**MANAGEMENT OF NATURAL RESOURCES-LAND AND WATER**

INTRODUCTION

“Degradation and erosion of natural resources, namely land and water, forest, biodiversity, livestock and fisheries along with air and sunlight –those parts of natural world that are used to produce food and other value goods and services and which are essential for our survival and prosperity and are one of the root causes of the agrarian crisis in the country. No current or intended use of natural resources should condemn our childrenendless toil or deprivation.”-*The Planning Commission, Government of India, Order No-M-12043/12/2006.*

A **resource** means for satisfying human and social requirements in a given space and time. It is a source or supply from which benefit is produced. Natural resource is anything obtained from the environment to satisfy human needs and wants. **Resources are basically of two kinds:**

* **Renewable**
* **Non-renewable**

Some resources such as plants (crops, forests) and animals are placed from time to time because they have a life-cycle, and a continuous harvest is possible. These resources are said to be **renewable**. Some resources like water does not have a life cycle but can be replaced.so water is also are considered as a renewable resource.

Resources which are not generated because they do not have a life cycle or are not recycled are termed as **non-renewable**. Mineral deposits are formed slowly over millions of years and once used cannot be regenerated. For example, fossil fuels such as petrol and coal. Since the formation of soil takes thousands of years and is not renewable in the life span of many generations, it is thought of as non-renewable in the life span of many generations.

These resources provide food, fodder, fuel, medicine and clothes for man and hence sustain life on this planet.

**Natural resources can be classified into other classes, like:**

* **Inexhaustible**
* **Exhaustible**

Resources which are usually not changed by man’s activities and are abundantly available and expected to be available for millions of years are said to be inexhaustible. Solar energy, atomic energy, wind power, tidal powers etc. are classified as inexhaustible. Renewable resources can also be classified as inexhaustible because the can be managed properly and non-renewable resources like coal, petrol, etc. are classified as exhaustible because their deposits on this planet are finite.

**LAND RESOURCES**

Land is the limited and most precious resource in the globe.71% of the earth is submerged in water. Thus the land is barely 29%.70% of this land has been useless for human use because of some natural causes.2.0% of the total land area constitutes by Arctic and polar region covered with snow. Another 2.0% is covered with hot deserts .A further 2.0% consists of mountainous regions.10% is covered with tropical rain forest. Thus agricultural land available in the entire globe is very limited.

The rapid increase of urbanization and migration of population from rural areas to towns and cities has created many problems. It has led to the utilization of agricultural land for housing, construction of office buildings, industries and so forth. This limited exhaustible resource is being degraded by rain, wind, deforestation, erosion, landslides, water logging and so on. This precious resource must be managed properly and should be used according to its suitability and capability.

**Management of Land Resources**

It is judicious to dispose solid waste so as to prevent land pollution and provide some benefit to society by conserving land resources. The various methods of waste disposal are:-

1. Resource recovery

All those articles of waste that can be recycled are separated and treated well.

1. Recycling

Treatment of waste to regenerate a new resource (paper, metals, glass, agricultural wastes, food etc).

1. Utilization

Waste of one can be used as a substrate for other.

1. Pyrolysis

Heating the solid waste at temperature 165⁰C without the supplement of air, so as to prevent air pollution.

1. Burning

Burning of all those solid waste which only release considerable amount of fumes.

1. Incineration

Controlled burning of waste in a closed chamber at a temperature of 850⁰C.

Land use policies are therefore very important for any country, particularly in India .Therational use of land resources is possible only by adopting an integrated land use policy which involves prevention of land misuse and reclamations of degraded and under –utilized land, wasteland, fallows, etc. Reclamation of abandoned mines and brick kilns may yield some much required land, such as:-

* The establishment of a sound data base through scientific survey of all land resources taking the village as a unit and apportioning land for both short and long term requirements for agriculture, forestry, water bodies and fisheries, human settlements, roads, industries, and so on.
* The land should be suitably evaluated and classified on the basis of soil type.
* There should be legislative control of land use.

Fertile agricultural land should not be sacrificed for non-agricultural purposes ,such as

* Road building
* Development of industries
* Construction of water reservoirs
* Development of urban areas.

Some essential components of land management are as follows.

* + - With the help of remote sensing methods, a land classification and land capability map must be prepared.
    - The land must be classified keeping in mind the nature of soil, physical features, availability of water and its storage, runoff, etc.
    - Changes resulting from land use should be monitored and the intensity and frequency of natural hazards like cyclones, floods, and so on should be anticipated.

**WATER RESOURCES**

Water is the most abundant compound on the planet and also a material which is essential for all living system. It is important in the cycling of materials for, industrial use, electricity production and irrigation.waterisneeded for daily use by organisms and domestic use. Of the water resource of the earth, 97.3% is salt water and the rest is the fresh water.This 2.7% amount is about 1.4 billion km2 of water.

Much of the ill-health in developing countries is attributed to lack of safe drinking water. About two-thirdsof our planet is covered with water and yet there is a dearth of fresh water. Thus the management of water resources is important. There is also a need for the management of sea water because of oil and other pollution threats.

**Water Resource Management**

Water management is the term used to mean the arrangement for properly organizing the hydrosphere in order to prevent a major crisis in years to come or in future.

* Water quality management

Following measures are adopted to maintain the water quality:

* Pollution control at industrial sources.
* Protection and preservation of drinking water resources.
* Proper pattern of sewage collection and disposal system in water resources.
* Sewage regulations.
* Pollution control at urban sources.
* Environmental planning guides for industrial estates and
* Coastal management.

With rapid urbanization and industrialization, it is very important to make proper use of the whole quantity on the surface of the earth. Otherwise, many problems may arise in the form of water quality in future.

Water management is operated at different levels such as,

* Hydrosphere
* Hydrological cycle
* Exchange of water
* Transportation of water

Water resource management should ensure that

* There is no wastage or misuse of water.
* Pure water is made available to man for various purposes
* Water storage and distribution are done in scientific way.

Usually water is wasted by leaking taps and excessive irrigation. Publicawareness should be different from that used for irrigation. Hence proper treatment is required for making water fit for drinking, cooking and so on.

WATER RESOURCE MANAGEMENT, RECOMMENDED BY ICAR-INDIAN COUNCIL OF AGRICULTURAL RESEARCH

* Micro level water resource through rain water harvesting (Rs.30000 expected extra gross income /year).
* SSWHSS (subsurface water harvesting structure)and micro-tube well technology in coastal water logged areas.
* Devised drip in sprinklers irrigation system saving water(30-50%) and increasing yields (12-76%).
* A network of 47 models watersheds developed making a basis for the National Watershed Development Program for Required Area (NWDPRA).

Global land cover share (GLC-share), a new database provided by FAO(Food and Agricultural Organization -UN, which assess and monitors our earth’s land and water resources to support food security).The purpose of water purification is to produce water fit for a specific purpose. Purification of water involves the following steps:

1. Physical processes such as filtration, sedimentation and distillation
2. Biological processes such as slow sand filters or biologically active carbon.
3. Chemical processes such as flocculation and chlorination.

After purification, municipal waste water and domestic water can be made fit for use in industry and agriculture. This involves the removal of toxic elements, pollutants, germs, and so on.

Rain water can be stored in ponds and lakes for later use and kept in pits, trenches, and so forth so that it can gradually filter underground.

An important aspect of water management is recharging ground water should be recharged for use during times of scarcity. In hills and mountains, water sheds are covered with vegetation and the litter covered soil of the water shed allows the infiltration of rain water, which ultimately reaches the ground water.

In India, most of the rain falls in the period between June and the middle of the October. The excess flow of water in this time should be diverted to areas of water scarcity, and stored properly.