

THE SAPTANADĪ: MYTHICO-RELIGIOUS SIGNIFICANCE ON CONTEMPORARY INDIAN BIODIVERSITY

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Abstract: The *saptanadī* (seven sacred rivers of Hinduism namely *Gangā*, *Yamunā*, *Godāvarī*, *Sarasvatī*, *Narmadā*, *Sindhu*, and *Kāverī*) have played a crucial role in shaping the geography and ecology of India. This paper discusses the ecological importance of the *saptanadī* by exploring its religious and cultural significance. It connects with the mythico-religious aspect of the *saptanadī* and elaborately studies its prominent role in shaping the contemporary Indian biodiversity. The ecology of these rivers plays a significant role in the sustenance of various types of habitats in and around them. Hence, this paper also explores the various species in and along the banks of these rivers which contribute to the sustenance of various natural and non-natural habitats like forests, water bodies, farms, wetlands, fisheries, and bird sanctuaries.

Keywords: Hinduism, Seven Sacred Rivers, Geography, Ecology, Biodiversity, Sustainability, Conservation

1. Introduction

Human history has been shaped primarily around the rivers. Rivers have acted as a lifeline for the development and sustenance

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of the civilizations that settled along its banks. This connection between human history and rivers has been evident in the Indian subcontinent as rivers have not only shaped the geography of India but have also played an important role in shaping the culture and the spiritual beliefs of the people.

Among the various rivers of India seven rivers known as *saptanadī* namely *Gaṅgā*, *Yamunā*, *Godāvarī*, *Sarasvatī*, *Narmadā*, *Sindhu*, *Kāverī* are considered as sacred in Hinduism as they are *jīva nadi* (perennial rivers). River *Gaṅgā* is considered the most sacred among the *saptanadī* as it encapsulates the spiritual essence of India. Emerging from the pristine peaks of *Gangotri* glacier in the Himalayas, it flows to the lowlands. This river occupies a prominent position in Hindu mythology and cultural ethos, as it is considered not only a geographical entity but is also personified as Goddess purifying the people from sins and providing them salvation after their death (Kumar, 2011). River *Yamunā*, a major tributary of *Gaṅgā* emerges from the *Yamunotri* glacier in the Himalayas. River *Godāvarī* originates from the Trimbak hills of Maharashtra and flows eastwards across the Deccan plateau (Chavan et.al., 1970). This river is a witness to the historical and biological complexities of central and southern India. River *Sarasvatī* despite being believed to be lost finds its historical significance in ancient texts like *Rgveda* (Griffith, 10.75). This river is highly revered as the embodiment of intelligence and cultural endeavors in ancient Vedic literature. River *Narmadā* played an important role in shaping the geopolitical dimensions of India. This river is venerated in Hinduism as one of the sacred rivers after *Gaṅgā* playing an important role in Hindu rituals. River *Kāverī* one of the major rivers of south India originates at *Talakāverī* of Coorg district and flows through the states of Karnataka and Tamil Nadu.

The *saptanadī*, like sacred rivers in various religious traditions, carry profound mythological significance in Hindu religion. These rivers are not merely seen as natural entities but are revered as divine beings embodying sanctity, fertility, and spiritual potency. In Hindu mythological narratives rivers of the *saptanadī* are highlighted as sustainers of life and as symbols of divine nurturance. In Hinduism, these rivers are venerated as

Goddesses who nourish life on earth which is depicted in mythological narratives associated with them. This perspective encourages humans to treat their natural environment with respect and responsibility, ultimately supporting the preservation of the rich biodiversity these rivers sustain. The mythical and religious reverence for rivers thus significantly impacts contemporary environmental conservation efforts, emphasizing the intertwined relationship between spirituality and ecological consciousness.

2. Indian Biodiversity and the *Saptanadī*

The *saptanadī* not only shaped the human history but has also acted as a home for a huge biodiversity in the Indian subcontinent due to its contribution to numerous ecological factors. Rivers determine soil composition and build deltas, which are vital to regional environmental dynamics. Silt-rich waters of the *saptanadī* enhances soil fertility which promotes agricultural growth. These rivers also regulate monsoonal flooding by acting as natural channels, protecting human populations and crops. Riparian nourishment provided by the *saptanadī* is necessary for growing food crops along their banks, providing a vital agricultural lifeline for people residing in these regions. Massive waters of the *saptanadī* affect local weather patterns and stabilize the climate in the places it flows through, making it vital for climate control. This climatic influence supports several habitats, which help a large number of aquatic and terrestrial species to thrive. Thus, beyond its historical and cultural significance, *saptanadī* plays a crucial role in defining and conserving the rich biodiversity of India.

3. Ecological Factors

Biodiversity deals with the interdependence and interaction among the living organisms and their environment. It is broadly classified into two types - natural biodiversity and non-natural biodiversity. Indian rivers play an important role in maintaining ecological equilibrium which is essential for the sustenance of both natural and non-natural biodiversity. The role of *saptanadī* in the context of climate regulation is crucial for maintaining

equilibrium of climatic patterns as they influence the temperature, precipitation and weather conditions of the regions around their course. This riverine system arises from the complex interactions between hydrology, atmosphere, and geomorphology.

River *Gangā*, revered for its sacredness, flows through the northern plains of India, playing a crucial role in shaping the climate of the area. During the south-west monsoon season, the *Gangā* basin receives heavy rainfall, leading to increase in river discharge. This increased discharge not only replenishes the groundwater and improves soil moisture levels but it also helps in maintaining a cooler microclimate in the adjacent regions. The river water nourished by the Himalayan glaciers also impacts humidity levels in the surrounding regions, thus affecting rainfall patterns and contributing to the biodiversity along the Himalayas to the Sundarbans. The meandering course of the *Yamunā* River across the northern plains exerts a vital influence on the regulation of the local climate by balancing the heat conditions which is helpful in fostering stable environment. River *Godāvarī*, which is the second-longest river in India, showcases its distinct climatic impact as it flows across various terrains of Western Ghats and Deccan Plateau.

River *Sarasvatī*, although believed to be a mythical river in ancient Hindu texts, is said to have originated from the Himalayas and flowed through the northwestern regions of India (Bhargava, 1987). Its impact on the climate and habitat in its supposed path is not well-documented due to the lack of a tangible river system (Patel et al., 2021). The *Narmadā* River, which traverses the central Indian terrain, has a crucial role in maintaining biodiversity and facilitating carbon sequestration thereby contributing to the overall ecological equilibrium of the region. River *Sindhu*, also referred to as the Indus, travels through the northern expanse of India, exerting significant influence on the arid and semi-arid terrains it passes through. The river's water sustains riparian ecosystems that are crucial for the preservation of biodiversity and the storage of carbon.

River *Kāverī*, traversing the southern terrains of India, possesses cultural importance and serves as a vital climate regulator in the area. The flow dynamics of the *Kāverī* result in

temperature moderation, leading to the formation of microclimates along its path which is crucial for maintaining agriculture and ecological equilibrium in the southern regions it flows through. The function of *saptanadī* as a climate regulator highlights the interdependence between water bodies and the overall environmental dynamics of their respective areas.

The *Saptanadī* also plays an important role in composition of soil particularly the alluvial soil which is one of the more fertile soil types in India (Sinha & Tandon, 2014). This soil is found in the regions surrounding these rivers. The Indo-Gangetic plains also known as the great plains of India is the largest alluvial plain of India (Singh et al., 2006) formed by the deposition of sediments brought down by like *Ganḡā*, *Yamunā* and *Brahmaputra*. River *Sarasvatī*, an ancient river mentioned in Hindu mythology, is believed to have contributed to the formation of the Indo-Gangetic plains as well as fertile loamy and sandy soils in its floodplains. River *Sindhu* originates in the Tibetan Plateau and flows through northern India before entering Pakistan. This river with its massive water flow and sediment load, has played a crucial role in shaping deltas and the soil composition of the plains it traverses. *Godāvarī* and *Narmadā* helps in the transportation of the black soil formed due to volcanic eruptions in the valleys of *Godāvarī* and *Narmadā*. Transported soil is deposited by River *Kāverī* around its banks making it suitable for cultivation of food crops due to its rich nutrient content.

The *saptanadī* also have a vital and innate function in managing floods by utilising a combination of geomorphological, hydrological, and biological processes. These rivers, with their vast catchment areas and extensive drainage systems, act as natural reservoirs and conduits for excess water during periods of heavy rainfall and monsoons (Patel et al., 2021). The *saptanadī* have the capacity to absorb and transport significant amounts of water during periods of intense rainfall or snowmelt, thereby reducing the building up of water that might result in flooding. In addition, the inherent storage capacity of the basins of the *saptanadī*, which includes lakes and wetlands, aids in the temporary retention of extra water and its slow discharge. The *saptanadī* essentially serve as dynamic, self-regulating systems

that effectively lessen the impact of floods by efficiently managing the flow and distribution of water over terrain. Preserving the inherent authenticity of these ecosystems is crucial for upholding these flood control mechanisms and guaranteeing sustainable water management.

4. Natural Biodiversity

Natural biodiversity refers to the diversity of living species that have evolved and adapted to their environment through natural selection processes over geological time scales. This section discusses about various plant and animal species that dwell in the forests and the waters of the *saptanadī*.

A. Plants

Saptanadī esteemed for their profound spiritual importance, serve as channels for both cultural history and abundant floral biodiversity creating a broad range of ecological conditions that provide distinct habitats for several plant species. River *Gangā* spans across many states in India, forming a diverse ecosystem that sustains a wide range of plant species (Kumar, 2021). The floral richness of the *Gangā* is evident in its distinct combination of tropical, subtropical, and temperate climates found along its banks. The *Gangā* basin harbours a plethora of various flower species, including the revered lotus, water hyacinth, and the Indian rosewood (Matta & Uniyal, 2017). The fertile soil along the *Gangā*'s banks provides a nurturing environment for a diverse range of flora, from delicate water lilies to towering trees. The presence of abundant plant species provides habitats for diverse animal life, including birds, insects, and small mammals.

The floodplain of the *Yamunā* in Delhi is an exceptional ecosystem that sustains a diverse array of plant species. Extensive research has been conducted on the floodplain of the *Yamunā* in Delhi to investigate the correlation between vegetation and hydrological attributes (Manral et al., 2013). The river *Godāvarī* serves as a source of water and nutrients, creating favourable conditions for plant growth. The river also supports a wide variety of medicinal plants like *Annona genus* (Annonaceae) which is known for its anti-oxidant, anti-inflammatory, anti-helminthic properties (Pumiputavon et al., 2019). There are also other plants

like *Abutilon indicum* that helps in treatment of Diabetes, ulcers, jaundice (Goyal et al., 2009); *Boerhavia diffusa* L has antibacterial, hepatoprotective, antitumor, anticonvulsant properties (Riaz et al., 2014).

River *Narmada* located in central India provides a diverse range of habitats and ecosystems for various species of plants to thrive (Bhaumik et al., 2017). The unique geographical features of the *Narmada* valley, including the Vindhyan escarpments and the *Saṭpura* ranges, contribute to the formation of distinct microclimates and soil types, creating a favourable environment for a wide variety of flora to flourish (Kathal, 2018). The variation in elevation of the River *Narmada* leads to a range of temperature and rainfall patterns, creating different habitats for plants adapted to specific climatic conditions. The river also traverses through different types of soil, including alluvial, black cotton, and red soils (Bhaumik et al., 2017). These soil types have varying nutrient levels and water-holding capacity, which influence the types of plants that can thrive in each area.

River *Sindhu* has limited floral diversity as only few plants can survive the severe climatic conditions. Most of the delta has mangrove species like grey mangroves (*Avicennia marina*), red mangrove (*Rhizophora mucronata*), Indian mangrove (*Ceriops tagal*) and black mangrove (*Aegiceras corniculatum*) and some salt tolerate plants like Sea Holly (*Acanthus ilicifolius*) also grow in this region (Wikramanayake, 2024). These mangroves provide food and habitat for numerous organisms residing in these regions. The floral diversity along the river *Sindhu* not only contributes to its ecological richness but also holds cultural and economic significance.

The floral diversity of river *Kāveri* has been influenced by various factors, including its geographical location, climate, and soil characteristics. Situated in the Deccan Plateau, the river passes through diverse topographies such as plains, hilly regions, and forest areas contributing to the diverse floral composition of plants like trees, shrubs, herbs, and aquatic plants (Richter, 2020). The tree species found around the river *Kāveri* include the iconic sandalwood, known for its aromatic properties and high commercial value (Singh, 2013). It also supports a variety of

shrubs, such as the fragrant jasmine and the medicinal neem tree. Another prominent feature of the floral diversity around the river *Kāveri* is the presence of numerous herbaceous plants like turmeric, which is known for its anti-inflammatory properties, and tulsi, which is revered for its medicinal properties and importance in Ayurvedic medicine (Mehrotra, 2020).

River Sarasvatī is believed to be flowing underground which makes it difficult to determine the floral diversity around its basin. However, a study done on the climbers of angiosperms like chanothi (*Abrus precatorius* L), Smudrasos (*Argyrea nervosa*), Batak Vel (*Aristolochia bracteolata*) around the rural region of Sarasvatī river of Patan district of North Gujarat area show their ethno medicinal value (Seliya & Patel, 2009). These plants not only contribute to the ecological balance of the region but also have economic significance, as they are used in traditional medicine and herbal industries.

B. Animals

The *saptanadī* also sustains a diverse range of animal species (Das et al., 2012). River *Ganḡā* is home to a wide variety of fish species. It harbours a total of 143 distinct fish species, with the family Cyprinidae prevailing as the most abundant (Singh et al., 2010). In addition to aquatic species, other terrestrial creatures such as the snow leopard (*Panthera uncia*), Himalayan tahr (*Hemitragus jemlahicus*), musk deer (*Moschus sp.*), Himalayan black bear (*Ursus thibetanus laniger*) and Himalayan monal (*Lophophorus impejanus*) are also found along this stretch. Likewise, the river *Yamunā*, a subsidiary of river *Ganḡā*, sustains a wide variety of animal species. *Yamunā* has rich piscine biodiversity, encompassing a wide array of fish species from families including Cyprinidae, Bagridae, and Siluridae (Kumar et.al. 2011). Identifying the animals that lived along the course of the river *Sarasvatī* is difficult because it is mostly dry now. Archaeological evidence indicates that the *Sarasvatī* harboured a diverse range of fauna, encompassing fish and aquatic mammals. River *Sindhu* and *Godāvari* are also known for abundant presence of various species of fish from prominent families such as Cyprinidae, Catfish, and Mahseer (Johnson et. al., 2017). River *Kāveri* harbours a diverse range of fish species, such as Mahseer, Catla, and Rohu

(Pownkumar et al., 2022). River *Narmadā*, is renowned for its abundant variety of fish species, including Mahseer, Catla, and Giant Snakehead, which are frequently encountered.

These rivers, esteemed for their profound spiritual importance, also function as homes for varieties of plants and animals. The biodiversity along these rivers not only enhances the aesthetic value of these holy waters but also plays a crucial role in preserving the ecological equilibrium of the surrounding areas.

5. Non-natural Biodiversity

Non-natural biodiversity pertains to the intentional introduction of living organisms into human made ecosystems. It involves the deliberate cultivation of different crops, selective breeding, or introduction of species, which leads to a human-engineered diversification of biological entities within ecological systems. *Saptanadi* not only influences the natural biodiversity but also play a crucial role in supporting the non-natural biodiversity like agriculture, riverbank plantation, wetlands, fisheries, and bird sanctuaries.

A. Agriculture

The complex network of the rivers plays a key role in Indian agricultural tradition. The symbiotic connection between the fertile river basins and agricultural methods has influenced the growth of numerous food crops, promoting a diverse range that showcases both regional distinctions and cultural multiplicity. Rivers such as the *Gaṅgā*, *Yamunā*, *Sarasvatī*, *Sindhu*, *Godāvarī*, *Kāverī*, and *Narmadā* have shaped the agricultural landscape and nourished the growth of food crops along their banks for centuries. The *Gaṅgā* is one of the most iconic rivers in India (Pradhan et al., 2021). It flows through the fertile Gangetic plains, irrigating vast agricultural lands and supporting a wide range of crops. Farmers have been utilizing this fertility for growing crops by flood recession farming since antiquity (Sarkar et al., 2003). Flood recession farming is a traditional practice where farmers make use of the nutrient-rich soil left behind after receding floodwaters to cultivate crops. This ancient method of food production plays a crucial role in ensuring human well-being and environmental conservation in the *Gaṅgā*'s Basin.

The impact of the river *Ganḡā* on food crops is twofold: on one hand, the river *Ganḡā* provides water for irrigation, which is essential for the growth of food crops; on the other hand, the river also replenishes the soil with nutrients through flooding and sediment deposition. River *Yamunā*, another major river in India, also has a significant impact on food crops (Sarkar et al., 2003). River *Yamunā*, like the *Ganḡā*, is a lifeline for agriculture in its surrounding areas. In Indo-Gangetic plain, food crops like wheat, sugarcane and millets are grown in abundance (Jat et al., 2020). River *Sarasvatī*, although currently a mythical river, is believed to have played a crucial role in the development of agriculture in ancient India.

The fertile soil along the banks of river Sindhu supports the cultivation of a wide variety of crops, including wheat, barley, rice, and fruits such as mangoes and oranges. River *Godāvarī* provides water for irrigation and helps in replenishing the soil with nutrients through the silt and sediments carried by its flow. This nutrient-rich soil supports the growth of a diverse range of crops, including paddy, sugarcane, oilseeds, maize and cotton (Bharambe et al., 2023). Similarly, the river *Kāverī* and river *Narmadā* also have profound impacts on food crops of their respective regions. The river *Kāverī* helps in the cultivation of crops such as rice, sugarcane, bananas, and vegetables (Sarath et al., 2022). River *Narmadā*, on the other hand, is a lifeline for agriculture in the states of Madhya Pradesh and Gujarat. It provides water for irrigation to large areas of agricultural land and supports the cultivation of crops such as wheat, rice, cotton, pulses, and oilseeds (Rao et al., 2015). The impact of these rivers on food crops is evident in the high agricultural productivity of the regions surrounding them.

Farmers living in the vicinity of these rivers have developed agricultural practices that are tailored to the specific conditions and resources provided by the rivers (Sridhar & Chamyal, 2018). The impact of these rivers on food crops is multifaceted, ranging from providing essential water and nutrients for robust plant growth to shaping cultural practices and traditional knowledge related to agriculture.

B. Riverbank Plantation

The perennial riverbanks of the *saptanadi* make it suitable for the riparian trees to thrive on them there by promoting non-natural habitats like riverbank plantations where strategically trees, shrubs, or other types of vegetation are grown along the shores of these rivers. This method of vegetation management is frequently employed for a range of ecological, environmental, and practical purposes (n. d. 2023). Riparian plantings are essential for mitigating soil erosion, enhancing riverbank stability, and improving water quality. It also reduces the risk of flooding, thereby creating habitats for various plant and animal species. Several initiatives have been taken by government and NGOs to facilitate the cultivation of vegetation along the banks of the *saptanadi* to address issues such as deforestation, soil erosion and degradation of river ecosystems.

C. Artificial Wetlands

The rocks and minerals present in the *saptanadi* make them agents to improve the water quality in them which facilitate the creation of non-natural habitats like artificial wetlands such as Bhunni Drain. Artificial wetlands are man-made habitats that aim to imitate the functions and ecological benefits of natural wetlands. These synthetic ecosystems are designed to serve the function of water filtration, flood control, and providing habitat for a wide range of plant and animal species. Artificial wetlands, in contrast to natural wetlands, are deliberately planned and built to achieve certain environmental objectives, such as wastewater and pollution treatment (Shutes, 2001). These systems frequently integrate many components, such as wetland plants, water retention structures, and substrate materials, to imitate the natural mechanisms of filtration and nutrient cycling. Artificial wetlands of the *saptanadi* have demonstrated efficacy in water treatment, purification, pollution removal, and biodiversity support, which make them valuable assets in environmental conservation.

D. Fisheries

The waters of *saptanadi* are considered pure due to their rich concentration of oxygen which makes them appropriate natural habitats for several aquatic animals that live within them

(Warrier, 2014, pp 41). This unique factor also enables the construction of non-natural habitats like fisheries and aquaculture ponds which are essential for meeting the increasing need for fish production and sustaining the livelihoods of communities that are reliant on the fishery industry. The ponds are deliberately constructed and regulated to optimise fish output, offering controlled conditions for fish breeding, nurturing, and harvesting (Gupta et. al., 2015). Many fish farmers frequently employ contemporary aquaculture methods, such as the utilisation of aerators, systems for checking water quality, and efficient feeding procedures, in order to maximise production. The objective of these initiatives is to improve the efficiency of the fisheries industry, reduce pressure on natural water resources, and establish a more resilient and sustainable method of meeting the nation's need for food.

E. Bird Sanctuary

The weather patterns of the *saptanadi* make it conducive for various migratory and non-migratory avian species which makes these river banks the perfect spots for the establishment of non-natural habitats like bird sanctuaries. For example, the Chambal wildlife sanctuary, located on the banks of river *Camba*, spanning over Rajasthan, Madhya Pradesh, and Uttar Pradesh, has exceptional biodiversity. It functions as a sanctuary for a multitude of aquatic avian species, such as Indian skimmers, sarus cranes, and various herons and egrets (Meshram, 2010). Keoladeo National Park, formerly known as Bharatpur Bird Sanctuary in the state of Rajasthan (Choudhary et al., 2020) is recognized as a UNESCO world heritage site and is renowned for its abundant avian biodiversity, which includes a wide range of bird species. Significantly, it functions as a temporary residence for migrating avian species, including Siberian cranes, ducks, and waders. Sultanpur Bird Sanctuary situated near Delhi has emerged as a popular destination for avid birdwatchers as it has varied bird species like different species of ducks, raptors, and migrating birds (Rani et al., 2023). Ranganathittu Bird Sanctuary, located in Karnataka, is home for bird species like painted storks, spoonbills, and herons.

The notion of non-natural biodiversity embodies a dynamic and new strategy for ecological preservation and rehabilitation. As human activities increasingly disrupt natural ecosystems, creation of non-natural biodiversity present a possible solution to address environmental issues and reduce the effects of habitat destruction and climate change. Nevertheless, it is imperative to approach these endeavors with a balanced perspective taking into account ethical considerations, prospective ecological hazards, and the necessity for continuous investigation and monitoring. It is crucial to maintain a delicate equilibrium between the biodiversity found in nature and the biodiversity created by human intervention.

6. Conclusion

The *saptanadi* apart from their mere geographical existence, have profound mythico-religious significance on human societies. In the context of Indian philosophical thought, *saptanadi* thrives for their socio-cultural and religious significance which is carried out since centuries. Rituals like *Puṣkara*, *Kumbha Mela*, *Piṇḍa Pradaṇa*, *Asthi Visarjana*, *Dīpāraḍhana* which take place near these sacred rivers, play a significant role in biodiversity preservation and fostering an eco-centric worldview. These practices have been derived from the mythical narratives like *Gaṅgā-avataṛaṇa* (*Vanaparva* of *Mahābhāṛata* 101-109); the myth of greatness of the river *Godāvari* in *Skanda Purāṇa* (2.1.29.42); the myth of the origin of river *Narmada* from Lord *Śiva*'s sweat droplets (*Skanda Purāṇa* 5.3-5.47), etc. These mythical narratives revered the *saptanadi*, thereby serving as a powerful tool for ecological consciousness among humans. These rituals show that myths help in fostering our religious beliefs. They inherently promote a deep connection between people and natural water bodies, fostering a sense of reverence and responsibility towards their preservation and the conservation of the biodiversity around them. For instance, the mass gatherings during *Puṣkara* and *Kumbha Mela* emphasize on the importance of clean and pure water, leading to community-driven river cleaning and conservation efforts. The rituals of *Piṇḍa Pradaṇa* and *Asthi Visarjana*, which involve offerings to ancestors helps in nutrient

recycling in nature. *Dīpārāḍhanā*, or the lighting of lamps, often uses biodegradable materials, reinforcing the value of environmentally friendly practices. Collectively, these cultural practices embed ecological mindfulness in societal norms, thereby contributing to the conservation of biodiversity and promoting an eco-centric worldview that respects and preserves the rich biodiversity around the *saptanadī*. Through their mythical background the *saptanadī* gives the powerful message on the preservation of biodiversity, thus showing that myths are not illusions but beliefs that have the capacity to make considerable change in the contemporary world.

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