entire river system. What is traditionally referred to as the Zhujiang Basin includes the Xijiang (West River), Beijiang (North River), Dongjiang (East River), and the vast Zhujiang Delta (Figure 5) (中國科學院地理科學與資源研究所, 2007c).

Figure 5: Map of the Zhujiang basin

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1. Geography
   - Zhujiang Basin spans across the provinces/autonomous region of Yunnan, Guizhou, Guangdong, Guangxi, Jiangxi, and Hunan. It is formed by the confluence of three major rivers: Xijiang, Beijiang, and Dongjiang. The main streams and tributaries stretch a combined length of approximately 11,000 km, with a total drainage area of 442,527 $km^2$ (中國年鑑,2024), including over 10,000 $km^2$ within Vietnam. Mountainous and hilly terrain accounts for 94.5% of the basin's total area, with plains and basins making up the remaining 5.5%. The topography slopes from the high northwest to the low southeast.
   - Main rivers and delta
     - Xijiang (West River): The Xijiang is the main trunk of Zhujiang, originating from Mount Maxiong in Zhanyi County, Yunnan Province. It spans a total length of approximately 2,210 km and has a drop of around 2,130 m. The drainage area above Sanshui is about 355,000 km2. Along its course, the names of Xijiang differs. After the confluence of the Nanpanjiang (South Pan River) and Beipanjiang (North Pan

River), it is called the Hongshui River; after passing through Dateng Gorge, it becomes the Qianjiang; and following its confluence with the Yujiang, it is known as the Xunjiang. After merging with the Guijiang at Wuzhou, it is officially called the Xijiang. The river connects with the Beijiang at Sixianjiao before flowing through the Zhujiang Delta into the South China Sea.

- Beijiang (North River): The main source of the Beijiang, called Zhenshui, originates from Xixiwang in Xinfeng County, Jiangxi Province. Its main stream is 468 km long, with a drainage area of approximately 46,000 $km^2$, the majority of which lies within Guangdong Province.
- Dongjiang (East River): The Dongjiang originates from Dazhu Ridge in Xunwu County, Jiangxi Province, and is initially called the Xunwu River. After merging with the Dingnan River, it becomes the Dongjiang. The river flows through eastern Guangdong Province, spanning a total length of 523 km with a drainage area of 28,000 km2 and a drop of approximately 440 m. At Shilong, the Dongjiang splits into two tributaries, forming the Dongjiang Delta. These tributaries, northern one and southern one, merge again to flow into the Shiziyang and exit into the sea via Humen.

- Zhujiang Delta: After the Xijiang and Beijiang merge at Sixian Jiaojiao, they form the Northwest River Delta, which features a dense network of waterways. This delta empties into the sea through eight estuaries: Humen, Jiaomen, Hongqili, Hengmen, Modaomen, Jitimen, Hutiaomen, and Yamen. The Dongjiang Delta, separated from the Northwest River Delta by Shiziyang, forms a composite delta with the latter. As a whole, the deltas cover an area of approximately 11,000 $km^2$, accounting for around 2% of the basin's total area. The Northwest River Delta extends seaward by 70–100 m annually due to sediment deposition, creating extensive tidal flats. Additionally, the ancient Xing'an Canal in Xing'an County, Guangxi Zhuangzu Zizhiqu, connects the Xiang River and the Li River, forming a historical link between the Chang Jiang and Zhujiang systems.

2. Climate and hydropower
   - The Zhujiang Basin is located in a tropical and subtropical monsoon climate zone. Annual rainfall varies between 1,000 and 2,000 mm, reaching up to 3,000 mm in some coastal regions, while the Yunnan-Guizhou Plateau receives less. Heavy rainfall is common, with precipitation concentrated in the summer and autumn months. In northern and central Guangxi, prolonged torrential rains often cause significant flooding in Xijiang.
   - The basin's annual average runoff is 341.2 billion $m^3$, making it the second-largest river system in our country in terms of water volume. The Xijiang contributes approximately 267 billion $m^3$ (80% of the total), the Beijiang 47.2 billion $m^3$, and the Dongjiang 27.2 billion $m^3$. The flood season occurs between April and September, accounting for 70–80%

of the year's discharge. Summer floods are common, and significant autumn floods often affect the lower course and the delta.

- The Zhujiang Basin has an estimated hydropower potential of 33.35 million kilowatts, with an annual electricity generation of 292.1 billion kilowatt-hours, accounting for 5.8% of the national total. Most hydropower resources are concentrated along the Xijiang, which holds 29.43 million kilowatts of potential (88% of the basin total) and 21.17 million kilowatts of exploitable capacity (86% of the basin total). The basin also boasts a navigable waterway network of approximately 12,900 km, accounting for one-quarter of our country's inland navigation mileage.

3. Socio-economic significance
   - The Zhujiang Basin is a key agricultural and forestry region in our country, serving as a major production base for tropical and subtropical crops. It is one of the country's main commodity grain bases, with sugarcane production accounting for about half of the national total. Key tropical crops include rubber, oil palm, coffee, cocoa, sisal, and citronella. The basin is also home to approximately 250 species of freshwater fish, including carp, crucian carp, bream, grass carp, silver carp, and bighead carp, as well as unique local species such as mud carp and tinfoil barb. Migratory species, such as shad, anchovy, mullet, burbot, eel, flower eel, perch, mullet and so on. The estuarine areas of the delta are rich in shellfish, blue crabs, sand shrimp, and farmed oysters.
   - The Zhujiang Basin is rich in mineral resources, including coal, manganese[1], pyrite, iron, aluminium, tungsten, tin, and zinc. Along the rivers, particularly near the Xijiang, Xunjiang, and Yujiang, fertile valleys and plains dominate. The delta plains are especially important for the production of grain, pond fish, marine products, sugarcane, mulberry, silk, and poultry (chickens, ducks, and geese), as well as various economic crops.
   - Zhujiang Delta is the largest plain in Guangdong province. It is located at the estuary of Zhujiang which flows into South China Sea. With its rich agricultural resources and development of high-tech industries, in 2010, the Zhujiang Economic Zone was developed to be the world's most urbanised and the largest megalopolis. In 2018, the GDP of the Zhujiang Economic Zone accounted for 80.2% of that of Guangdong province, equivalent to 9% of the GDP of the country.

## IV. Conclusion

Chang Jiang, Huang He, and Zhujiang are far more than geographical landmarks; they are lifelines of our country. From the towering gorges of the Chang Jiang to the sediment-rich waters of the

[1] Manganese ore is a very important mineral resource and is widely used in steel production, battery manufacturing, and the chemical industry.

Huang He and the fertile plains of the Zhujiang Delta, each river has contributed uniquely to our country's agriculture, hydropower, navigation, and biodiversity. They have also fostered human civilisation over millennia, shaping the historical and cultural legacy of our country. As these rivers continue to sustain the livelihoods of millions and power our country's economy, their protection and sustainable use remain vital for preserving their role as the arteries of our country's life and progress.

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