

## STRATEGIES FOR RATIONAL USE OF NATURAL RESOURCES

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### Summary

This article elaborates on the status quo of natural resources and points out the urgency of developing the national use of natural resources. The feasibility of rational use of resources and bringing strategic choices into effect is also discussed.

Natural resources refers to materials and energy in the natural world that could be used by humankind in production and in our lives (e.g. biological resources, land resources, mineral resources, water resources, climate resources, solar power resources, wind power resources, tidal power resources, etc.). Natural resources are important elements of the ecological system and constitute the environmental conditions on which humankind depends as well as the physical basis on which society depends.

Our modern economic system depends increasingly on the consumption of natural resources. However, natural resources are not inexhaustible; they are also scarce. The

limited reserves and uneven distribution of natural resources is in sharp contrast to the never ceasing demands of human beings, and this is the reason for the shortage of natural resources. The only way to solve the problem is for people to exploit and utilize natural resources reasonably, efficiently, and cleanly.

We must therefore familiarize ourselves with the differing features of natural resources. Renewable resources can be renewed and retrieved in the cyclic movement of the ecological system after being reasonably exploited and utilized. Therefore, sustainable utilization of this kind of resources could be effected so long as the speed of exploitation does not exceed the speed of reproduction. Non-renewable resources, however, can be depleted since their non-renewable nature cannot be reversed; therefore, we must emphasize reasonable exploitation and utilization of them. With such resources as the atmosphere that are susceptible to pollution and abuse, full attention must be given to protecting them from pollution and destruction because of their great importance to the development of humankind.

In addition, various kinds of natural resources have their certain things in common, and the awareness of these could render us wiser in resource exploitation and policy making. 1. Organic entirety and interrelatedness. 2. Regional features. 3. Versatility. 4. Exploitation demands protection and utilization requires management. 5. Limitation. However, our most pressing challenge is to acknowledge the present situation of natural resources and avoid further destruction and abuse.

## **1. Urgency**

### **1.2. Exploitation and Depletion of Resources**

The pressures of population growth and economic development are mounting beyond the carrying capacity of the planet on which we live. Natural resources are wearing out, more and more species are on the brink of extinction, energy production is shrinking, freshwater resources are inadequate, water and soil erosion is worsening, and the climate is undergoing unpredictable changes. All these are posing severe challenges to the existence and development of humankind.

Land resources means the land that can be used to produce wealth under a given level of production. At present, the world's land resources are facing the most serious challenge in history, because of excessive cultivation and other activities. Soil erosion of arable land is roughly 24 billion tons per year throughout the world. The direct consequence of excessive soil erosion is that the soil layer becomes thin, the productivity of the land declines, and desertification of land expands continuously. According to United Nations (U.N.) estimations, every year about 21 million hectares of agricultural land are becoming useless or almost useless, resulting in US\$26 billion lost agricultural and husbandry production value each year. Some 35% of land in the world is currently under direct threat of desertification. The situation is especially serious in Asia, Africa,

and South America. Drastic loss of land resources, arable land in particular, has directly affected the grain production of the world. Grain shortage and population growth are in sharp contradistinction, which will jeopardize human development in the twenty-first century.

Forest and grassland, which cover 84% of the surface of the earth, are not only the most important centers in materials exchange and energy exchange in nature, but they also provide basic necessities such as lumber, meat, and milk. Nonetheless, forest and grassland in countries all around the world are suffering different degrees of destruction. Since 1950, forests have been destroyed by half in the world; from 1980 to 1995, the world as a whole lost at least 0.2 billion hectares of forest. And tropical rainforest, which represents tremendous wealth, is also disappearing at surprising speed. Since the 1960s, 40% tropical rainforest has been destroyed and one-fifth has disappeared, through massive deforestation. In some areas, enlarging arable land by reducing grassland is frequent, and excessive grazing without nurturing the grassland has given rise to ecological problems such as degradation and desertification of grassland, loss of water, erosion of soil, and deterioration of climate.

Although 70% of the earth's surface is covered by water, freshwater resources available for human use are less than 1%. Nevertheless, so long as the limited freshwater resources are reasonably exploited and utilized, the demands of humankind can be met. On the earth, freshwater resources are distributed unevenly, leaving some regions and countries seriously short of water. In the past three centuries, the demand for freshwater has been increasing day by day; the water we take from freshwater resources has increased 35-fold. The second half of the twentieth century alone has seen a four- to eight-fold increase. At present, the world uses 4130 billion cubic meters of freshwater every year. The continuous growth of the world's population means that available freshwater for each person is decreasing continuously. Among water consumers, the agricultural sector takes the lion's share, claiming 69% in 1990. Using water efficiently and raising the efficiency of irrigation is the most important method of decreasing consumption of water. Apart from the shortage of freshwater resources, there are also problems of water pollution. Every year, throughout the world, about 40 billion cubic meters of wastewater is discharged into rivers, lakes, and seas, contaminating more than 21.4% of the waters of the world. Water pollution is leaving less and less safe and potable water to this world.

In the last two decades of the twentieth century, energy consumption showed a continual upward trend. Economic growth, demands on energy, and increasing consumption have made people realize the mounting threat of the shortage of mineral resources. Although at present the proven reserves of mineral resources are rising rather than declining, the undiscovered and exploitable resources have a limitation after all. Oil and natural gas will be depleted by the end of the twenty-first century, and coal one or two hundred years after that. People can still recall the panic of the disasters caused

to human life and production by energy crises in the past. Therefore, reasonably exploiting mineral resources and energetically develop renewable resources are the most urgent things to do.

## **1.2. The Present Efficient Use of Some Resources**

Actually, it is not that humankind has failed to realize that natural resources are being severely damaged and depleted. Since the publication of *The Limits of Growth* by the Club of Rome in 1972, discussions relating to resources, the environment, development, and the future have received worldwide attention and, faced with the severe resource situation, people have begun to reexamine their own practices and have raised the idea of sustainable development, hoping that humankind can subsist and develop in peace and harmony with the natural environment. Protection of resources and management of pollution have become a common topic throughout the world. Nevertheless, there is still a gap between words and deeds, especially when the present technological and economic levels hamper the reasonable utilization of energy and hinder the protection of resources.

For example, one of the leading causes of serious destruction of forests is still deforestation for the purpose of cultivation and the use of wood as fuel, which is caused by backward production and living conditions. Many developing countries acquire foreign exchange through international trade of wood, thus fostering the expansion of the international trade of wood. According to World Wild Fund for Nature (WWF) research, the international trade of wood is a major cause of the degradation and disappearance of high-level forests with biodiversity. Additionally, the destruction of other natural resources is also related to such factors as the low level of economic development and high growth rate of the population. For instance, in Australia, thanks to the relatively small population per unit of land, animal husbandry and livestock products have all remained stable. Yet, in some Asian and African countries, for population growth and other reasons excessive grazing on grasslands has damaged the herbage, rendering the food chain for animals and plants hard to sustain. As a consequence, the development of husbandry is restricted and natural resources are being destroyed.

The process of comprehensive exploitation of resources is also subject to the limitations of the economy and technology. Sometimes, enterprises that undertake comprehensive utilization need large funds. The Japan Chain Store Association undertook the recycling of paper boxes for milk, foam plastic containers, plastic boxes, and other waste materials in 3104 stores across Japan for a year. Citing plastic boxes as an example, the cyclic utilization of each plastic box cost 18 Japanese yen. This figure indicates that to make them with primary raw materials costs less than with cyclic utilization of wastes. In the iron and steel industry, the use of waste steel rose after the technology of continuous casting and direct rolling was adopted.

In short, economic level and the technological situation have restrained reasonable utilization of resources to a certain degree. Especially in the developing countries and backward areas, low economic level and backward technologies have constituted a major obstruction to the reasonable and full utilization of resources. However, we shall also see that the key to solving the problem of destruction of natural resources lies in developing the economy and technology.

## 2. Feasibility

Throughout human evolution, and especially after the first industrial revolution in the eighteenth century, natural resources have been the physical basis for the existence and development of human beings and have helped us work wonders in social and economic development. But during this process, a large amount of natural resources are consumed and some are depleted. The unreasonable mode of exploitation has created pollution of the global environment and ecological destruction, and the momentum is continuing. All this has posed a severe threat to the subsistence and development of humankind. On this account, reasonable exploitation of natural resources and the subsistence and development of human beings are fundamentally interrelated. The importance of protecting and utilizing natural resources in a reasonable manner has gradually dawned on the world. People have begun to place increasing emphasis on readjusting the resources structure and shaping the strategy of sustainable development in order to guarantee the availability of natural resources for our use, while coordinating development between humankind and nature. However, in face of the resources crisis, can humankind realize sustainable utilization of resources? Can we change an adverse situation? What kinds of jobs need to be done?

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