



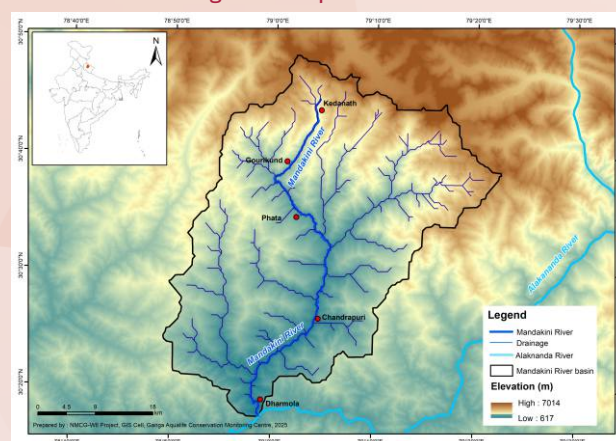
Mandakini

GENERAL INFORMATION

- Mandakini River, a tributary of the Alaknanda River, originates at the Chorabari Glacier (3,895 m asl), near Kedarnath in the Rudraprayag district of Uttarakhand, and flows for about 80 km through the district.
- It meets the Alaknanda River at Rudraprayag.
- Mandakini River basin spans an area of about 1,666.34 km² (Figure 1).
- The basin falls under the Himalaya (West Himalaya – 2B) biogeographic zone.
- The climate of Mandakini basin is subtropical.
- The basin features prominent glacial and fluvial landforms, with glacio-fluvial deposits and outwash plains near Kedarnath, and downstream sections marked by deep gorges, V-shaped valleys, incised meanders, and waterfalls.
- Major left-bank tributaries of the Mandakini River include the Basukiganga, Kali Ganga, and Madhyamaheshwar Ganga, while Laster Gad joins from the right.
- The population density along the river is 122.12 persons/km².

- Decadal LULC changes in the Mandakini basin (2008-09 to 2018-19) showed area under kharif crop and double/triple cropping increased by 1.2% and 2.43%, respectively, reflecting agricultural intensification. Current fallow land declined by 2.99%. Evergreen forest showed a slight decrease (0.2%), while deciduous and scrub forests remained nearly stable. Grassland expanded by 0.3%, wasteland reduced by 1.07%, water bodies declined marginally by 0.02%, snow cover increased by 0.37%, and built-up areas remained unchanged (Figures 2a and 2b).

Figure 1: Map of Mandakini River basin



BIODIVERSITY VALUE

- Mandakini basin is dominated by non-forest areas (44.23%), followed by moderately dense forest (29.82%), very dense forest (12.92%), open forest (12.82%), and scrubland (0.21%) (Figure 3).
- At higher elevations, the basin supports alpine meadows and sub-alpine forests dominated by *Juniperus* spp., *Rhododendron* spp., *Betula utilis*, and diverse alpine herbs such as *Anaphalis* spp., *Potentilla* spp., and *Primula* spp. Mid-elevation temperate forests are characterized by oak species like *Quercus semicarpifolia*, *Q. leucotrichophora*, and *Q. glauca*. Lower-elevation subtropical and tropical forests are dominated by chir pine (*Pinus roxburghii*) with associated broadleaf species.
- The basin supports the rare, sacred flower, Brahmakamal (*Saussurea obvallata*).
- 26 mammalian species (14 families and 21 genera) have been recorded from the Kedarnath Valley of the Mandakini basin, which includes the Endangered Himalayan muskdeer (*Moschus leucogaster*), Vulnerable Asiatic black bear (*Ursus thibetanus*) and leopard (*Panthera pardus*), and Royle's pika (*Ochotona roylei*).
- 86 fish species belonging to 7 orders, 19 families and 48 genera have been documented from the river, including the Endangered golden mahseer (*Tor putitora*), and Vulnerable snowtrout (*Schizothorax richardsonii*).

Figure 2a: LULC map of Mandakini River basin (2008-09)

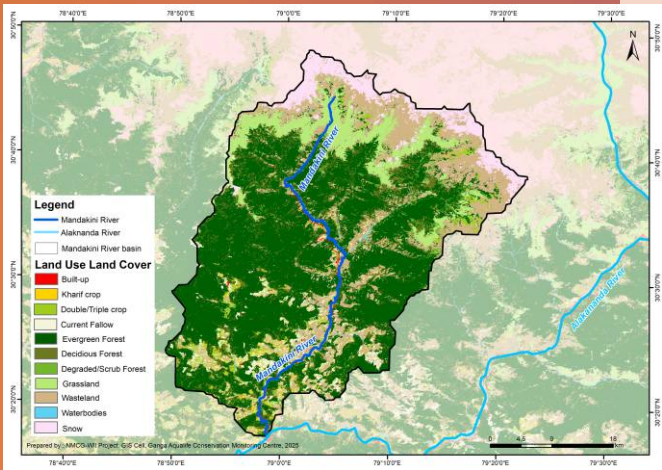


Figure 2b: LULC map of Mandakini River basin (2018-19)

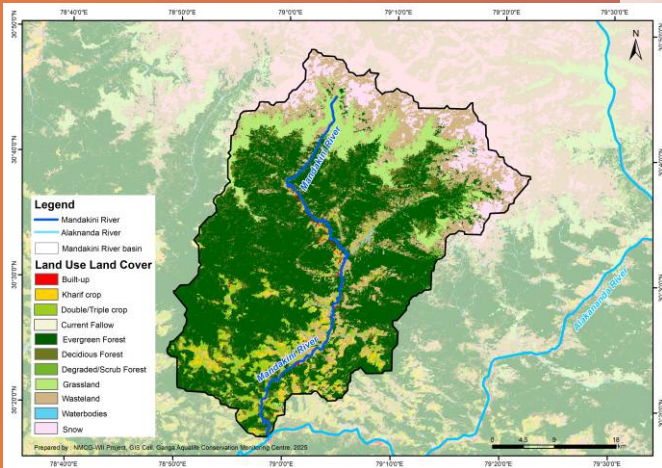
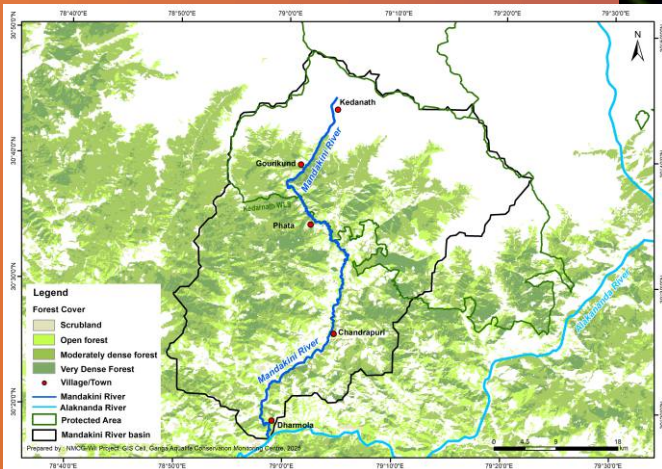


Figure 3: Forest cover of Mandakini River basin (2019)



CONSERVATION SIGNIFICANCE

ENDANGERED

Avifauna

Pallas's fish-eagle *Haliaeetus leucoryphus* (Pallas, 1771)

Fish

Golden mahseer *Tor putitora* (Hamilton, 1822)
Glyptothorax madraspatanus (Day, 1873)

VULNERABLE

Fish

Gangetic loach *Botia rostrata* (Gunther, 1868)
Dark mahseer *Naziritor chelynoides* (McClelland, 1839)
Hill trout *Schizothorax plagiostomus* (Heckel, 1838)
Snowtrout *Schizothorax richardsonii* (Gray, 1832)

KEY PROTECTED AREAS

Kedarnath Wildlife Sanctuary

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DRIVERS OF RIVERSCAPE CHANGE

- Climate change is accelerating glacial melt in the Chorabari Glacier, intensifying rainfall and cloudburst events, and increasing landslide frequency, collectively intensifying the risk of flash floods, as seen during the 2013 Kedarnath disaster.
- The two dams on Mandakini River, namely Phata-Byung Hydroelectric project and Singoli-Bhatwari Hydroelectric Project, impact flow regimes, sediment transport and downstream river dynamics.
- Anthropogenic pressures such as construction and urbanization disrupting natural flow, heavy tourism stressing the ecosystem, resource extraction altering the riverbed, sewage and waste pollution degrading water quality, and deforestation reducing soil stability are collectively degrading the river system and increasing erosion.

INTERESTING FACTS

- Rudraprayag, the confluence of Alaknanda and Mandakini, is the fourth of the five sacred confluences in Hindu mythology along the Alaknanda River, termed as 'Panch Prayag'. The confluence is named after Lord Rudra (another name for Lord Shiva, one of the three supreme Hindu deities) and holds strong spiritual significance.
- Mandakini River carries deep cultural significance, as it flows through the sacred landscape of Kedarnath and Tungnath, two of the Panch (translation: 'five') Kedar shrines dedicated to Lord Shiva. Kedarnath is one of the twelve *Jyotirlingas*, while Tungnath, the highest Shiva temple in the world, stands on the ridge dividing the Mandakini and Alaknanda catchments. Kedarnath Dham is also part of the *Chhota Char Dham* pilgrimage circuit in Uttarakhand.
- Chandrashila Peak (3,690 m asl), located just above Tunganath Temple, is known as the "Moon Stone." According to Hindu mythology, Lord Rama (an incarnation of Lord Vishnu, one of the three supreme Hindu deities) and Chandra (the Hindu God of the moon) meditated here. The peak offers 360-degree panoramic views of Himalayan peaks like Nandadevi, Trisul and Chaukhamba, making it popular among trekkers and pilgrims alike.
- Triyuginarayan, situated near Sonprayag, the confluence of Mandakini and Songanga (Vasuki Ganga) rivers, is celebrated as the site of Lord Shiva and Goddess Parvati's wedding. Consequently, making it an immensely popular wedding destination.
- Brahmakamal, a flowering species named after Lord Brahma (one of the three supreme Hindu deities), has immense cultural significance and is a part of religious rituals. Sold to pilgrims, it is overexploited due to high demand, leading to its decline in the fragile alpine habitats.



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