Information Sheet 1: The Sun Koshi River Basin

Introduction

The Sun Koshi is a transboundary river basin shared between Tibet Autonomous Region in PR China and Nepal (Figure 1). The river has its source on the northwestern slopes of Laptshegang mountain and is called Poiqu until it crosses into Nepal near Liping. It takes the name Bhote Koshi in the upper reaches in Nepal, changing to Sun Koshi close to Barabise where it merges with the small tributary of that name, whose source lies in Nepal. The basin is located between latitudes 26°37' to 28°32'N and longitudes 85°43' to 86°18'E. It covers an area of 3,394 km2, 60% (2,007 km2) within China, and has an elevation range from 8,012 masl at Xixiabangma to 620 masl at the river outlet near Dolalghat in Nepal. The only highway linking Nepal and China (the Arniko highway) passes through this basin and is aligned along the river channel.

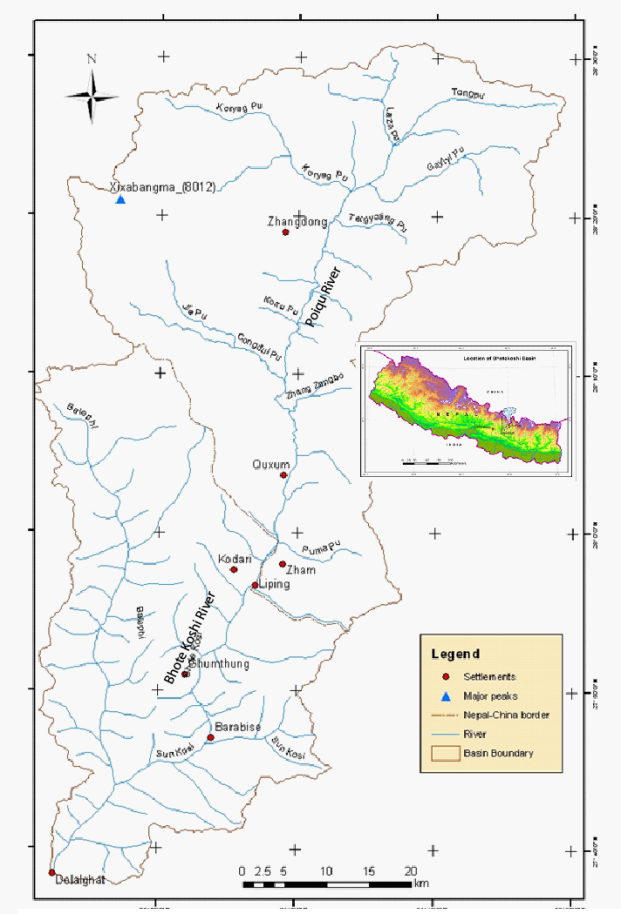


Figure 1: THE SUN KOSHI RIVER BASIN – LOCATION AND RIVER NETWORK

Meteorology and Hydrology of the basin

The Chinese part of the Sun Koshi basin lies on the leeward side of the Himalayan range. There is only one meteorological station in this part of the basin at Nialamu (3,310 masl). The next closest station is at Dingri (4,300 masl) about 76 km away to the northeast. The mean annual precipitation at Nialamu is around 700 mm and at Dingri about 300 mm. The Nepalese part of the basin lies on the southern slope of the Himalaya. There are six rainfall stations within this part of the basin and several more in the vicinity. The precipitation is considerably higher, annual rainfall ranges from about 1,300 to 4,100 mm. The precipitation pattern follows the general trend in the Himalaya with an increase in annual rainfall from south to north on the southern slope followed by a drastic decrease on the leeward side, and marked seasonal variation on the southern slope with most of the precipitation in the monsoon season (Figure 2, 3). Seasonal variation in precipitation and river discharge at Barabise is shown in the Figure 4.

The part of the basin in the Tibetan Plateau is heavily glaciated, while the Nepalese side has very little glacier cover. In 2000, the glaciated area was 232 km2, or 7% of the total basin area, with 11.5% of the area in TAR, China glaciated. The glaciers are retreating rapidly, however, with some on the east slope of Mt. Xixabangma retreating at rates of 50–70 m per year. The rapid deglaciation has resulted in the formation and growth of several glacial lakes. In 1988, there were 119 glacial lakes in the basin, covering an area of 13.4 km2 areas, by 2000 this had grown to 139 lakes with an area of 16.4 km2, an increase of 18% in 12 years. Nine glacial lakes in the basin have been identified as potentially dangerous (Ives et al., 2010; Yamada & Sharma, 1993).

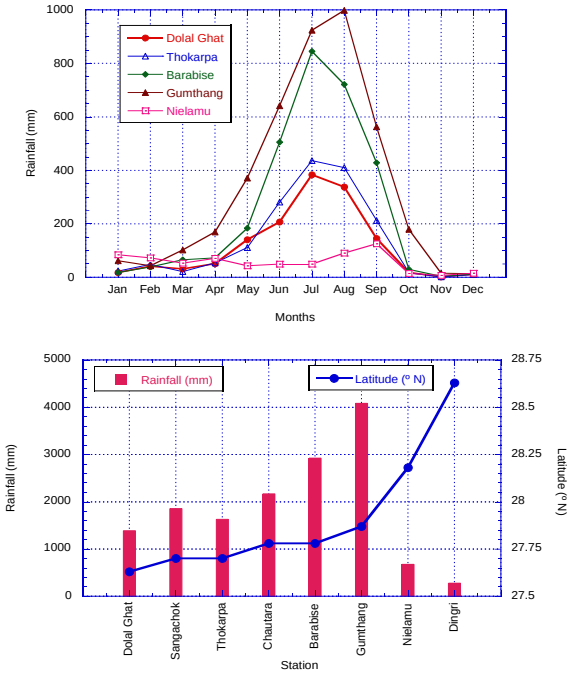


Figure 3: Seasonal variations of precipitation at stations in the Poiqu/bhote Kosi basin (top) and variation in annual precipitation with latitude

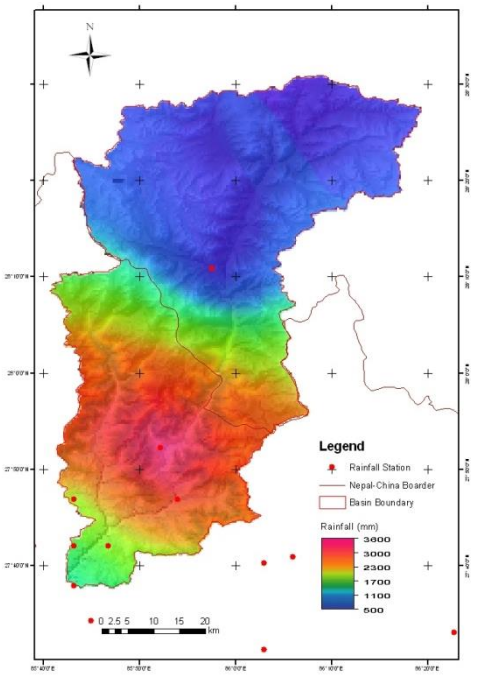
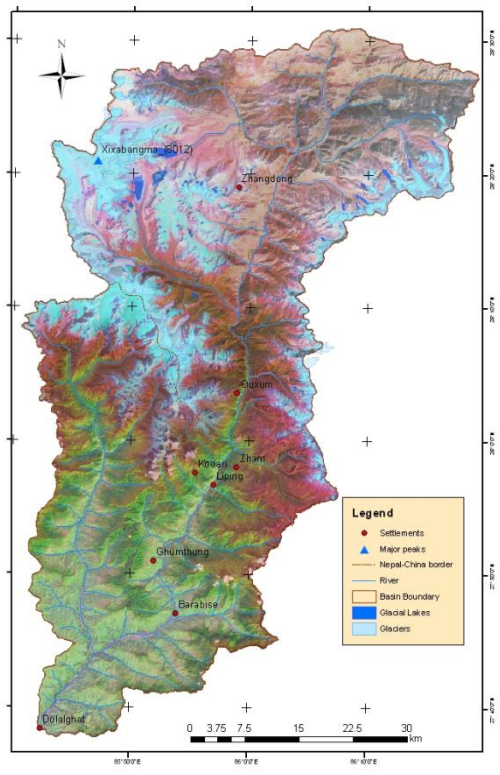


Figure 2: Spatial distribution of precipitation in Poiqu/Bhote Kosi basin locations of stations to derive the spatial distribution.



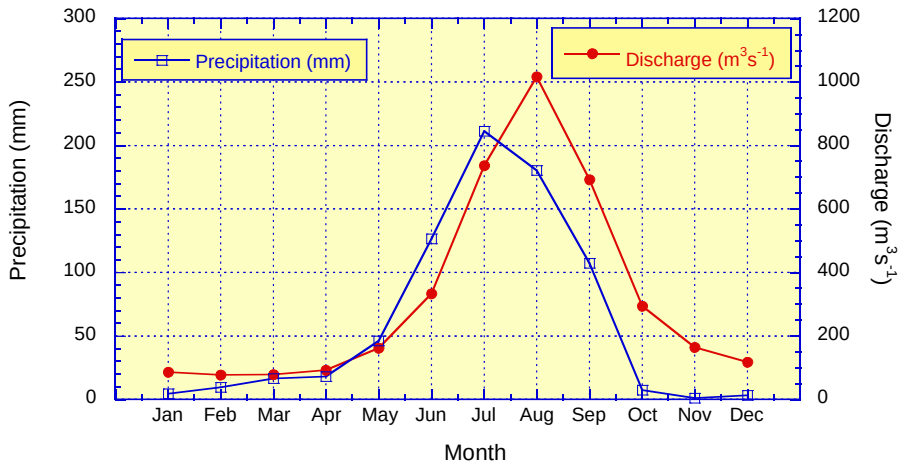


Figure 4: Seasonal variations in precipitation and river discharge at Barabise

Socio-economic scenario

The basin is highly important socio-economically. The only all weather highway linking Nepal with China passes through this basin and has great economic significance with a high volume of goods transporters. There are two medium size hydropower stations on this part of the river – the Sun Koshi and Bhote Koshi – and several mini hydropower plants within the basin. These power plants are connected to the central power grid by a high tension transmission system.

In 2009, ICIMOD conducted a detailed socioeconomic study of the Sun Koshi river corridor in relation to GLOF risk assessment. The total number of people living in these areas according to the 2001 population census was 639,000. The major source of family income for a large proportion of families was wage labour followed by trade and business and agriculture. Agriculture is still the dominant sector in the lower reaches – the Sukute, Lamosangu, and Barabise area. The main sectors providing employment opportunities are mining of sand gravel, stone and slate; small-scale industries such as carpet, paper, and bread; transport and construction work, especially loading and unloading of goods, and maintenance of roads and drainage systems; and trade and business, mainly in hotels and restaurants. In addition, many people go to Kathmandu in search of jobs and work as wage labourers. Many families are also involved in wholesale and retail trade. Food scarcity is more widespread in the upper reaches than in the lower reaches. Close to 50% of families are below the poverty line. The proportion of poor households is relatively higher in Tatopani and Liping in the upper reaches, Shakhuwa and Chaku in the middle reaches, and Sukute and Balephi in the lower reaches.