
UNIT 15 MAN-NATURE RELATIONSHIP

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15.0 INTRODUCTION

Since ancient past concern for environment has been an integral part of Indian intellectual and popular traditions. This concern for environment is not something which has come to us from the West as is usually projected. It is indigenously visible in the cultural patterns, religious practices and social norms and needs careful delineation.

This Unit provides you with an insight into various traditions of Indian philosophy with regard to its vision of the environment. Indian philosophy has always considered environment as an organic living entity. Traditions have stressed *a participatory life with environment*. Humans have been seen as one component of this wider reality i.e., environment. They are created by the elements of environment and they finally dissolve in the environment. Here we must stress that Indian philosophical traditions are pluralistic in nature, therefore, we cannot reduce our examination to any single philosophical tradition. Yet a practical approach is to focus on the major philosophical traditions and take up manifestations of environment therein for a detailed study.

Since *Srsti*/Universe figures in almost all the traditions as a representation of nature, we discuss the concept of *Srsti* as visualised in Indian philosophy and its relationship with the humans in detail and also take up a discussion on, and the integration of, various components of environment with the living forms in this Unit. The significance of popular and classical traditions in promoting prudent attitudes towards environment is also part of our discussion. Finally we take up the notion of *Pradushana* of environment i.e. pollution of environment and discuss the treatment of this concept in philosophical traditions keeping in view the role played by human activities.

15.1 MAN'S PLACE IN NATURE

The Indian tradition places man alongside other creatures of the animal world and the world of vegetation. This is a significant feature and we would prefer to dilate on the subject further.

Man enjoys no pristine position though a whole lot of privileges get accrued to man through his intellect. Actually man's place in nature/environment is two fold – physical and the spiritual. The physical relationship entails interaction with all the other living things and non-living objects that are part of the environmental surroundings. The spiritual relationship, on the other hand, requires a set of the rules of conduct to be followed by man. These rules of conduct specify the duties and obligations towards other living species. The guiding principle in both relationships is that the environment should not be endangered due to the activities of man. There is an element of ethics involved in this and man's place in environment/nature is located within the realm of this ethics.

The treatment given to the issue – man's place in nature – in Indian philosophical traditions too distinguishes between the physical and the spiritual or psychical, as suggested in some treatises. Since the physical relationship is principally determined by those requirements that sustain existence, such as food and living environment, it is a relationship of providing for the material needs. However, material needs and material wealth are two separate notions and these are clearly demarcated in the treatment of man's physical relationship with environment. Unlike the techno-modern objective of mastering environment for extracting the maximum of material resources, the Indian tradition lays great emphasis on inculcating environmental ethics encouraging preservation, protection and conservation of nature.

The psychical or spiritual relationship transcends the material world. In a beautiful verse from *Kathopnishad* the idea is clearly described: 'Higher than the senses (and their objects) is the mind, more excellent than the mind (*manas*) is intellect (*sattvam*); above the intellect soars the great soul (*mahatma*) and more excellent than the great one is the unmanifested (*avyakta*). And higher than the unmanifested is the soul (*purusa* here) which is all-pervading and without sense' (Cf. Kapila Vatsyayan, 'Indian View of Environment As A Part of Indian Aesthetics' in *Creativity and Environment*, ed. Vidya Niwas Misra, Sahitya Akademi, New Delhi, 1992, p.25). Evidently man is conceived in Indian tradition as representing a microcosm of the larger universe which is the macrocosm. Interestingly the two – micro and macro-cosm – constantly exchange their forms. Thus fire of the nature becomes speech as it enters the mouth; the sun becomes sight as it enters the eyes; wind becomes breath by entering the nostrils; the annual herbs and regents of the forest become hairs as they enter the skin; the moon enters the heart and becomes mind. It also indicates man's and nature's interdependence as also the reality that the two can be comprehended completely only in

a state of union. The following verse from *Atharvaveda* illustrates the point nicely:

O earth! Pleasant be thy hills and snow clad mountains and thy woodlands on the earth-brown, black, ruddy and of all colours – the firm earth, the earth protected by the deity (Indra), upon this earth I – unconquered, unslain, unwounded, have set my foot.

15.2 SRSTI/UNIVERSE AND ITS ATTRIBUTES

The configuration of environment in Indian thought is expansive enough to include the entire Universe within itself rather than being locative or temporal in character. A more commonly used word for this is *Srsti*. In Indian thought *Srsti* is conceived as a living mechanism where humans along with *Pasu*, *Paksi* and *Vanaspati*, are one of the many living creatures and non-human forms are not the lifeless entity as the physical matter alone. The concept of *Srsti* has been elaborated in terms of its mobility where humans relate with *Srsti* continuously and the concept is therefore continuously redefined. Here one can read an attempt at trying to understand and relate to the greater ‘whole’ of the nature. In this process emphasis on adaptation has been one of the guiding principles for an interaction between human and natural world.

Indian philosophical traditions have visualized *Srsti* as a creation of the Almighty and so is the case with humans. As both are the creation of God, there is greater stress on maintaining cordial relations between these two in particular and among other components of *Srsti* in general. At the same time man has been considered as the most intelligent creature and therefore it is imperative upon humans to ensure a peaceful co-existence with other living creatures as well as with non-living material world.

The creation of *Srsti*, in the Indian philosophical tradition, is a concept that can be broadly categorized in four groups. An element of history seems to order the groups. We can begin with the Vedic theory as elaborated in the *Vedanta* and *Sankhya* traditions, followed by *Upanisadic* theory. The third theory is termed as *Puranic* traditions and lastly is the tradition as enumerated in the Gita as part of Mahabharata.

Indian philosophical traditions have developed a cosmic vision that is cyclic in nature. The cycle begins with creation and is followed by continuance that finally culminates in destruction; and then a new cycle begins. It suggests that every material object/creature is perishable with the possibility of regeneration. The fragility of the environment has also been carefully stressed in such discourses. Traditional thoughts have proposed a set of *Trinity* i.e., the Creator, the Preserver and the Destroyer.

The Vedic tradition traces the origin of *Srsti* from *Hiranyagarbha* which is golden embryo. The God from his will deposited the seed of creation in a cosmos that was in a state of chaos. This seed became the golden germ, from which was born the *Brahma* or the creator himself. It is

interesting to note that *Brahma* is identified as the *Purusa* who is all-pervading and is the supreme reason for all subsequent creations. This *Purusa* is also distinct from all that he created. The *Rigveda* also speculates on the world beyond the moment of creation. Several different names attributed to the creator indicate that the origin of the world is not unidirectional in spite of the fact that origin is always attributed to the God or creator. This also includes a feminine creation of the world. A verse of *Rigveda* locates the cause of creation in Aditi:

The Divinity (Aditi) is the Heaven, mid-region, the mother, the father, the son. The divinity is all deities, five classed men, and all that is born and will be born.

“The above Vedic theory was further expounded by Bhartrhari” say Dwivedi and Tiwari. The sage “discussed the *Vedas* and *Puranas* as visualizations of the divine power in Vedic words. A number of *Rigveda* hymns are in worship of inspired speech (*Vak*), considered a creation of God” (O.P. Dwivedi and B.N. Tiwari, *Environmental Crisis and Hindu Religion*, New Delhi, 1987, p.15).

Upanasadic theory of creation suggests that *Purusa* creates matter out of itself and then enters it as the first born.

Purusa Prajapati, creates the waters, enters into them as an egg in order to be born from them, and issues forth from them as Brahma. (Satapatha Brahman,6.1.1)

The beginning is traced with *Him* as lone creature who, to combat the solitude, transformed himself into man and woman which became the carrier of his progeny. Likewise he transformed himself into other elements such as earth, water, animals, etc.

The *Puranic* theory considers *Brahma* as *Svayambhu*, who is born at his will. No other cause is responsible for his birth. *Brahma* being desirous of progeny, created waters first. He deposited in the waters a seed out of which *nara* was born and was called *Narayan*. While lying on the Ocean (*Ksir Sagar*) a golden egg arose from his navel which gave birth to *Brahma*. He then divided the egg and made earth and heaven. From that moment on the creation of all things began to take place. (*Brahma Purana* 137-40 as cited by Dwivedi and Tiwari, *op.cit*, p.17).

The theory of creation, according to *Gita*, has been most elaborately expounded in the *Santiparva* of Mahabharata. Yudhishtiva and Bhisma converse about the *Srsti* and the process of its creation: “Yudhishtir asked Bhisma Pitamaha – How was the world created? What was the position of creatures at the time of *Pralaya*? Who is the maker of the sea, sky, mountain, clouds, *Agni*, air and other things of the world? How are all creatures made, how cleanliness and impurity emerged, and how *dharma* (religion) and *adharm*a came into existence. In reply Bhisma said – God is the form of *Srsti*. He created the one out of the one-thousandth part of his body, and that *Purusa* became known as *Manas*

Purusa” (*Mahabharata*, Moksaparva, 182.1-3 as cited by Dwivedi and Tiwari, *op.cit.* p.19).

Further “The Father of all creatures, God, made the sky. From sky he made water and from water he made fire (*Agni*) and air (*Vayu*). From fire and air, *Prithvi* (earth) came into existence. Mountains are his bones, Earth is the flesh, Sea is the blood, Sky is his abdomen. Air is his breath, *Agni* is his *Teja*, rivers are nerves. The sun and moon which are called *Agni* and *Soma* are the eyes of *Brahma*. The upper part of the sky is his head, *Prithvi* (earth) is his feet and direction (*Disa*) are the hands” (*Mahabharata*, Moksaparva, 182.14-19, *op.cit.*).

Gita sums up the situation by declaring that the *Brahma*, created the *Srsti* and decided to protect it and to rectify its malfunctioning by appearing as Vishnu in various incarnations to set things right.

As stated in the beginning *Srsti* is created to provide a stage to all its creatures to perform their assigned roles and then vanish into oblivion. In this process the supreme power undertakes to create *Srsti*, maintains it and then annihilates the entire creation. The universe thus remains completely dependent on the will of the supreme power. Krishna tells Arjuna in *Gita*:

The whole cosmic order is under me. By my will it is manifested again and again and by my will it is annihilated at the end.

The chief attribute of *Srsti* is that it is illusionary, yet when it assumes a physical form the matter gets shaped into seven cardinal elements and five gross material elements. The creatures and vegetation emerging out of this creation receive eleven senses and the three major qualities – the quality of *Sata*, the quality of *Raja*, and the quality of *Tama*. All living creatures are infested with one of the three qualities and are in turn administered under the laws of God. Consciousness is another important attribute which the living creatures receive at the time life is breathed into them by God. *Srsti* is thereafter permitted to run itself.

It is now evident that the creation of *Srsti* and its attributes have a slight variation in the four theories discussed above. One may legitimately probe the reason for this difference. The vedic deities are generally classified according to their natural characteristics. The division available from *Rigveda* classifies them as below:

- 1 Celestial Deities : *Dyaus, Varuna, Mitra, Surya, Savitr, Pusan*, the *Asvins*, and the Goddesses *Usas* (dawn) and *Ratri* (night);
- 1 Deities of Atmosphere : *Indra, Apam, Napat, Rudra, Maruts, Vayu, Parjanya, Apas* (the waters);
- 1 Terrestrial Deities: *Prithvi, Agni, Som* (Cf. Dwivedi & Tiwari, *op.cit.* p.14).

The four theories give precedence to one of the three attributes of nature in the act of Supreme manifestation in the form of *Srsti*, hence the difference. The difference is in the material cause of the universe not in its essence. *Rigveda* reflects on this essence aptly:

He is one, but the wise call him by different names; such as Indra, Mitra, Varuna, Agni, Divya – one who pervades all the luminous bodies, the source of light, Suparna – the protector and preserver of the universe; whose works are perfect; Matriswa – powerful like wind; Garutman – mighty by nature.

15.3 COMPONENTS OF ENVIRONMENT

*Earth with the attributes of smell (Gandha),
water with the quality of viscosity (Sneha),
fire with the quality of energy (teja),
sky with the quality of sound (sabda),
air (vayu) with the quality of touch (sparsa), and
all the Mahatattvas-let all these elements bless our mornings.*

This verse from Vamanpurana makes it evident that in Indian thought environment has been visualized as an organic entity where all or most of the components are connected with each other in a complex web of inter-relationship. This thought also perceives that *there is life in all kinds of material or things*. Thus existence of any of its components in isolation is inconceivable. The emphasis on mutual dependence has been the guiding philosophy of existence in Indian tradition. There cannot be any dichotomy between the numerous components of environment. Mutuality is considered beneficial both for the environment and for the individual elements of its constituent parts.

It has been proposed that in creating the *Srsti Brahma*, the Almighty, shapes primal matter into eight *tattvas* (elements): earth, water, fire, air, sky, mind, intelligence, and ego of which first five are considered basic elements. Almost at the same time the evolution of animal and human world gives rise to the emergence of five senses: sight, hearing, touch, taste and smell. The essential components of environment are the *tattvas* and the senses. *Aitareya Upnishada* provides the details of the process of their evolution:

*He is Brahma, he is Indra, he is Parjapati, he is all gods,
He is the five elements, earth, air, space, water and light or
fire,
He is the tiny living objects and is similar to them,
He is seed of one kind or another,
He is those born from the egg, born from the womb, born from
sweat, born from sprout,
He is the horse, cattle, people and elephants,
He is everything that lives, that moves and flies and which is
motionless.*

This verse is quite illustrative of the process of creation as well as the compositional features of *Srsti*. The genesis has been attributed to processes that are multiple in character; the objects of creation have been defined as composed of terrestrial, aqueous and avian categories; the amplitude, ranging from minuscule to mammoth has been accounted for; and the cardinal five elements reiterated.

To further illustrate the characteristics of five basic elements of *Srsti* we provide a glimpse into their nature and significance as described in the treatises. There is a chronology of appearance that begins with sky. Sky is considered to be the first among all the five elements. It is also known by terms like, *Dyauh*, *Svah*, *Akasa*, and *Kham*. As we come to water, that is next in importance, we find *Rigveda* considering water great and all-pervading. Water is considered to be propitious and the enhancer of power:

The waters are propitious, the water verily are the enhancer of power. These waters, truly, do support Agni and Soma. May the readily flowering, strong sap of the honey-drops (water) come to me, together with life's breath and lustre.

(*Rigveda*, 3.13.5)

The source of water and the qualities of water have been especially stressed in the *Atharvaveda*:

O Man! may the waters from the snowy hills be peace giving to thee. May the spring waters bring calmness to thee. May the swift flowing waters be pleasant for thee. So may the rainy waters be a source of tranquillity to thee.

O Man! Sweet be the waters of the oasis upto thee and so may be the waters of the pool. May the waters dug from the earth (i.e., wells) be sweet, as well as those stored in tanks.

(*Atharveda*, 19.2.1-2)

This verse from *Atharvaveda* is significant from another point of view. It invokes the propitiatory attributes of water and proposes that these be bestowed on *Man*. It thus brings *Man* at the centre of *Srsti* and places at least one of the five cardinal elements at the disposal of the *Man*. The relationship of interdependence is missing and its place is acquired by the features of appropriation even if in rudimentary form. Water is ascribed several qualities. In a text called *Yuktidipika* we get these qualities described in the form of a list: Viscosity, firmness, radiance, brightness, delicacy, gravity, cold, protection, purity, progeny or union are the qualities of water.

These qualities are communicable and depending on the nature of the object the effect shows.

Philosophical traditions of India give the next (third) position to (Air) *Vayu*. It is also considered as *prana* of all the living creatures. It has

been suggested that the body of all the living creatures can be sustained only as long as the *prana* inhabits it:

All these creatures enter with the breath (prana) (into the body), and with the breath (prana) they again depart out.

(*Chandogyaa Upanishad*, 1.11.5)

The *prana* is both a psychic as also a cosmic principle that is it is not only the breath of life in men but also the universal breath of life that prevails throughout nature.

Next to follow is energy visible as *agni* Fire. *Agni* is equated with the Sun-the ultimate source of energy. It is accepted as the source of rains and its relation to rains has been clearly brought out in *Satapatha Brahaman*:

From Agni is born steam, from steam the cloud and from the cloud rain.

Agni is also treated as a vehicle of carrying the sacrificial offerings made to God. It is accepted as mouth of the all-pervading *Parmatma* (the Supreme *Atman*/consciousness).

The last of the *Panch Tattva* has been Earth (*Prithvi*) which is attributed feminine qualities and treated as the mother of all living beings. *Prithvi* needs to be worshipped as it bears the material base of our sustenance.

Atharvaveda says

The earth which possesses oceans, rivers and other bodies of water, and which gives us land to produce food grains and on which human being depend for their survival, continue to possess these for all of us.

Further:

May she, our motherland, on whom grow wheat, rice and barley, on whom are born five races of mankind, homage to her, nourished by the cloud, and loved by the rain, ...may God, the lord of life, make our motherland, who beareth all precious things in her womb, pleasant to us on every side.

(*Atharvaveda*, 12.1.42-43)

The special significance given to *Prithvi* is easily forthcoming from these two verses. It is recognized most unambiguously that *Prithvi* as mother provides all the necessary means of the sustenance of life. It should therefore be prayed so that the resources do not dwindle and it should be revered so that the value of these resources is not obliterated from our thought.

It is also important to note that in this tradition the fruits of the earth

and its bounties are not declared as the sole belonging of the humans. In fact they are for all forms of life to use and get from them the benefits. The following verse from *Atharvaveda* illustrates this point:

*Born on thee, on thee move mortal creatures;
Thou bearest them- the biped and the quadruped.*

In this tradition the five components of environment, also known as *Pancha Mahabhutas*, are considered essential for the emergence, growth and continuance of the universe. They maintain a peaceful co-existence. The resultant order of nature/environment becomes a ground for a complex interaction of numerous living and non-living entities. The environment, as the life sustaining ambience, commands a sense of respect.

15.4 VEGETATION AND THE ANIMAL WORLD (*VANASPATI AUR PASU – PAKSHI*)

Even if there is only one tree full of flowers and fruits in a village that place becomes worthy of worship and respect.

(*Mahabharata, Adiparva, 138.25*)

Trees have been attributed a place of reverence in Indian tradition. The importance given to trees can be assessed from the fact that plants and trees have been seen as epitomising God's existence. *Vanaspati* as the creation of God and embodying *Him* has been a common description:

*From Him the seas and the mountains all,
From Him roll rivers of every kind,
And from Him all herbs, the essence too,
Whereby that inner soul dwell in beings.*

(*Mundakapanisad, 2.1.9*)

Rigveda offers prayer to God for the purpose of making plants and herbs plentiful with beneficial properties:

*May the plants and herbs be sweet. May the heavens, the waters
and the mid regions be all sweet. May the producer of grains
and vegetables be sweet.*

Trees are placed equivalent to Humans in significance and importance in so far as the *Srsti* is concerned:

*Just like a tree, the prince of the forest,
So the man is, in truth,
His hairs are leaves,
His skin resembles the external bark,
Out of his skin streams forth the blood,
Like the juice or the sap out of the tree,
It flows out from the wounded man,*

*Like the sap of the tree, when it is cut,
The flesh is comparable to the wood,
The sinews are like the inner bark,
The strong bones are like the inner core of the wood,
The marrow resembles the marrow (pitt) of the tree.*

(Brhandarankya Upaniasad, 3.9.28)

Any kind of intentional damage to the trees/ *vanaspati* has been condemned in the traditions as trees are considered living creatures. *Chandogaya Upnisad* says:

When one, O dear one, cuts this big tree here at the root, it trickles sap, because it lives. ... if life departs from the whole tree, the whole tree withers or dries up, Therefore O dear one, you should mark this.

Similarly,

The cutting of all these trees is condemned. Except for the reason of sacrifice, trees should never be cut, particularly in rainy season.

(Skanda Purana, 20.83)

Reverence for the trees as an ancient tradition, was based on the belief that every tree had a *Vriksh Devta*. It was offered water in the morning which ensured continuous care of the trees. Different trees have been identified with different deities to stress the notion of worship.

Traditions with respect to the animal world have been similar to that we witnessed for the *vanaspati*. Moreover it included the humans who were not accorded any priority over other creatures. The central concern was for life forms and all the living beings were given equal treatment. Animal world had been classified in terms of their mobility, origin, features, attributes etc. The term *Jangama* was used to denote the animals and they were classified in terms of their mode of generation:

- 1 *Jarayuja* (producing living young)
- 1 *Swedaja* (born like ant),
- 1 *Ayonija* (non-womb born like worms),
- 1 *Andaja* (egg-born), and
- 1 *Jalaja* (water born like fish).

Animals were attributed different qualities. Animals and birds were believed to possess a certain intelligence and the power to predict future climatic or atmospheric changes as well as the ability to foretell events, good or bad for an individual or with respect to nature.

Since life forms were treated with care, killing of animals was prohibited and it was believed that such an act was liable to incur God's wrath:

The Yatudham (killer of animal) who fills himself with the flesh of man, and he who fills himself with the flesh of horses or of other animals, and he who steals the milk of cows— Lord cut off their hands with thy flame.

(*Rigveda*, 10.87.16)

To further stress the vulnerability of animals and to offer them protection, different animals were identified as the modes of transportation of different Gods. For example lion is the *vahana* (vehicle) of *Durga*, *Indra* rides elephant, *Siva* has bull as his conveyance, *Saraswati* travels on swan and *Vishnu* prefers eagle for transportation purposes.

The Indian textual tradition assumes that, like the rest of the material world, humans are also made up of elements which at death disintegrate and dissolve into nature. At the most general level the five *tattvas* or elements that dissolve into nature at the time of death are: *Earth, Water, Fire, Air, Sky*.

15.5 POPULAR AND CLASSICAL TRADITIONS: REPRESENTATIONS OF ENVIRONMENT

The nature/environment in India is represented by two different but related traditions – the popular and classical. While the reflections of the popular traditions are more visible in practice, the classical or textual tradition offers a complete and systematic analysis of the universe.

It is an interesting fact that the popular tradition is mostly preserved in oral, non-textual form in an uncoded manner. Oral traditions thus constitute a basic method by which we come to know about the knowledge which has not been organised and codified. They also help us to understand those societies for which we have very limited textual information. Day-to-day practices and methods carry the glimpses of ancient past. In oral tradition in India, *environment has been perceived in a symbiotic relationship with the humans where environment is also considered as a living organism which breathes, feels, and possesses sensory perceptions*. Various components of environment in this relationship either acquire or have been accorded special positions. At times these special considerations are also ritualized.

The trees and animals are one of the basic components of popular folk tales which are part of the popular oral traditions in India. Moreover various attributes of animals are also identified and are used as if they are natural sensory characteristics. The flora has been part of the themes of different stories. It is always kept in mind that human survival is possible only with the conservation of entire flora and fauna. This understanding is also reflected in the religious practices as different animals and plants are worshipped at different times so as to ensure their survival.

Popular traditions consider nature as a reality of which man is an inseparable part at all levels. The myths do not give man a unique position in so far as his origin or his position with respect to other creatures is concerned. It is generally believed in the popular tradition that knowledge came to humans from birds and animals. Man is not the creator of knowledge. Cosmic intelligence is considered to be self-existent and source of all knowledge.

The classical traditions are naturally more tilted towards philosophical expositions on environment. In these traditions the world was divided into two halves: the sky and the earth. There also existed a world beyond the sky and another below the earth. The five cardinal elements overlap in the formation of this world and so is the matter with the other world. This explains how biological and social, both aspects of human life were placed in an integral vision of environment in the ancient Indian traditions.

The classical traditions conceive environment as a system with complex inter-relationships of numerous living and non-living entities. Even the non-living organic world has been perceived as a living creature with a soul. It was a very significant concept as it placed man as equal to every other element of our environment as has been repeatedly stressed. To highlight the importance of various components of environment, various rituals have been institutionalized. These rituals ensured that we treated even the non-living world with great care and maintained a harmony with it. For example fire is conceived as messenger of God. Earth has been considered as mother goddess. Sky is worshipped as father.

The non-human living world has been given great attention in Indian philosophic thought. There is a whole tradition of anthropomorphism, where various kinds of plant and animal lives have been ascribed special position. The ancient tradition of worship of *Pashupati Mahadev* is one such example. The tales of *Panchtantra* may also be cited as another composition that highlights the special position given to non-human living world. Animals are given human characteristics of not only language but also faculty of feeling and intellect. The objective of the tales is to give lessons to mankind by highlighting the problems through animal world's characteristics. Different attributes of animals have been identified and are very beautifully utilized in these tales. Indian philosophical thought also highlights the numerous species of flora and fauna and their special position vis-à-vis environment. This all-encompassing view is a great achievement.

The same enveloping view finds reflection in man's visual expression of perceived reality. The Indian tradition looks at this perceived reality as imbibing three composite aspects, each involved in the other and each orienting the other. The order of priority goes like this;

- 1 the first place is for *pratibha* or inspired vision,
- 1 the second is for *vyutpatta* or studious equipment of the creator, and
- 1 the last being *abhayasa* or assiduous practicing.

It is while explaining the details of the second that the theoreticians find an occasion to take environment into their consideration. The term they use for it is *loka* which means the world in all its infinite variety of living and non-living beings.

In Indian philosophy it is generally believed that each creative act comes from direct contact with *prakriti* (nature). The language of the artistic manifestation evolves through the visual and audio perceptions of the objects in nature. Even the smallest sprout in nature becomes the artist's greatest joy. In celebrating nature nothing is considered as useless. The art form becomes a living entity, a part of the self, family, village and that way, the environment, as a whole.

The dance of Shiva is a perfect iconographical statement of ecology. His emblems are *Agni* and *deer*. His locks are the forests. He hides within himself *Ganga* (water). His hair adorns the sun and the moon. His garlands are the snakes. He wears the tiger skin. He brings to this world the cosmic rhythm of his *damaru* in the incessant process of cyclic creation, degeneration and regeneration and finally of enlightenment. His energy is *Sakti*. Without her he is incomplete. She herself, the daughter of the *Himalayas*, must undergo penance and austerities. The emphasis here is on discipline and austerity, with greater integration of environment.

15.6 POLLUTION (*PRADUSHANA*): TRADITIONAL CONCERNS

Traditionally, the environmental vision in India has been conceived in terms of a universe which is a creation of God and therefore, a definite set of rules seems to govern the universe. These rules are there for every living creature to follow, however, humans being more intelligent, were expected to adhere to the rules more vigorously. We have read above how it was expected of man to follow ethics for righteous path. Traditional Indian thought awards man the role of a steward/ guardian to take care of all the creatures of the earth. Adherence to the pious practices and ethics is considered as an act to ensure the continuance of order and flourishing of civilisation.

*For one who lives by eternal law,
The winds are full of sweetness;
The rivers pour sweets;
So may plants be full of sweetness for us.
Sweet be the night and sweet the dawns;
Sweet be our Father Heaven to us.
For us may the forest tree be full of sweetness,
Full of sweetness the sun,
And full of sweetness the kine for us.*

(*Rigveda*, 1.90.6-8)

In this situation a violation of the peaceful co-existence among the creatures or material world was considered as *pradushan*. The prime

cause of *pradushan* has been identified as human greed and selfishness. Polluted *Srsti* has been described in the following terms: It seems that all stars, planets, moon, sun, air, Agni and nature or directions have been polluted. Seasons also appear to work against the nature, Prithvi in spite of being full of its virtues has lost its *rasa* in all medicinal plants. Medicinal plants are without original qualities and have been polluted. When such pollution will occur human beings will suffer from diseases. Due to pollution of seasons, several types of diseases will crop up and they will ruin the country. Therefore, collect the medicinal plants before the beginning of terrible disease and change in the nature of Prithvi” (*Charaka Samhita, Vimansthan, 3.2* as cited by Dwived & Tiwari, *op.cit.* p.79).

The source of *pradushana* has been explained in terms of non-adherence to the set norms of cleanliness, violation of *maryada* (code of conduct), etc. Cleanliness was greatly stressed in the traditional thoughts. Cleanliness of body and mind are stressed as a weapon to ward off *pradushan*: Unless the body is kept scrupulously clean and free from toxic or morbid material, the procedures for revitalising and strengthening it will not be efficacious as the dirty clothes will not take proper colour. (*Charaka Samhita, 8.17*, as cited by Dwived & Tiwari, *op.cit.*, pp.80-81).

Indian traditional thought stressed on the prohibition of any such activity which had the impact of disturbing the natural symphony or causing contamination of any of the elements of the earth. Anybody violating general norms of cleanliness and hygiene was liable to be cursed. Clearly tampering with the environment to generate disharmony was *pradushana*.

15.7 SUMMARY

We now know that resources exist within Indian philosophical tradition for the elaboration of man-nature relationship. There is great emphasis on man’s integral relatedness to nature, its elements and the animal and plant life. The environment in which man lives is not an alien environment. He has always to consider it his own, where he is like all other beings but endowed with special faculty of self-reflection and speech. Indeed man is constantly seen as an embodiment of the elements and forces of nature and constantly in relationship to animal and plant life. This gives the world a different character from what is implied in the modern idea of progressive evolution.

15.8 EXERCISES

- 1) Write an essay explaining the place attributed to man in Indian philosophical doctrine.
- 2) Explain the creation and characteristics of *Srsti* as exposed in Indian philosophy.
- 3) Is there a difference between popular and classical traditions of environmental representation in Indian philosophy? Comment.
- 4) Examine the concept of *pradushana* in Indian thought.

15.9 SUGGESTED READING

O.P. Dwivedi & B.N. Tiwari, *Environmental Crisis and Hindu Religion*, New Delhi, 1987.

R. Carson, *The Sea Around Us*, New York, 1951.

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UNIT 16 CONSERVATION THROUGH AGES

Structure

- 16.0 Introduction
- 16.1 Understanding Conservation
- 16.2 Indian View of Conservation
- 16.3 Conservation Practices in History
- 16.4 Summary
- 16.5 Exercises
- 16.6 Suggested Reading

16.0 INTRODUCTION

The conservation of environment is a subject of serious and wider concerns. We are however inadequately equipped to deal with this concern in the absence of any significant documentation of the subject in the textual tradition of India. We have however attempted to piece together the available evidence for examining the significance of conservation and for giving you a brief history of conservation practices in this unit.

The idea of conservation is probably as old as the human existence but the use of the term in the contemporary writings is relatively recent. Moreover, the environmental problems, in recent decades, have attracted a lot of popular and governmental interest. Environmental matters are becoming a critical part of the political discourse in almost every country. The viability of human survival in the wake of an ever-increasing pollution of the earth is becoming a matter of concern for humans. Recent times have witnessed an increase in the popular awareness with respect to the consequence of global environmental degradation and have noted the necessity for conservation. We hope the problem of conservation will be seriously examined and will pave the way for examining the concept of sustainable development and bio-diversity protection.

16.1 UNDERSTANDING CONSERVATION

Conservation of environment does not and cannot have a universally accepted definition. Generally conservation is considered as protection of wild nature where as few see it as an attempt to stress the prudent use of already stressed natural resources. In fact as the human concern about nature has grown so have the definitions evolved. Generally most accepted definition presented at the *World Conservation strategy* by the International Union for Conservation of Nature and Natural Resources is that of “the management of human use of the biosphere so that it may

yield the greatest sustainable benefit while maintaining its potential to meet the needs and aspirations of future generations.”

Although we do not equate biodiversity conservation with the complete preservation of all species nor the maintenance of the environmental status quo, we are concerned with the current rates of resource exploitation and habitat modification which may be leading to an excessive biodiversity loss. Thus conservation is not simply preservation of wild nature or biodiversity but it also encompasses the larger issue of the usage of natural resources. At the same time it also implies *preservation of some level of biodiversity that is essential to the functioning of the ecosystems and the survival of the mankind along with other living creatures.*

It is generally believed that nature has its own way of functioning and there is an unsaid balance maintained by nature between humans and its resources. It is only now that greater exploitation of natural resources is disturbing this natural balance. This has forced environmentalists to argue for the conservation of environmental systems and the diversity of species. It has been further supported by those who have become disillusioned with the course of development. The debate has larger political dimension and it is believed that Northern countries (Developed Countries) after developing their industry and in the process destroying the natural balance are now forcing the Southern countries (Developing countries) to not develop in the name of conservation of environment and natural resources in particular. It has been pointed out that the level of energy consumption enjoyed by Northern countries is not tenable in the absence of sufficient natural resources. This view was most vehemently argued at the U.N. Conference on the human environment in Stockholm and Northern environmentalists were shocked in 1972 by the positions taken by the South.

Politics apart, it is a matter of concern that all are threatened by the decay of global life support systems. Historically, people in industrialized countries have not perceived the importance of environmental conservation the same way as the people in developing countries have done. North Americans, due to their cultural history, have to glorify nature to decry its defilement and to propose “back to – nature” type solution. As a consequence of their colonial history, Third World people have tended to be much more concerned with the social origins and human consequences of environmental degradation. It is now being argued that environmental leaders and scientists from North and South should learn from each other through repeated discussions and team work. The 1987 report of the *World Commission on Environment and Development* reflects both views. There is a new synthesis arising among world political leaders as well. Among the populace the differences between North and South are diminishing. Northern workers are becoming more politically active with respect to the danger their work has on environments, while Southern people are gaining a broader understanding of the importance of ecological systems and processes for economic development.

Conservation is essential for the survival of humans as well as life forms on earth. Existence of life forms on earth has been made possible by a very complex combination of interaction among innumerable factors. The most important among these factors being the atmosphere, which represents availability of air (oxygen), water, sun, land forms in particular and numerous other materials. It is presumed that any large scale disturbance in the availability or functioning of any of the components of environment would lead to environmental decay and ultimately cause extinction of life. Therefore, conservation of not only the quantity of the components but also the quality of the components is also very important. As such plants are considered as the primary producers but their relevance with respect to generation of oxygen cannot be undermined. Therefore, any factor which hampers the growth of plant life on earth will lead to the paucity of oxygen and will disturb the proper functioning of environment. At the same time we must be careful to note that till date we are not able to identify numerous other factors that also influence the environment.

Certain aspects of conservation, such as the prevention of pollution, have more narrow but immediate importance. There are numerous examples of the serious effect of pollution in air, water, or soil on human health and survival. Moreover, it is now being realised that impact of pollution on humans can not be treated in isolation and we have to extend our concern to other life forms also.

Another related but equally relevant aspect of conservation has been its economic value. Mostly it has been realised in terms of the cost to the humans. Although the floating plants of the ocean, the microscopic phytoplankton, are of little direct economic value to the humans their elimination from the food chain would sooner or later destroy the world's marine life and eliminate fisheries – the major source of food for large sections of humanity. The same is applicable to an unrestrained cutting of forest for petty gains. The deforestation would ultimately not only influence the food chain but also lead to depletion of oxygen in the atmosphere. Short term economic consideration will ultimately lead to disruption of the functioning of environment and any rectifying measure will be capital intensive, defeating the basic purpose.

Similarly, along with economic considerations of conservation, we must realise the irreparable damage being caused to the aesthetics of environment. Greater the human technological penetration in the functioning of different components of environment it is difficult to explain the real nature of environment to larger population and urban born in particular.

Conservation is also of great scientific value. Because relatively little is known about the past, present and possible future of the earth, we need to preserve some part of our natural environment to conduct the scientific research in the pristine environment. Moreover, there are still numerous undiscovered materials/natural resources waiting for scientific investigations. Any possibility of elimination or pollution of any such natural resource will deprive humans of its possible benefits.

16.2 INDIAN VIEW OF CONSERVATION

Cutting across historical, philosophical debates, the one principle which underlies and provides unity in Indian philosophy as also continuity of vision and perception is the assertion that *Man is only one among all living matter*. Man's life depends upon and is conditioned by all that surrounds him and sustains him, namely, inanimate, mineral and animate, aquatic, vegetative, and gaseous life. It is therefore, Man's duty to constantly remind himself of the environment and the ecology.

In the Indian world view, as also of other ancient civilizations and cultures, life on earth emerges from the eternal waters that hold the potency of fires. Perhaps we have not pondered over the significance of the myth. While on surface myth has a dream like structure, its meaning and value lies in its pointing at the natural phenomenon. Indian science and philosophy and thus culture develop on the postulate of the perpetual movement of *creation, degeneration, and regeneration* of the cosmos.

The traditional society is structured on a four fold control system that orders human life, its subsistence and desires. Life is ordered into four successive stages (*ashramas*) from learning and performing to gradual indifference and final withdrawal. Although seemingly opposed in character, these primal desires stand in an organic and interactive relationship to one another. This fourfold ordering of life is called *purusartha*, that is, the making of a cultural person (*purusha*). At a higher level of consciousness, the cultural person is transformed into a cosmic person.

The Indian theory of nature and ecology is enormously affected by the theory of creation which recognizes that *every element, object and living being in the universe is created by the same Supreme Being; and the man has no special dominion over nature*. The early Indian socio-religious systems enshrine respect for nature in the following basic elements:

- 1 faith in a supreme power,
- 1 non-dualistic view of this supreme being, and
- 1 a set of rules defining duties in consonance with cosmic order.

The early scriptures of India provide useful references ascribing practical conservation tips that directly relate with this enshrined respect for nature. *Vedas, Upanishads, Puranas* and other scriptures give detailed descriptions of trees, plants and wildlife along with their importance to the community. Trees have been considered as an essential part of Indian homes. Significance of plants and trees to human life is further exemplified in *Varah Puran* which advocates regular plantation as a means to achieve heaven. In *Matsyapurana* and *Padmapurana* also there is a description of great plantation ceremony – *Vriksha Mahotsave*. In *Matsyapurana* plantation of a tree has been equated with progeny of ten sons.

Indians accept nature as divinity; and as such various trees and plants are used in religious ceremonies and worship. Some trees and plants are considered so sacred that it is assumed that particular Gods and/or Goddesses have made their abode in them. In *Narsimha Puran* tree has been personified as God (*Brahma*) itself. *Atharvaveda* considers *Peepal* tree as abode of various Gods. Names of various trees and their associations with God and Goddesses are:

1	<i>Ashoka</i>	<i>Buddha, Indra, Vishnu, Aditi etc.</i>
1	<i>Peepal</i>	<i>Vishnu, Laxmi, Vana Durga etc.</i>
1	<i>Tulsi</i>	<i>Vishnu, Krishna, Jagannath, Laxmi etc.</i>
1	<i>Kadamba</i>	<i>Krishna</i>
1	<i>Ber</i>	<i>Shiv, Durga, Surya, Laxmi</i>
1	<i>Vata</i>	<i>Brahma, Vishnu, Shiv, Kal, Kubera, Krishna, etc.</i>

The various trees and plants are not only worshipped but cutting green trees has also been prohibited and punishments prescribed for the offender. Indian society had been very much aware of the fact that *indiscriminate destruction of plants and forests would result in diseases and pollution of the atmosphere.*

One of the early historical evidence of this nature comes from the inscriptions engraved on pillars and rocks at the behest of Ashoka, the famous Mauryan Emperor in the third century BC.

The Ashokan inscriptions were put up at centres of population and pilgrimage where crowds of people would gather and read them, and receive the inscription of their messages of morality. One of this pillar edicts, No.V found at Rampurwa in Bihar and issued by him in 243 BC provides elaborate injunctions relating to environment. This edict may even be taken as one of the earliest historical record focusing on conservation practices to be followed by people in general. The text of this edict reads as below (English translation):

Thus saith king Priyadarshi, Beloved of the Gods.

*Twenty-six years after my coronation, I have declared the following species of animals exempt from slaughter, viz., parrots, mainas, ruddy geese, wild geese, **nandimukhas gelatas**, bats, mango-tree ants, terrapins, boneless fish, **vedaveyakas**, **gangapuputakas**, skate-fish, tortoises and porcupines, leaf-hares, twelve-antler stags, bulls set at liberty, household vermin, rhinoceroses, white pigeons, village pigeons and all the quadrupeds which are neither useful nor edible.*

Those she-goats, ewes and sows, which are either pregnant or milch, are not to be slaughtered, nor their young ones which are less than six months old. Cocks are not to be caponed. Husks containing living beings should not be burnt. Forests must not be burnt either uselessly or in order to destroy living beings. The living must not be fed with the living.

At the three Chaturmasis and at the full-moon of the month of Tishya, for three days in each case, viz., the fourteenth and fifteenth of one fortnight and the first of the next, and invariably on every fast day, fish is exempt from slaughter and should not be sold. And on the same days, not only these but also other species of beings should not be killed in the elephant-forests and in the fisher-men's preserves.

On the eighth of each fortnight and on the fourteenth and fifteenth, on the tishya and Purnarvasu days, on the three Chaturmasi days and on every auspicious day, bulls are not to be castrated. And he-goats, rams, boars and such other animals as are usually castrated should not be castrated on those days. Horses and bullocks should not be branded on the Tishya and Punarvasu days, on the Chaturmasis and during the fortnights associated with the Chaturmasis.

Up to the time when I completed twenty-six years after my coronation, the release of prisoners has been ordered by me twenty-five times during the period in question.

(D.C. Sircar, *Inscriptions of Asoka*, New Delhi, 1957, pp 64-5).

The text of this edict is self-explanatory. It gives a list of creatures which were declared protected and it was forbidden to slaughter them. Injury to living creatures in other ways was also prohibited. The conservation of forests was earnestly propagated. Forests as the living abode of a variety of creatures would help protect a variety of species. The injunctions concerning fish were invoked perhaps with a view to protect them during the breeding season. For its date which is as early as the third century BC the edict is unparalleled in propagating conservation ethics. (Cf. Radha Kumud Mookerji, *Asokan Inscriptions: A Commentary*, Allahabad, 1942).

The Indian culture, in ancient and medieval times, provided a system of moral guidelines towards environmental preservation and conservation. Environmental ethics as propounded by ancient scriptures and the seers continued to exist in society and was practiced by not only common man but even by rulers and kings. These principles were properly knitted with the Indian way of life. Even very minor things creating environmental problems were dealt with giving proper solutions.

We have several examples from medieval Rajasthan highlighting the concern for environment. The attitude towards nature is apparent in the teachings of sects like Bishnois. The founder of the Bishnoi sect, Jambhoji (AD 1451-1536) prescribed twenty-nine rules for his followers. Most of these suggested maintenance of harmony with the environment, such as the prohibition on cutting green trees and animal slaughter.

Jambhoji's teachings, which were congruent with the interests of the common man, became immensely popular. The number of his followers increased manifold but primarily in the arid regions of Bikaner and Jodhpur. His sect became so influential that the rulers of these states were

forced to respect his sermons. Maharaja Ajit Singh issued a *parwana* (official order), restraining the cutting of green trees in 1754 vs./AD 1698. Anup Singh, king of Bikaner prohibited cutting of green trees in the villages dominated by Bishnois in 1752 vs./AD 1696. Similarly, in 1878 vs./AD 1821, Man Singh, the king of Jodhpur, issued a similar order with respect to the *khejari* tree. King Takht Singh in 1900 vs./AD 1843 extended the scope of this legislation by prohibiting slaughter of any animal in the villages dominated by *vaishnoi*.

The founder of the Bishnoi sect was not alone in attempting to influence conduct towards living beings via religious and ethical transformation. Another popular saint, Jasnathji (AD 1482-1506) a contemporary of Jambhoji also endorsed such a viewpoint. His followers were known as Jasnathi. Like his contemporary, Jasnathji was also aware of the importance of the preservation of environment. In his teachings, the *jal* tree, which formed the natural vegetation of the region, was accorded special protection. These teachings became popular in the region, which had traditionally sustained goat and sheep rearing. Conservation of green vegetation and prohibition on the slaughter of animals seemed to be an attempt towards protecting their livelihoods. However, restrictions through religious and official sanctions question the older assumptions of prudent use of natural resources and environmental conservation as supposedly practiced by traditional societies.

16.3 CONSERVATION PRACTICES IN HISTORY

Conservation has a chequered history. It has, in the long and coiled process, concerned itself with natural ecosystems and the animal world. Modern attitudes and practices about conservation have evolved largely in the context of the socio-economic mores of western society. These attitudes have been influenced by the political and economic upheavals that western society has undergone. Western notions of conservation have been mainly guided by the philosophical foundations of Judeo-Christian position about man and nature. Two ideas constitute the core of this position:

- 1 the right of exploitation of nature by man, unfettered by any serious ethical consideration; and
- 1 the responsibility of stewardship.

The fundamental Judeo-Christian belief holds that nature was created to serve the human race. Hence, the exploitation of nature is a natural legitimate pursuit. This view does not endow the environment and its inhabitants with protective spirits that prohibit exploitation.

Starting with the voyages of discovery in the fifteenth century, the influence of European culture was spread over the world. By the seventeenth century Europeans were equipped with an increasingly powerful technology and a growing ability to modify large areas of the

earth. During this period the attitudes of explorers and colonists were oriented more toward immediate personal aggrandizement of the lands they visited and settled than toward any concern for the long-term health and productivity of the newly discovered countries. Soil erosion as well as the destruction of natural vegetation and wildlife accompanied the spread of European colonization. During the same period, however, some conservation ideas and practices were also being promoted. Forest conservation, for example, developed sound beginnings because of the disappearance of natural forests as a result of the increasing demand for wood fuel for industrial uses. Also a general interest in and concern for wildlife was developing.

The nineteenth century, however, witnessed unusually severe environmental exploitation and destruction. In Africa many forms of wildlife were hunted to extinction, and most of the larger mammals were reduced to numbers that endangered their survival. Even the larger predatory animals were nearly exterminated, and some of them subsequently became extinct. Many types of birds that once had occurred in great abundance were wiped out. Logging and fires combined to menace the once luxurious forests. Livestock populations were allowed to increase to levels far above what the natural forage could support. The process of over foraging damaged the range lands to such a degree that they have not yet recovered. The grasslands were overgrazed and native vegetation was eliminated.

By the middle decades of nineteenth century biology was undergoing a revolutionary change in its view of the natural world i.e. the replacement of a static, creationist view of life by an evolving mechanistic view. This change is best exemplified by the emergence of the theory of *evolution by natural selection*, presented jointly by Charles Darwin and Alfred Wallace. The concept of natural selection replaced the creationist view of the original living species with a mechanistic process of interaction within nature. *The evolutionary view also opened the eyes of many to the fact that change in the environment, including changes caused by humans, could bring about the extinction of many kinds of organisms, as the fossil record demonstrated.*

It could have been predicted that the modern conservation movement would have its beginnings not in the settled lands of the Old World but in those areas of the New World where, within the memory of a single generation, there had been extreme changes in the landscape and similar changes in the abundance of wildlife. Conservation as a national movement was initiated by U.S. President Theodore Roosevelt and his immediate advisers. Roosevelt's chief forester, Gifford Pinchot, is credited with having first used the term "conservation" in its present context.

World War II, suddenly diverted attention from conservation issues. It also initiated an era of unparalleled economic expansion and explosive growth of technology and human population. The result was exponential growth in the pollution of air, land and water by chemicals and chemical wastes.

The emerging situation was frightening. The attention of world community to the issues related with conservation of environment was bound to be attracted by it. In the post-war scenario serious attention was paid to the issue. It was seriously realised that the global commons were being increasingly threatened by a wide variety of real and potential environmental problems.

Since 1950s environmental issues have been catapulted on to the centre stage of global politics. International organisations are now seriously involved and an elusive consensus on a global action plan is being attempted. These developments shall be discussed in detail in Block 7.

16.4 SUMMARY

Various developmental activities are rapidly destroying nature and its finely maintained and fragile balance and interdependence created over million of years. But by destroying nature society is creating a basis for self destruction. The destruction of nature has gathered speed in the last two decades, and we are fast heading towards a complete devastation and destruction of ecology. We are not on the brink of disaster; we have already entered the realm of disaster. *Man by his thoughtless acts is fast turning the globe into a large garbage heap.*

Much of his recent industrialization and agrarian development was ill conceived, and continues to be so. Man and society have ruthlessly robbed nature and have made a desert of the earth. But the worst crime man and society continue to commit is to deprive the planet of its deep-fresh-cover of dense forests, those forests that sustain man and all the living beings and provide them with the life giving oxygen. Virtually every state and country is involved in this criminal act – an act against the humanity. Some people do it for profit, others in the name of providing basic necessities of live, still others purely for pleasure.

Conservation is essential to human survival. Because life depends upon he proper functioning of the biosphere – the relatively narrow zone of air, water, soil, and rock in which all life on earth exists – the ultimate purpose of conservation is to maintain the biosphere in a healthy operating condition. Although it is known that green plants supply oxygen to the atmosphere, that plants and animals recycle nutrients, and that plants and animals help maintain the fertility of soils, many of the elements that contribute to the proper functioning of the biosphere have not yet been identified. Because mankind lives with such environmental uncertainties, an attitude of care and protection toward the earth's living resources is necessary.

The ecological situation has become quite critical today, so critical that if we do not take urgent steps, things will go out of control and beyond redeem. Man's various activities in all fields of daily life, particularly the industrial and agricultural ones, are rapidly destroying nature. By destroying ecology, man is creating conditions for self destruction. What must we do? Obviously the question of protection and regeneration of

ecology is the question number one before the world society. The entire strategy of the future development of civilization has to change drastically in all the fields; otherwise our survival is out of question.

16.5 EXERCISES

- 1) Write a note on the significance of environmental conservation.
- 2) Discuss conservation practices since the beginning of the modern period.
- 3) Write an essay on the Indian view of conservation.
- 4) Write a short note on the meaning of conservation.

16.6 SUGGESTED READING

The Princeton Conference Report, Man's Role in Changing the Face of the Earth, 1958.

O.P. Dwivedi & B.N. Tiwari, *Environmental Crisis and Hindu Religion*, B.N. Tiwari New Delhi, 1987.

James E. Hickey & Linda A. Longmire, ed., *The Environment, Global Problems, Local Solutions*, London, 1994.

