

ENVIRONMENTAL CONSERVATIVE & MANAGEMENT SYSTEMS IN ANCIENT INDIA: A STUDY OF PREVALENT PRACTICES IN ANCIENT INDIA

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ABSTRACT

India is a mega diversity country with an enormous repository of biological wealth in terms of flora (45,000 species), fauna (75,000 species) and microorganisms. It is also endowed with a rich and invaluable, cultural and traditional knowledge, and practice systems. Our country is well known for its indigenous systems of medicines like Ayurveda, Unani, Siddha, etc. New pharmaceutical products are being identified based on this and their effects are to be validated. We need to plan to conserve and sustain this biological wealth for our next generations.

The concern for environmental issues is among the most topical issues in academic, business and political debates in both the developed and the developing countries. This paper highlights the issues related to evolution, utilization and degradation of natural resources right from ancient to modern era and also highlights the prevalent practices of Ancient India for environment conservation. Several researchers, academicians, spiritual leaders and many more have conducted many studies, focusing on the historical and sustainable management of natural resources such as forests, land, water etc.

KEYWORDS: Natural Resources, Evolution, Pre-Vedic Age, Management, Degradation

INTRODUCTION

The last few centuries have been dominated by human beings, and are referred to by some scholars as 'anthropocene', or a period of human domination over the planet. This domination, as we know, has impacted the planet, leading to, among other things, the rapid depletion of wildlife and their habitat. In the last few decades, growing human populations and their consumption levels, accompanied by greater need for water, electricity, metal, food, housing and other luxury items has led to the quick erosion of other species. This loss of species has been guesstimated by various scholars at anywhere between one per hour to one per day.

Does this mean that human beings are not at all concerned about other species and their habitats? This is not entirely true, for human beings have always either set aside areas for protection and conservation of species or followed lifestyles and cultural values that are harmonious with the needs of other species. The earliest known examples in India of areas being set aside to provide protection to the species living in them are from around 300 BC, during the time of Emperor Ashoka.

Human beings have been interested in ecology since the beginning of civilization. Even our ancient scriptures have included practices and values related with ecological and environmental conservation. The concept of ecological and environmental conservation “*enters into every form of religion.... It rests on the earliest conceptions of the unity of life in nature, in the sense of communion and fellowship with the divine centre and source of life...*”. The protection of forests as sacred forests and of several tree species as sacred trees belongs to the religion-based conservation ethos of ancient people all over the world. Although such practices became extinct in most parts of the world, basically due to changes in religion, and during recent times due to changes in resource use patterns, conserving sacred forests continue to be of much importance in religion, culture and resource use systems in many parts of India. Indian nationalism has grown out of the amalgamation of scores of nature-based local cultures and practices, evident from the worship of plants, groves, animals and natural objects like rivers, mountains, ant-hills and rocks. Ancient Indian scriptures, while advocating conservation of sacred forests, do highlight the importance of planting trees and groves. For example, the Vriksotsavavidhi of the Matsyapurana attaches great importance to the planting of trees and even to the celebration of the tree festival or ‘vana mahostav’. It emphasises the importance of planting a tree thus: "A son is equal to ten deep reservoirs of water and a tree planted is equal to ten sons". A tree laden with flowers and fruits saves its dependents (birds, humans, etc.) from distress, just as a good son saves his family.

One of the most widespread conservation practices in India is the protection given to trees of the genus *Ficus* (*Ficus religiosa*; pipal tree or ashwatta), which dot the countryside and are often the only large trees in the midst of towns and cities. These trees have a conspicuous position in the cultural landscape of India for more than 5,000 years. It was depicted even on Mohenjo Daro artefacts. Buddha had attained enlightenment under a pipal tree. *Ficus* sp. are now recognised as keystone resources of tropical forests, ‘fruiting’ often at times when most other species are without fruits. Thus, humans are inextricably linked to and dependent upon ecosystems for their very survival. However, enhanced human activities during the recent years have induced stresses on ecosystems, necessitating the understanding of ecosystems.

When the British first came to India in the 17th century, this element of Indian society left them completely confused. For them, first as traders and then as colonial rulers, forests were meant to be exploited for economic gain; animals (where they existed) needed to be hunted either for food or sport. In 1878, in a small village called Vedanthangal, near Chennai, British soldiers shot some storks in the local wetland. The villagers stormed the collector’s office and made him issue an order that no one would harm the nesting birds in future. This is by no means the only example of its kind; Indian history is peppered with such examples. Among the best known are the Bishnoi, in Rajasthan, Punjab and Haryana who are famous for their self-sacrificing defence of wildlife.

It is believed that in 1730, the king of Jodhpur ordered his men to cut timber from Bishnoi land. The local people, led by Attri Devi, hugged the trees to save them. The king’s men hacked down 263 children, women and men before they gave up! The Bishnoi religion was initiated by Guru Jambheshwar about 500 years ago. Followers believe in a set of 29 principles, hence are called the ‘Bishnoi’. These principles include a ban on felling trees and a ban on killing animals. In particular, they consider the kejadi (*Prosopis cineraria*) and blackbuck sacred species.

In recent times, this incident has become an inspiration for many communities to save their forests from destruction: the Chipko Movement in the Garhwal Himalayas and the Apiko Movement in Karnataka in the 1980s are two important examples.

This is not to say that traditionally, all species and their habitats were protected by all communities in India. However, different communities, cultures and practices together ensured greater protection and conservation of biological diversity. This was combined with the fact that cultural and economic needs were very different then from what they are now.

Despite this rich tradition of conservation, India today holds the distinction of being one of the most densely populated countries, yet being one of the world's mega-biodiversity countries, but also having one of the highest rates of biodiversity decline.

Traditional Knowledge for Sustainability

Local Vegetation Management

Over thousands of years local people have developed a variety of vegetation management practices that continue to exist in tropical Asia. Such systems are often integrated with traditional rainwater harvesting that promotes landscape heterogeneity through augmented growth of trees and other vegetation, which in turn support a variety of fauna. In India these systems can be classified in several ways:

- **Religious Traditions:** Temple forests, monastery forests, sanctified and deified trees
- **Traditional Tribal Traditions:** Sacred forests, sacred groves and sacred trees
- **Royal Traditions:** Royal hunting preserves, elephant forests, royal gardens etc.
- **Livelihood Traditions:** Forests and groves serving as cultural and social space and source of livelihood products and services

The traditions are also reflected in a variety of practices regarding the use and management of trees, forests and water. These include:

- Collection and management of wood and non-wood forest products
- Traditional ethics, norms and practices for restraint use of forests, water and other natural resources
- Traditional practices on protection, production and regeneration of forests.
- Cultivation of useful trees in cultural landscapes and agro forestry systems
- Creation and maintenance of traditional water harvesting systems such as tanks along with plantation of the tree groves in the proximity

These systems support biodiversity, which is although less than natural ecosystems but it helps reduce the harvest pressure.

Farm Biodiversity

Throughout the Indian farms and field one finds strips of vegetation containing several species of plants and small animals. These strips are beneficial in several ways. Such strips on tropical lands have been found to accelerate natural successional processes by attracting seed-dispersing animals and increasing the seed rain of forest plants. Effects of these strips resemble the windbreaks on seed deposition patterns (Harvey, 2000). Isolated trees provide seed in the area for

natural regeneration. The strips enhance seed rain, and connectivity. Because such strips trap large number of seeds of several species they help in further tree growth. Compared to open fields, farm boundaries with vegetation receive seed in greater densities and species-richness than open farms and pastures. All forms of seed dispersal help in the process but animal-dispersed (birds, bats, mammals etc.) seeds often occur in greater densities and species numbers. Presence of isolated trees and shrubs or remnant trees helps. Farm boundaries maintained throughout the country are often self regenerating and require only management as these barriers considerably increase the deposition of tree and shrub seeds within the cultural landscape. Indeed considerable biodiversity is found within these strips. This is a practice that needs to be maintained as it has several socio-economic benefits as well.

Conservation Principles in Ancient Texts

Ancient texts make explicit references as to how forests and other natural resources are to be treated. Sustainability in different forms has been an issue of development of thought since ancient times. For example, robust principles were designed in order to comprehend whether or not the intricate web of nature is sustaining itself. These principles roughly correspond with modern understanding of **conservation, utilization, and regeneration**.

Conservation Principles

Atharva Veda (12.1.11) hymn, believed to have been composed sometime at around 800 BC, somewhere amidst deep forests reads: "O Earth! Pleasant be thy hills, snow-clad mountains and forests; O numerous colored, firm and protected Earth! On this earth I stand, undefeated, unslain, unhurt." Implicit here are the following principles:

- It must be ensured that earth remains forested.
- It must be understood that humans can sustain only if the earth is protected.
- To ensure that humans remain 'unslain' and 'unhurt', the ecosystem integrity must be maintained.
- Even if vaguely, it also makes reference to ecology, economy and society concurrently.

Utilization and Regeneration Principles

Another hymn from Atharva Veda (12.1.35) reads: "Whatever I dig out from you, O Earth! May that have quick regeneration again; may we not damage thy vital habitat and heart". Implicit here are the following principles:

- Human beings can use the resources from the earth for their sustenance,
- Resource use pattern must also help in resource regeneration,
- In the process of harvest no damage should be done to the earth,
- Humans are forewarned not against the use of nature for survival, but against the overuse and abuse.

Although not in modern terminology, the three segment of sustainability – ecology, economy and society seem to get addressed simultaneously.

Similarly, water management and associated tree growing has been the subject of ancient text. Tanks have been the most important source of irrigation in India. Some tanks may date as far back as the *Rig Vedic* period, around 1500 BC. The *Rig Veda* refers to lotus ponds (5.78.7), ponds that give life to frogs (7.103.2) and ponds of varying depths for bathing

(10.71.7). Reference to the tanks is also found in the *Arthashastra* of Kautilya⁵ written around 300 BC (Rangarajan 1987: 231-233). The *Arthashastra* refers to the ownership and management of the village tanks in the following verses:

Waterworks such as reservoirs, embankments and tanks can be privately owned and the owner shall be free to sell or mortgage them (3.9.33)⁶.

The ownership of the tanks shall lapse, if they had not been in use for a period of five years, excepting in case of distress (3.9.32).

Anyone leasing, hiring, sharing or accepting a waterworks as a pledge, with a right to use them, shall keep them in good condition (3.9.36).

Owners may give water to others in return for a share of the produce grown in the fields, parks or gardens (3.9.35).

In the absence of owners, either charitable individuals or the people in village acting together shall maintain waterworks (3.10.3).

No one will sell or mortgage, directly or indirectly, a bund or embankment built and long used as a charitable public undertaking except when it is in ruins or has been abandoned (3.10.1, 2).

The earliest scholar to have commented on the relationship of tanks and trees is Varahamihira who described the detailed technical instructions for the tank constructions in his famous work *Brahatsamhita* (550 AD):

Without the shade of the trees on their sides, water reservoirs do not look charming; therefore, one ought to plant the gardens on the banks of the water (55.1)⁷

Commenting on the species to be planted on the embankments of the tank, after its construction, Varahamihira writes:

The shoreline (banks) of the tanks should be shaded (planted) with the mixed stands of Arjun (*Terminalia arjuna*), Vata (*Ficus benghalensis*), Aam (*Mangifera indica*), Pipal (*Ficus religiosa*), Nichul (*Nauclea orientalis*), Jambu (*Syzygium cumini*), Vet (*Calamus?*), Neep (*Mitragyna parvifolia*), Kurvak (?), Tal (*Borassus flabellifer*), Ashok (*Saraca asoka*), Madhuk (*Madhuca indica*), and Bakul (*Mimusops elengi*) (54.119).

For example, there is a considerable overlap in the formal and scientific forestry policy and practice, which provides hope that traditional knowledge systems can contribute to the management of natural resources. It would be pertinent to quote Gadgil and Guha (1992: 51) in this context:

"Indeed one could argue that scientific prescriptions in industrial societies show little evidence of progress over the simple rule-of-thumb prescriptions for sustainable resource use and the conservation of diversity which characterized gatherer and peasant societies. Equally, the legal and codified procedures which are supposed to ensure the enforcement of scientific prescriptions work little better than earlier procedures based on religion or social convention".

Incorporating Traditional Knowledge in Practice

There is an urgent need for the integration of Traditional and formal sciences. Following considerations may be useful in this regard:

- Development of methods for mutual learning between local people and the formal scientists.
- State forest policies and sustainable forest management processes need to give full attention to eth forestry and local institutional arrangements to incorporate traditional knowledge in forest management and development projects.
- Traditional knowledge and traditions can contribute to the preparation of village microplans, which are prepared for eco-development, joint forest management and rural development. The plans should be based on both geographic and traditional community boundaries rather than only on administrative boundaries.
- Revival of the traditional water management systems that have served the society for hundreds of years but are currently threatened
- There is a clear need to integrate traditional and formal sciences for participatory monitoring, and taking feedback to achieve adaptive strategies for management of natural resources.

In spite of the value of traditional knowledge for biodiversity conservation and natural resource management there still is a need to further the cause. The following consideration may be useful in this respect:

- Encouraging the documentation of indigenous knowledge and its use in natural resource management. Such documentation should be carried out in participation with the communities that hold the knowledge. Due attention should be given to document the emic perspectives regarding IK rather than only the perspectives of professional outsiders. The documentation should not only consist of descriptions of knowledge systems and its use, but also information on the threats to its survival. People's biodiversity registers are a case in point (Gadgil 1994 & 1996, Gadgil *et al.* 2000). The program of People's Biodiversity Registers promotes folk ecological knowledge and wisdom by devising a formal means for their maintenance, and by creating new contexts for their continued practice. PBRs document traditional ecological knowledge and practices on use of natural resources, with the help of local educational institutions, teachers, students and NGOs working in collaboration with local, institutions. Such a process and the resulting documents, could serve a significant role in "promoting more sustainable, flexible, participatory systems of management and in ensuring a better flow of benefits from economic use of the living resources to the local communities" (Gadgil *et al.* 2000).
- Facilitating the translation of available and new documents describing Indic traditions such as ancient texts on medicinal plants, into local languages and dissemination of these documents amongst local people. Such a translation is indeed required because texts are often available in languages (e.g. Sanskrit) not understood by many in contemporary India. On the other hand, translation of local knowledge into formal scientific terminology will provide space to external researchers, policy makers, and practitioners to comprehend and support people's knowledge systems and initiatives.
- Facilitating the exchange of information amongst practitioners of local knowledge.

Developing clear and concise educational material on traditional knowledge systems to be used in communication programmes to impart information regarding the merits and threats to indigenous knowledge systems to both policy makers and the general public.

CONCLUSIONS

Along with science, local technologies (Gandhi, 1982) and people's knowledge systems such as ethno forestry have an important role to play for biodiversity conservation and sustainability. There are numerous examples where local knowledge derived from long-term nature-society interaction has been extremely useful in validating scientific hypotheses and suggesting new research directions (see for example a recent analysis by Kimmerer 2002, among others; see also Robertson and Hull 2001). Likewise, formal scientific methods have been extremely valuable in validating the traditional ethno-pharmacological knowledge by identifying the active ingredients (chemicals) in plants used in ethnomedicine. One such example of significant contribution that established the ancient-modern concordance came with the isolation of the hypertensive alkaloid from the sarpagandha plant (*Rouwolfia serpentina*), valued in Ayurveda for the treatment of hypertension, insomnia, and insanity. Several such isolations of active ingredients have been made since then (Dev 1999, Mishra *et al.* 2001)⁹. Another example pertains to the conservation of ethnomedicinal species that are also globally traded, and, therefore, have become endangered in India. "A reasonable degree of scientific rigour" is required to assess the threat status of species to be banned in trade (Ved *et al.* 1998) as well as to monitor, learn and craft strategies for context specific adaptive management by using formal and local sciences. The important issue to be guarded here is that the benefits must go to the community.

Ultimately, it does precious little to present models, concepts, and results of studies in academic discourses if those efforts are not tested under real conservation situations (Kohm *et al.* 2000). Conservation scientists must make a transition from "staid observer to participant at some level" (Meffe 1998). Gone are the times when scientists could afford to say that their work is to create knowledge, transmit it and leave application to policy makers and practitioners. Scientists shall have to collaborate with people to put forth new hypotheses that incorporate aspirations of formal and local systems of knowing and modify their methodologies accordingly. We would, therefore, forewarn against the futile philosophical arguments that engage in the questions of supremacy of one faith over the other, or, a particular knowledge system over the other. Humanity needs to go beyond disciplinary divide and find a common ground across cultures, faiths and disciplines (Pandey, 2002a).

Collective wisdom of humanity for conservation of biodiversity, embodied both in formal science as well as local systems of knowledge, therefore, is the key to pursue our progress towards sustainability.

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