**NATURAL RESOURCES: NOTE-1**

**B.A 6TH SEM (Major)**

**(Paper: M603)**

 **Definition, subject matter and scope**

Natural resource economics deals with the supply, demand and allocation of

the earth’s natural resource. Main objective of natural resource economics is to better

understand the role of natural resources in the economy in order to develop more sustainable methods of managing those resources to ensure their availability to future

generations. Resource economists study interactions between economic and natural

systems, with the goal of developing a sustainable and efficient economy.

**Natural resource management**

Natural resource management refers to the management of natural resource such as land, water, soil, plants and animals with a particular focus on how management affects the quality of life for both present and future generations. Natural

resource management deals brings together land use planning, water management,

biodiversity conservation and the future sustainability of industries like agriculture,

mining, fishing, etc.

**Natural resources classification and characteristics:**

Natural resources are often classified into renewable and non-renewable

Resources.

**Renewable resources:** Renewable resources are generally living resources (fish,

coffee, and forests, for example), which can restock (renew).

**Non- renewable natural resources:** Non-living renewable natural resources include

soil, as well as water, wind, tides and solar radiation, etc

Resources can also be classified on the basis of their origin i.e. biotic and abiotic.

**Biotic resources:** Biotic resources are derived from animals and plants (i.e-the living

world). Biotic is a living component of a community; for example organisms, such as

plants and animals.

**Abiotic resources**: Abiotic resources are derived from the non-living world e.g. land,

water, and air. Mineral and power resources are also abiotic resources some are

derived from nature.

**Natural resources:**

**Water resource:** Water resources are usually renewable resources which naturally

recharge. Overexploitation occurs if a water resource is extracted at a rate that exceeds the recharge rate, that is, at a rate that exceeds the practical sustained yield.

**Forest resources:** Forest is overexploited when they are logged at a rate faster than

reforestation takes place. Reforestation competes with other land uses such as food

production, livestock grazing, and living space for further economic growth.

**Deforestation**

Deforestation is the removal of a forest or stand of trees where the land is thereafter converted to a non-forest use. Examples of deforestation include conversion of forestland to farms, ranches, or urban use.

**Resources characteristics**: Resources have three main characteristics namely

1) Utility,

2) Limited availability/ Scarcity,

3) Potential for depletion or consumption.

In economics, **utility** is a measure of satisfaction, referring to the total satisfaction received by a consumer from consuming a good or service

**Scarcity**

Scarcity is the fundamental economic problem of having humans who have unlimited wants and needs in a world of limited resources. It states that society has

insufficient productive resources to fulfill all human wants and needs.

**Resource depletion**

Resource depletion is an economic term referring to the exhaustion of raw materials within a region. Resource depletion is most commonly used in reference to farming,

fishing, mining, and fossil fuels.

**Causes of resource depletion**

Over-consumption/excessive or unnecessary use of resources

Non-equitable distribution of resources

Overpopulation

Slash and burn agricultural practices, currently occurring in many developing countries

Technological and industrial development

Erosion

Irrigation

Mining for oil and minerals

Aquifer depletion

Forestry

Pollution or contamination of resources

Natural resources are also categorized based on the stage of development:

**Potential Resources** are known to exist and may be used in the future. For example, petroleum may exist in many parts of India and Kuwait that have sedimentary rocks, but until the time it is actually drilled out and put into use, it remains a potential resource.

**Actual resources** are those that have been surveyed, their quantity and quality determined, and are being used in present times. For example, petroleum and natural gas is actively being obtained from the Mumbai High Fields. That part ofthe actual resource that can be developed profitably with available technology is called a **reserve resource**, while that part that cannot be developed profitably because of lack of technology is called a **stock resource**.

**Management of renewable and non-renewable resources**

A **natural resource** may exist as a separate entity such as fresh water, and air, as well as a living organism such as a fish, or it may exist in an alternate form which must be processed to obtain the resource such as metal ores, oil, and most forms of energy

**Renewable resource**

Renewable resource is a natural resource which can replenish with the passage of time, either through biological reproduction or other naturally recurring processes. Renewable resources are a part of Earth's natural environment and the largest components of its ecosphere. A positive life cycle assessment is a key indicator of a resource's sustainability. Renewable resources may be the source of power for renewable energy. Sustainable harvesting of renewable resources (i.e., maintaining a positive renewal rate) can reduce air pollution, soil contamination, habitat destruction and land degradation.

N**on-renewable resource**

Non-renewable resource is also known as a finite resource and is a resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human time-frames. An example is carbon-based, organically-derived fuel. The original organic material, with the aid of heat and pressure, becomes a fuel such as oil or gas. Fossil fuels (such as coal, petroleum, and natural gas), and certain aquifers are all non-renewable resources. David Ricardo in his early works analysed the pricing of exhaustible resources, where he argued that the price of a mineral resource should increase over time. He argued that the spot price is always determined by the mine with the highest cost of extraction, and mine owners with lower extraction costs benefit from a differential rent.

**Economic Approaches to Resource Management**

In **economics approaches** to resource management, the common denominator is typically some form of measurement that can be related to individual welfare. Economics provides a comprehensive framework for analysing most aspects of natural resource and environmental issues. Optimal extraction and use of nonrenewable resources, in particular as analysed by the Hotelling’s rule. Economic indicators of sustainability derived from the weak sustainability view that the total amount of capital must be maintained. The basic Hotelling Rule is based on a number of simplifying assumptions. The total stock of resources is assumed to be known and of equal quality, and all the market players are assumed to have full knowledge. The concept of management of non-renewable resources is mainly concerned with how a resource stock should be used optimally and not concerned with sustainability.

**Major issues in use of natural resources – productivity, equity &sustainability**

**Sustainability:**

The word sustainability is derived from the Latin sustinere (tenere, to hold; sus, up). The most widely quoted definition of sustainability and sustainable development, that of the Brundtland Commission of the United Nations on March 20, 1987: “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Environmental, social and economic demands - the "three pillars" of sustainability. The word sustainability is applied not only to human sustainability on earth, but too many situations and contexts over many scales of space and time, from small local ones to the global balance of production and consumption. Sustainability is the capacity to endure.

**Principles and concepts**

The philosophical and analytic framework of sustainability draws on and connects with many different disciplines and fields. In recent years an area that has come to be called sustainability science has emerged. Sustainability science is not yet an autonomous field or discipline of its own, and has tended to be problem driven and oriented towards guiding decision-making.

**Scale and context**

Sustainability is studied and managed over many scales (levels or frames of

reference) of time and space and in many contexts of environmental, social and

economic organization.

**Consumption — population, technology, resources**

The total environmental impact of a community or of humankind as a whole depends both on population and impact per person, which in turn depends in complex ways on what resources are being used, whether or not those resources are renewable and the scale of the human activity relative to the carrying capacity of the ecosystems involved.

To express human impact mathematically called as I PAT formula. This formulation attempts to explain human consumption in terms of three components: population numbers, levels of consumption and impact per unit of resource use,

 The equation is expressed:

I = P × A × T

Where: I = Environmental impact,

P = Population,

A = Affluence,

T = Technology

**Measurement**

Sustainability measurement is a term that denotes the measurements used as the quantitative basis for the informed management of sustainability. The metrics used for the measurement of sustainability (involving the sustainability of environmental, social and economic domains are evolving: they include indicators, benchmarks, audits, sustainability standards and certification systems.

**Resource productivity:**

Resource productivity is the quantity of good or service (outcome) that is obtained through the expenditure of unit resource. This can be expressed in monetary terms as the monetary yield per unit resource. Resource productivity and resource intensity are key concepts used in sustainability measurement. The sustainability objective is to maximize resource productivity while minimizing resource intensity.

**Equity and issues in equity of natural resources**

Equity derives from a concept of social justice. It represents a belief that there are some things which people should have, that there are basic needs that should be fulfilled, and that policy should be directed with impartiality, fairness and justice towards these ends Equity means that there should be a minimum level of income and environmental quality below which nobody falls.

**Intra-generational equity**

Equity can also be applied across communities and nations within one generation. The reason that intra-generational equity is a key principle of sustainable development is that inequities are a cause of environmental degradation. Poverty deprives people of the choice about whether or not to be environmentally sound in their activities.

**Equity issues, key parameters and indicators:**

**Key parameters and indicators**

**First**, the majority of people would be deprived in terms of low welfare level despite their hard work (equity failure),

**Second**, unfair access to public infrastructure, facilities and services could occur (equity failure). i.e . Failure to guarantee intra- and inter-generational equity would cause deep inequality and un sustainability

**Third**, natural resources may be so exploited that threaten their sustainability of use.

**Fourth**, negative externalities of economic activities could create serious threat to the environment

**Discounting (very important)**

In order to compare costs and benefits at different points in time, we use the technique

of discounting, in order to calculate present discounted value. The formula for present

discounted value is given by

X

PV = ------------

(1+R)t

where PV = present value

X = value to be received or paid in the future

t = number of years until the receipt or payment

R = "discount rate"

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