

Management of Natural Resources

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Abstract. Our Environment consists of various components of biotic and biotic nature. Environment runs in a systematic manner involving the flow of energy and its materials through these components. This system of running the Environment is called Ecosystem. In our Environment there are various natural resources which are utilized by us for our survival and development. These natural resources provide us goods and services. Of various natural resources, food and fresh water are the most important ones because these fulfill our necessary needs of survival. Their extensive use in unplanned manner and overexploitation may harm these resources causing risk to human life. Therefore in our developmental practices, using of goods and services from nature, we must pay attention for their sustainability and that can be achieved by adopting the ethics of environmental management. This requires a proper environmental education and awareness amongst people. The information regarding sustainable development and protection of environment can also be disseminated through the use of information technology.

Keywords: Ecosystem, Natural Resources, Environmental Ethics, Environmental Management

1 Introduction

Total Flora and Fauna including 'Homo sapiens', the human beings are born and developed in Earth's environment and for their survival, they receive all necessary materials from it. Organisms, other than human beings lead their life in natural manner, without disturbing the nature and its resources. But modern humans do not believe in living their life in simple and natural manner. We believe in our economic, social and cultural developments, to improve the quality of human life. This quality of human life is based on 'basic human needs' (Streeton and Burki, 1978). These needs are fulfilled by goods and services as well as space provided by our environment which consists of air, water, land, flora, fauna and other components. Our environment runs in a systematic manner, in which all its components influence each other. It includes flow of energy and also flow of materials in cyclic manner i.e nutrient cycling and food chains (Odum and Odum,1976).These components and processes are called structure and

function of ecosystem (Odum 1962). It also includes social, economic and political components (Smith 1972) and cultural components (Boyden 1976). If the state of these components is not disturbed in any manner, the nature will be able to, sustain itself and will keep on providing us the necessary resources in proper manner forever. In other words if environmental quality is maintained, our life quality will also be maintained forever.

But while adopting developmental processes, we exploit the environment incessantly and disturb the ecosystem, making it harmful/ hazardous for human beings and other creatures. We have already caused so much harm to nature, that it has become very serious to think over and protect it from further degradation. Our irresponsible and selfish behaviour towards our environment and wrong policies have already caused many environmental problems viz. climate changes, diminishing wild life and forests, diminishing fertile lands and fresh water resources etc. Therefore our development should be made keeping in mind the protection of environment, which can be achieved by adopting the measures of sustainable development. Our development should not only be human friendly but it should also be environment friendly, so that our present as well as future generations should not suffer. While utilising the natural resources ethical practices must be adopted (Goulet, 1971) so that our environment is not threatened. Sustainable development can be achieved by keeping in mind, the environmental ethics which include philosophical, moral, caring and compassionate characters in ourselves, specially in scientists, technocrats, politicians, policy makers and other concerned.

1.1 Natural Resources

Goods and services required by us are provided by nature(Lugo and Brinson,1979). These are classified into two types, the natural and economic and these are based on ecological principles. Therefore their utilization should be environmentally sustainable and should not disturb the ecosystems. Economic goods and services are obtained after involving labour and capital investment to convert natural resources into useful products of health, food, communication etc. These have value in society, whereas natural goods had not got the attention of economists. But now economists have started studying the value of non priced natural goods and services too (Hufschmidt, 1983) .These include food, water etc.

These natural resources are biotic and abiotic. Biotic resources are derived from photosynthetic activity of green plants whereas minerals, fresh water, rocks, salts, chemicals etc

are abiotic. These resources have their limitations. Therefore there should not be overexploitation of these resources. Also to fulfill the needs of society or individual, there should be proper and equitable distribution and utilization of these resources.

Value of these natural resources force us to think about preservation of endangered/rare species of plants and animals, ecosystem, germplasm reserves and making the unused land useful. These activities which conserve and protect the natural goods and services include maintenance of ecosystem, checking soil erosion, flood control, climate regulation etc.

2. Managing the Food and Fresh Water as Natural Resources

Mobilization of natural resources should be based on principles of ecology. It requires environmental management because the development in one sector may affect adversely the other sector. Proper planning in this regard, improves, conserves and protects natural goods and services. We should refrain from activities which create difficulties for others viz individual, community or the country. One of the irresponsible behaviour due to wrong policies is the population explosion and its migration from villages towards urban areas causing expansion of cities. Rapid urbanization requires supply of electricity, pure air, drainage system etc and the supply of food and fresh water from far away places. Although the green revolution resulted in production of sufficient food grain, even then planning should be made to develop rural sector also alongwith urban sector to meet the future demand and to keep balance between the two. Food production should be further increased by the use of fertilizers, chemicals, irrigation and advanced agricultural practices.

Ecologists are adopting various measures to increase soil fertility, productivity and freshwater resources in a sustainable manner. Keeping aside barren, deserts, ice-covered, rocky, forest land, pastures etc, we should try to develop cultivable land for the use of more grain production to meet the future demands. We should adopt the practices to retain the fertile soil and try to reclaim all available culturable waste land for agricultural production by treating their alkalinity, salinity, providing irrigation, protecting them from soil erosion, water logging etc. Human activities like extensive deforestation, indiscriminate over exploitation of forest resources, over grazing; various unplanned developmental schemes etc which convert culturable land into unculturable should be discouraged.

Waste land can be reclaimed by adopting methods to control soil erosion, retain more water on land, adopting the measures of downward percolation of water specially on sloppy surfaces, and by addition of more organic matter in soil by covering soil surfaces with leaves and crop residues. It can also be done by growing crops like Rye or Alfalfa and ploughing and mixing them in the soil.

3. Fresh Water Conservation

Major portion of Earth's water is useless as it contains salts dissolved in it. Only about 5-6% of water is fresh water. Land receives it in the form of rain or snow. A major portion of water is lost by evaporation, transpiration by plants and flood flow through streams and rivers. As the human population is increasing the demand for fresh water is also increasing and there is possibility of gap in demand and supply of fresh water in future. Therefore there is need to conserve the fresh water by reducing its wastage, economical use and its augmentation. Otherwise the shortage of freshwater may result in making more area of land barren making risk to life. Conservation of fresh water can be done by adopting following measures:

- i. By reducing over consumption of fresh water
- ii. Water once used for one purpose can be reused for other purpose
- iii. Recycling of freshwater by treating wastewater. Biodegradable impurities are removed by biological treatment and with the use of suitable disinfectant. This can again be discharged in water bodies.
- iv. Surplus water of rivers should be diverted to regions of water scarcity
- v. In agriculture latest improved irrigation practices like drip irrigation, use of sprinklers etc can also save freshwater upto greater extent.
- vi. To avoid the loss of freshwater in surface flood flow, soil should be covered by vegetation. It soaks up large quantities of freshwater which is retained in upper surface of soil and provides more time for its percolation down to raise the subsurface water level. Otherwise if the land is naked, water easily evaporates from its upper surface making it hard to absorb the water. In this situation water easily flows into streams, rivers and goes to sea.
- vii. Rain water harvesting: In this practice rain water is collected and stored in large storage tanks and utilized throughout the year. It also helps in absorption of water by ground which ultimately charges groundwater level.

- viii. To avoid the loss of rainwater through surface flow, ponds and big tanks or water reservoirs are made to store this water. This is also done by making embankments and dams to check the loss of rainwater through flood flow. It detains and retains water for longer duration on land. This water stored in dams and reservoirs is also used to generate hydroelectric power.

4. Water Shed Management

Water which falls in the form of rain on land flows through streams, which may form tributaries which ultimately join to form a river. This natural drainage system is called as 'Watershed'. Managing and protecting the loss of this water from wastage is called 'Watershed Management'. Rapid flow of rain water on land surface hardly gives time to water to percolate down and raise the groundwater table. This free and rapid flow of water is also due to various human activities which remove plants from soil making it bare. Also when water flows through such land, it causes soil erosion and collects large amount of silt and rock debris which is harmful for aquatic flora and fauna. In this process large quantity of nutrients are lost. Therefore the main reason for this kind of loss is due to naked land i.e land without vegetational cover. Therefore the technique used in watershed management, involves growing plants and provide vegetational cover to the land in watershed areas. This will create hindrance in rapid and free flow of rain water and will provide time to water to percolate down and recharge soil sub-surface water table. Watershed management involves following measures:

- i. Discouraging the forest destruction and retaining the plant cover, specially on sloppy parts of hills.
- ii. Reforestation on open land.
- iii. Increasing organic content in the soil by covering it by crop residues to prevent it from desiccation and erosion.
- iv. By digging of pits, trenches and by erecting check dams to retain rain water.

These are the two examples of utilizing and protecting the above two natural resources. Same way for sustainable development, the practices of Environmental management and ethics should be practiced to protect other natural resources too.

5. Conclusion

Above environmental problems need awareness among people to adopt proper practices to save our environment. It needs environmental education so that people realise the importance of healthy environment and its consequences. A little effect in this direction will bring substantial results in solving the environmental problems and conserving the natural resources.

Information technology also plays a very important role in providing environment related information through its computers, satellites, telecommunication instruments etc. Information technology has tremendous potential to educate people in environmental management and conservation of natural resources. World Wide Web, Geographical Information System, Remote sensing and information through satellites provide up-to-date information on various environment related issues. Geographical Information System (GIS) is very effective in managing the environment. It provides information regarding water resources, soil types, forest land, crop land, grass land, barren land and all such other information. These information are helpful in decision making with regard to protection of environment and natural resources and sustainable development.

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