Chapter - 15

Classification of Resources, Conservation and Sustainable Development

Concept of Resource

Resources are such physical and human assets which are used to fulfill our daily needs. In other words, progress and development of human life and their existence depends on Resources. Every physical resource is useful to human life but they have to be used to developed techniques. According to Zimmerman "Meaning of Resources is to fulfill any purpose. The purpose is to achieve human needs and the social targets."

On The Earth Anything is Counted as Resorces if they fulfill following conditions:-

(1) When the use of things is possible.

(2) Can be transformed into more valuable and usable articles.

(3) Having the ability to fulfill certain objectives.

(4) Availability of Human resource with the ability to extract these items.

(5) Availability of desirable capital for sustainable development of resources.

On the basis of above conditions, we include any biotic and abiotic component in the category of resources.

As Human is a key resource, Any substance he creates by applying labour and technical knowledge becomes resources. Therefore, it is said that resources are not created. Infact man creates resources and therefore he is considered as the father of resources.

Classification of Resources

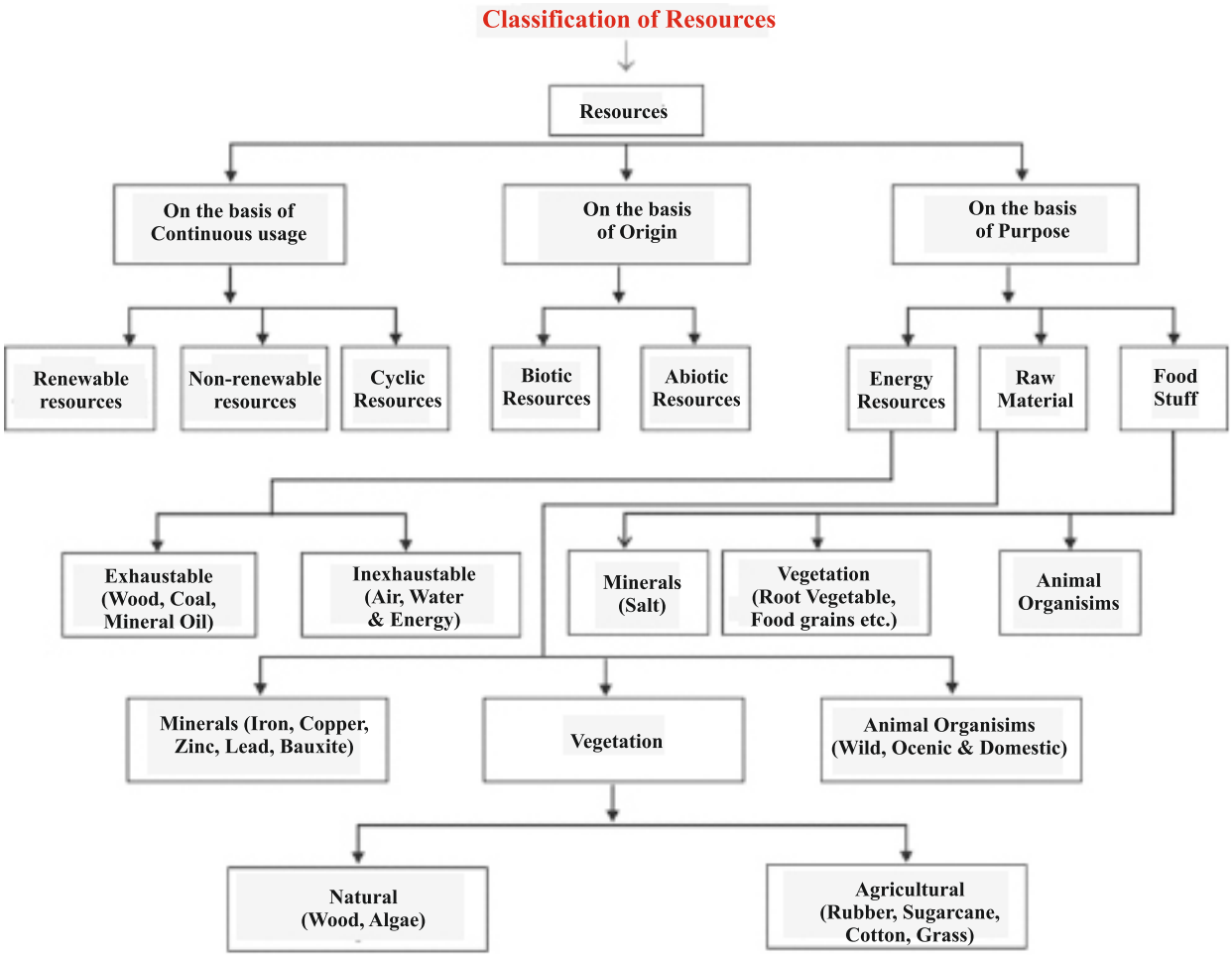
It is necessary to classify resources for detailed study. It is as follows. Diagram 15.1 presents the classification of resources.

On the Basis of Production

(A) Biotic Resources : All kinds of Resources related to Biotic components or Environment such as man, animals, vegetation, pastures etc. All biological resources are inexhaustible and renewable due to breeding capacity. Their renewal ability and rate may vary according to their natural environment.

Due to locomotion in humans and living organisms they are considered as movable resources whereas fixed vegetation is counted in immovable biotic resources.

(B) Abiotic Resources : All Stable and non living components of environment are counted as abiotic resources. Such as all minerals, land, soil, air, water, solar, tidal and geothermal energy are abiotic resources. These resources are non renewable in the absence of breeding. They are exhausted after single use.



Due to the very slow construction process of the abiotic resources, there is no possibility of renewal soon. All such substances are available in fixed quantities and at certain locations.

On the basis of purpose :

(A) Energy Power Resources : The sources of energy used to get energy (Power) are called energy resources. Such as Petroleum, Coal, Nuclear energy, Wind energy, Solar energy, Tidal energy, Geothermal energy, Human power and Animal power etc.

(i) Conventional Resources : The resources that are being used since ancient times are traditional resources. Such as- coal, petroleum, hydel electricity, nuclear energy etc are being used from ancient time.

(ii) Non conventional Resources : The use of such resources has just begin or the use has recently begin are called non- conventional resources such as nuclear energy, solar energy, wind energy, tidal energy and geothermal energy etc. are being used in recent times.

(B) Non-Energy Resources : The resources used as raw materials in manufacturing industries are called non-energy resources. For example-Iron, Gold, Silver, Tungsten, Aluminium, Lead, Copper etc.

On The Basis of Continuation of Usage

(i) Non- Renewable/ Exhaustible Resources : Resources which cannot be reinstated, once they are used are called limited resource. Due to repeated and continuous use of these resource and due to non-reinstatement, they exhaust soon. Such resources are called non- renewable or exhaustible resources. For example Iron, Coal, Petroleum etc.

(ii) Renewable / In Exhaustible Resources : Those resources which can be repatriated or renewed by human or nature after use are called unlimited resources. Due to rehabilitation, these resources will never vanish. That is why they are called renewable or inexhaustible resources for example humans, animals, forests, water, wind, solar, geothermal and tidal energy etc.

On The Basis of Ownership

(A) Individual Resources : Resources on which an individual, family or organization have complete rights are called individual resources. For example- house, land, gold ornaments , physical and mental ability, good health etc.

(B) National Resources : The resources on which the entire nation has the rights are called national resources. Such as Population, Minerals, Forests, Wind, Solar Energy, Military Power, Technical Knowledge & International relations etc.

(C) International or World Resources : The resources possessed by the whole world, which are useful for human prosperity and welfare are called International resources. Such as all abiotic and biotic resources.

Resource Conservation :

Meaning : Resources conservation include both the protection and rational use of natural resources in planned and prudent, friendly way and wisely up to the recharge capacity of resources. Use of resources should be done in a wise manner according to the population and its need. Doing so, resources can be kept safe for future generations. Resource conservation does not mean absolutely no use or stingy use of resources. Those resources production and availability is less must be used in the most essential work. For example, the production and availability of copper in world is low, so copper is to be meaningfully used in electrical devices and machines. In other works, Aluminum can be used in replacement of copper for better and longer availability of copper for sustainable use.

So, the optimum and judicious use of resources with planning without harming and damaging the environment so that it is available for long period of time is called the conservation of resources.

Need of Conservation :

Use of different types of resources is essential for the sustainable development of human beings and their conservation is also essential for long term use of resources. Full use of the resources at the expense of development is fatal. It is our duty to preserve resources for our future generations, so resources conservation is essential. Rapid growth of population, urbanization, industrialization, indiscriminate cutting of trees led to environmental pollution and exhaustion of resources. The quality of land, water, air etc is lost due to environmental pollution. The present day imbalances in ecosystem lead to ozone layer depletion, increase in global warming, destruction of biotic resources and decrease in working capacity of man.

So, conquering all the adverse conditions, it is essential that people must be educated and trained for rational use of resources. Proper facilities should be given to the people for their intellectual development, so that nation and its people develop socially, economically and culturally. Thus conservation is essential to maintain quality of environment for humans and sustainable development.

Resource Conservation Problems :

Use of resources is essential for the fulfillment of human needs and development. Due to rapid competitive development, man started exploiting resources. There is also a limit to the restoration of renewable resources, they cannot be restored immediately. Due to very low rate of formation of non- renewable resources, these resources will exhaust in near future. Our coming generations, in the absence of these resources, will not be able to keep the pace or develop. If the use of coal,

petroleum etc. goes on at the same rate then it will exhaust forever in the coming time. The four factors jointly liable for causing problems in resources conservation are :-

(1) Increasing human needs due to rapid growth of population.

(2) Rapid growth in industrialization, urbanization and transportation due to scientific inventions.

(3) Trend of maximum utilization of resources by the wide spread publicity of western consumerist culture.

(4) Trend of maximum development.

Resources stocks are continuously being depleted and population is continuously growing. Resource conservation is becoming a major problem in how to grow, using these limited resources and how to make them available for a long time.

Resource Conservation Measures-

With the problem of resources requirements and conservation , this fact emerges primarily that some methods should be adopted which can help in resource conservation. The following methods can help in resource conservation -

(1) Effective control over population growth

Population is the most important and essential resource of a country. Man uses resources for economic development and better living. When the ration between population and resources is optimum, the economic development continues without any hinderance, but when the population increases in comparison to the resources, the exploitation of resources begins. This results in rapid consumption of resources. More resources are needed to fulfill the demand and need of rapidly growing population. So, it is imperative to control the population growth for conservation of resources.

(2) Holistic approach to planning

The overall view in planning refers to the proper use and protection of various components of the environment. All components of environment are interrelated. Therefore, it is necessary to consider the entire environment as an entity in the planning and implementation of the country's development plans. The deficiency of any component can deteriorate the balance of the entire environment. For example rapid industrialization and urbanization reduces productive agricultural land, forest degradation lead to soil erosion, less productive destruction of pastures, environmental pollution and deficiency of rainfall leads to decreasing ground water table which is a major danger. Due to imbalance in the oxygen and carbon dioxide cycle the living organisms are endangered and ending therefore, adopting a holistic approach to planning for human welfare should be adopted.

(3) Maintaining Biological Balance

The objective of industrial and economic development is to make human life comfortable. For the survival of humans- water, air, soil, flora and fauna is the main biological foundations. Thus keeping in mind the biological equilibrium, economic planning will continue to be the balance of human environment, the resource availability and the humans will continue to progress progressively. Due to environmental pollution adverse human development will occur leading to ecological imbalance caused by the biological imbalance.

(4) Usage of Non Conventional Sources of Energy

Non conventional sources of energy are renewable, Such as solar, wind, tidal, geothermal energy are inexhaustible resources. All these resources provide very cheap pollution free energy at low installation cost, instead of petroleum, coal and nuclear fuels. This not only help to conserve

these resources but also help to keep environment clean.

(5) Search for alternative resource

With limited reserve of non renewable resources in the world, it is necessary to search for alternatives so that the coming generations must have the availability of these resources. Such as aluminum can be used as alternative of copper, which is very less in production & availability. In order to get energy, instead of coal and petroleum, solar, energy, wind energy, hydel power, nuclear energy, tidal energy and geothermal energy can be better alternative. Railways and industries need more power. Therefore thermal energy, nuclear power and hydro electricity may be used. Due to low consumption, solar, wind power and geothermal energy should be used in domestic activities.

(6) Use on Priority basis

The limited and exhaustible resources must be used only in the works of urgent and national importance. The use of alternative options in other works would be beneficial. As the availability of tungsten is low in India . Tungsten can be used with priority in Armament area for its conservation.

(7) Recycling

The metal scrap, clippers or old used metal is reused after melting is called recycling. This is very useful and important method of resource conservation. This method can be used several times even after using any metal once e.g. copper lead, zinc, aluminum, & iron etc can be clamped and then can be reused. Aluminum up to 80%, lead up to 75-80% and copper up to 65-75% can be reused. Our country is recycling metals like gold, silver, brass, copper etc. from ancient time.

(8) Use of artificial item

To maintain long term availability of natural resource artificial substances should be used. As plastic instead of wood, plastic and cement concrete slippers can be used in railways instead of iron and wood to save these natural resources.

(9) Use of advanced and sophisticated technology-

By using advanced technology, energy and other resources can be saved. Construction of multi storey buildings has saved land resources. Today, use of power saving equipment in five star hotels saves the energy resources, by improving the railway lines and four lane roads, speeding up trains has saved time and energy. Similarly air travel has saved time. By the use of advanced technology man has saved production costs and resources. Many waste materials can be used to produce energy and fertilizer.

(10) Multipurpose use of resource

When many objectives are accomplished by the same project they are called multipurpose projects. Resources can be conserved through these projects. For example there are three main objectives of constructing a dam on rivers (but they serve other purposes also) such as -

- Water for irrigation, drinking and for electricity generation.
- Fisheries, flood control, forestry improvement, stopping soil erosion, increasing ground water level and water transport etc.
- Petroleum (crude oil) has two main energy products petrol and diesel. Their minor products include kerosene oil, grease, vaseline, synthetic products prop gum and coal tar etc are examples of multipurpose use of resources.

Sustainable Development

The goal of sustainable development is to balance with the environment. Use them intelligently and should be recharged according to capacity without damaging the environment. So they can be available for coming generation and

have long lasting stock. Sustainable development is such a continuous process that not only wants to be adopted in developing countries but also can be adopted in industrialized countries. In this process of sustainable development with the fulfillment of the present need of human beings, resources are used keeping in view the need of future generations with special emphases is given on the use of conservation of resources according to the optimum and rechargeable capacity of the resources.

Humans have come to the modern industrial age through hunting age of ancient time by excessive use of resources. Excessive absorption of resources has affected the balance between the natural and biological interactions of the environment. The issue and consequences of environmental pollution due to the imbalance started today, pushes the universe in crisis. It is difficult to maintain the pace of development by harming the environment and moving towards continues enduring in resources. Therefore , in order to avoid environmental consequences in the future instead of the idea of sustainable development adopt a permanent and sustainable development path. By providing the needs of our current generation, resources will also be preserved for future generations. Sustainable development is also called as the concept of continuous development.

Population Growth and Sustainable Development

The resources and human development are inter-related. Development means increase in per capita income, industrial and agricultural production, developed transportation, advanced information technology, clean drinking water, fresh air, luxury living, essential commodities, healthy & tasty food, modern medical facilities, education and means of entertainment etc. Human Development Index of developed countries with the above mentioned facilities are -

(1) Norway (0.944) (2) Australia (0.935) (3) Switzerland (0.930)

India with 0.609 HDI stands on 130th position in world. Lowest HDI is (1) Niger (0.348) (2) Central African Republic (0.350) whereas world's average HDI is 0.711. Citizen of these countries have made life rich by enhancing the national assets by making judicious use of natural and biological resources. In order to maintain the level of population growth and economic development, production at local level by the medium sized enterprises driven by advance technology is necessary. Increasing employment opportunities in the local production of raw materials leads to lower production cost and self reliant society. The developing countries have a shortage of capital for the fast paced large scale industries. So the medium sized industries units will be useful. Adoption of labour based technology in the country of large human power like India is beneficial. The difference in living standards between developed countries having low population and increasing export and developing and under developed countries having high concentration of population and low export share in international trade is widening. Developed countries are becoming more advanced and prosperous and developing countries are becoming victims of constant poverty and hunger.

Production can be increased in India by constructing dams on rivers for portable water supply, generation of hydel power and irrigation. Country like India have remedied by erecting dams on rivers, for plantation, control over erosion, flood control and fisheries. Harike barrage (Punjab) have rejuvenated western Rajasthan through Indira Gandhi canal. Mineral rich regions can be developed through industrialization. Life of people of rich mineral resource regions such as Jamshedpur, Rourkela, Bhilai, Durgapur etc have emerged at world level. Through proper knowledge of the impact on the environment and technology, extensive research is also necessary. With the afore

mentioned efforts, resource conservation, effective control over population, biological balance, more use of renewable resources, the priority of needs, use of artificial objects, use of advanced techniques, recycling, necessary emphasis on the need for multiple use of resources and the need based development in place of maximum development should be emphasized. There lies the human welfare.

IMPORTANT POINTS

1. The substances used by humans to meet their needs are called resources.
2. Humans create resources, hence man is called the father of resources.
3. Rational, optimum and intelligent use of resources with restoration capacity and destruction free is called resource conservation. It doesn't include no use or stingy use of resources.
4. Destruction free conservation of resources is essential for sustainable development.
5. Due to the effects of population explosion, industrialization, scientific inventions, urbanization, excessive growth in transportation and the spread of western consumerism culture, ideology of trends of maximum development created resources conservation problems.
6. Following are the methods of conservation of resources-
   (i) Effective control over population.
   (ii) Holistic approach to planning.
   (iii) Maintaining biological balance.
   (iv) Increased use of non-conventional sources of energy.
   (v) Search for alternative resources.
   (vi) Use on priority basis.
   (vii) Recycling.
   (viii) Use of artificial items.
   (ix) Use of advanced sophisticated technology.
   (x) Multipurpose use of resources.
7. Sustainable development implies to balance with the environment through intelligently, optimum use of resources, recycling according to capacity and over all destruction free development, so the resources can be saved for future generation and make the proper use for today.

EXERCISE

Multiple Choice Type Questions

1. Which of the following is a biotic resource -
   (A) Minerals (B) Animals
   (C) Petrol (D) Air
2. An example of abiotic resource is -
   (A) Coal (B) Forest
   (C) Man (D) Sea creatures
3. Which one of these is a conventional source of energy ?
   (A) Geothermal energy (B) Wind energy
   (C) Solar energy (D) Petroleum
4. Which is the non- conventional source of energy ?
   (A) Solar energy (B) Coal
   (C) Natural gas (D) Diesel
5. The inhibiting element in resource conservation is -
   (A) Undulating surface
   (B) Rapid industrialization and urbanization
   (C) Low growth rate of development
   (D) Adoption of sustainable development
6. Sustainable development means -
   (A) Misuse of resources

(B) Excessive use of resources

(C) Continuous use of resources

(D) Stop the use of resources

Very Short Answer Type Questions

7. What do you mean by resources?
8. Why man is called the father of resources?
9. Why is conservation of resources necessary?
10. Mention any four reasons which inhibit resource conservation.
11. Write any four examples of biotic resources.
12. Explain resource conservation by the recycling method?

Short Answer Type Questions

13. What do you mean by resource conservation?
14. Present the classification of resources?
15. Distinguish between biotic and abiotic resources.
16. What is sustainable development?
17. Distinguish between renewable and nonrenewable resources?

Essay Type Questions

18. Describe the meaning of resource, need for it's conservation and discuss problems and it's types in detail.
19. Write an essay on the methods of conservation of resources.
20. Give your views on the sustainable development of resources?