

Role of Traditional Indian Knowledge System in Modern Environmental Protection Efforts

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Abstract

Traditional Indian Knowledge System (TIKS) have long contributed great emphasis on protecting our environment and natural resources. India has a long history of biodiversity conservation, which is deeply ingrained in its culture, traditions, and indigenous knowledge systems. Ancient India's complete educational system comprised not only academic knowledge but also moral and ethical principles, such as the preservation and responsible use of the environment and natural resources. The ancient Indian cultural traditions, which emphasize the connection of humans and nature, provide important lessons for environmentally responsible living and sustainable living. It was included into several facets of education, from moral and spiritual instruction to hands-on training in agricultural and natural resource management. The core tenets of TIKS that emphasize the value of protecting the environment and nature were discussed in this article. It was possible to ensure that future generations learned the need of protecting and exploiting natural resources responsibly thanks to this holistic approach. In conclusion, India's traditional knowledge systems recognize the interdependent relationship of all living things and stress the importance of living in harmony with nature. These traditional teachings keep having an impact on modern day environmental protection efforts carried out at national as well as international level.

Keywords: Environment; Nature; Protection; Traditional Indian Knowledge System

Introduction

Environmental conservation is deeply rooted in traditional Indian knowledge systems (TIKS), which have evolved over thousands of years. Indian traditions pertaining to biodiversity conservation form the basis of human life, particularly in village and remote areas (Langton and Rhea 2005). Natural resources conservation has been a vital aspect of India's ancient education systems, particularly in texts like the Vedas, Upanishads, and various other traditional teachings. In Indian philosophy, water, earth, fire, air, and space are considered as divine elements (panchabhuta). The ancient Vedic Period is where the culture of protecting the environment first emerged. The all four Vedas-Rig Veda, Sama Veda, Yajur Veda, and Atharva Veda contain hymns honoring the superiority of diverse natural beings (Sarmah 2015). Sun worship is of vital importance in Vedic worship, even today offering water to sun early in morning is a holy practice in Hindu religion. Today it is scientifically proved that solar energy is the ultimate source of energy that play main role in regulation of the energy flow through the food-chain and cycling of materials

via various nutrient cycles. So, the regulation of the ecosystem in nature was much earlier is recognized by the ancient people than us. This understanding promoted a deep respect for the natural resource as divine entities, fostering a sense of responsibility in their use.

The Convention on Biological Diversity (CBD) is the main international agreement that explicitly recognizes the contribution of indigenous and local communities' traditional knowledge, innovations, and practices in the preservation and sustainable development of biodiversity (Kannaiyan 2007). Each contracting party subject to its national legislation is required by Article 8(j) of the convention to respect, preserve, and uphold the tangible or visible lifestyles of indigenous and local communities that are relevant for the conservation and sustainable use of biological resources. In addition to CBD, India is a signatory member of UNESCO's Natural heritage site convention, Ramsar convention and many other international treaties and conventions to conserve biodiversity and related practices of our country. In 2001, India has taken a landmark step to conserve its Traditional Knowledge systems by establishing Traditional Knowledge Digital Library (TKDL). The TKDL is a collaborative project of the Department of AYUSH (now Ministry of AYUSH) and the Council of Scientific and Industrial Research (CSIR). TKDL aimed at preventing defalcation of India's traditional medicinal knowledge by other countries at international patent offices. Additionally, India has enacted the Biodiversity Act 2002, forest right Act 2016 to protect our biodiversity and communities living in forest areas for the sustainable management of country's environment. Various other efforts have been taken by the Government of India to protect the traditional knowledge at local level amongst which research activities and establishment of Indigenous knowledge system (IKS) cell are very important (Fig.1). These efforts encourage the wider application of these knowledge, and innovative practices with the consent and involvement of their holders.

Communities have carried on a long legacy of adoration and respect for nature in various places of India. Religious teachings, behaviors, and traditions have been significant in this regard (Chapple 1998). They advocated for laws that would guarantee ordinary people close relationships with and a sense of connection to nature. The believers were given instructions on how to carry out specific ceremonies and rituals in order for it to become a way of life. The messages of environmental preservation and protection can occasionally be subtle. Nowadays when severe ecological crisis and environmental deterioration is going on across the globe, it is our duty to comprehend these traditions today for saving our future generations (Negi et al. 2023). The core tenets of traditional Indian knowledge systems (TIKS) include the doctrine of Dharma, the literature of the Vedas, respect for all living forms, sacred natural sites, traditional farming methods, Ayurveda and traditional medical practices, ethical and moral education, preserving biodiversity practices, handling waste, practicing meditation and yoga, festivals and rituals, etc. The present study discusses some deep insights from Indian traditions and its knowledge system for nature and environment conservation

Integral aspects of Traditional Indian Knowledge system

TIKS inherits the wisdom, innovations, and practices of indigenous and local communities developed over centuries through interaction with the natural environment and passed to successive generations mainly through written and oral traditions. The holistic and sustainable nature of Indian Traditional Knowledge integrates various vital aspects of environment including all life forms. It encompasses environmental wisdom in form of sustainable water management practices, biodiversity conservation practices, sustainable agriculture practices, architectural knowledge, traditional medicinal systems, spiritual practices, cultural practices, ethical and legal dimensions (Fig. 2).

Concept of Dharma: The concept of

"dharma" in Indian philosophy includes the duty to protect and preserve the environment. It is considered a moral and ethical responsibility to live in harmony with nature and not harm it. Before law and statutory laws arose to regulate and govern human behavior and activities, dharma served as a person's guiding principle. In general, rivers are referred to as holy, and some particular rivers are thought to be sacred enough to wash away a person's sins if they take a holy bath in them. There are tales and folk songs extolling the importance and origin of the rivers and distributaries from the vast Himalayas, which are regarded as pious (Atharvaveda). In the Sankha 16, it is said that flowing water is always pure and that both water pollution and water purity have been considered.

Respect for All Life Forms: Indian traditional knowledge promotes respect for all forms of life, from plants and animals to rivers and mountains. Many animals, plants, and natural elements are considered sacred, and harming them is discouraged. Some direct and indirect instructions were given in manu-samhita for conserving biodiversity and their sustainable uses (Sharma 2016).

Sacred Natural Sites: In Indian traditional knowledge, certain natural sites such as forests, rivers, mountains, and groves are considered sacred. The sacred groves consist of a bunch of old trees, generally at the outskirts of villages, the cutting of trees was prohibited in these areas. These sacred natural sites are protected and conserved as they are believed to be inhabited by deities or spirits. This cultural and spiritual connection to nature has helped preserve these areas over generations. Sacred natural sites (SNS) perform multiple functional in nature and contribute to variety of ecosystem services for human well-being and environmental sustainability (Singh et al. 2022).

Traditional Ecological Knowledge: Indigenous communities in India have developed intricate knowledge systems about their local ecosystems. This knowledge includes information about plant and animal species, their habitats, and sustainable resource management practices. This knowledge has been passed down through generations and is essential for the sustainable use of natural resources. As for water conservation practices includes efficient irrigation techniques, rainwater harvesting, and the use of traditional water management systems like step wells (baolis). Slowly global recognition of traditional ecological knowledge is increasing day by day as it is based on the natural resource's conservation as well as their utilization in a sustainable manner. Das et al. (2023), reviewed the different traditional methods practiced by indigenous communities of the north east India, in context to natural resource management.

Traditional Farming Practices: Indian agriculture has a history of diverse and sustainable practices, including organic farming, mixed cropping, and agroforestry. These methods prioritize soil health and biodiversity conservation. Agriculture has always been a crucial part of Indian society. Ancient educational institutions, such as ashrams and gurukuls, taught agricultural practices that emphasized water conservation. This included crop rotation, soil moisture conservation, and the efficient use of irrigation water (Patel 2020).

Vedic Literature: The Vedas, the oldest sacred texts of Hinduism, contain verses that highlight the importance of natural resources and their conservation. The oldest and simplest form of nature-worship and environmental awareness finds expression in Vedic texts (Sarmah 2015). The Vedas are the oldest monumental scriptures and represent fountain of wisdom and knowledge. These are four in number – Rigveda, Samaveda, Yajurveda and Atharvaveda. Gāyatrī mantra of the Rig-Veda, which is chanted by people on daily, admires properties of the sun. Similarly, the Atharva-Veda has a beautiful hymn dedicated to applaud of the earth. The other ancient scriptures include – Brahmanas, Upanishads, Smritis, Samhitas, Aranyakas, Puranas, etc. (Verma 2020).

Ayurveda and Traditional (Herbal) Medicine: Ayurveda, a natural system of medicine, originated in India more than 3,000 years ago. The term *Ayurveda* is derived from the Sanskrit words *ayur* (life) and *veda* (science or knowledge). Thus, Ayurveda translates to *knowledge of life* (Ayurveda _ Johns Hopkins Medicine.html). Ayurveda, the traditional Indian system of medicine, is truly based on natural ingredients like herbs and minerals. The conservation of medicinal plants and their sustainable uses are core of the heart of Ayurvedic practice. Traditional healers (vaidyas) often have great comprehension of plant conservation and collection methods (Shi et al. 2021).

Moral and Ethical Education: The ancient Indian education system aimed not only to impart academic knowledge but also to instill moral and ethical values in students (Begum 2022). These values often included teachings about the responsible use of resources, including water, and the need to protect the environment. Air is mentioned as the guru, water as father, and earth as the great mother of all in 'Guru Granth Saheb'.

Water Management Techniques: Ancient texts and treatises on various subjects, including agriculture, architecture (Vastu Shastra), and urban planning, contained guidelines for efficient water management. The practice of yajnas, or sacrificial rituals, was common in ancient India. These rituals often required the use of water in various forms, and they emphasized the importance of using water judiciously and not wasting it. Techniques for rainwater harvesting, groundwater recharge, and efficient irrigation were part of this knowledge. Specific texts like the "Arthashastra" by Chanakya and various texts on agriculture and irrigation engineering contained detailed instructions on water management and conservation practices. Water conservation messages were often conveyed through traditional art forms, folklore, and stories. These creative methods helped reinforce the importance of water conservation in a culturally relevant way.

Community and Village Wisdom: Traditional education in ancient India often took place in village settings or under the guidance of gurus (teachers) in ashrams (hermitages). This allowed for the transmission of local wisdom and practices related to water conservation. Communities had their own methods for managing water resources sustainably. Bishnois community of Khejrali village of Rajasthan is well known for their love towards khejri trees (*Prosopis cineraria*) as in Rajasthan about 363 young and old men and women embraced the Khejri tree to protect them from being felled by the local King's men. One of the leading women of the movement was Amrita Devi Bishnoi. Many indigenous and tribal communities in India have a strong tradition of community-based conservation efforts. They often manage local forests, watersheds, and other natural resources collectively, using traditional knowledge to sustainably extract resources while preserving the ecosystem. Bain (2017) reviewed traditional knowledge, beliefs and practices impacts on conservation of nature and environment in India and highlighted how the tribes of India utilize their knowledge and practices for conserving the environment, plants and animals.

Integrated Curriculum and Practical Training: The ancient Indian education system was holistic, covering a wide range of subjects. Subjects like environmental science and ecology were integrated with spiritual and moral teachings, instilling a deep sense of responsibility toward the environment, including water resources. Education often included hands-on training in water management, such as constructing and maintaining water storage structures, which helped students understand the practical aspects of water conservation.

Teachings of Buddhism, Jainism, Saints and Philosophers: Jainism promotes total nonviolence, or Ahimsa; it holds all living things on earth, including the smallest insects or bacteria, in equal regard and forbids their destruction by any means. This attitude significantly contributed to the preservation of

biodiversity. Jainism advocates total nonviolence, while Buddhism takes the middle road and advises against killing animals or cutting down trees unless absolutely necessary (Narayan and Kumar 2003). Philosophers and saints like Mahatma Gandhi emphasized the importance of simple living and the responsible use of natural resources. Their teachings had a profound impact on societal values and behavior.

Biodiversity Conservation Practices: Various indigenous and local communities in India have developed practices for conserving biodiversity. These include rotational farming, seed saving, and crop diversity management. These practices not only ensure food security but also help maintain a healthy ecosystem. Recently Negi et al. (2023) attempted to document the need of mainstreaming the Indigenous Knowledge for biodiversity conservation and sustainable use of bio-resources particularly in the Indian Himalayan Region.

Animal Protection: Traditional knowledge systems in India include practices that protect wildlife. For example, some communities consider certain animal species as totems or sacred, which prohibits their hunting or harm. This has contributed to the conservation of various species. Wild animals and even domesticated ones were also given pride of place and respect in the ancient tradition. Numerous Hindu deities have a particular animal or bird serving as their vhana, or chariot. These animals include lions, tigers, elephants, bulls, horses, swans, owls, vultures, oxen, mice, and more. In India, wild animals were preserved for a very long time due to the connection between such animals and peoples' religious beliefs.

Waste Management: Traditional practices often include the efficient use of resources and minimal waste generation. For example, the concept of "Aparigraha" in Jainism promotes non-possessiveness and non-wastefulness. Ecological harmony is revealed in the Vedas, Upanishads, Smritis, and Puranas, ancient Indian texts. Since ancient times, Indian culture and lifestyle have been inextricably linked to Reduce, Reuse, and Recycle and Zero-Waste Management. Recently Chauhan et al. (2022) attempted to explore a few sustainability and waste management ideas that are currently in vogue but have their historical roots in the Vedic Scriptures. These ideas include the circular economy, ecosystem understanding, conservation of forests and wildlife, rainwater harvesting, organic farming, composting, and many others.

Yoga and Meditation: Practices like yoga and meditation, rooted in Indian tradition, foster a deep connection with nature and promote mental and emotional well-being, which can lead to greater environmental awareness and conservation efforts. Yoga, a priceless gift from ancient Indian tradition, has become one of the most reliable ways to improve both mental and physical health. The word "yoga" comes from the Sanskrit root "yuj," which means "to join," "to yoke," or "to unite." It represents the harmony between humans and nature, the unity of mind and body, thought and action, restraint and fulfilment, and an all-encompassing approach to health and well-being. By adopting resolution 69/131 on December 11, 2014, the UN declared June 21 to be the International Day of Yoga in recognition of its worldwide appeal. India proposed the draft resolution creating the International Day of Yoga, and a record 175 member states supported it. The proposal was initially presented by Prime Minister Narendra Modi on September 27, 2014, as he opened the 69th session of the General Assembly. Since June 21 is the Summer Solstice, the longest day of the year in the Northern Hemisphere, it was selected as the date. This day is significant in many cultures and symbolizes a balance between human health and the natural world. The theme of International Day of Yoga in 2025 is "Yoga for One Earth, One Health", aligning yoga with sustainability and global well-being (PIB, Delhi).

Festivals and Rituals: Many traditional festivals and rituals in India involve acts of conservation, such as tree planting, cleaning rivers, or protecting wildlife during specific seasons. These rituals serve as

reminders of the importance of environmental preservation. For example the practice of yajnas, or sacrificial rituals, was common in ancient India. These rituals often required the use of water in various forms, and they emphasized the importance of using water judiciously and not wasting it. The worship of the pipal tree became a folk ritual, and the pipal was called the king of trees in Brahma Purana. In our local communities, we saw many such plants and trees were worshipped according to deities associated with them. The upanayaya (initiation) ceremony with papal tree and the marriage ritual between the banyan tree and neem tree are showing how deeply nature is involved with ancient people lives.

Legal Recognition: Manusmrti contains references to both explicit and oblique directives regarding the preservation of plants and animals. If trees or animals are endangered, there are harsher punishments. In recent years, there has been an effort to incorporate traditional knowledge into formal conservation and environmental policies in India (Jose and Manchikanti 2021). Various laws and regulations recognize the role of indigenous and local communities in conservation efforts and seek their participation.

Our understanding of the need to maintain the flora and fauna is enlightened by Indian traditions, practises, and religious beliefs. One key ecological theory they instill in us is that each living thing in the biosphere plays a crucial part in the movement of energy. Cycling of nutrients sustains life on Earth. Therefore, environmentalists have begun realizing the importance of culture as a centre on traditional knowledge systems (TKS) and a force for conservation. Religious Teachings and cultural customs could be positively interpreted for the conservation of the ecology and protection of the environment.

Conclusion

In conclusion, Indian traditional knowledge is not a mere relic of the past, but a diverse and dynamic, environment centric system offering insights into co-existence with nature, resilience and sustainability. Nature conservation has been deeply integrated into Indian traditions and its knowledge systems for centuries. Recognizing and respecting these traditional practices is crucial for modern conservation efforts and the overall well-being of both nature and society in India. These traditions and knowledge systems offer insightful information about the management of sustainable resources and serve as a source of inspiration for modern environmental conservation efforts in India and around the world. TKS complements advance science and technology and has immense potential to formulate solutions for modern problems particularly in the face of climate change and biodiversity loss.

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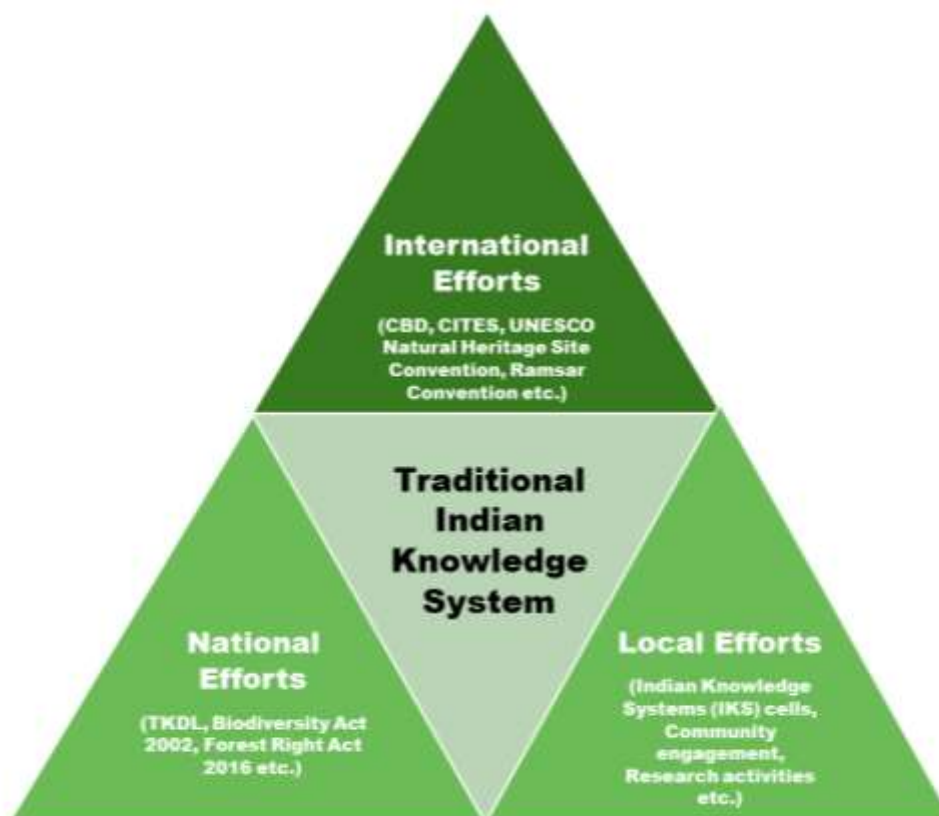


Figure. 1 India's efforts to protect Traditional Knowledge System



Figure. 2 Word cloud showcasing integral aspects of Traditional Indian Knowledge System