

Boundary Data of the Koshi River Basin

Zhang, Y. L.^{1,2} Wu, X.¹ Gao, J. G.³ Li, B. Y.¹

1. Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences, Beijing 100101, China;

2. University of Chinese Academy of Sciences, Beijing 100049, China;

3. Texas A & M University, Texas 76502, USA

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The Koshi River originates from the Dasuopu Glacier, which located on the north slope of Xixabangma in the central Himalayas. It crosses the entire mountain range from the north and eventually reaches the Ganges plain in the south. The Koshi River flows through China, Nepal, and India, making it a crucial tributary of the Ganges River and a significant transboundary river in South Asia. The drainage system of Koshi River basin (KFB) is primarily composed of three tributaries: Sun Koshi River in the west branch, Arun River in the north branch and Tamor River in the east branch^[1-4]. The Sun Koshi River originates in Tibet, China (In China it is known as Yairuzangbo), and with a length of 366 km. Tamor River originates from Mount Kanchenjunga, and with a length of 191 km. The middle and upper reaches of the Arun River are called Pumqu in China and originate from Dasuopu Glacier on the north slope of Mount Xixabangma. The length of the Arun River is 523 km, and the length of the Koshi River basin is 801 km. The three rivers join to form the Koshi River near Dhankuta and finally join the Ganges at Katihar in India. The Koshi River rises north to the Laguigangri mountains, South to the junction of the Koshi River on the Ganges plain, West to the Kathmandu valley, east to the New Garira Mountains^[2-4]. The Koshi River basin located in 85°01'E–88°57'E, 25°20'N–29°09'N, spans three countries: China, Nepal and India. The KRB has a total area of 87,723 km² and a circumference of 1,985 km, the northern part

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***Corresponding Author:** Zhang, Y. L., Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences zhangyl@igsnr.ac.cn

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located in Tibet autonomous region of China, covering an area of 29,387 km², accounting for 33.50% of the total basin area; the central part located in Nepal, covering an area of 39,494 km², accounting for 45.02% of the total basin area; the southern part located in India, covering an area of 18,841 km², accounting for 21.48% of the total basin area.

The Koshi River basin boasts the world's greatest elevation drop. It is home to six of the world's fourteen highest peaks above 8,000 m^[2-4], including Mount Qomolangma (8,848.86 m), Mount Kanchenjunga (8,586 m) and Mount Lhotse (8,516 m), etc. Among them, Qomolangma is the highest peak in the basin, while the lowest peak lies at the confluence of the Koshi and Ganges rivers, with an elevation of only 33 m. The basin experiences an elevation drop of 8,810 m, resulting in complete vertical natural zones, varieties of landscape types, land use forms are abundant and significant regional differences^[4-6].

The Koshi River basin in China comprises mainly the Pumqu basin and Yairuzangbo basin. Langqiang Co, situated in the rain shadow zone of The Himalayas, as well as Baikui mai Co and Cuomuzhelin lake, are primarily fed by precipitation, and the three lakes were originally part of Pumqu basin. As the climate of "rain shadow zone" became dry and the precipitation decreased, the lake shrank and the lake surface decreased, and finally closed into three independent inland basins, Langqiang Co basin (with an area of 71 km², a circumference of 40 km), Baikui mai Co basin (71 km², 38 km) and Cuomuzhelin basin (1,067 km², 181 km). Their original outflow rivers were separated by accumulation plains. Their original outflow rivers are separated by an accumulation plain with a residual dry channel, which can be regarded as a product of climate change and a part of the Koshi River basin.

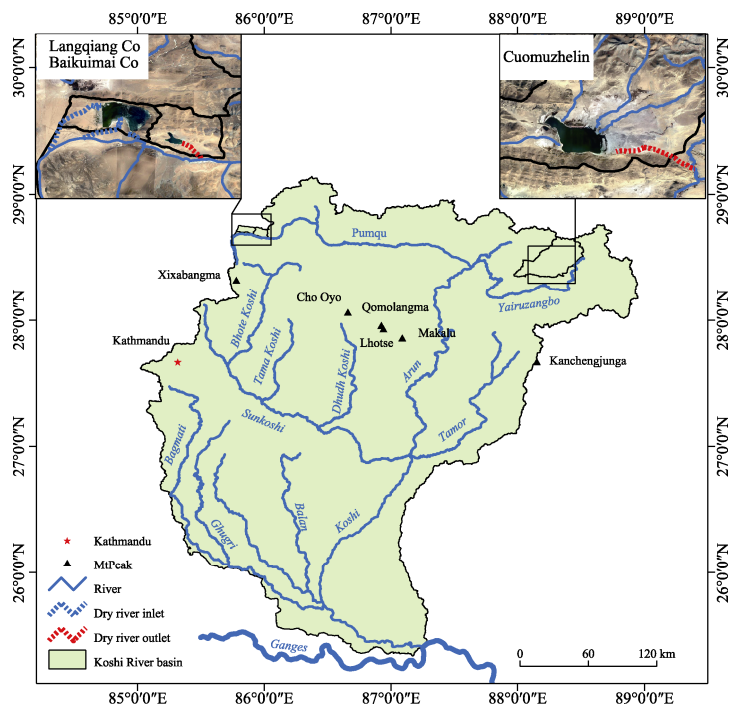


Figure 1 Map of Koshi River basin

The KRB involves 5 counties in China's Tibet autonomous region, 3 provinces with 27 districts in Nepal, and 1 state 6 zones with 14 counties in India. The list of administrative regions in the KRB was shown in Table 1.

Table 1 Administrative regions of Weihe River basin

Country	State/Province	Zone/ City	County /District	Area (km ²)
China	Tibet auton- omous region	Rikaze city	Dingjie county, Nyalam county, Kamba county and Sa'gya country (5 counties)	29,387
Nepal	Province NO.1		Taplejung, Panchthar, Sankhuwashava, Bhojpur, Tehrathum, Dhankuta, Sunsari, Solukhumbu, Khotang, Okhaldhunga, Udayapur	39,495
	Province NO.2		Saptari, Siraha, Dhanusha, Mahottari, Sarlahi, Rautahat, Bara	
	Province NO.3		Ramechhap, Sindhuli, Sindhupalchowk, Lalitpur, Kathmandu, Bhaktapur, Kabhrepalanchow, Makawanpur, Dolakha	
Total (Nepal)	3 provinces		27 districts	
India	Bihar state	Tirhut zone	Muzaffarpur, Purba Champaran, Sitamarhi, Sheohar	18,823
		Darbhangha zone	Darbhangha, Madhubani, Samastipur	
		Munger zone	Begusarai, Khagaria	
		Purnia zone	Purnia	
		Kosi zone	Saharsa Madhepura	
		Bhagalpur zone	Bhagalpur	
Total (India)	1 state	6 zones	14 counties	

*From references [7, 8].

The boundary data of the KRB was developed based on ASTER-DEM with a precision of 30 m×30 m and Google Earth image to interpret the distribution of river network, the river network and watershed are generated in ArcGIS software to extract the preliminary results. Then, the Koshi River basin boundary was manually revised at the scale of 1:100,000 by referring to Google Earth image with 10 m×10 m spatial resolution and DEM data. The boundary of the Koshi River basin is not include the three inland basin of Langqiang Co basin, Baikuimai Co basin and Cuomuzhelin basin when used, the actual area of Koshi River basin is 86,539 km² and a circumference of 2,134 km. The data is archived in both .kmz and .shp formats with the compressed data size of 22.7 MB^[9].

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