

THE INFLUENCE OF THE ORGANIZATION OF SOCIETY  
ON THE STATE OF THE ENVIRONMENT

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**Abstract.** The article is aimed at researching the current problem of socioecology – the causes and consequences of possible resource depletion, as well as establishing the possibility of its averting. There are two classifications of natural resources from the point of view of ecology: according to their renewability and according to the possibility of use. Based on the concept of the Roush limit, the law of the resource balance of society is formulated, which relates the social productivity of labor to the population density and the depletion of available natural resources. This law is another form of recording the balance of social production and consumption of resources. The consequences of its violation are shown. The effect of abiotic, biotic and anthropogenic factors on the rate of depletion of available natural resources is studied, and the decisive role of scientific and technological progress in the development of the resource base of society is shown. It was determined that scientific and technological progress is a decisive factor in averting a resource catastrophe by humanity and individual nations. The conducted study of the social structure allows us to draw a conclusion about the decisive role of industrial relations in the implementation of new scientific and technical solutions in production.

**Keywords:** socioecology; depletion of natural resources; environmental disasters; productive forces; industrial relations.

## 1. Introduction

There is nothing more important to a living organism than survival. The survival of the biological species is genetically embedded in the personal program of each individual as the instincts of self-preservation and procreation. This is the essence of any

living being and the basis of biological evolution (Collins, 1977).

And so in the story itself. Every subject of the historical process, from man to humanity, strives to survive and perpetuate himself in posterity. That is how historical evolution takes place (Hayek, 2005)

Human needs include various factors of development – from primary material needs to the highest culture and spirituality. This work is devoted to the study of the influence of the organization of society on the environmental situation. The survival of each nation in particular and humanity in general is possible only under the condition of unlimited raw and energy resources. But everyone knows that the resource mass is limited (Comenar, 1974) and physically cannot exceed the total mass of our planet. Thus, a contradiction arises between the limitation of the total resource mass and the growing needs of humanity for raw materials and energy (Reimers, 1992).

Of the four largest environmental disasters of our time (Chelyabinsk 1957 and Chernobyl 1986 nuclear accidents, the chemical accident in Bhopal 1984, as well as the accident at the Fukushima nuclear power plant in 2011), only the last one occurred as a result of a natural disaster. The rest accidents occurred as a result of the human factor in feudal (“socialist”) countries and in countries with strong remnants of feudal relations (“socialist orientation” countries) (Drobina, 2020; Scherbak, 1991; BBC News, 2014; Made for minds, 2011). Is this a coincidence? What

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preceded the great historical catastrophe of the 5th century AD – the fall of the Western Roman Empire?

Therefore, a theoretical study of the problem of solving the contradiction between modern productive forces and outdated production relations and the impact of this contradiction on the ecological situation is an urgent task.

## 2. Theoretical part

This work examines the urgent problems of socio-ecology – the ways of occurrence and averting of global and local resource disasters, an integral part of which are significant environmental troubles manifested in the form of local ecological disasters. A resource catastrophe is a significant reduction in the resource mass of society due to the rapid depletion of critical types of available natural resources, with the impossibility of using promising and future natural resources. A resource disaster, as a rule, makes the existence of a given community in a given territory impossible.

From the point of view of ecology, all resources can be divided according to **renewability** into conditionally non-renewable, relatively renewable and absolutely renewable – intelligence as a person's ability to create, first of all, new technologies.

According to the possibility of use, resources can be divided into existing, promising and future – factors of the biosphere, which are not resources yet, but can become them as a result of the scientific and technical development of society. Prospective and future resources include, in particular, all today's production waste.

Under the influence of natural factors, the resource mass can change. Natural factors have a double influence on the resource mass of humanity. The normal action of abiotic and biotic factors contributes to the reproduction of all types of resources. Sunlight is absorbed by green plants. That is how plant food resources are created, as well as forests and oxygen reserves in the atmosphere. The vegetation of swamps and wet forests gradually sinks under the soil, forming peat. After tens of thousands of years, peat turns into brown coal, and after tens of millions – into stone (Lloyd, 2021). Chemical processes of carbon gasification, occurring at great depths under the influence of enormous temperatures and pressures, lead to the formation of graphite and diamonds. Microbiological and chemical processes of transformation of organic substances and carbon in anaerobic conditions under thick layers of soils under

high pressure and temperature are the source of the formation of natural gas and oil (Höök, 2010). Even minerals are gradually reproduced during the natural process of renewing the earth's crust – up to 3...4 billion years (Deryabin, 2007). In the case of relatively renewable resources, the influence of the natural level of abiotic and biotic factors is decisive, but conditionally non-renewable resources are renewed for a period that far exceeds our entire history.

In contrast to the normal level, the catastrophic (abnormally high or low) effect of natural factors always causes a significant decrease in the resource base of society. During catastrophic processes, a natural decrease in resource volumes is possible. But the main thing is that a lot of resources are spent on eliminating the consequences of a natural disaster. So, we can say that for the normal development of society, abiotic and biotic factors must be stable within certain "normal" limits.

The more the productive forces of mankind grew, the stronger the influence of anthropogenic factors on the biosphere was. Throughout history, the "exchange of matter and energy" between society and nature has grown rapidly. After all, to maintain their existence and meet growing needs, people were forced to use an ever-increasing number of resources. The need for such growth is explained by the natural increase in population density on the one hand and the deterioration of the quality of available natural resources due to their exploitation on the other.

An American economist and philosopher Lyndon LaRouche proposed to introduce an indicator in social science, which was named the Rouche limit in his honour (LaRouche, 1992). Any society is characterized by its value of the indicator of this limit. The Rouche limit is the maximum population density that can be fed with the available labour productivity in society. If the social productivity of labour increases, the Rouche limit increases accordingly. A decrease in social labour productivity automatically leads to a decrease in the Rouche limit.

If we consider the indicator of the Rouche limit as a share of the division of the country's GDP by the subsistence minimum, then for the Federal Republic of Germany, for example, the population is 10.3 times lower than the Rouche limit; in Ukraine – by 2.9 times (taking into account the subsistence minimum with the addition of the cost of 30 kWh of electricity and natural gas for heating a sanitary standard of housing for four months), and in Nigeria, as one of the most developed countries in Africa – only 1.56 times. The optimal development of society occurs when the population

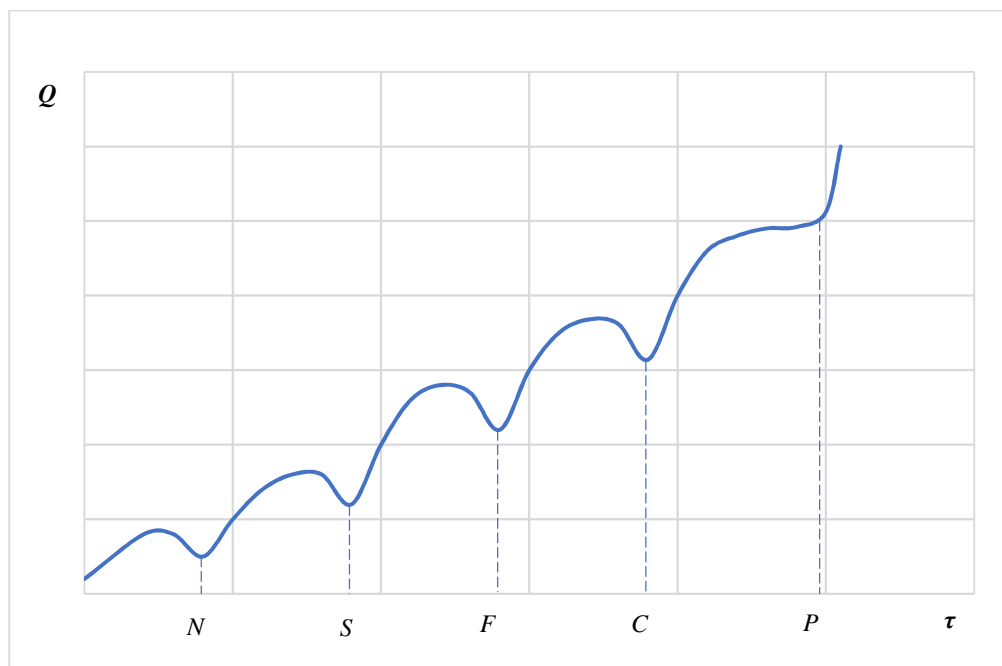
density is significantly lower than the Rouché limit but high enough for the normal functioning of society.

Throughout its history, mankind has been relentlessly depleting the Earth's resources. If people did not learn to use new types of resources, their mass would have been exhausted long ago and history would have ended. But thanks to scientific and technical progress and the development of productive forces, the available resources of mankind are growing all the time. Such growth can be schematically represented in the form of a growing wavy line (Fig. 1). This undulation is explained by the fact that the increase in productive forces is not linear. Production relations cease to satisfy the conditions for maximum promotion of the development of productive forces relatively quickly. The pace of scientific and technological progress is slowing down. Accordingly, the rate of the increase in the resource mass is also slowing down. There is even some decrease in the number of available resources. Tension accumulates in society, which puts

pressure on industrial relations and forces them to change. New production relations open a wide space for the development of productive forces. The number of resources begins to increase rapidly until the positive potential of these production relations is exhausted.

### 3. Results and Discussion

The increase in labour productivity due to the improvement of equipment and the emergence of new technologies means a gradual transformation of future resources into promising ones and promising ones into existing ones. Therefore, scientific and technological progress leads to the transformation of those factors of the biosphere that were not available previously into available, exploitable resources. Thus, at the end of the 19th century, people mastered electric energy, and in the middle of the 20th, nuclear energy.



**Fig. 1.** Development of the resource situation throughout history.  $Q$  is the mass of resources,  $\tau$  is historical time. The scale is conditional.  $N$  is Neolithic revolution (approximately 10 thousand years BC);  $S$  is emergence of slave ownership (6–4 thousand years BC);  $F$  is establishment of feudalism (V–VII centuries);  $C$  is the beginning of the era of capitalism (XVI–XVIII centuries);  $P$  is the emergence of post-industrial society (end of the 20th century)

For all humanity in general, as well as for each nation people, the law of balance of available natural resources is a fair one. The growth of available natural resources due to technical and technological progress must outweigh the economic consequences of the natural increase in population density and the global deterioration of available natural resources.

Mathematically, the law of the balance of available resources can be represented by the following inequality:

$$c > a + b,$$

where  $c$  is an increase in available resources due to technical progress,  $a$  is a decrease in available resources as a result of their accelerated consumption

by a growing population,  $b$  is a deterioration in the quality of the available mass of natural resources during their exploitation, which requires an increase in the consumption of substances and energy for their extraction.

Therefore, the progress of engineering and technology is the only guarantee of increasing the mass of natural resources available to each nation in particular and humanity in general. Its provision is the main task of the government, which carries it out by relentlessly improving industrial relations.

The subject of work, the people of work and the tools of work in a complex form the productive forces of society, with production relations above them – the relations of people in the production process. There are three most important groups of production relations: the form of ownership of productive forces, the distribution of produced income, and the constituent nature of society – the system of permits and prohibitions for certain sections of the population on certain types of production activities. Together, production relations and productive forces constitute the mode of production on which all other social relations are based.

The development of society primarily means the development of productive forces. Productive relations should correspond to the latter. Productive relations are a kind of greenhouse for the development of productive forces. It is impossible to invent production relations that would ensure the development of any productive forces – from stone tools to atomic energy. It is also impossible to build a society in general without industrial relations since human labour is a social phenomenon.

The appearance of man meant a qualitative change in the evolutionary process. Previously, the organs of living beings changed. The man began to make and change “extensions of his organs” – tools. Therefore, the evolution of technique and technology is the first direction of historical evolution.

In order to apply new technical and technological solutions, and to work with fundamentally new subjects of work, a person had to improve as well. The second direction of the historical process is the evolution of man, first of all, his moral and psychological qualities and attitude to work.

Since industrial relations are designed to provide the best possible conditions for the development of productive forces, they had to change as technology improved. The evolution of productive relations is the third direction of social development.

All other components of human society also develop evolutionarily: religion, law, state, language, science, etc. History is a harmonious combination into a single evolutionary space of all directions of the development of civilization, among which there are three most important ones – the evolution of productive forces, productive relations, and man.

Each dimension of a single evolution has its own subject, which changes its qualities over time – evolves. For living nature, the subject of evolution is a biological species.

The productive forces of society develop at the enterprise. The enterprise itself is the subject of the evolution of productive forces – the smallest link in which technical and technological solutions are implemented in production. The fastest improvement of technology (other things being equal) occurs in a society built on the principles of free competition of many independent enterprises.

The main subject of human evolution is a free and independent individual. Thus, the observance of human rights enshrined in the Geneva Convention is nothing more than an instinctive awareness of the best way to contribute to the evolution of society with such a structure.

The smallest unit – the bearer of industrial relations – is the state nation and other supranational or interstate entities able to influence states and induce them to change productive relations. Therefore, the evolution of productive relations accelerates when the number of independent national states and other subjects of industrial relations increases.

Any evolutionary system develops against the second law of classical thermodynamics. The evolutionary system is self-complicating and self-improving (Podolinsky S. A., 2004). At the same time, the number of development entities is increasing. Therefore, the evolutionary development gradually accelerates until the system grows into a new quality. For example, biological evolution is replaced by historical evolution. An increase in the number of competing entities – biological species, independent enterprises, politically independent states, as well as an increase in human freedom – is the regularity of evolutionary processes.

Since the optimization of the development of productive forces and the acceleration of the evolution of the personality are determined by the level of productive relations, this factor is decisive in social development.

The normal functioning of the state in the 21st century, aimed at the continuous improvement of

industrial relations, leads to the rapid development and implementation of new equipment and technologies. Accordingly, the mass of available natural resources is rapidly increasing, which leads to an increase in the standard of living of the population, an improvement of the ecological situation, an increase in security, etc.

And the long-term resistance of countries and peoples that are backward in terms of production relations, their reluctance to improve production relations, to gradually reject the old way of life and outdated traditions (“our fathers and grandfathers lived, and we will live”) leads to the inhibition of scientific and technical progress, and therefore to a decrease in available resource mass.

If the available resources of the society are quickly exhausted, the social productivity of labour begins to decrease, and the Roush limit decreases accordingly. When this indicator becomes close to the real population density, society reaches a dead end.

In any society, some expenses cannot be avoided (for example, one cannot worry today about the future harvest etc.), and some can be postponed by focusing the available resource mass on more urgent needs. You can save on infrastructure repairs today. You can limit medical and educational expenses for some time. Savings on environmental and labour protection was a common practice in the last period of the USSR's existence. However, if such austerity continues for decades, society will face catastrophic destruction of infrastructure, destruction of the environment, and deterioration of the health of workers and their level of education. And this causes a sharp increase in the use of available resources and, therefore, a decrease in the Roush limit.

The entire social product, including the additional one, begins to be spent exclusively on the needs of maintaining the existing standard of living of the population. Society ceases to make any investments, and this excludes all opportunities to counteract harmful natural and anthropogenic factors and, therefore, to stabilize labour productivity. The Roush limit continues to decrease. When the real population density becomes greater than the Roush limit, an “excess” population is formed in the country, and famine begins. That is how a resource disaster is looming. A nation that has allowed a resource catastrophe cannot exist on this territory under the given production relations because the natural resources available to it have already been exhausted. It must either occupy a new territory with new, not yet exhausted volumes of available natural resources or radically, often with help from outside, change the relations of production, modernizing them. Thus, the

factors of anthropogenic impact on the biosphere make peoples and countries improve equipment and technology to prevent a resource catastrophe, and therefore, educate a new attitude of a person to work with the help of a timely change in industrial relations (Mykhaylenko, 1999).

Since the natural environment is the same necessary condition for the existence of society as other types of natural resources, a resource catastrophe leaves behind, among other things, the destruction of the environment. The territory can turn into a “moonscape”, the air and water sources are poisoned, and the soil turns into the subsoil for a giant garbage dump.

Thus, delaying productive relation reforms inevitably leads to a catastrophic change in the environment and a general crisis in social life.

In a general sense, the ecological situation is global. There cannot be a local (belonging to a separate state) part of the atmosphere and hydrosphere, and soil pollution in a particular area soon spreads to the surrounding area. Thus, the ecological disaster in the occupied territory of Donbas, caused by the stoppage of mine water pumping, led to an increase in the inflow and mineralization of water in the mines of the Lysychansk coal district (Hirske and Zolote mines). Therefore, the destruction of the environment in a single country cannot leave the rest of the world indifferent. It is especially relevant in the period of military operations, which are accompanied by strong resource shocks. The world is forced to intervene in military conflicts to end them and prevent the development of energy, food, environmental crises and other harbingers of resource catastrophe.

Over the last century, the world has experienced many environmental disasters. Some of them had a global character. And only one – the nuclear disaster at the Japanese Fukushima plant – was caused by a catastrophic natural phenomenon. The rest happened in “socialist” countries (Chelyabinsk-40, 1957, Chernobyl, 1986) or countries with a “socialist orientation” (Bhopal, 1984). And this is evidence of the influence of backward (feudal) production relations under “socialism” or significant remnants of the feudal system in countries with a “socialist” orientation. A particularly destructive effect on the environment is caused by the combination of feudal production relations with the productive forces inherent in the industrial society of the II type, which produces industrial products with a deep level of processing of raw materials and consumes available natural resources quickly, exceeding the capabilities of the biosphere and outdated treatment facilities for processing and assimilating waste.

In ancient times, Western civilization had already experienced a resource catastrophe. We are talking about the rapid desertification of the lands of North Africa at the beginning of the III century of the new era (Kuzischin, 2002). This process was caused by the predatory exploitation of the territory by the Roman Empire using outdated farming methods since new, more complex and frugal farming methods, known since the II century before the new era, could not be widely implemented based on slave ownership. The situation was worsened by the influence of the state and the imperial bureaucracy (Parkinson C. N., 1989). As a result, there was a shortage of agricultural products in the empire and later also of finances, which led first to the split of the single empire into two parts, and then to the decline and fall of the Western Roman Empire during mass uprisings of slave and the free impoverished population, and the invasion of the so-called “barbarians”. The latter brought a new way of organizing work and later revived society on new foundations.

#### 4. Conclusion

1. The sustainable development of society requires constant maintenance of the resource balance – the increase in available natural resources due to scientific and technological progress must outweigh the increase in their consumption due to the growth of the population and standard of living and the deterioration of the quality of available resources due to their exploitation.

2. For sustainable development, the population density should be below the conditional limit (the Rouche limit) and, at the same time, sufficient for the normal functioning of society.

3. The survival of humanity in general and of each people in particular requires the development and implementation of new equipment and new technologies to increase the available resource mass, and for this, the continuous improvement of industrial relations.

4. Outdated production relations lead to the rapid depletion of available resources and the destruction of the environment, the consequences of which descendants have to eliminate for a long time.

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