

NATURAL RESOURCES AS AN ELEMENT OF THE SOCIETY-NATURE SYSTEM

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Summary

Natural resources are among the moving factors of social and economic systems' development. Therefore, in this article their impact upon the mankind's evolution, as well as the changing attitude of the human society to them is being regarded. Up to the middle of the 20-th century natural resources seemed to be inexhaustible, but during the recent decades it's getting more and more clear that the nature isn't infinite. The authors attempt to describe changes in the state of natural resources resulting from human activities and the present situation in this field. The main conclusion that might be made is: if we are striving for survival and long and happy life we should put the end to our existence as **unthinking consumers**. So in this paper the attention is also paid to the basic lines of nature protection activities and the ways to sustainable development.

1. Introduction

The term 'Natural Resources' generally can be defined as concentration of some substances or some properties in the lithosphere, the hydrosphere and the atmosphere which in principle can be used by humans. For instance, some substances can be used as food (plants, mushrooms, salt, water), other - for different purposes (manufacture of materials with certain properties, agriculture, etc.) Some properties make it possible for humans to meet some of their vital needs and development (being highly calorific/hard/elastic/resistant to different coercions/electrically conductive).

'Resources' can be considered as those parts of natural resources which are known and accessible and come to be used under foreseeable technological and economic conditions. 'Reserves' are those parts of resources which are sufficiently known and accessible to be utilized profitably under current conditions. It is important to mention one more term - 'Raw materials' - which are substances or mixture of substances in various forms and are used for manufacture of products in industrial or other processes.

Accessible types of reserves, resources and raw materials depend upon the progression level, structure and organization of the society. In order for something to be a natural resource both the material foundation and a particular social environment are necessary. As the needs of the society are constantly growing, not only material objects being used as sources of raw material and fuel play a role of natural resources but also particular properties of nature more and more. For example, such property of air and water basins as self cleaning has become very important. Aesthetic properties of landscapes acquire status of a resource. Purity of water and air become valuable resources.

The state of a resource or a reserve is not timeless. New technology and changes in the economic situation (prices, emergence of new consuming areas, etc.) may have an effect of widening or shrinking the resource base.

Diversity of natural resources gives rise to their classification. Natural resources for the sake of simplicity are divided into two categories: living and non-living. Land, fresh water, fuel and non-fuel minerals are included in the category of non-living or non-renewable resources. Staple food crops, domestic and wild animals, forestry, fishery, plants are living (renewable) resources.

The main difference between the above two groups is usually explained by ability of the second and inability of the first to be renewed at least so long as the cycle remains unbroken. This widespread explanation deserves further comments.

It is right and proper that a distinction should be made between natural resources which consist of biologically constructed complex molecules (e.g. carbohydrates) and simple substances (e.g. metals). They might be perhaps termed as 'photosynthetic resources' and 'simple resources' respectively. But the degree of 'renewability' is not necessarily a direct expression of this. Mineral oil, for example, is derived from different kinds of plants and animals which lived long ago; in other words, it is based on photosynthesis. But this particular resource is not renewing fast enough to make itself 'renewable' for practical present-day purposes. Thus photosynthetically based resources can be 'non-renewable'. The hydrological cycle renders fresh water as a renewable resource. Solar energy is regarded as an abundant source and solar energy systems are also called renewable energy systems. Likewise, wind, hydropower, and tides also are referred to renewable resources. These are all non living. Therefore, it is not fully appropriate to classify resources only on the basis of biotic and abiotic character. It is the cyclic nature that renews a resource and living things are cyclic. Renewability depends on the time scales of the cycle.

The term 'renewable' may also imply that the resources in question are included in a cyclic chain of survivable duration. Mineral oil and rape oil both are 'photosynthetic

resources', but mineral oil is considered 'non-renewable' because, unlike rape oil; it forms very slowly. In this case then the two designations are based on a distinction between the time scales of the cycles.

The quality 'included in a natural biological context' had often been connected to the idea of 'cycles'. But as one can see, there are other kinds of cycles, e.g. those of a purely geochemical nature, which can take several hundred million years. Where certain metals are concerned - the iron incorporated in vehicle bodies, for example - a great deal of material is reused in a 'technically organized cycle'.

The parts, which disappear as a result of corrosion and wear, are in practice lost because the atoms become so widely scattered. But a dispersion of, for example, metallic atoms, which today would be considered complete because we have no feasible technical processes for reconcentrating, may possibly be regarded as less than complete at some future date. This may be achieved, for example, by employing a biological link in an otherwise technically organized chain for the recovery of the metal. Experiments have been pursued in which bacteria have been used to concentrate uranium. Certain ascidians (marine creatures) have been found to be capable of concentrating the metal vanadium. Thus new types of concentrating processes may eventually cause substances being considered hopelessly scattered today and therefore classed as 'non-cyclic resources' to be classed as 'cyclic resources' instead. Generally speaking, it is concentration that turns a substance into a resource, so that once a substance has been concentrated (either by nature or as a result of human technology) it should not be dispersed again unnecessarily.

Certain 'non-renewable' raw materials of more complex nature, e.g. oil, may possibly be produced synthetically in the future by technological alternatives to or accelerations of the natural cycles which have created these 'stored resources'. If this happens, the resources in question will cease to be 'non-renewable'. Without going any further into the question of how likely this is to happen, we may observe that classification can depend upon the level of technology in a society.

Another aspect is that 'renewable' resources are closely interlinked with 'non-renewable' ones. For example, large quantities of 'non-renewable' resources, such as phosphorites, apatites or mineral oil used to produce artificial fertilizer or to run agricultural machines are employed nowadays in the production of plant crops and timber, i.e. to produce 'renewable' resources.

The 'renewability' of 'renewable' resources also depends to a great extent on the possibility or impossibility of preserving the biological basis intact (for instance, by saving it from the build-up of toxic chemicals, erosion, etc.). In this sense they can be termed 'conditionally renewable'.

Thus in referring to 'renewable' as distinct from 'non-renewable' you have to be clear in your own mind as to which of the following observations you intend to make:

- A substance has originated biologically (photosynthetically based, e.g. wood, mineral oil) or otherwise;

- A substance forms a part of a cycle that, considering the amount of material involved, means that it is 'recreated' within a reasonable period of time (a 'flow resource', e.g. wood, but not minerals or mineral oil);
- A substance is included in a natural cycle, but not in a technical cycle. This involves an assessment of capacity for reconcentrating 'dissipated atoms'.

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Biographical Sketches

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