

SOCIAL AND ETHICAL DIMENSIONS OF ENVIRONMENTAL CONSERVATION

M.D. Subash Chandran*

&

T.V. Ramachandra

Despite the traditional distance between the practitioners of science and the people with spiritual beliefs, there has now been a convergence of religion and environmental activism. The global environmental crisis, which is demanding our attention with ever-increasing urgency, reaches into every area of our existence: physical, social, economic, political, cultural, psychological and spiritual. Consequently, people who attempt to deal with this crisis tend to approach it through a variety of channels, including the natural and the social sciences, ethics and religion. Those for whom the search for a meaningful existence involves the integration of nature and spirit tend to seek solutions in which these different approaches are in harmony rather than in conflict (Vaillancourt and Cousineau, 1997). Environment is visualized as all of the conditions, circumstances etc. that surround and influence life on earth, including atmospheric conditions, food chains and water cycle. It is a harmonious blend of life in its infinite diversity with the non-living factors viz. climatic, edaphic and topographic. All the living beings, are in tune with the environment; their origin and evolution, and even extinctions are in perfect blend with time and dynamism of nature. The humans however are not only coming out of this primal harmony, but also destroying it in many ways. Science or technology alone or in combination cannot redeem the deteriorating situation and set aright once again a healthy atmosphere for natural continuity of life and evolution. Humans, forming a major and decisive sector of the biosphere, have a conscious role to play in this regard. The impending global crisis, both economic and ecologic, having tumultuous effect on the entire biosphere, has prompted scientists and thinkers to probe into the social and ethical dimensions of environmental conservation as well.

The worldview of the modern society is that all benefits are man-made. Products of scientific, technological and industrial progress are accessible through the market system. Health is seen as something that comes through hospitals or through the medical profession, with the help of latest technological devices and pharmaceutical products. Education is seen as a commodity that can only be acquired via schools and universities. Law and order are dispensed with by the police, courts and the prison system. Even government is seen as man made. A country's wealth is measured by its per capita Gross National Product (GNP), which provides a rough measure of its ability to provide its citizens with all such man-made commodities. For economists trained in these ideas the benefits obtained from the natural processes of the biosphere, those that stabilize the climate, provide fertility to our soil, replenish our water supplies are not regarded as benefits at all (Goldsmith, 1992).

* Centre for Ecological Sciences, Indian Institute of Science, Bangalore -560012

For correspondence: M.D. Subash Chandran, CES Field Station, Viveknagar, Kumta -581343, Uttara
Kannada, Karnataka. Email: mdschandra@yahoo.com

COMMUNITY BASED CONSERVATION

The discipline of conservation biology, although had formal origin in 1978, can be traced to religious and philosophical beliefs concerning the relationship between the human societies and the natural world. In many of the world's religions, people are seen as both physically and spiritually connected to the plants and animals in the surrounding environment. In the Chinese Tao, Japanese Shinto, Hindu and Buddhist philosophies, wilderness areas and natural settings are valued and protected for their capacity to provide intense spiritual experiences (Hargrove, 1986b, 1989; Callicot and Ames, 1989; Callicot, 1994). These philosophies see a direct connection between the natural world and the spiritual world, a connection that breaks when the natural world is altered or destroyed by human activity. Strict adherents to the Jainist and Hindu religions in India believe that all killing of animal life is wrong. Descriptions of environmentally devastating events, such as droughts, fires and earthquakes, that occur when people act against the wishes of the gods are a prominent feature of the religious traditions of many societies. Biological diversity often has immediate significance to traditional societies whose people live close to land and water (Primack, 1998).

Natural sacred sites and conservation

Conservation has its roots in pre-agricultural societies. It was often in the name of sacredness that natural areas such as forests, trees, animals, water bodies, grasslands etc. were preserved by ancient societies. The details of some of the important natural sacred sites, the world over, out of thousands such, are furnished in the Table-1. These sacred sites are mountains, ridges, lakes, caves, water falls, forests etc. Most of them are associated with the native cultures of the Third World countries of Asia, Africa and South America. Obviously mountains are most important in the geography, culture and economy of every region. They are at the origins of rivers, and lakes are found in their depressions. They shelter healing herbs and varieties of animals. Being highest of the landscape features of the locality, rising into skies, the people often associated the sun and moon as rising or setting behind them and ascending to their tops brought them nearer to the abodes of gods. The mountains, like the Himalayas and the Western Ghats are not only global biodiversity hotspots but also of great significance in the legends and lives of the people of India.

Traditional societies all over the world valued a large number of plant species from the wild for a variety of reasons, for food, fiber, shelter or medicine. Partly, perhaps, arising out of this close human-forest linkage and partly because of the ancient animistic belief system of the traditional societies, patches of forests were protected in different parts of the world as sacred, ranging in size from less than an hectare (at present) to few sq. km. The sacred groves of Europe are part of history and legends, but are a living tradition especially in India (Hughes and Chandran, 1998). In ancient (pre-Christian) Mediterranean region patches of forests were preserved in the name of gods. Viewing such a stately patch of woods, the first century BC Roman poet Ovid said, 'Here stands a

silent grove black with the shade of oaks; at the sight of it anyone could say, “There is a god in here!”’. In ancient Roman religion deities were felt to be inherent in aspects of the landscape. Every notable spot had its *genius loci*, or spirit of the place. An image was not necessary. In classical Greece, sacred groves were first dedicated to the deity. In later times artistic images were installed in groves. There were groves dedicated to Artemis, goddess of hunting, Apollo, who also carried bow and arrow, Pan, hunter and herder and others (Chandran and Hughes, 2000)

The sacred groves of the Mediterranean as well as of India had distinct borders. Tree felling, collection of biomass, removal of earth, hunting, fishing, farming, grazing of domestic animals, and use for residences or other buildings were forbidden. Specific rules varied from grove to grove, but in general the biodiversity was protected. Exceptions might be allowed in times of need (Hughes and Chandran 2000). An inscription from the city of Magnesia in ancient Greece says, “By the sacred laws, prohibitions and censures, it is forbidden for anyone to pasture or stable or cut wood in the sanctuary of Zeus (Dittenberger, 1924).

Natural sacred sites of India are in several thousands and have traditionally been associated with sites worthy of conservation for water and biodiversity. As ancient people carved out lands from pristine nature for agriculture, pastures and homes, they would be drifting away from the path of their forefathers who hunted and gathered for livelihoods, seldom ever clearing forests or draining wetlands. Not to incur the wrath of gods, to be in communion with the supernatural, and to obtain several goods and services from the wilderness, especially water, medicinal plants and non-timber products without creating any vegetational alterations, groves of woods were preserved as sacrosanct. The sacred groves in India are known by different names and have different local deities (Table-2). The sacred groves and other natural sacred sites such as mountains, lakes and rivers are closely interwoven with the social and cultural life of the people. Various religious beliefs associated with the groves and other natural sacred sites have been instrumental in protecting them through generations.

Conservation of natural sacred sites: legacy of folk tradition

Natural sacred sites, have been centres of local worship and local cultures. Majority of the deities of the groves are local deities, basically father deity or mother deity known by different names in different places as well as spirits and animals such as serpent, tiger, peacock etc. They do not find any mention in the ancient Hindu scriptures of the Vedic period. In the course of evolution of the Hindu religion many of these deities have been absorbed into Shaivism, Vaishnavism and Shaktism. The animal deities also have often been linked to Hindu gods as *vahanas* (vehicles). Thus the bull became the *vahana* of Shiva, peacock of Subrahmanya, the eagle (Garuda) of Vishnu, the tiger/lion of Parvati/Durga and so on. The serpent cult became associated with both Saivism and Vaishnavism. Such absorption of local cults into the Hindu mainstream, while paving the way for cultural unification of the people resulted also in the growth of temple centred worship, which started gradually eroding the biodiversity and ecosystem value of natural sacred sites.

Table-1: Some of the notable natural sacred sites of the world

Type of sacred sites	Place/ country	Deity/significance	Worshippers
Mount Kenya	Kenya	Ngai, creator of all things	Local people
Lake Bosumtwi	Ghana	Dead souls visit here	Ashanti tribe
Mt. Passot, site of sacred volcano lakes	Madagascar	Spirits of princes	Local people
Natavu Rock	Fiji	Departure point for afterlife	Local people
Mt. Kailau and lake of lava	Hawaii	Goddess, creator of Hawaii	Local people
Wichon Falls	Micronesia	Spirit	Local people
Mt. Kailas (Mt. Meru) & Manasarovar Lake	Tibet/China	Shiva of Hindus; Mandala for Buddhists from which Indus, Sutlej, Brahmaputra & Ganges flow like spokes from an eternal wheel	Hindus and Buddhists
Mt. Jizu	China	Buddhist holy place	Buddhists
Mt. Emeishan	China	Thickly wooded with streams good diversity	Buddhists
Mt. Taishan	China	Most venerated in China	Taoists, Buddhists & Confucianists
Mt. T'aebaeksan	S. Korea	Popular pilgrimage	Koreans
Ibusuki & Kyushu sacred woods	Japan	Nature spirits	Japanese
Mt. Saitobaru	Japan	Ninigi	Shintos of Japan
Mt. Popa	Myanmar	Nats (a group of spirits)	Local people
Mt. Sam	Vietnam	Holy mountain	Local people
Karang Tretes cave	Java, Javanese	Virgin quees of Southern ocean. Javanese make sacrifices to her before journeying along dangerous coastal zone	Javanese
Mt. Kanchenjunga	Nepal	Padmasambhava	Hindus and Buddhists
Mt. Sorte	Venezuela	Healing place	Maria Lionza religious group
Lake Guatavita	Colombia	Water and mountain gods	Muisca people
Bear Bute ridge	United States	Praying place for spiritual power and self knowledge	Native Indians of South Dakota

Reference: Hay-Edie and Hadley, 1998.

Table-2: Kind of sacred groves from India and their deities

Type of sacred site	Deities	Place	Hindu tribes/castes associated
Law Lyngdoh, Law Kyntang, Law Niam	Local deities	Meghalaya	Lyngdoh Syntiew, Khasi tribe
Jankor or Sarna	-do-	Central India	Dudh and Dhelki tribes
Sarna	-do-	Bihar	Munda tribe
Jaher	-do-	Central India	Santal tribe
Pen geda	-do-	Central India	Gond tribe
Oran	-do-	Rajasthan	Bishnois
Jogmaya	-do-	Rajasthan	Various
Deorai	-do-	Maharashtra	Various
Kavu	Local deities, serpent	Kerala	Nairs, Ezhavas etc.
Devarakadu	Local deities	Coorg	Kodavas
Kan	Local deities	Uttara Kannada, Shimoga	Local people
Nagarabana	Serpent	Coastal Karnataka	Local people
Hulidevarubana	Tiger/panther	Uttara Kannada	Local people

(The names of the deities of the groves collected from Siddapur in Uttara Kannada district are: Bhutappa, Choudamma, Gamadevaru, Beerappa, Masti, Mariamma, Jatakadevaru, Kattedevaru, Brahma, Bommadevaru, Hulidevaru (tiger/panther), Nagara (serpent) etc. Chandran and Gadgil 1998)

Gadgil and Guha (1992) argue that the belief systems, religions, and myths of hunter gatherer societies and the stable agricultural societies tend to emphasize conservation themes and the wise use of natural resources because these groups have learned over time to live within the constraints of a fixed resource base. In contrast, the beliefs of pastoralists and rapidly expanding agricultural and industrial societies emphasize the rapid consumption and destruction of natural resources as a way of maximizing growth and asserting control over other groups. These groups move to new localities when the resources of any one place are exhausted. The rituals found in many ancient religions that involve burning wood and sacrificing animals are seen by Gadgil and Guha as an attempt to dominate and subdue the natural world. Modern industrial states represent the extreme development of cultures of excessive and wasteful consumption, in which resources are taken to urban centres in ever-widening circles of resource depletion.

Community control over common lands

In pre-colonial India extensive tracts of land were controlled by local communities and used in a sustainable fashion. The thousands of endogamous caste groups of the Indian society had very diversified patterns of resource use and were at the same time linked in a web of reciprocity. Such organization favoured sustainable use of forest resources. The communities enforced strict protection of some forest patches, which apart from sacred groves already referred to, included also village forests with regulated harvests. The regulations included restriction of seasons for harvests such as leaves for manure, collection of non-timber products as well as family-wise limit for harvests, firewood for instance. Although such system perished in most of India during colonial and post-colonial period, it still prevails in the Halkar village of Kumta taluk in Uttara Kannada. In this village an elected body of members, well representative of the caste groups (specialized traditionally in diversified use of resources) formalized as “Village Forest Panchayat” during the British period, manages the conservation and sustainable use of the village forest. The system, obviously, is a formalized relic of more informal pre-colonial community based forest management.

Impact of market economy on conservation ethics

In the European mind, the prevalent view has been that God created nature for human’s use and benefit. In *Genesis* of Bible God instructs Adam and Eve to be “fruitful and multiply and fill the Earth and subdue it; have dominion over every thing that moves upon the Earth.” The biblical instruction supports a dominant tenet of Western philosophy: nature should be converted into wealth as rapidly as possible and used for the benefit of the people. This point of view justifies nearly all land uses and implies that to leave land unused is to misuse God’s gift – a foolish, if not downright sinful mistake. In medieval Europe, wilderness was perceived to be unused land, often believed to be inhabited by evil spirits or monsters, in contrast to the orderly qualities and appearance of agricultural landscapes (Nash, 1982; 1990). In practice, the wealth and benefits that came from this policy accrued primarily to the citizens of the colonial powers, while the needs of the non-European native peoples were largely disregarded. Lynn White (1967) charged that Christian anthropocentrism was largely responsible for the current environmental crisis. However, White’s viewpoint has been hotly debated and the church’s role in upholding environmental ethics and eco-justice has been upheld by many (Shibley and Wiggins, 1997). The protagonists of the newly emerging Christian environmentalism make it clear that Noah (of the Bible) was the first conservationist and Noah’s Ark presents a clear mandate for preserving species (Kearns, 1997).

The European powers did not consider the long term ramifications of this philosophy on the resources themselves. The unexplored territories of the Americas, Asia, Africa, and Australia seemed so vast and rich that it was inconceivable to the colonial powers that their natural resources would ever run out. 19th century American sociologist Lester Ward attacked nature’s “inefficiency”: “Rivers, instead of flowing straight, and so delivering their water to the sea, with minimum expenditure of energy,

lazily meander through plains and valleys.” For Ward, man must become nature’s engineer and create a paradise on earth, of his own design.

The British colonization of India led to large-scale of systematic exploitation of forest resources, which had a tumultuous effect on the conservation ethics of the local people. Most of the extensive forests of the country, teeming with wildlife, were taken over by the government during early 19th century and exploited commercially. Cleghorn (1861), the first British Conservator of Forests in South India, stated the government takeover of forests was “somewhat ill-advised attempt.... thoroughly failed in its objective....and threatened the speedy and complete destruction of forests themselves.” The reserved forests were meant to meet the needs of the urban, industrial and military sectors, and the protected forests those of the rural population. In Uttara Kannada, except for the continuing the protection of some of the erstwhile sacred groves or *kans*, bulk of the reserved forests were intended to be gradually converted to teak after extraction of marketable hardwoods. The protected forests, often the degraded areas closer to habitations, suffered from the ‘tragedy of the commons’ due to unregulated exploitations by the people themselves, as communities were deprived of power to keep others outside or to regulate harvests by their own members. This affected even the sacred *kan* forests. The colonial trend of forest exploitation continued almost unabated late into the 20th century, even after Indian independence, completely disrupting the community based conservation systems (Gadgil and Chandran, 1988; Chandran and Hughes, 2000).

Relic forests and rare trees: Legacy of the pre-colonial conservation

Community-based conservation in the present day Western Ghats is almost a thing of the past. The community conserved areas, often the primeval sacred groves, lost their special identity during the British period, and became one with the rest of the reserved forests and were not spared from commercial exploitation or alternative land uses. Yet there remained numerous small relics of these ancient climax forests, almost unknown to science of their past glory. Chandran and Mesta (2001) found in southern Uttara Kannada, over 50 patches of *Myristica* swamp forests with their special flora of ancient lineage traceable to the Gondwanaland, specially the trees like *Myristica fatua* and *Gymnacranthera canarica*. *Semecarpus kathalekanensis*, an altogether new tree species has been described from such relic forests of Siddapur taluk (Dasappa and Swaminath, 2000). Most of these relic forests were *kan* sacred groves which lost their special identity during the British period (Kathalekan for eg.). Incidentally Kathalekan and Karikan forests of Uttara Kannada are the only places where the Western Ghat endemic *Dipterocarpus indicus* is conserved in the district. The one hectare sacred grove of Mattigar in Siddapur, protected by Karivokkaligas is the only place in the district having *Vateria indica*, yet another Western Ghat endemic tree. The northernmost distribution of the endangered, endemic primate Lion-tailed Macaque is mainly in the *kans* of Siddapur (Chandran and Gadgil, 1998). Recently, to our great surprise, we also discovered *Madhuca bourdillonii*, and *Syzygium travancoricum*, two critically endangered trees of Travancore Western Ghats, in these relic *kan* forests of Uttara Kannada (Chandran *et al*, 2008).

Evolution of conservation ethics in the West

The West has been also witnessing a neo-conservation movement from early 19th century. Committed scientific officers were sent to assist in the development of colonies in the 19th century. These scientists were trained to make detailed observations on the biology, natural history, geography and anthropology of the colonial regions. Many of them expected to find the indigenous people living in wonderful harmony with nature; instead they found devastated forests, damaged watersheds and poverty. These scientific officers felt protection of forests was necessary to prevent soil erosion, maintain wood supplies and prevent famine. Some colonial administrators also argued that certain intact forests should remain uncut because of their necessary role in ensuring a steady supply of water in adjacent agricultural areas. British scientists working in India issued a report in 1852 urging the establishment of forest reserves throughout the vast subcontinent in order to avert environmental calamities and economic losses. The report linked deforestation to lowered rainfall and water supplies, resulting in famine among the local people. During the mid 19th century Indian state governments established an extensive system of forest reserves protected and managed by professional foresters- a system also adopted by the colonial powers in Southeast Asia, Australia, Africa and in North America. The irony is that, prior to colonization, indigenous peoples in these regions had well-developed systems of natural resource management that were swept aside by the colonial powers (Poffenberger, 1990; Gadgil and Guha, 1992; Grove, 1990; 1992)).

Preservationist ethics: Among the first major intellectual figures in the US arguing for the protection of natural areas were R.W. Emerson and David Thoreau. Emerson (1836), influenced profoundly in his thoughts by Eastern religions, which emphasize the importance of natural beauty as an aid to spiritual enlightenment, argued that nature could be viewed as a temple in which people can commune with the spiritual world. Thoreau was an advocate of nature and opponent of materialism. He believed that people needed far fewer possessions than they sought. He himself lived in a simple cabin and wrote his experiences in a book- *Walden* published in 1854. The book had significant impact on generations of students.

John Muir (1838-1914), yet another well known American environmentalist believed in preservation of nature. Natural areas such as forest groves, mountaintops and waterfalls had great value in fostering religious and spiritual experiences and for emotional refreshment. Muir believed that spiritual values of nature were generally superior to the tangible material gain obtained by its exploitation. The emphasis of preservationist ethics is more on the needs of philosophers, poets, artists and spiritual seekers who require the beauty and stimulus of nature for their development than the needs of the mass of the society who require jobs and material goods from the natural environment. Muir believed that wilderness can benefit all of society; an individual can derive happiness and enhance quality of life with tangible benefits of physical and mental health and even productivity in the work place. Muir stated explicitly that nature has intrinsic value (value in itself), apart from its value to humanity. Muir also viewed biological communities as assemblages of species evolving together and dependent on one another (Primack, 1998).

Resource conservation ethics: Gifford Pinchot (1865-1946), the first head of the U.S. Forest Service, was known for his 'resource conservation ethic'. According to this view natural resources are for the "greatest good of the greatest number (of people) for the longest time." Resources should be fairly distributed among present consumers, and between present and future consumers. A monetary value is attached to natural resources. This ethic has been further developed into the modern concept of **sustainable development**. The World Commission on the Environment and Development (1987) defines sustainable development as the "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs." From the perspective of conservation biology sustainable development is redefined as development that best meets present and future needs without damaging environment and biological diversity (Lubchenco et al. 1991).

Endorsing the human factor at the centre, Principle 1 of the 1992 Rio Declaration on Environment and Development states: "Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature." At the same time in a big way traditions of nature conservation and traditional practices of indigenous people are recognized in Principle 22: "Indigenous people, and their communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interest and enable their effective participation in the achievement of sustainable development."

Resource conservation ethic stresses importance of using natural resources with efficiency- that is the best possible use and not wasted. Even appreciation of natural beauty and other aesthetic and intellectual experiences can be considered competing uses of nature, and may even get higher priority than material uses. The resource conservation ethic dominated American thinking throughout the 20th century. Government bodies such as the U.S. Forest Service and Bureau of Land Management are the products of this conservationist approach, whereas the National Park Service used the preservationist philosophy (Primack, 1998).

Evolutionary-ecological land ethic: Aldo Leopold (1886-1948), who synthesized this ethic advocated a land use policy in which human use of natural resources was compatible with, or even enhanced, biological diversity (Leopold, 1939, 1949). He believed that developing woodlots, fields and ponds could in many cases create a more complex, biologically richer environment than a completely natural environment. Leopold's vision of an integration of nature and human activities is consistent with modern ecological research suggesting that humans have been an integral part of most ecosystems of the world for thousands of years, even in the tropical rain forests (Gomez-Pompa and Kaus, 1988, 1992).

Ethics of modern conservation biology: The modern discipline of conservation biology was formally born with the First International Conference of Conservation Biology organized by Michael Soule in 1978 at San Diego. Soule proposed a new inter-

disciplinary approach that could save plants and animals from mass extinctions caused by humans. Soule and his colleagues Paul Ehrlich and Jared Diamond combined into conservation biology the practical experience of wildlife, forestry and fisheries management with theories of population biology and biogeography to develop new approaches and methods for preserving species. In 1985 this group of scientists founded the Society for Conservation Biology, which has become one of the fastest growing and most exciting societies in biology (Primack, 1998).

Ethical principles of conservation biology

The underlying assumptions on which conservation biology rests cannot be proved or disproved. Accepting all of them is not a requirement for conservation biologists. These assumptions, however, represent a set of ethical and ideological statements which form the basis of the discipline and suggest research approaches and practical applications. The assumptions are stated below:

- *The diversity of organisms is good:* It has been suggested that humans have a genetic predisposition to like biological diversity called biophilia by Wilson (1984). In hunting resources to agriculture, in cultivation of roses and orchids and in domestic cattle, dogs and cattle humans like diversity. Greater biological diversity would provide greater variety of food and other resources which act as a buffering effect on environmental hazards and starvation.
- *The untimely extinction of populations and species is bad:* Extinctions do happen in nature, which is a slow process balanced by evolution of new species. However, as a result of human activities the rate of extinction has increased a thousand-fold (Smith et al., 1993; Lawton and May, 1995).
- *Ecological complexity is good:* While the biological diversity of species may be partially preserved in zoos and gardens, the ecological complexity that exists in natural communities will be largely lost without the preservation of wilderness.
- *Evolution is good:* Evolution leads to increased biological diversity. Therefore populations should continue to evolve in nature. Human actions that limit or prevent populations from evolving, or even eliminate them are bad. Although preserving wild species in captivity, when they are not able to survive in the wild, is important, such species are cut off from their natural evolutionary process. These species may no longer be able to survive in the wild if released.
- *Biological diversity has intrinsic value:* Every species has its own evolutionary history and unique ecological role. The very fact that a species exists confers on it an intrinsic value regardless of its economic, scientific, aesthetic values to the humans. This view is in contrast to economic valuation of species.

(Source: Primack, 1998)

The rich cultural heritage of India, one of the most ancient civilizations of India, has its roots in the basic principles of nature and also in the intimate relationship of human beings with environment as a part of nature. This is evident from the ancient literatures of Hinduism, Buddhism and Jainism, the core groups of Indian cultural history, highlighting the pre-historic Indians' knowledge and awareness of the intricacies

of nature and human beings and their symbiotic relationships. These are more relevant today as the world is looking for **ecologically sound development** with integrated holistic approaches towards nature (Ramachandra et al. 2006)

REFERENCES

Callicot, J.B. 1994. *Earth's Insights: A Multicultural Survey of Ecological Ethics from the Mediterranean Basin to the Australian Outback*. University of California Press, Berkeley, C.A.

Callicot, J.B. and Ames, R.T. 1989. *Nature in Asian Traditions of Thought: Essays in Environmental Philosophy*. State University of New York Press, Albany.

Chandran, M.D.S. and Gadgil, M. 1998. Sacred groves and sacred trees of Uttara Kannada. In: Saraswati, B. (ed.) *Lifestyle and Ecology*. Indira Gandhi National Centre for the Arts & D.K. Printworld, New Delhi, pp. 85-138.

Chandran, M.D.S. and Hughes, J.D. 1997. The sacred groves of South India: Ecology, traditional communities and religious change. *Social Compass* 44(3), 413-427.

Chandran, M.D.S. and Hughes, J.D. 2000. Sacred groves and conservation: The comparative history of traditional reserves in the Mediterranean area and in South India.

Chandran, M.D.S. and Mesta, D.K. 2001. On the conservation of the Myristica swamps of the Western Ghats. In: Shaanker, U.R. et al. (eds.). *Forest Genetic Resources: Status, Threats and Conservation Strategies*. Oxford & IBH, New Delhi, pp 1-19.

Chandran, M.D.S., Mesta, D.K., Rao, G.R., Ali, S., Gururaja, K.V. and Ramachandra, T.V. 2008. Discovery of two critically endangered tree species and issues related to relic forests of the Western Ghats. *The Open Conservation Biology Journal*, 2: 1-8.

Cleghorn, H. 1861. *Forests and Gardens of South India*. W.H. Allen & Co., London.

Dittenberger, W. 1924. *Sylloge Inscriptionum Graecarum*, 3, 685, A.III. 81-82.

Emerson, R.W. 1836. *Nature*. James Monroe and Co., Boston, MA.

Gadgil, M. and Chandran, M.D.S. 1988. On the history of Uttara Kannada forests. In: Dargavel, J. (eds.) *Changing Tropical Forests*. Australian National University, Canberra, pp. 3-58.

Gadgil, M. and Guha, R. 1992. *This Fissured Land: An Ecological History of India*. Oxford University Press, Oxford.

Goldsmith, E. 1992. Gaia is the source of all benefits. In: Sen, G. (ed.). *Indigenous Vision: Peoples of India Attitudes to the Environment*. Sage Publications & India International Centre, New Delhi, pp. 13-24.

Gomez-Pompa, A. and Kaus, A. 1988. Conservation by traditional cultures in the tropics. In: Martin, V. (ed.). *For the Conservation of Earth*. Fulcrum Inc. Golden, CO.

Gomez-Pompa, A. and Kaus, A. 1992. Taming the wilderness myth, *Bioscience* 42: 271-279

Grove, R.H. 1990. Colonial conservation, ecological hegemony and popular resistance: Towards a global synthesis. In: McKenzie, J.M. (ed.). *Imperialism and the Natural World*. University of Manchester Press, Manchester.

Grove, R.H. 1992. Origins of Western environmentalism. *Scientific American* 267: 42-47.

Hargrove, E.C. (ed.). 1986. *Religion and the Environmental Crisis*. University of Georgia Press, Athens, G.A.

Hargrove, E.C. 1989. *Foundations of Environmental Ethics*. Prentice Hall, Englewood Cliff, NJ.

Hay-Edie and M. Hadley, 1998. Natural sacred sites- a comparative approach to their cultural and biological significance.

Hughes, J.D. and Chandran, M.D.S. 1998. Sacred groves around the earth: An overview. In: Ramakrishnan, P.S. et al. (eds.). *Conserving the Sacred for Biodiversity Management*. Oxford & IBH, New Delhi and UNESCO, Paris.

Kearns, L. 1997. Noah's Ark goes to Washington: A profile of evangelical environmentalism. *Social Compass* 44(3): 349-366.

Lawton, J.H. and May, R.M. 1995. *Extinction Rates*. Oxford University Press, Oxford.

Leopold, A. 1939. The farmer as a conservationist. *American Forests* 45: 294-299.

Leopold, A. 1949. *A Sand County Almanac and Sketches Here and There*. Oxford University Press, New York.

Lubchenco, J. et al. 1991. The Sustainable biosphere initiative: An ecological research agenda. *Ecology* 72: 371-412.

Nash, R. 1990. *American Environmentalism, Readings in Conservation Biology* (3rd Ed.) McGraw-Hill, New York.

Nash, R. 1982. *Wilderness and the American Mind*. Yale University Press, New Haven, CT.

Poffenberger, M. (ed.). 1990. *Keepers of the Forest*. Kumarian, West Hartford, CT.

Primack, R.B. 1998. *Essentials of Conservation Biology* (2nd ed.). Sinauer Associates, Inc., Sunderland, U.S.A.

Ramachandra, T.V., Chandran, M.D.S., Gururaja, K.V. and Srekantha. 2006. *Cumulative Environmental Impact Assessment*. Nova Science Publishers, Inc, New York,

Shibley, M.A. and Wiggins, J.L. 1997. The greening of mainline American religion: A sociological analysis of the environmental ethics of the National Religious Partnership for the Environment. *Social Compass* 44(3), 333-348.

Smith, F.D.M., May, R.M. Pellew, R., Johnson, T,H. and Walter, K.R. 1993. How much do we know about the current extinction rate? *Trends in Ecology and Evolution* 8:375-378.

Vaillancourt, J.-G. and Cousineau, M. 1997. Introduction. *Social Compass* 44(3), 315-320.

Wilson, E.O. 1984. *Biophilia* Harvard University Press, Cambridge, MA.

World Commission on Environment and Development (WCED), 1987. *Our Common Future*, Oxford University Press, Oxford.

Paper presented during UGC sponsored State Level Seminar on “ENVIRONMENTAL CHALLENGES OF 21ST CENTURY – THE ROLE OF ACADEMIC INSTITUTIONS” - 17 & 18 October, 2008.

Government Arts and Science College, Karwar.

International Union for Conservation of Nature - International Environmental Education Program - Millennium Development Goals - Decade of Education for Sustainable Development - Central Pollution Control Board - Development Alternatives - World Health Organisation - Analysis of variance - Javagar Navodya Vidyalaya School - Makkal Thalaivar Vasudeva Subya Government High School - Chewalier Sellane Government Higher Secondary School - Sri Vallimmal Vidyalaya Matric Higher Secondary School - National Green corps - Solid Waste Management - Community Service.Â Â analyze the magnitude of environmental literacy presented in science and social science text books in Tamil Nadu and to compare them Environmental conservation and attempts to address environmental aspects of public health provision are increasingly being pursued under the rubric of protecting or restoring ecosystem services, defined as those processes in nature that increase human welfare. Market-based policy tools are often but not always proposed as mechanisms to achieve this conservation, based on the welfarist economic principles that price observed in a perfect market is the purest expression of a commodity's benefit to society. SOCIAL AND ETHICAL DIMENSIONS OF ENVIRONMENTAL CONSERVATION M.D. Subash Chandran— & T.V. Ramachandra Despite the traditional distance between the practitioners of science and the people with spiritual beliefs, there has now been a convergence of religion and environmental activism. The global environmental crisis, which is demanding our attention with everincreasing urgency, reaches into every area of our existence: physical, social, economic, political, cultural, psychological and spiritual. Consequently, people who attempt to deal with this crisis tend to approach it through a variety of