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Natural resources include total natural environment, i.e. the entire surface layer of the Earth, because all parts of the Earth's surface are of some use to human beings. These resources contribute to the production of necessities and comforts of mankind. Natural resources are the stock of the nature such as air, water, soil, minerals, animals and plants. Natural resources are classified into following two categories:

1. **Inexhaustible Natural Resources:** These resources are present in unlimited quantity in the nature and they are not likely to be exhausted by human activities, e.g. Solar radiation, air, water, etc. These resources are renewable and thus are replenished naturally.
2. **Exhaustible Natural Resources:** These resources are limited in nature and are liable to degrade in quantity and quality by human activities, e.g. soil, forests, wildlife, minerals, coal, petroleum, etc. These, are non-renewable and non-replenishable due to lack of regeneration.

Management and conservation of natural resources: Management and conservation of natural resources means the scientific utilisation of resources in such a way that it may yield the greatest sustainable benefit to the present generation, while maintaining its potential to meet the needs and aspirations of future generations. In recent years, it has been observed that most of our natural resources are being depleted. It is mainly due to the over exploitation of resources as a result of changing lifestyle, over population and technological development.

Thus, the need of the hour is to wisely manage our natural resources and minimize their wastage. For this, we should remember the 3 R's that can save the environment, i.e. Reduce, Recycle and Reuse.

Reduce: It means to minimize the use of various products and all the things, which are obtained directly or indirectly from natural resources, e.g. we should save electricity by switching off unnecessary lights and fans. We should also save water by repairing leaky taps. Moreover, food should not be wasted on several occasions like marriages, parties, etc.

Recycle: This involves the processing of things that are considered waste and turning them into useful products. The articles made of recycled plastic, glass, paper or metal can be used instead of using fresh plastic, paper, etc.

Reuse: This means to use things again and again, e.g. use of cloth napkin instead of paper napkins, used envelopes can be reversed and used again, the empty plastic bottles of jams or pickle can be used to store things in kitchen. This method is actually better than recycling because the process of recycling uses some energy.

Concept of Sustainable Development: It is the process of development to sustain natural systems and their yields, which can be maintained for a long time without any damage to the environment.

The concept of sustainable development encourages growth that meet the current basic human needs, while preserving the resources for the needs of the future generations. Sustainable development implies a change in all aspects of life. It depends upon the willingness of the people to change their perceptions of the socio-economic and environmental conditions around them and the readiness of each individual to alter their present use of natural resources.

Need to manage our natural resources

- Natural resources are limited and with the current increasing rate of human population, the demand for all the resources is increasing exponentially.
- Natural resources require a long term perspective, so that they can last for the generations to come and will not merely be exploited to the hilt for short term gains.
- To ensure equitable distribution of resources, so that all and not just a handful of rich and powerful people, benefit from the development of these resources.



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- To control the damage caused to the environment, while resources are extracted by mining or used.

Pollution of the Ganga and Ganga Action Plan (GAP): Ganga is one of the most important river of India. It runs over 2500 km from Gangotri in the Himalayas to the Ganga Sagar in Bay of Bengal. It is being polluted by more than hundred cities and towns in Uttar Pradesh, Bihar and West Bengal. Garbage, human excreta, untreated sewage are dumped into the river Ganga daily. Several human activities like washing of clothes, immersion of ashes, chemical effluents of industries are also responsible for pollution of Ganga. This pollution resulted in the fish killing in large sections of the river.

Ganga Action Plan (GAP) was a programme launched by Government of India in April 1985 in order to reduce the pollution load on the river. The programme was launched with much fanfare, but it failed to decrease the pollution level in the river after spending 901.71 crore rupees over a period of 15 years. Coliform is a group of bacteria, found in human intestines. Its presence in water indicates contamination by disease causing microorganisms which was found to be very high in Ganga during 1993-1994 indicating it is a home of diseases.

Forests: It is an extensive area of land covered with trees and other plants. This is a plant community made of trees, shrubs, herbs, etc. They grow in almost all parts of the Earth from cold polar areas to hot equatorial areas; from high mountains to low plains and from wet areas to dry deserts of the world. Forests are the hotspots of biodiversity, they need to be conserved in order to preserve the biodiversity found in the forest (loss of diversity may lead to the loss of ecological stability).

Forests need to be conserved because:

- They provide habitat to numerous species of plants animals. All inhabitants get food and protection from the forests.

- They help in protecting the soil from erosion.

They store a large amount of water which acts as buffer for ecosystem during dry periods. Removal of forests disturbs the ecological balance that causes floods and droughts. They play a vital role in the atmospheric circulation and thus, control the global climate.

- The leaves of trees absorb carbon dioxide and release oxygen, a phenomenon that is vital for all life on the Earth.

- They provide timber to man for various activities like construction.

- They are a source of edible fruits and nuts. Numerous waxes and oils are also obtained from forests. Sap of many trees is used as a raw material to manufacture variety of goods.

- Bark of some trees are used to make cork and medicines. A variety of chemicals are produced from forests for their use in tanning of leather, inks, dyes, medicines, alcohol, etc.

Stakeholders: A stakeholder can be a person, a group or an organisation that may be affected or have any kind of interest in the project or in the project's outcome either directly or indirectly. All stakeholders are not equal, every stakeholder has his own expectations and requirements and they should be handled the way he expects. When we consider the conservation of forests, we need to look at the stakeholders who are:

1. The Local People: These are the people who live in or around forests and are dependent on forest products for various aspects of their life. They need large quantities of firewood, small timber and thatch (craft for building roof). Bamboo is used to make slats for huts and baskets for collecting and storing food materials. Implements for agriculture, fishing and hunting are largely made of wood, also forests are the sites for fishing and hunting.

In addition to people, gathering fruits, nuts and medicines from the forests, their cattle also graze in forest areas or feed on other fodder which is collected from forests.

2. The Forest Department: The Forest Department is India's biggest landlord and control the resources from forests. The officials- of this department tend to ignore both local





knowledge and local needs in their management practices. Thus, vast tracts of forests have been converted to monocultures of pine or Eucalyptus. In order to plant these trees, huge areas are first cleared of all vegetation. This destroys a large amount of biodiversity in the area. Not only this, the varied needs of the local people, leaves for fodder, herbs for medicines, fruits and nuts for food, can no longer be met from such forests. Such plantations are useful for the industries to access specific products and are an important source of revenue for the Forest Department.

3. Industry: It would consider the forest as merely a source of raw material for its factories. And huge interest groups lobby the government for access to these raw materials at artificially low rates, e.g. after cutting down all teak trees in one area, they will get their teak from a forest farther away. They do not have any stake in ensuring that one particular area should yield an optimal amount of some produce for all generations to come.

4. The Nature and Wildlife Enthusiasts: The wildlife and nature enthusiasts, is the one who wants to conserve nature in its pristine form. They are in no way dependent on the forests. The conservationist first started conserving large animals like, lions, tigers, elephants and rhinoceros. But, they now recognise the need to preserve biodiversity as a whole. There have been enough instances of local people working traditionally for the conservation of forest, e.g. the great Himalayan National Park contains within its reserved area alpine meadows which were grazed by sheep in summer. 'When, this national park was formed, this practice was put to an end. Now, it is seen that without the regular grazing by sheep, the grass first grows very tall and then falls over preventing fresh growth.

Amrita Devi Bishnoi Award: For Bishnoi community in Rajasthan, the conservation of forest and wildlife had been a religious tenet. In 1731, Amrita Devi Bishnoi, sacrificed her life along with 363 others for the protection of Khejri trees in Khejrli village near Jodhpur in Rajasthan. In the memory of "Amrita Devi Bishnoi," the Government of India has recently instituted an "Amrita Devi Bishnoi National Award for Wildlife Conservation."

Sustainable management: The controlled use of a resource in such a way that its present availability and continuous flow to the future generation is ensured without any disturbance to the environment is known as sustainable management. The resources should be used in such a way that it does not hinder the present progress and also does not put at stake, the future availability of the resources. Forest resources need to be used in a manner, which is environmentally and developmentally sound. The benefits of the controlled exploitation should go to the local people.

If the resource exploitation will be too high, then the economic and social development will be faster, but the environment will further deteriorate. So, natural resources should be used continuously in such a way that economic growth and ecological conservation should go hand in hand.

Chipko Andolan (Hug the Trees Movement): This movement was started in early 1970s from Reni village, in Garhwal. A logging contractor was allowed to cut trees in a forest close to the village.

On a particular day, the contractor's workers appeared in the forest to cut the trees while the men folk were absent. The women of the village reached the forest and hugged the tree trunks preventing the workers from cutting trees. Thus thwarted, the contractor had to withdraw.

People's participation: The Chipko Movement quickly spread across communities and media and forced the government to whom the forest belongs, to rethink their priorities in the use of forest produce. Experience has taught people that the destruction of forests affects not just the availability of forest products, but also the quality of soil and the sources of water. Participation of the local people can indeed lead to the efficient management of forests. A programme named "Silviculture" had also been started to

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replenish the depleting forests, so as to meet the diverse needs of various sectors and maintain balance in ecosystem and its functions

An Example of People's Participation in the Management of Forests: In 1972, the Sal forests in the Southwestern districts of West Bengal degraded alarmingly. Traditional methods like policing and surveillance employed by forest Department resulted in frequent clashes between forest officials and villagers. A.K. Banerjee, an officer of forest department changed the strategy by making a beginning in the Arabari forest range of Midnapore district, Villagers were involved in the protection of sal forests, in return villagers were given employment and were allowed to collect fuel, wood and fodder on payment of nominal fee. With the active and willing participation of the villagers, the sal forests showed a remarkable recovery by 1983.

Wildlife and its Conservation: The depleting wildlife also includes animals present in these forests. The poaching or killing of wild animals present in forest for commercial benefits is also an increasing threat. The animals are killed for their skin, teeth, fur, feathers, tusk etc., used in commercial production of many products. This practice disturbs the existing food chain in an ecosystem and ii the ecological balance. **Measures for Conservation of Wildlife:**

- The poaching should be made a punishable offence.
- Monitoring/surveillance by the forest department should be increased.
- Conservation strategies for endangered animals is vital.
- Increased number of national parks and sanctuaries adequate security.

