

CHAPTER I

Ecology : past and present

Ecology and environment are the chief concern of the people in the ancient time. If we go through the early civilizations of the world, we can get their idea regarding the ecology and environment.

The Harappa Culture (2500-1550 BCE) starts before Vedic era. The people in that time are highly nature loving as found from seals, inscription, etc from the site. They are worshipper of Peepal tree (*Ficus Relidiosa*). This tree is considered as giver of life. Gods were considered as the protectors of the tree. In some seal the Peepal tree has been protected by a Rhinoceros. In other seal it is saving the tree from evil spirit or demon. A few seals are depicting pictures where it is shown that the Cobra is spreading fangs over the tree for saving the tree from any unwanted attack. In some seal group of trees or whole forest has been worshipped. People at that time understand that their food or any other livelihood solely depends upon the tree or environmental products. Their feeling of interdependence indicates their feeling that any harm caused to the tree or plant could have dangerous consequences for human beings.

Vedic period is generally 1500-500 BCE according to A.L. Basham. The literature in Vedic period gives the idea of five basic elements which are the components of the environment. The concept of *Pañcamahābhūtas* is not present in the Veda but it is understood in Upanisads and its later philosophical texts. However, few basic ideas of *bhutas* as gross elements may be traced in Rigveda. It is believed in Rigveda that after death the spirit coming out from the body goes to earth, fire, water, and other components of the environment. Vedic people believed that man has certain relation with the gross elements which are responsible for the formation of body and after death these elements go to the respective sources. It may be observed that the Vedic people believed in some kind of union with different elements (*bhutas*) after death, and that the different components of the gross (earthly) body united with the corresponding subtle elements, the *tanmatras* of the Upanisads. It is also mentioned in the Rigveda that the fine constituent of the *bhutas* occurs in the *Rigveda* in the form of five defined natural elements in the environment. The words *prthivi* (earth), *ap* (water), *agni* (fire), *vayu*(air) and *akasa* (or *dyaus*)(sky) have been deified in the Rigveda.. A number of myths and legends have been woven around them to bring out their essential nature and characteristic features, that might have led the post-vedic thinkers to conceive and transform them into the five *bhutas* constituting the physical

universe¹. People in the ancient time do not consider themselves the supreme being but always think they are the part of whole creation. So they try to establish their relationship with the external universe. Concept of *rita* i.e. moral order is the interdependence between all beings which is extensively propounded in vedic texts. The universal relation with all beings leads to the harmony and existence. Vedic texts invoke this idea in many places. In Rigveda, it is stated that – May the sky and earth give us blessedness; may the atmosphere be a blessing to us. May herbs and forest tree be a blessings to us. May the victorious Lord of heaven bring us blessedness!(7.35.5).

शं नो द्यावापृथिवी पूर्वहूतौ शमन्तरिक्षं दृशये नो अस्तु ।

शं न ओषधीर्वनिनो भवन्तु शं नो रजष्पतिरस्तु जिष्णु ॥ Rigveda 7.35.5.

In Egyptian civilization (3100-2686 BCE) the nature and its various functions are conceived as different deities. Here Sun God is most powerful because all are controlled and governed by sun. Its regular motion maintain the periodic nature of all natural phenomenon. Their calculation of the year is on the basis of solar system. Their concept of God is not so any terrible or fearful aspect but some sort of friendly feelings are present in relation to human beings². The ecological idea and environmental settings of dynastic Egypt is based on four points a) The changing climate of the Egypt, b) The short-term and long-term flood of Nile floods, c) The former topography of Nile Valley, d) the role of environmental factor for modifying the landscapes of delta and the Faiyum³.

The people in the Mesopotamia (2900–2350 BCE) believed nature is a sort of obstacle or chaos and this chaos is to be overcome by constant struggle with the external environment. So the people are very much concern about the astronomy and the planetary motion. “ Nature herself was represented in the Mesopotamia mythology as chaotic monster and their patron gods that chaos could be overcome and order established. The order of heaven was quite apparent to the Mesopotamian, who developed both astrology and astronomy to an intensified degree and noticed that the motions of the moon, and the sun, stars and the planets were constant and predictable”⁴.

The people in the Persian civilization is very much aware of the importance of earth, fire and water. So they worship them with great reverence. The rituals related to

Persian religion is greatly involved to free them from pollute things and dirt. Cleanliness is the great concern for the Persian mind. Water is kept in a state of purity so that no such thing i.e. urine, any excreted body etc. could not mix with the water. The worst of pollution is presence of any decayed body of animal or human. So it is the bounded duty or rite for everyone to remove the decayed body and perform necessary action to clean the spot. Earth and water are sacred object to Persian eye. So they do not like to burry any dead body due to the fact that after decomposition it will spread pollution in the Earth. Similarly fire is also the object of respect. So they put the dead body on the top of a mountain to be eaten by unclean animals like wolves and vultures. Persian habitation is localized in a region which is full of desert and rocky mountain. So the land is not fertile for cultivation of crops or food grains. They believe that through agriculture the nature of the earth surface can be changed. So agricultural activity is a great object of veneration to Earth⁵.

Greek (500-336 BCE) people are very much nature loving. In the writings of the Greek thinkers we find the description of the plants and animals in different story forms. Herodotus in his writings describes the different relationship between prey and predators. His observation is that prey animals are timid and fleshy to appease the hunger of the predator. Prey animals are multiplied large in number in a given time compare to the predators which are less number. It is the balancing factor for the prey and predator life-cycle in this earth. His observation is the present day basic foundation for ecological principle. Another prominent Greek writer Aristotle describes the relation between the whole natural world and human beings. All things in the natural world have a specific purpose and after fulfilling the purpose they have an end. So beauty and goodness are all related to the point for satisfying the purpose of human beings. Human beings love all animals and plants because they serve the wellbeing of humankind⁶.

Roman (753 BCE to 27 BCE) believed the cosmic order of the nature. Everything in this world has own purpose to fulfill which is also interconnected. Plants are serving the cause of animal, animals are for the cause of human and human are striving for the perfection. Roman generally believed that whole world is meant for the humankind. All these are ideas are reflected in the literatures, arts, architecture and philosophy.

The concern of Arabic Islamic (750–1258 CE) people are found in mathematics, alchemy, physics, and geography. Abu ‘Uthman ‘Amr ibn Bahr, who is known to history by an unflattering nickname, al-Jahiz (goggle-eyed). He wrote stories of 350

different kinds of animals. Al-Jahiz's animal stories remained immensely popular and influenced later writers. 'Abd al-Latif was born in Baghdad and became an outstanding physician. He lived in Cairo and collected information on Nile crocodiles and different kinds of lizards. His description on the nature based upon both his own observations and previous data found in the different writings. He assumed that crocodile eggs would produce either crocodiles or snakes, depending on whether the place of hatchlings took place whether in water or in the sand. Zakariya-al-Qazwini was educated in Damascus and then served as a jurist in Iraq⁷. The first of his two works, *Wonders of the Creation*, is on cosmography. Drawing upon both Greek and Arabic language sources, this work showed vast knowledge but has little originality or critical thinking. He discussed, for example, not only plants and animals, but also angels, without making clear that knowledge of the former comes from observations. (Some of his accounts were translated into German by E. Wiedemann , and extracts from that were translated into English by Bodenheimer. His other work, on geography, was entitled *Wonders of the Lands* in the first version and *Monuments of the Lands and Histories of the Peoples* in the second version. It is a dictionary of towns and countries that gave some indication of latitude and longitude, and also discussed the influence of locations on the people, plants, and animals. Several aspects of zoology were widely discussed in Arabic-language medical literature. The common assumption that Islamic civilization forbade dissection of human cadavers or even animals is incorrect, although there were few significant discoveries made during such investigations. There are several indications that Arabic-language medical authors enriched the understanding of parasites, gained when the medical encyclopedia by Paul of Aegina had been translated into Arabic. Al-Razi was a leading medical author who discovered that a skin disease previously ascribed to an injured nerve was actually due to parasitic Guinea worms. Byzantine tradition in accepting the spontaneous generation of parasites⁸.

Form the term *Oikologie* (the study of home with its surroundings) the modern Ecology is derived. Ernest Haeckel has defined ecology as the science treating the reciprocal relation of organism and external world⁹.

According to E.P. Odum ecology is the study of the structure and function of ecosystems or broadly of nature¹⁰.

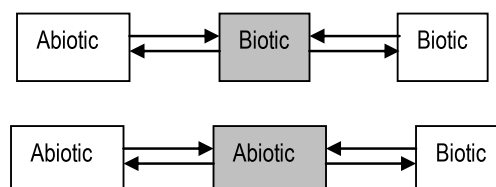
Clarke has treated ecology as the study of inter-relations of plants and animals with their environment which may include the influence of other plants and animals present as well as those of the physical feature¹¹.

Macfadyen defined ecology as science which concern itself with the inter-relationships of living organism, plants and animals, and their environment. Woodbury has regarded ecology as the science, which investigates organisms in relation to their environment: a philosophy in which the world of life is interpreted in terms of natural processes¹².

Allect Etal has considered ecology as the science of interrelationship between living organisms and their both physical and biotic environment, especially inter-species and intra-species relations¹³.

A clear definition of ecology was put forward by Andrewartha (1961CE) : Ecology is the scientific study of the distribution and abundance of organisms. According to Charles J. Krebs (1972 CE) ecology is the scientific study of interactions that determine the distribution and abundance of organisms. Smith has defined it as a multidisciplinary science which deals with organism and its place to live and focuses on the ecosystem¹⁴.

From this above definition of the modern ecologist in the world it is clear that ecology is science of interrelationship between the living object present on the earth and the environment present surrounding the earth. This relationship is complex in nature and we can not predict its dynamics easily. It is because of the fact that we do not understand the life and its presence in the living matter. So life, living matter and the surrounding environment i.e. triad relation and interrelation make the proper meaning of the term ecology. Moreover in a living body having presence of life and where only matter exists, none can predict it clearly. So the term biotic indicates the body physically separated from the rest of the outer environment. In respect of the one biotic organism the outer environment again divides into two categories i.e. a) abiotic , b) biotic. Similarly in respect of one abiotic matter the outer environment exists in two forms – abiotic and biotic. The following is the schematic diagram which gives the two types of interactions.



All the interactions present in the environment and all the definition and explanation put up by the eminent ecologist give some directions of thinking in present context.

Ecology is the interrelationship science between biotic organism and abiotic organism.

Ecology is the science of intra-relationship between same species i.e. interactions among the same group members. Depending upon the external situation different climates are present in the environment. So, same species exhibits different physiological and ecological behavior.

Ecology is the science of inter-relationship between different species. Living world is broadly classified as plant and animal. Plants as well as animals have different species. So interactions may be between different plants species or different animal species or between animal species and plant species.

Ecology is the expression of life process in the environment through integrated relationship between abiotic and biotic elements.

Ecology is the total process of the life cycle of different organisms and transformation of material objects including the inflow and outflow of the matter in the environment.

Modern times the term Deep Ecology is a movement for environmental protection and preservation. In 1972 CE Norwegian philosopher Arne Naess coined this term Deep ecology. Deep Ecology indicated to think deeply the inner question regarding human beings and nature. It has two basic principles- firstly it gives the scientific outlook of interconnectedness between human beings and other non-human objects in the nature, secondly it helps for self-realization of human beings i.e. human beings do not identify themselves with their self rather identify with outer other beings like plants, animals, etc. present in the nature. Michael E. Zimmerman, Professor of Philosophy at Tulane University, New Orleans, rightly told in this aspect – “Deep ecology is founded on two basic principles: one is a scientific insight into the interrelatedness of all systems of life on Earth, together with the idea that anthropocentrism - human-centeredness - is a misguided way of seeing things. Deep ecologists say that an eco centric attitude is more consistent with the truth about the nature of life on Earth. Instead of regarding humans as something completely unique or chosen by God, they see us as integral threads in the fabric of life. They believe we need to develop a less dominating and aggressive posture towards the Earth if we and the planet are to survive. The second component of deep ecology is what Arnie Naess calls the need

for human self-realization. Instead of identifying with our egos or our immediate families, we would learn to identify with trees and animals and plants, indeed the whole ecosphere. This would involve a pretty radical change of consciousness, but it would make our behavior more consistent with what science tells us is necessary for the well-being of life on Earth. We just wouldn't do certain things that damage the planet, just as you wouldn't cut off your own finger”.

So Deep Ecology indicates the closer connectedness of human beings with all living beings on the earth and a deeply felt spiritual interconnectedness with other beings on the earth with moral and ethical grounds for preservation. Sometimes someone found some connection with other religions with the world.

Deep ecologist considers their perspectives to “*ecocentrism*” or “*biocentrism*” which means to consider the whole earth as focus for consideration or whole life-system on the earth. Simultaneously they rejects the *anthropocentrism* idea of the environmental movement. Anthropocentric idea gives prime importance to the human beings as human beings are considered more valued animals on the earth. So all living world simply exist due fulfill the need of the human beings. But deep ecologists argue that all have equal right to in on the earth and all have equal importance as all are interconnected for perpetuate life flow on the earth. According to Michael E. Zimmerman - Many deep ecologists call their perspective alternatively “ecocentrism” or “biocentrism” (to convey, respectively, an ecosystem-centered or life-centered value system). As importantly, they believe humans have so degraded the biosphere that its life-sustaining systems are breaking down. They trace this tragic situation to anthropocentrism (human-centeredness), which values nature exclusively in terms of its usefulness to humans. Anthropocentrism, in turn, is viewed as grounded in Western religion and philosophy, which many deep ecologists believe must be rejected (or a deep ecological transformation of consciousness within them must occur) if humans are to learn to live sustainable on the earth¹⁵.

Naess and Sessions formulated an eight-point platform for the Deep ecology. Arne Naess's Apron Diagram structure narrated clearly the role of the Buddhist, Christian and Philosophical approach of understanding for explaining the Deep Ecology. The eight points of Deep Ecology is as follows:

1. The well-being and flourishing of human and nonhuman life on Earth have value in themselves (synonyms: intrinsic value, inherent worth). These values are independent of the usefulness of the non-human world for human purposes.
2. Richness and diversity of life forms contribute to the realization of these values and are also values in themselves.
3. Humans have no right to reduce this richness and diversity except to satisfy vital needs.
4. The flourishing of human life and cultures is compatible with a substantially smaller human population. The flourishing of non-human life requires a smaller human population.
5. Present human interference with the non-human world is excessive, and the situation is rapidly worsening.
6. Policies must therefore be changed. These policies affect basic economic, technological, and ideological structures. The resulting state of affairs will be deeply different from the present.
7. The ideological change will be mainly that of appreciating life quality (dwelling in situations of inherent value) rather than adhering to an increasingly higher standard of living. There will be a profound awareness of the difference between bigness and greatness.
8. Those who subscribe to the foregoing points have an obligation directly or indirectly to try to implement the necessary changes¹⁶.

The apron diagram developed by Naess is depicted below and the role of the Deep ecology in the waist portion to balance the all portion present in the above and below portion of the apron discussed vividly in the diagram -- For example (Naess 1986, p. 24), in the diagram Buddhist, secular philosophical, and Christian first principles (the bust) converge in the eight-point platform (the waist), which then justifies an array of activisms (the skirt [see Figure 1]). Buddhist metaphysics might channel through the waist of deep ecological principles calling for environmental action to reduce consumption; secular metaphysics might channel through the waist of Deep Ecology calling for action to reduce human population growth; or Christian metaphysics might channel through the waist of Deep Ecology to call for action to preserve biodiversity¹⁷.

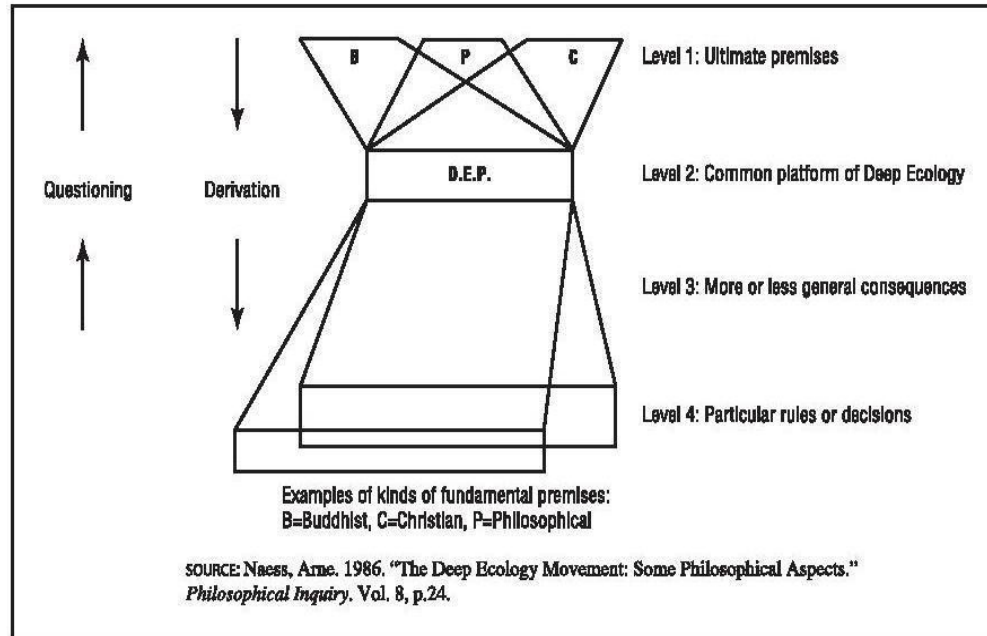


Figure 1. Arne Naess's Apron Diagram. CENGAGE LEARNING, GALE.

Diagram-1: Deep Ecology Apron Diagram

Human ecology is the study of the interactions of human beings with their environments, or the study of the distribution and interaction of humans. This definition is based directly with the definitions of biological ecology. Ecology is generally defined as the study of interactions of living organisms with their environments and each other. So study of human ecology is based on two perspectives. According to Robert Foley - Human ecology is an approach to the study of human behavior marked by two commitments.

A) First, human ecologists think that humans should be studied living systems operating in complex environments. The human sciences are interlinked into several social science, humanistic, and human biological disciplines. Ecologists are used to thinking that systemic nature of individual organisms and populations of organisms mean that we typically have to understand how diverse parts of the system operate together to produce behavior. The traditional human science disciplines make people separate from the environment and natural phenomenon ; human ecologists try to put human beings back together.

B) Second, human ecologists think that humans go through very similar ecological and evolutionary processes as any other species.

The basic ideas for the concept of human ecology is grounded into the biological science to understand the nature of human being. Just like other animal species, human being is also a species of special character. So the nature of human beings should be studied through scientific parameter.

Human ecology depends upon the population biology concept. Like other species human beings are growing in number. So the Darwin concept like other concepts plays an important role to shape the human ecology. Man is present in society. Without man no society is formed. Here the interaction of human beings with the society play a significant role to shape the ecological idea. This is known as the socio-ecology or community ecology. In society many groups are present in a constant flux of cooperation, communication and interaction. So more strong and trained group extracts more resource from the society and resulting deprives the less privileged groups in quantum and quotient.

Human ecology is a complex subject. So its nature and dynamics should not flow the normal dynamics of the behavior followed by the animal kingdom. So biological, social and behavioral phenomena cannot predict human ecological pattern either singly or collectively. As human beings are complex their ecological relation cannot be explained by simple way. So the human ecology is a sort of study of all different fields explored in human knowledge domain and also beyond human knowledge. There are different knowledge field in human society. All have a specific contribution to highlight a specific portion of human understanding. So for understanding the human ecology all fields of subjects have cooperative role.

Many disciplines contribute to human ecology because our behavior is complex and diverse. Individuals who have taken the ecological/evolutionary approach to humans include biologists, anthropologists, psychologists, sociologists, demographers, historians, geographers, geophysicists, and economists. The justification for having so many disciplines is the complexity and diversity of human behavior. We are affected by the laws of physics, by our biological capabilities, and by the skills and knowledge available to us. We are diverse in the sense that human behavior is very different in different places and at different times, even when environments are very similar. The various simple societies of the past were as different in their adaptations as most animal species (compare the Kung of the Kalahari Desert with the Eskimo), not even to mention the differences between simpler and more complex societies. Complexity and diversity obviously offer a severe challenge to understanding humans. A complex

web of causal processes and historical constraints influence the least thing we do. No one person can hope to understand all of them in any detail¹⁸.

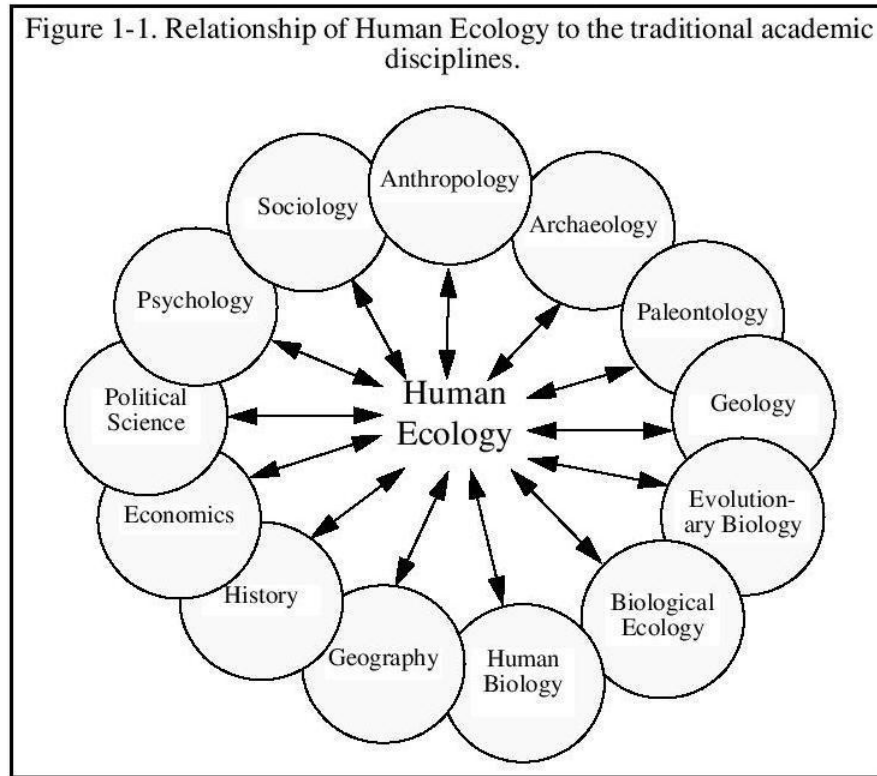


Diagram-2: Human Ecology relates with other discipline

So ecological study which was present in ancient times has taken shape in different newer dimension to satisfy the different understanding of the attitude towards environment and more specifically the nature. But above all in all period of history of human development man always is trying to preserve and protect the environment in his own way.

The study of the past and present regarding the ecological concept gives the indication of gradual development of the subject matter.

In past time several civilization have come in existence on the earth. Their attitude towards the environment is almost same and difference is only mode of application. Every civilization gives nature and their components a high value and standard than anything else. Their attitude towards environment makes the environmental

components like water, air, fire, etc. as the part and parcel of life and religion of human being. This indicates that they feel some sort of interconnectedness with environment. Moreover their feeling proves that they never consider that the supreme right of human beings in the nature, rather consider as one of the sentient being in the whole biotic world. In modern science ecology is evolved to study the interactions of the living organism with the non-living materials. This study is also placed human being as one of the component in biotic world. The 'Deep Ecology' and 'Human Ecology' proclaim the interconnectedness of human being with whole environment and identification oneself with other components of the environment. First factor helps to develop the feeling of oneness with environment and second one develops the feeling that environment and its components have higher value than anything or individual. This study gives the idea that the nature or environment consciousness is same in all age or era whether it is past or present. People in every age are widely conversant with different factors of environment and its importance in the field of development and propagation of living process.

But with advancement of science and technology, urbanization etc. total global environment has to some extent changed. Many species of flora and fauna had already extinct from the earth permanently. Pollution and population become headache day-by-day to the human civilization. In every country many acts and regulations are adopted to ward off the incoming danger related to environment or earth. In India Government has introduces Wildlife Protection Act in the year 1972 CE. National parks, wildlife sanctuaries, conservation reserves and community reserves are formed in different parts of the land. Protection to habitat and wildlife within premises of such protected areas is the prime concern of these efforts. Environment protection act 1986 CE was passed by the Central Government in the year 1986 CE. Besides these several rules, acts and regulation are framed time to time by the Govt. of India for protection and preservation of the environment. Some are given below:

- Air (Prevention and Control of Pollution) Act, 1981 CE
- Biological Diversity Act, 2002 CE
- Forest Conservation Act, 1980 CE
- Indian Forest Act, 1927 CE
- National Green Tribunal Act, 2010 CE
- Protection of Plant Varieties and Farmers' Rights Act of 2001 CE

- Public Liability Insurance Act, 1991 CE
- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 CE
- Water (Prevention and Control of Pollution), 1974 CE
- Wild Life (Protection) Amendment Act, 2002 CE
- Noise Pollution Act, 1974 CE

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⁶ Ibid..p 64.

⁷ Ahmad, S. M 1975, *Zakariya al-Qazwini. Dictionary of Scientific Biography* 11., pp 230–233.

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