For Anthropology (EVS) (9:40am-10:40am) Thursday (09-04-2020)

Chapter 5: Environmental Pollution (Continued…..)

Topics to Cover

Control measures of urban and industrial wastes:

An integrated waste management strategy includes three main components:

1. Source reduction
2. Recycling
3. Disposal

Reduction in use of raw materials: Reduction in the use of raw materials will correspondingly decrease the production of waste. Reduced demand for any metallic product will decrease the mining of their metal and cause less production of waste.

Reuse of waste materials: The refillable containers which are discarded after use can be reused. Villagers make casseroles and silos from waste paper and other waste materials. Making rubber rings from the discarded cycle tubes which are used by the newspaper vendors, instead of rubber bands, reduces the waste generation during manufacturing of rubber bands. Because of financial constraints poor people reuse their materials to the maximum.

Recycling of materials: Recycling is the reprocessing of discarded materials into new useful products. For e.g. formation of some old type products *e.g.* old aluminium cans and glass bottles are melted and recast into new cans and bottles. Formation of new products: Preparation of cellulose insulation from paper, preparation of fuel pellets from kitchen waste. Preparation of automobiles and construction materials from steel cans.

The process of reducing, reusing and recycling saves money, energy, raw materials, land space and also reduces pollution. Recycling of paper will reduce

cutting of trees for making fresh paper. Reuse of metals will reduce mining and melting of ores for recovery of metals from ores and prevent pollution.

Waste segregation and disposal

Sanitary landfill: In a sanitary landfill, garbage is spread out in thin layers, compacted and covered with clay or plastic foam. In the modern landfills the bottom is covered with an impermeable liner, usually several layers of clay, thick plastic and sand. The liner protects the ground water from being contaminated due to percolation of leachate. Leachate from bottom is pumped and sent for treatment. When landfill is full it is covered with clay, sand, gravel and top soil to prevent seepage of water. Several wells are drilled near the landfill site to monitor if any leakage is contaminating ground water. Methane produced by anaerobic decomposition is collected and burnt to produce electricity or heat.

Composting: Due to shortage of space for landfill in bigger cities, the biodegradable yard waste (kept separate from the municipal waste) is allowed to degrade or decompose in an oxygen rich medium. A good quality nutrient rich and environmental friendly manure is formed which improves the soil conditions and fertility.

Incineration: Incinerators are burning plants capable of burning a large amount of materials at high temperature generally more than 900°C. The required heat comes from oxidation of organically bound carbon and hydrogen present in the waste material or the added fuel. During incineration high levels of dioxins, furans, lead and cadmium may be emitted with the fly ash of incinerator. Dioxin level may reach many times more than in the ambient environment. For

incineration of materials, it is better to remove batteries containing heavy metals and plastic containing chlorine before burning the material. Prior removal of plastics will reduce emissions of dioxins and polychlorinated biphenyls (PCBs).

Hazardous waste

Modern society produces large quantities of hazardous waste which are generated by chemical manufacturing companies, petroleum refineries, paper mills, smelters and other industries. Hazardous wastes are those that can cause harm to humans or the environment.

Characteristics of hazardous wastes

A waste is classified as a hazardous waste if it exhibits any of the four primary characteristics based on the physical or chemical properties of toxicity, reactivity, ignitability and corrosivity. In addition to these waste products that are either infectious or radioactive are also classified as hazardous Toxic wastes are those substances that are poisonous even in very small or trace amounts. Some may have an acute or immediate effect on humans or animals causing death or violent illness. Others may have a chronic or long term effect slowly causing irreparable harm to exposed persons. Acute toxicity is readily apparent because organisms respond to the toxin shortly after being exposed. Chronic toxicity is much more difficult to determine because the effects may not be seen for years. Certain toxic wastes are known to be carcinogenic, causing cancer and others may be mutagenic causing biological changes in the children of exposed people and animals. Reactive wastes are those that have a tendency to react vigorously with air or water, are unstable to shock or heat, generate toxic gases or explode during routine management. For example, gunpowder, nitro glycerine, etc. Ignitable wastes are those that burn at relatively low temperatures (less than 60 C) and are capable of spontaneous combustion during storage, transport or disposal. For example, gasoline, paint thinners, and alcohol.

Corrosive wastes are those that destroy materials and living tissue by chemical reaction. For example, acids and bases. Infectious wastes include human tissue from surgery, used bandages and hypodermic needles, microbiological materials, etc. Radioactive waste is basically an output from the nuclear power plants and can persist in the environment for thousands of years before it decays appreciably.

Environmental problems and health risks caused by hazardous wastes.

As most of the hazardous wastes are disposed in land the most serious environmental effect is contaminated groundwater. Once groundwater is polluted with hazardous wastes it is very often not possible to reverse the damage. Pesticides are used increasingly to protect and increase food production. They form residues in the soil which are washed into streams which then carry them forwards. The residues may persist in the soil or in the bottom of lakes and rivers. Exposure can occur through ingestion, inhalation and skin contact resulting in acute or chronic poisoning. Lead, mercury and arsenic are hazardous substances which are often referred to as heavy metals. Lead is an abundant heavy metal and is relatively easy to obtain. It is used in batteries, fuel, pesticides, paints, pipes and other places where resistance to corrosion is required. Most of the lead taken up by people and wildlife is stored in bones. Lead can affect red blood cells by reducing their ability to carry oxygen and shortening their life span. Lead may also damage nerve tissue which can result in brain disease. Mercury occurs in several different forms. Mercury is used in the production of chlorine. It is also used as a catalyst in the production of some plastics. Our body has a limited ability to eliminate mercury. In the food web mercury becomes more concentrated as it is taken up by various organisms.

PCBs (Polychlorinated biphenyls) are resistant to fire and do not conduct electricity very well which makes them excellent materials for several industrial

Purposes. Rainwater can wash PCBs out of disposal areas in dumps and landfills thus contaminating water. They cause long term exposure problems to both humans and wildlife. PCBs are concentrated in the kidneys and liver and thus cause damage. They cause reproductive failure in birds and mammals.

References:

Bharucha, E.; Kumar, S.; Nair, S. and Foulger, S. "Text book of Environmental Studies for Undergraduate Courses" University press (India) private Limited 3-6-747/1/A&3-6-754/1 Hyderabad 500029,Telangana, India ISBN:978-81-7371-862-5

Kaushik, A.; Kaushik, C. P.; Perspectives in Environmental Studies

Lecture 1

For Computer Sciences, Life Science, Electronics and Mathematics (EVS)

Chapter7: Human Communities and the Environment

Topics to cover

Resettlement and rehabilitation of developmental project: affected persons and communities

Developmental projects are planned to bring benefits to the society. Major projects such as dams, mines, expressways, or the notification of a National Park disrupts the lives of the people who live there and may also require moving them to an alternative site. None of us would like to give up the home we grew up in. Uprooting people is a serious issue. It reduces their ability to subsist on their traditional natural resource base and also creates great psychological pressures. Especially tribal people, whose lives are woven closely around their own natural resources, cannot adapt to a new way of life in a new place. Thus no major project that is likely to displace people can be carried out without the consent of the local people.

A- **Displacement problems due to dams-**The Big River valley projects have one of the most serious socio-economic impacts due to large scale displacement of local people from their ancestral home and loss of their traditional profession . India is one of the countries in the world leading in big dam construction and in the last 50 years more than 20 million people are estimated to have been directly or indirectly affected by these dams.

The **Hirakund Dam (Odisha)** has displaced more than 20,000people residing in about 250 village.

The **Bhakra Nangal Dam** was constructed during 1950's and till now it has not been possible to rehabilitate even half of the displaced persons

In the case of **Tehri Dam (Garhwal,Uttarakhand)** on the River Bhagirathi, construction of which was green signalled after three decades of long campaign against the project by the noted activist Sunderlal Bahuguna the propagator of Chipko Movement.The immediate impact of the Tehri Dam would be on the 10,000 residents of the Tehri town, while displacement is looming large over the people, rehabilitation has become a more burning issue.

B- **Displacement Due to Mining**- Mining is another developmental activity , which causes displacement of the native people .Several thousands of hectares of land area is covered in mining operation and the native people are displaced .sometimes displacement of local people is due to accidents occurring in mined areas like subsidence of land that

Often leads to shifting of people.

C- **Displacement due to creation of National Parks-** When some forest area is covered under a National Park, It is a welcome step for conservation of the natural resources. However, it also has a social aspect associated with it, which is often neglected. A major portion of the forest is declared as core area, where the entry of local dwellers or tribles is prohibited.

The Government is expected to find 'good' arable land to resettle displaced persons and provide them with an adequate rehabilitation package to recover from the disruption. This has rarely occurred to the satisfaction of the project affected individuals. In many cases across the country, this has not been implemented satisfactorily for decades. Resettlement requires alternate land. However, in our overpopulated country, there is no arable high quality land available. Thus most project affected persons are given unusable wasteland.

Rehabilitation involves more than just giving land. In most cases this is also not adequately done. The greatest battle to save their own precious land has been carried out by the tribal people of the Narmada River. They have fought to save their lands for decades. The Narmada Bachao Andolan has shown how bitter people can get over this issue. Resettlement not only puts pressure on the project affected people but also on the people who have been living in the area that has been selected for resettlement. Thus both the communities suffer and conflict over resources is a distinct possibility in future. There are however situations where communities request for shifting to a new site. This is often observed where people live inside or on the periphery of a National Park or Wildlife Sanctuary. In these situations, such as the Gir in Gujarat, the local people have asked to be given alternate land where they could live peacefully away from lions that kill their cattle, but the Governmenthas been unable to find suitable areas where they can be shifted for decades.

References:

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Kaushik, A.; Kaushik, C. P.; Perspectives in Environmental Studies

Lecture 2

Chapter7: Human Communities and the Environment

Topics to cover

ENVIRONMENTAL ETHICS

Environmental ethics deals with issues related to the rights of individuals that are fundamental to life and well-being. This concerns not only the needs of each person today, but also those who will come after us. It also deals with the rights of other living creatures that inhabit our earth. It deals with issues that are related to how we utilise and distribute resources. Individuals use resources so differently that one individual uses resources many times more lavishly than other individuals who have barely enough to survive? In a just world, there has to be a more equitable sharing of resources than we encounter at present. The just distribution of resources has global, national and local concerns that we need to address. There are rich and poor nations. There are rich and poor communities in every country. And there are rich and poor families. In this era of modern economic development, the disparity between the haves and have-nots is widening. Our human environments in the urban, rural and wilderness sectors, use natural resources that shift from the wilderness (forests, grasslands, wetlands, etc.) to the rural sector, and from there to the urban sector. Wealth also shifts in the same direction. This unequal distribution of wealth and access to land and its resources is a serious environmental concern. An equitable sharing of resources forms the basis of sustainable development for urban, rural and wilderness dwelling communities. As the political power base is in the urban centers, this itself leads to inequalities and a subsequent loss of sustainability in resource management in the rural and even more so for forest dwelling people. In 1985, Anil Agarwal published the first report on the Status

of India's Environment. It emphasized that India's environmental problems were caused by the excessive consumption patterns of the rich that left the poor poorer. It was appreciated for the first time that tribal, especially women and other marginalized sectors of our society, were being left out of economic development. There are multiple stakeholders in Indian society who are dependent on different natural resources which cater directly or indirectly to their survival needs. Anil Agarwal brought forth a set of 8 propositions which are of great relevance to the ethical issues that are related to environmental concerns. These include:

1. Environmental destruction is largely caused by the consumption of the rich.

2. The worst sufferers of environmental destruction are the poor.

3. Even where nature is being 'recreated', as in afforestation, it is being transformed away from the needs of the poor and towards those of the rich.

4. Even among the poor, the worst sufferers are the marginalised cultures and occupations, and most of all, women.

THE ROLE OF VARIOUS RELIGIONS AND CULTURAL PRACTICES IN ENVIRONMENTAL CONSERVATION.

In ancient Indian traditions people have always valued mountains, rivers, forests, trees and several animals. Thus much of nature was venerated and protected. Forests have been associated with the names of forest gods and goddesses both in the Hindu religion as well as in tribal cultures. 'Tree' goddesses have been associated with specific plant species. *Ficus religiosa*, the

peepal tree, is venerated and is thus not to be cut down. The Banyan tree in some regions such as Maharashtra is venerated once a year by tying a thread around it as a symbol of respect. The Tulsi plant is grown on the doorstep outside every home. Patches of forest have been dedicated to a deity in many Indian cultures especially in tribal areas. These traditionally protected forest patches depict the true nature of undisturbed vegetation and have a large number of indigenous plant species as their exploitation has been controlled through local sentiments. Certain species of trees have been protected as they are valued for their fruit or flowers. The mango tree is protected for its fruit around most farms even when wood becomes scarce. The Mohua tree (*Madhuca indica*) is protected by tribal people as it provides edible flowers, oil from its seeds and is used to make a potent alcohol. Many plants, shrubs and herbs have been used in Indian medicines which were once available in the wild in plenty. These are now rapidly vanishing. Many species of animals are venerated as being the 'vahan' or vehicle of different gods on which they are said to travel through the cosmos. In Indian mythology, the elephant is associated with Ganesha. The elephant headed Ganesha is also linked to the rat. Vishnu is associated with the eagle. Rama is linked to monkeys. In mythology, Hanuman, the monkey god, rendered invaluable help to Rama during his travels to Lanka. The Sun god, Surya, rides a horse and has a superb chariot on which he moves through the sky. The lion is linked to Durga and the blackbuck to the moon goddess. The cow is associated with Krishna. Vishnu's incarnations have been represented as taking various animal forms which serially include, fish, tortoise, a boar and a dwarf, and a half man half lion form. The associations to various plants that have been given a religious significance include Tulsi, which is linked to Lakshmi and Vishnu. The Tulsi plant is also linked to the worship of ones own ancestors. The peepal tree is said to be the tree under which Buddha attained enlightenment. It is also associated with Vishnu and Krishna. Several trees are associated with the goddess Laxmi, including Amalaki, Mango and the

Tulsi shrub. Traditions also held that these species, which were considered as an important aspect of Nature, were the basis of local life support systems and were integral to bringing about a harmonious life. In traditional societies of the past, these examples were all a part of ethical values that protected nature. As modern science based on the exploitation on nature spread into India, many of these traditions began to lose their effectiveness as measures that led to conserving nature. Concepts that support nature's integrity must thus become a part of our modern educational systems. This constitutes a key solution to bring about a new ethic of conserving nature and living sustainable lifestyles.

References:

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For Physical Sciences (Time 1 pm to 3 pm) Tuesday (07-04-2020)

Chapter 7: Human Communities and the Environment

Topics to cover

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