

## **River Culture in China and India: A comparative perspective on its origins, challenges, and solutions**

La culture fluviale en Chine et en Inde, une perspective comparative sur ses origines, ses défis et ses solutions

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### **RÉSUMÉ**

L'Inde et la Chine sont d'immenses pays asiatiques voisins qui abritent les populations les plus importantes et les traditions les plus anciennes en matière de rivières, en tant que relation représentative d'une ontologie animiste entre les humains et la nature - l'identité profondément enracinée de la rivière "Mère"/"Dieu" fait des rivières le berceau d'anciennes civilisations dans les deux cultures. Nous nous efforçons de synthétiser leurs caractéristiques communes sur la base du concept de culture fluviale. Ce chapitre est divisé en trois aspects : (I) comment et pourquoi la culture fluviale bio-culturelle en Chine et en Inde est actuellement en danger ; (II) comment sont-elles (ou pourraient-elles être ?) sauvées en faveur d'une gestion durable ? (III) fournir des exemples de différentes mesures pour améliorer l'intégrité socio-écologique des rivières. Nous avons constaté que les rivières chinoises et indiennes connaissent une industrialisation et une urbanisation rapides au prix d'une grave dégradation physico-chimique de leurs cours d'eau. En Chine, le degré de fragmentation des rivières est extrêmement élevé en raison de la construction intensive de barrages et du changement d'affectation des terres, un bond en avant après la réforme économique de 1978. En Inde, le débit des rivières et les modifications de leurs chenaux induites par l'homme sont apparus pendant la période coloniale. Les rivières indiennes souffrent d'une forte pollution dans les zones urbaines et rurales en raison de la capacité limitée de traitement des eaux usées. Aujourd'hui, l'Inde et la Chine promeuvent la restauration écologique des rivières en tant que stratégie de durabilité sous la pression des menaces de réchauffement climatique, de l'engagement en matière d'émissions de carbone et du différend transfrontalier sur les ressources en eau.

### **ABSTRACT**

India and China are huge, neighbouring Asian countries that bear the largest populations and the oldest traditions about rivers, as a representative relationship of an animist ontology between humans and nature – the deep-rooted "Mother"/"God" river identity make rivers the cradle of ancient civilizations in both cultures. We make an effort to synthesize their common features based on the River Culture Concept. This chapter is divided into three aspects: (I) how and why the bio-cultural River Culture in China and India are currently in danger; (II) how are they (or could be) saved in favour of a sustainable management; (III) provide examples of different measures to improve the socio-ecological integrity of rivers. We found that both Chinese and Indian rivers are experiencing rapid industrialization and urbanization at the cost of severe physical-chemical degradation of their rivers. China has an extremely high degree of river fragmentation due to intensive dam building and land-use change, a leap after the 1978 economic reform. In India, the river flow and human-induced changes of the river channels emerged in the colonial period, and Indian rivers suffer from heavy pollution in urban and rural areas due to limited sewage treatment capacity. Today, India and China promote ecological river restoration as a sustainability strategy under the pressure of global warming threats, carbon emission commitment, and the cross-border dispute over water resources.

### **KEYWORDS**

River Culture, biocultural approach, river restoration, environment policies, comparative study

## INTRODUCTION

The Yellow and Yangtze River Valleys in China and the Indus and Ganges River Valleys were essential cradles of human civilizations in the two countries. Despite different political systems and religious backgrounds, India and China have surprisingly much in common concerning rivers underpinning human life, well-being and shaping their culture. This phenomenon could be explained by the River Culture concept, which recognizes the co-evolution pattern of biological and cultural diversity, and that rivers are socio-ecological systems (Wantzen et al., 2016). Starting from the industrial revolution, intense environmental changes have been a menace for both, the biological and cultural diversities in river basins, especially in cities. Suffering from what is known as the "Southern Urban Hydrosystem Syndrome", their aquatic ecosystems are damaged by several simultaneous environmental stressors associated with accelerated urbanization and extreme climate (Wantzen et al., 2019). Both countries have acknowledged the biocultural crisis and have begun to act. While China changed its economic model towards an "Ecological Civilization" in 2012, India set up The National Mission for Clean Ganga (NMCG) in 2016. As the unchanged river governance models prove inefficient, both countries also carry out reforms on 'rivers' management schemes. China implemented the River Chief System (RCS) in 2016 to facilitate large-scale institutional cooperation from the top down, while India has a variety of community-based innovations prospering from the bottom up, the latter often including religious human-nature linkages. Comparing the similarities and differences between China and India, this paper develops the framework of the River Culture concept a step further at the outset for future comprehensive comparative studies.

## 1 METHOD

This research adopted literature review, comparative study and case analysis methods. The literature included research on the various forms of cultural connotations of rivers in Indian and Chinese history, and analysis of the common trend of biocultural crisis induced by rapid industrialization and urbanization in both countries. In addition to that, a number of case collection work was carried out to develop a comparative perspective on the different measures taken today to restore rivers socio-ecological integrity in two countries. The purpose of this paper is to contribute to sustainable river management for China and India with further suggestions of combining top-down (i.e., River Chief System in China) and bottom-up (i.e., public participatory movements in India) approaches in future. Authors, with research backgrounds respectively in China and India, cogitated each country's river culture and modern river management scheme through observation, comparison, and discussion.

## 2 RESULTS AND DISCUSSION

### 2.1 Rich connotations of River Culture in China and India

Since the earliest agrarian civilizations emerged in the Yellow River Valley in China and the Indus River Valley in India, rivers have been vital. Rivers bolster human welfare by providing drinking water, food, fresh water, energy, and indirect economic values such as transportation channels, farmland irrigation, and hydroelectric power. Rivers in both countries have profound spiritual and literary values. In Chinese culture, rivers contain a wealth of imagery in numerous literature and poetry. The flowing water is a metaphor for the continuity of sorrow, permanent change and eternity. There was continuous worship of the Yellow River God in China's ancient dynasties. Water flow and sediment movement produce regularly recurring but constantly variable patterns (e.g., the vortex structure) in the shape of optical and acoustic waves, which find their expression in numerous artworks. The history of the Indian subcontinent is similarly entangled with its rivers. The Indus valley civilization (2500–1700 BCE) flourished on the banks of the river Indus, while the southern civilization thrived along the banks of Krishna, Kaveri, and the Godavari. The roots of India's cultural heritage are mainly from the major rivers, depicting emotions and life in Indian culture and Hinduism. The riverbanks have been sites for literary works, the birthplace of art and recognized as cultural heritages.

### 2.2 Analysis of the crisis of riverine biocultural diversity in China and India

After WWII and India's independence, new build-up eras began in China and India in the 1950s. Albeit following different economic growth paths, both countries became emerging giants with fast-growing economies. Both countries have abundant freshwater resources, but they have exploited their riverine resources for development in different ways, e.g., the highest density of dams is found in China and India in 2020. Consequently, both countries are now facing substantial socio-ecological impacts in terms of river crisis: hosting more big dams than any other country worldwide, China's rivers have been severely blocked, diverted, and their ecosystems are degraded; India suffers heavy water pollution and

flooding in urban and rural fields due to inadequate infrastructural facilities. Modern industrialization and urbanization also bring on a loss of the unique river-related identity in two countries. In China, changing land-use invades the cultural landscapes derived from river resources, tourism weakens the place-centered authenticity, and the reconstruction of waterfronts, copy-pasting the same urban planning system in many Chinese cities makes the original riverine identities no longer distinguishable. In India, class inequalities in cities, infrastructure development, loss of religious sentiments, and the shift from rural to urban areas all lead to the loss of river culture.

## 2.3 Measures taken for 'rivers' socio-ecological integrity in China and India

In China, 2013 can be seen as a turning point towards sustainable development; the River Chief System (RCS), a policy innovation from top-down, marked a paradigm shift in the river management mindset and has been efficient in curbing water pollution in rivers. In India, 'saving the river 'Ganga' led to a series of river policies, and different types of public participatory movements locally emerged.

### 2.3.1 China: River Chief System (RCS)

In 2016, the Chinese government adopted an innovative solution for river management: the national policy of the River (and further Lake) Chief System. Closely following China's top-down administrative system, the River Chiefs are empowered and well-placed to facilitate and enact wide-ranging collaborations amongst different departments. By strengthening the stewardship and accountability of River Chiefs, the system aims at improving the efficiency and efficacy of water management. The establishment of the RCS is a paradigm shift in 'China's environmental management, and the short-term outcome is remarkable – water quality throughout the country has been improved and quickly. However, with the lack of public actors, the system's sustainability remains determined.

### 2.3.2 India: Public Participatory movements

In India, public participatory movements in environmental protection have been active. The awareness about the biocultural identity of rivers remains widespread, and the inactivity by governments in protecting them has provoked resistance from the public through social, legal, and religious activism in protecting the river environment 'by themselves'. A variety of community-based initiatives to clean up the rivers has yielded positive results, though in relatively small scales and scattered throughout the country. These bottom-up initiatives grew rapidly, involve diverse stakeholders, and are deeply bonded to local communities. However, they are yet to be implemented on a larger scale.

## 3 CONCLUSION

Rivers are considered sacred in both China and India. The rich ecosystem services that the rivers have offered underpin historic cultural prosperity and diversity in history and the process of rapid economic growth in the post-WWII era. Both countries began rebuilding in the 1950s, and the urge to become a superpower nation with grey infrastructure across the waterways and meet the growing population's demands are common factors in exploiting river resources in the second half of the 20th century. 2013 was a turning point for China when the "Ecological Civilization" was created. Whereas in India, awareness of fighting river pollution has been alive through social, legal, and religious activism. Both countries have started preserving and restoring river ecosystems. In China, innovative management technique of RCS was implemented by the government in 2016. In India, a variety of community-based initiatives to safeguard the rivers' environment and values developed from the local. For future suggestions in the two countries, we propose to reasonably combine the top-down and bottom-up approaches according to local circumstances, aiming to achieve a long-term sustainable management of rivers and create harmony between human and river (Zingraff-Hamed et al., 2021).

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