

CONSERVATION SIGNIFICANCE

CRITICALLY ENDANGERED

Avifauna

Baer's Pochard *Aythya baeri* (Radde, 1863)
Sociable lapwing *Vanellus gregarius* (Pallas, 1771)
Spoon-billed sandpiper *Calidris pygmaea* (Linnaeus, 1758)

Reptile

Gharial *Gavialis gangeticus* (Gmelin in Linnaeus, 1789)
Northern river terrapin *Batagur baska* (Gray, 1830)
Red-crowned roofed turtle *Batagur kachuga* (Gray, 1831)
Three-striped roofed turtle *Batagur dhongoka* (Gray, 1832)
Elongated tortoise *Indotestudo elongata* (Blyth, 1853)

Fish

Ganges shark *Glyphis gangeticus* (Müller and Henle, 1839)

ENDANGERED

Avifauna

Great knot *Calidris tenuirostris* (Horsfield, 1821)
Spotted greenshank *Tringa guttifer* (Nordmann, 1835)
Black-bellied tern *Sterna acuticauda* (Gray, 1832)
Indian skimmer *Rynchops albicollis* (Swainson, 1838)
Pallas's fish-eagle *Haliaeetus leucorhynchus* (Pallas, 1771)
Steppe eagle *Aquila nipalensis* (Hodgson, 1833)

Mammal

Gangetic dolphin *Platanista gangetica* (Lebeck, 1801)
Irrawaddy dolphin *Orcaella brevirostris* (Owen in Gray, 1866)

Reptile

Crowned river turtle *Hardella thurjii* (Gray, 1831)
Spotted pond turtle *Geoclemys hamiltonii* (Gray, 1830)
Indian eyed turtle *Morenia petersi* (Anderson, 1879)
Indian narrow-headed softshell turtle *Chitra indica* (Gray, 1830)
Indian softshell turtle *Nilssonina gangetica* (Cuvier, 1825)
Indian peacock softshell turtle *Nilssonina hurum* (Gray, 1830)
Tricarinate hill turtle *Melanochelys tricarinata* (Blyth, 1856)

Fish

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

VULNERABLE

Avifauna

Common pochard *Aythya ferina* (Linnaeus, 1758)

Lesser white-fronted goose *Anser erythropus* (Linnaeus, 1758)
Long-tailed duck *Clangula hyemalis* (Linnaeus, 1758)
Red-breasted goose *Branta ruficollis* (Pallas, 1769)
Horned grebe *Podiceps auritus* (Linnaeus, 1758)
Sarus crane *Grus antigone* (Linnaeus, 1758)
Grey plover *Pluvialis squatarola* (Linnaeus, 1758)
Broad-billed sandpiper *Calidris falcinellus* (Pontoppidan, 1763)
Curlew sandpiper *Calidris ferruginea* (Pontoppidan, 1763)
Wood snipe *Gallinago nemoricola* (Hodgson, 1836)
River tern *Sterna aurantia* (Gray, 1831)
Eastern imperial eagle *Aquila heliaca* (Savigny, 1809)
Greater spotted eagle *Clanga clanga* (Pallas, 1811)
Black-capped kingfisher *Halcyon pileate* (Boddaert, 1783)

Mammal

Smooth-coated otter *Lutrogale perspicillata* (I. Geoffroy Saint-Hilaire, 1826)
Asian small-clawed otter *Aonyx cinereus* (Illiger, 1815)

Reptile

Mugger *Crocodylus palustris* (Lesson, 1831)
Indian roofed turtle *Pangshura tecta* (Gray, 1830)
Indian flapshell turtle *Lissemys punctata* (Lacépède, 1788)
Indian star tortoise *Geochelone elegans* (Schoepff, 1795)

Fish

Bull shark *Carcharhinus leucas* (Valenciennes in Müller and Henle, 1839)
Botia rostrata (Günther, 1868)
Dark mahseer *Naziritor chelynoides* (McClelland, 1839)
Chirruh snowtrout *Schizothorax esocinus* (Heckel, 1838)
Asla *Schizothorax plagiostomus* (Heckel, 1838)
Snowtrout *Schizothorax richardsonii* (Gray, 1832)
Bagarius bagarius (Hamilton, 1822)
Wallago attu (Bloch and Schneider, 1801)

KEY PROTECTED AREA

Gangotri National Park
Rajaji National Park
Hastinapur Wildlife Sanctuary
Dr. Bhimrao Ambedkar Wildlife Sanctuary
Kachhua Wildlife Sanctuary
Vikramshila Gangetic Dolphin Sanctuary
Udhwa Lake Bird Sanctuary
Purbasthali Wildlife Sanctuary
Jhilmil Jheel Conservation Reserve
Gogabeel Community Reserve

DRIVERS OF RIVERSCAPE CHANGE

- Ganga basin is among the most densely populated river basins globally (~560 persons/km²), with 54 Class-I cities and 30 Class-II towns located within 10 km of the river. Rapid urbanisation has led to large volumes of untreated or partially treated sewage and industrial effluents entering the river and its tributaries, contributing to significant water quality degradation.
- With over 60% of the basin under agriculture, runoff carrying fertilisers, pesticides, and sediments constitutes a major non-point source of pollution, affecting water quality and aquatic ecosystems.
- Major barrages, including Bhimgoda, Chaudhary Charan Singh Madhya Ganga (Bijnor), Narora, Lav Kush (Kanpur), and Farakka—along with pump canal projects such as Narayanpur and Bhupauli, and seven dams on the mainstem, regulate and divert large volumes of water. These structural interventions fragment the river continuum, alter natural flow regimes and seasonal discharge patterns, disrupt sediment transport, and adversely affect aquatic biodiversity.
- Expansion of inland water transport and barge movement contributes to channel modification, bank disturbance, and underwater noise, impacting sensitive species such as the Gangetic dolphin.
- Sand extraction destabilises riverbeds and banks, alters channel morphology, and degrades critical habitats.
- Protected Areas (around 140) in the Ganga basin provide refuge for biodiversity, partially mitigating ecological pressures within the basin. There are approximately ten protected areas located along or near the Ganga mainstem.

INTERESTING FACTS

- *Ganga Avataran*, a prominent narrative in Hindu mythology, describes the descent of the Ganga from the heavens to Earth to purify the ashes of King Sagara's 60,000 sons following the penance of King Bhagiratha. According to the tradition, Lord Shiva restrained the river's immense force in his matted hair before releasing it in streams to prevent catastrophic flooding. The river is revered as the goddess Ganga, symbolically depicted with her *vahana*, the *Makar*.
- *Kumbh Mela*, one of the largest religious gatherings in the world, was inscribed by UNESCO as an Intangible Cultural Heritage of Humanity in 2017. The festival is held periodically, in rotation, at four sacred sites—Haridwar, Ujjain, Nashik, and Prayagraj—associated with the mythological *Samudra Manthan* (churning of the ocean of milk), where drops of *Amrit* (nectar of immortality) are believed to have fallen.
- Archaeological excavations at sites such as Hulas, Alamgirpur, Mandi, Madarpur, Bhorgarh, and more recently Sinauli in the Ganga-Yamuna Doab indicate their coexistence with the Mature Harappan Civilization. The Sinauli site in Baghpat district, Uttar Pradesh, dating to around 1900 BCE, contains India's largest necropolis (an extensive burial ground) and has yielded unique Bronze Age cart burials.
- *Fontana dei Quattro Fiumi* (Fountain of the Four Rivers) in Piazza Navona, Rome, (commissioned by Pope Innocent X, designed by Gian Lorenzo Bernini in 1651), features sculptural personifications of four major rivers representing the continents known to Renaissance geographers—Ganga (Asia), Nile (Africa), Danube (Europe) and Río de la Plata (America). Ganga is depicted holding an oar, symbolizing the river's navigability.
- Three biosphere reserves within the Ganga basin, namely Nanda Devi, Sundarbans, and Panna, are designated under UNESCO's Man and the Biosphere (MAB) Programme.

VIBRANT GANGA



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Ganga



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GACMC/NCRR

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GENERAL INFORMATION

- Ganga River, the National River of India, originates from *Gomukh*—the snout of the Gangotri Glacier (4,070 m asl; Uttarkashi district, Uttarakhand)—as the Bhagirathi River, which meets the Alaknanda River at Devprayag (Tehri Garhwal district, Uttarakhand), downstream of which it is known as the 'Ganga'.
- Ganga flows for approx. 2,525 km through the states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal, encompassing 57 districts, before draining into the Bay of Bengal at Gangasagar (South 24 Parganas district, West Bengal).
- Ganga River basin is a transboundary basin spanning four countries, namely India, Nepal, Tibet (an autonomous region in the People's Republic of China), and Bangladesh, and covers an area of approx. 1,086,000 km², of which 861,404 km² (approx. 80%) lies in India (Figure 1).
- The basin falls in six biogeographic zones, viz. Trans-Himalaya (Tibetan Plateau – 1B), Himalaya (West Himalaya – 2B; Central Himalaya – 2C), Semi-Arid (Punjab Plains – 4A; Gujarat Rajputana – 4B), Deccan Peninsula (Central Highlands – 6A; Chotanagpur – 6B), Gangetic Plain (Upper Gangetic Plains – 7A; Lower Gangetic Plains – 7B), and Coasts (East Coast – 8B).
- Ganga basin is characterized by pronounced altitudinal gradients, ranging from near sea level to over 8,000 m asl, and by diverse geological formations and geographic features, including the geologically young Himalayan mountain range (featuring glaciers, steep mountains and valleys, rugged terrain, and high seismicity); the geologically ancient Aravalli, Vindhya, and Satpura ranges (with discontinuous ridges, rounded hills, plateaus, and valleys); the Malwa, Bundelkhand, Baghelkhand and Chota Nagpur plateaus; the vast Gangetic alluvial plains; and the Sundarbans delta.
- The basin exhibits diverse climate regimes, influenced primarily by the Himalaya and peninsular hill ranges, the South-West Monsoon, and Western Disturbances. These range from alpine climate at higher elevations in the Trans- and Upper Himalaya; subtropical highland climate across the Middle and Lower Himalaya; hot semi-arid steppe climate in the

- transition zone between the Thar Desert and the Gangetic plains; monsoon-influenced humid subtropical climate across the Gangetic plains; to tropical wet and dry (savanna) climate in parts of West Bengal.
- Ganga River is characterised by steep, vertically eroding channels in the upper Himalayan stretch, meandering alluvial floodplains in the middle Gangetic plains, and braided, deltaic channels in its lower and deltaic reaches.
- Drainage pattern of the rivers in the Ganga basin ranges from trellis to dendritic in the Himalaya, dendritic to meandering in the Gangetic plains, dendritic to sub-dendritic in the Aravalli Range, rectangular to trellis in the Malwa and Bundelkhand plateaus, rectangular in the Vindhya Range, radial to trellis in the Chhota Nagpur Plateau, and braided and distributary in the lower stretch (Jharkhand and West Bengal).
- Major tributaries of the Ganga are the Yamuna, Ramganga, Gomti, Ghaghra, Son, Gandak, Kosi, Ajay, Damodar, Rupnarayan, and Mahananda.
- Population density along the Ganga mainstem is 952.55 persons/km².
- Decadal LULC transitions in the Ganga basin (2008-09 to 2018-19) indicate a significant increase in double/triple cropping (9.26%) and kharif cropping (2.22%), accompanied by declines in current fallow (-6.92%), wasteland (-2.39%) and rabi cropping (-1.87%), reflecting a shift towards agricultural intensification. Marginal increases were observed in built-up area (0.39%), grassland (0.30%), water bodies (0.05%), plantations (0.02%) and scrub forest (0.01%), while zaid cropping (-0.71%) decreased. Ecologically sensitive classes such as littoral swamp (-0.29%) and snow cover (-0.07%) declined. No change was recorded in evergreen and deciduous forest cover (Figures 2a and 2b).

BIODIVERSITY VALUE

- Ganga basin is dominated by non-forest areas (84.07%), followed by open forest (7.17%), moderately dense forest (6.08%), very dense forest (1.65%), and scrubland (1.03%) (Figure 3).
- In the Himalayan headwaters, the basin includes Sub-Alpine Forest characterised by *Abies pindrow* and *Betula utilis*, followed by Himalayan Moist Temperate Forest with *Rhododendron arboreum* and *Quercus* spp., and Sub-Tropical Pine Forest dominated by *Pinus roxburghii* and associated *Quercus incana*. Across the Upper and Middle Gangetic plains, the dominant zonal types are Tropical Moist Deciduous Forest represented by *Shorea robusta* and *Tectona grandis*, and Tropical Dry Deciduous Forest with *Dalbergia sissoo* and *Acacia nilotica*. In semi-arid western tracts, Northern Tropical Thorn Forest occurs with *Prosopis cineraria* and *Ziziphus mauritiana*. The Chhota Nagpur–Rajmahal segment of the lower basin supports Tropical Dry Deciduous Forest with *Butea monosperma* and *Terminalia pendula*, along with moist deciduous patches. Finally, the deltaic Sundarbans region comprises Littoral and Swamp (Mangrove) Forest dominated by *Rhizophora apiculata* and *Heritiera fomes*.
- Ganga basin harbours 5 aquatic mammals, namely the Endangered Gangetic dolphin (*Platanista gangetica*) and Irrawaddy dolphin (*Orcaella brevirostris*), Vulnerable smooth-coated otter (*Lutrogale perspicillata*) and Asian small-clawed otter (*Aonyx cinereus*), and Near Threatened Eurasian otter (*Lutra lutra*).
- 3 crocodilians, namely the Critically Endangered gharial (*Gavialis gangeticus*), Vulnerable mugger (*Crocodylus palustris*), and saltwater crocodile (*Crocodylus porosus*), occur in the basin.
- 118 testudines comprising 14 aquatic turtles, 2 land turtles and 2 tortoises have been documented in the Ganga basin. These include the Critically Endangered northern river terrapin (*Batagur baska*), red-crowned roofed turtle (*Batagur kachuga*), three-striped roofed turtle (*Batagur dhongoka*), and elongated tortoise (*Indotestudo elongata*); Endangered crowned river turtle (*Hardella thurjii*), spotted pond turtle (*Geoclemys hamiltonii*), Indian eyed turtle (*Morenia petersi*), Indian narrow-headed softshell turtle (*Chitra indica*), Indian softshell turtle (*Nilssonina gangetica*), Indian peacock softshell turtle (*Nilssonina hurum*), and
- Tricarinate hill turtle (*Melanochelys tricarinata*); Vulnerable Indian roofed turtle (*Pangshura tecta*), Indian flapshell turtle (*Lissemys punctata*), and Indian star tortoise (*Geochelone elegans*); Near Threatened brown roofed turtle (*Pangshura smithii*), and Assam leaf turtle (*Cyclemys gemelli*); and Indian tent turtle (*Pangshura tentoria*), and Indian black turtle (*Melanochelys trijuga*).
- 236 water and water-associated bird species (14 orders, 32 families) have been recorded from the Ganga River basin, including the Critically Endangered Baer's pochard (*Aythya baeri*), sociable lapwing (*Vanellus gregarius*), and spoon-billed sandpiper (*Calidris pygmaea*); Endangered great knot (*Calidris tenuirostris*), spotted greenshank (*Tringa guttifer*), black-bellied tern (*Sterna acuticauda*), Indian skimmer (*Rynchops albicollis*), Pallas's fish-eagle (*Haliaeetus leucorhynchus*), and steppe eagle (*Aquila nipalensis*); and Vulnerable common pochard (*Aythya ferina*), lesser white-fronted goose (*Anser erythropus*), long-tailed duck (*Clangula hyemalis*), red-breasted goose (*Branta ruficollis*), horned grebe (*Podiceps auritus*), sarus crane (*Grus antigone*), grey plover (*Pluvialis squatarola*), broad-billed sandpiper (*Calidris falcinellus*), curlew sandpiper (*Calidris ferruginea*), wood snipe (*Gallinago nemoricola*), river tern (*Sterna aurantia*), eastern imperial eagle (*Aquila heliaca*), greater spotted eagle (*Clanga clanga*), and black-capped kingfisher (*Halcyon pileate*).
- The Critically Endangered pink-headed duck (*Rhodonessa caryophyllacea*), Siberian crane (*Leucogeranus leucogeranus*), and white-bellied heron (*Ardea insignis*) were historically recorded from the Ganga basin. The pink-headed duck is now considered extinct in India and the Siberian crane locally extinct; while the white-bellied heron was reported only once from the basin (Bihar in 1967).
- 269 fish species (24 orders, 84 families) have been documented from the Ganga River, including the Critically Endangered Ganges shark (*Glyphis gangeticus*), and Endangered golden mahseer (*Tor putitora*), *Glyptothorax madraspatanus* and wagur (*Clarias magur*).

Figure 1: Map of Ganga River basin

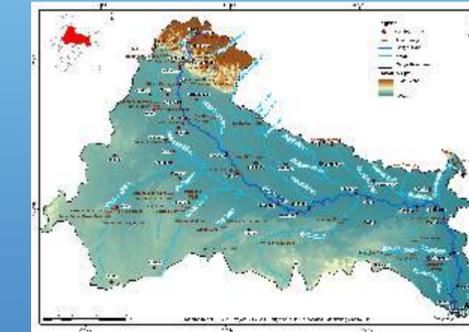


Figure 2a: LULC map of Ganga River basin (2008-09)

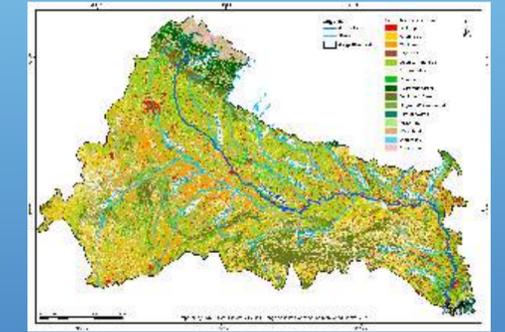


Figure 2b: LULC map of Ganga River basin (2018-19)

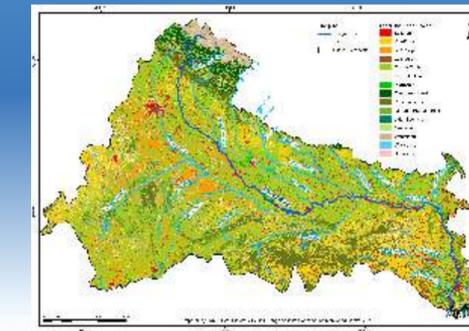
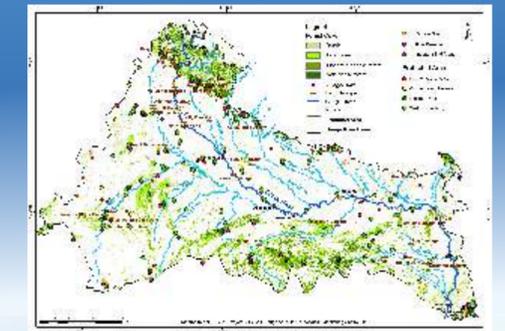


Figure 3: Forest cover of Ganga River basin (2019)



Gangetic dolphin (*Platanista gangetica*) | ©Ganesh Chaudhary

