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Ecology, raw materials and economic development. Expectations

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Abstract. As always, ecology and raw materials will play a major role in the economic development of the world in the future. This refers to raw materials that are naturally created in the ecosystem and are indispensable for man-made industries. Environmental factors have a great impact on the processing of raw materials and future sustainable development. The formation of the impact of all environmental factors depends on the decisions made in public administration. The world's most advanced economy and technology cannot sustain itself without commodities. If we add to this the raw materials used by the productive and non-productive sectors to meet the needs of the people, the seriousness and strategic importance of the issue becomes clearer.

Keywords: economic development, natural resources, ecology, ecological economy, sustainable development, economic crisis, raw materials, oil, gas, water, land

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The world is living in such a period of development that all continents, regions, countries and areas are very interconnected and interdependent. A crisis in one country or field affects other regions and areas in a very short time. Reaching this level of development, communication and dependence is the choice of the people, especially government officials. Today's worldview is the result of the desire to outdo each other, to take a step forward in the competition. In particular, ecology is sacrificed to economic development, which will perhaps result in an irreversible ecological crisis.

Every year the state of the environment deteriorates significantly, which means that the urgency of environmental security must increase every day. If environmental safety is not ensured in time, all our efforts in the future will be in vain. Currently, the negative impact of industry on the environment is growing, and environmental safety measures, unfortunately, are ignored by many enterprises. Environmental safety must be constantly monitored and regulated to reduce the amount of anthropogenic impact on the natural environment [1, p. 108].

The development of all spheres of society requires labor, diligence, attention, a scientific approach, etc., and most importantly, raw materials and natural re-

sources. Raw materials are a gift of nature and ecological environment to people. It is impossible to live without it today and tomorrow.

Developed countries and transnational companies operating in these countries are constantly pursuing policies to meet the needs of the people by creating new technologies and new products. This policy also stems from their desire to compete and gain an advantage. All this and, most importantly, the need for raw materials for people to live on the minimum requirements is constantly growing. This growth forces states to make secret or overt radical decisions in this direction. This policy, pursued over the last 100 years, has led to parallel environmental crises and climate change, which poses serious challenges in the context of growing demand for water, land, energy resources and raw materials.

In general, the main factors determining economic activity are natural and human resources, technical knowledge and the system of economic institutions. People, dependent on natural resources, do not take this into account and consume instead of saving. This creates contradictions between the economy and the environment. Thus, a developing economy has harmful consequences for the environment.

According to Marx, productivity is not as natural as it seems: it is closely connected with modern social relations. In fact, the material intended for the production of any product is a raw material. There are different groups, types and subgroups of raw materials in the economic literature. I will analyze more extracted and collected raw materials, which, in addition to meeting the basic but fundamental needs in life and production, play a major role in determining the geopolitical position of countries.

Theoretically, there is an approach in the economic literature to natural resources and raw materials. Natural resources are directly or indirectly involved in the formation of primary raw materials and the development of basically all areas. Examples of these natural resources are land, water, oil, gas, iron, etc. The wider and clearer picture is reflected in the table below.

Table 1. Distribution of natural resources on Earth

Natural resources				
Inexhaustible resources	Exhausted resources			
Kinetic energy of water	Renewable resources			Nonrenewable resources
Thermal energy of Earth and Heat energy	Soil	Biology	Water	Mineral
Solar energy	-Forest	-plants	-rivers	-ores
Wind energy	-meadow	-animals	-lakes	-stones
	-pasture	-forests	-seas	-sand
	-croplands		-oceans	-clay
				-coal
				-oil
				-gas
				-non-ferrous metals
				-salt, etc.

I can mention oil and oil products as a natural resource that has a serious impact on people's lives and lifestyles before and today. Development in all spheres of the world economy began to accelerate in the middle of the 19th century after the mass production of oil in Baku (Azerbaijan).

Oil and gas reserves and the petrochemical industry still have a strong impact on economic development and policy formation. Today, oil and oil products are used in almost all areas of industry and services in the world. Examples include pharmacy, cosmetology, textiles, and more areas can be noted.

**Table 2. The structure of oil consumption in the world.
Oil consumption by industry (daily, million barrels)**

Field	2016	2020	2025 prognosis	2030 prognosis	2035 prognosis	2040 prognosis
According to vehicles						
Automobile transport	43.00	45.40	46.80	47.70	48.20	48.40
Aviation	6.00	6.60	7.20	7.80	8.40	8.90
Rail transport	1.80	1.90	2.00	2.10	2.10	2.20
Sea transport	3.80	4.20	4.70	5.00	5.20	5.40
According to industry						
Petroleum chemistry	12.60	13.40	14.30	15.00	15.90	16.50
Others	12.50	13.00	13.30	13.60	13.70	13.70
According to other fields						
Agriculture, Communal economy, Commerce	10.50	10.90	11.40	11.70	12.00	12.10
Electric energy	5.10	5.30	4.80	4.60	4.20	3.90

Figures tell us that in the next 30 to 40 years, the demand for oil and oil products as a known, discovered raw material will not decrease. Given that the development of science and technology allows oil products to become more of a primary raw material. This increases the economic and political importance of the countries in the world that have more oil reserves and use them effectively.

Despite all this, rapid work is being done to reduce dependency on energy resources and create environmentally friendly technologies and products. Today, East Asian countries are trying to reduce the energy capacity of production and demand for energy resources by adopting the latest technological advances.

The abundance of oil reserves does not stimulate the scientific and technological development of these countries.

When we look at the list of countries that consume the most oil, we come across a mixed picture. Technologically advanced Japan and South Korea are among the largest oil consumers. Despite the development of technology, oil and oil products will remain an indispensable raw material for industries for decades to come.

Table 3. The top ten in terms of oil reserves according to the OPEC Bulletin for 2021

	Country	Oil reserves, billion barrels
1	Venezuela	303,561
2	Saudi Arabia	261,600
3	Iran	208,600
4	Iraq	145,019
5	UAE (United Arab Emirates)	107,000
6	Kuwait	101,500
7	Russia	800,00
8	Libya	48,363
9	USA	44,539
10	Nigeria	36,910

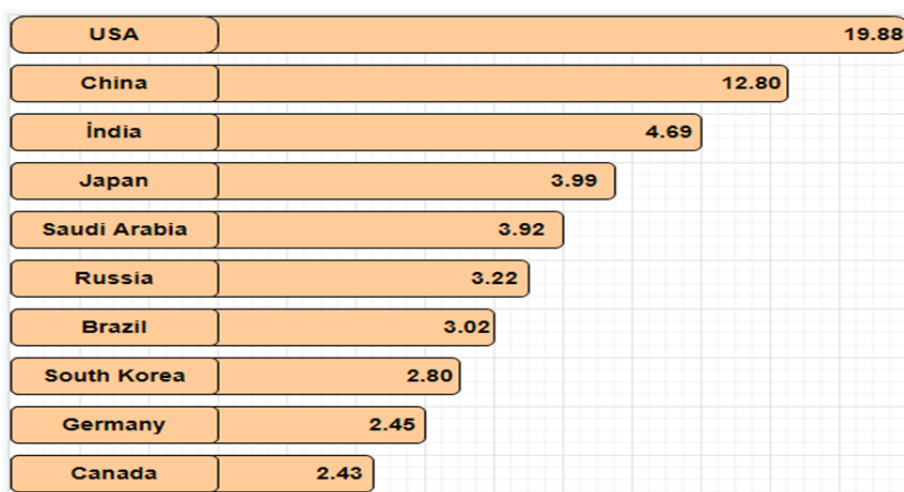


Figure 1. The top ten largest oil consumers in the world (daily, million barrels)

Another natural resource widely used in industry is gas. Natural gas is used in industry as a fuel, as well as ammonia, methanol, acetylene, nitrogen fertilizers, aromatic hydrocarbons and as a raw material for the production of a wide range of chemical intermediates. In particular, natural gas is used to heat buildings, kitchens and restaurants to organize a comfortable lifestyle for people. It is also an indispensable raw material for heating greenhouses.

In some countries, natural gas is the main source of budget funding and socio-economic problems.

Table 4. According to the OPEC Bulletin for 2021, the top ten countries with natural gas reserves

	Country	Gas reserves, trillion m ³ .
1	Russia	48,938
2	Iran	34,077

	Country	Gas reserves, trillion m ³ .
3	Qatar	23,831
4	Turkmenistan	15,365
5	USA	12,958
6	Saudi Arabia	8,438
7	UAE	7,726
8	Nigeria	5,750
9	Venezuela	5,590
10	Algeria	4,504

In the structure of natural gas consumption, 77% falls on electricity and utilities, 10% on metallurgy, 2% on motor fuel, and 11% on other sectors.

Table 5. The top ten consuming the most gas in the world

	Country	Natural gas consumption (million m ³ /year)
1	USA	846,600
2	Russia	444,300
3	China	307,300
4	Iran	223,600
5	Canada	120,300
6	Saudi Arabia	113,600
7	Japan	108,100
8	Mexico	90,700
9	Germany	88,700
10	Great Britain	78,800

There is a growing demand for freshwater, which is a key player in the formation of primary and secondary raw materials for all the products we consume as a natural resource. Fresh water is an indispensable participant in the supply of raw materials to the agricultural, food and clothing industries. Unlike energy carriers, there is no substitute for fresh water.

Table 6. Ten countries with rich water resources

	Country	Water reserve, km ³	Per person, min m ³
1	Brazil	6,950	43
2	Russia	4,500	30.5
3	Canada	2,900	87.2
4	China	2,800	2.3
5	Indonesia	2,530	12.2
6	USA	2,480	9.4
7	Bangladesh	2,360	19.6
8	India	2,085	2.2
9	Venezuela	1,320	60.3
10	Myanmar	1,080	23.3

Currently, there are countries that suffer from such a shortage of fresh water.

Table 7. Countries with the largest water shortages

	Country	Water reserve, km ³
1	Djibouti	0.3
2	UAE	0.15
3	Bahrain	0.12
4	Barbados	0.08
5	Qatar	0.06
6	Antigua and Barbuda	0.05
7	Malta	0.05
8	Maldives	0.03
9	Kuwait	0.02

The world consumes about 4.7 trillion m³ of water every year. 70% of consumed freshwater resources fall to agriculture, 20% to industry and 10% to households. 2 billion people are short of clean water. Experts estimate that by about 2025, 50 countries and about 3 billion people will experience water shortages.

The shortage of water resources on the planet is growing every year. The 10 billion tons of water consumed per day is equal to the annual volume of all other minerals. The total consumption of fresh water is 1,000 times more than all industrial raw materials.

In agriculture, fresh water is used for irrigating arable lands, washing the accumulation of salts in the soil below the root zone of cultivated plants, livestock care, processing of harvested products, etc.

Table 8. The amount of water consumed in the production of some foods.
Water consumption in food production

	Product name	Quantity	Used liters of water
1	Wheat	1 kg	1,000
2	Corn	0.5 kg	450
3	Milk	1 liter	1,000
4	Rice	1 kg	3,400
5	Coffee	1 kg	21,000

Approximately 150,000 liters per ton of pulp and paper, 25,000 liters for the production of 1,000 liters of high-quality aviation gasoline, more than 10,000 liters for the production of 1 ton of cotton fabric, 86,000 liters for the production of 1 ton of steel (4,000 liters of which are considered fatal losses due to evaporation), 130,000 liters for 1 ton of cast iron, 40,000 liters of water for 1 ton of steel are consumed [2].

Currently ranked fourth in the world in terms of freshwater resources, despite high rainfall, half of China's population does not have regular access to drinking water.

There are activities in all sectors of the economy that could lead to an environmental crisis, perhaps due to uncontrolled competition or insufficient technology. I can show greenhouses as an example. The Earth's climate is constantly

deteriorating due to the constant release of carbon dioxide into the atmosphere. This causes an abnormal distribution of precipitation, causing drought in countries with regular rains, and snowfall in areas where there should be a drought.

The planet's ecosystem is unable to adapt to such anomalous changes, which results in reduced productivity, increased plant diseases, and the proliferation of pests and various insects.

With its features such as relief and quality, soil is the most important natural resource for people to live comfortably. Along with air and water, soil is the most amazing product for the survival of all living organisms. There is no life without it. Factors such as climate, vegetation, time and, most importantly, human activity are important factors that affect soil composition.

Land, which has an irreplaceable role in social production, can be considered as the main means of production. As a means of production, there are features that distinguish soil from other means of production:

- If all other means of production are the result of previous human labor, land is the product of natural historical development created by nature for centuries – it is not reproduced by labor.

- Land is irreplaceable: virtually no production process can take place without it;

- Land is limited in terms of space; it is impossible to enlarge its surface.

- The use of land as a means of production is related to the permanence of its location, which is excluded in relation to most other means.

- Land plots are qualitatively heterogeneous.

- With proper care, soil does not wear out or deteriorate. A special feature of a location is its fertility [3].

In many countries, sustainable land management policies are fragmented and incomplete, mainly due to institutional barriers, conflicts of authority and the unreasonable predominance of economic goals over social and environmental goals, as well as the priority of short-term development goals [4].

The land fund of the planet is 13 billion 37 million hectares, of which 36.1% is agricultural land.

Table 9. The top ten by size of sown areas

Country	Cropland	
	Million ha	% of land fund
USA	185.7	20.3
India	166.1	55.9
Russia	116.1	6.9
China	92.5	9.9
Australia	47.0	6.1
Canada	45.4	4.9
Brazil	43.2	5.0
Kazakhstan	34.8	13.1
Ukraine	33.3	56.9
Nigeria	30.2	33.0

Land is mainly considered as a resource for agriculture. Agriculture provides the world's population with food and raw materials (fruits, vegetables, meat and meat products, milk and dairy products, textiles, pharmaceuticals, perfumes, etc.). Defining the meaning of land, Marx emphasized that land "...is a large laboratory, an arsenal of tools, labor materials and a place to live."

Wheat, corn, rice, etc. are the most important agricultural products for human survival. Let us focus on the realities and predictions.

For example, wheat production in 2020 was about 806 million tons (an increase of 18% compared to 2008). In 2050, it is projected to be 950 million tons. According to UN forecasts, the population will increase by 30–35%.

In the late twentieth century states began to pay more attention to food security.

Table 10. The top ten for wheat production in 2020

	Country	Production (million tons)
1	China	133,590
2	India	102,190
3	Russia	73,500
4	USA	52,258
5	Canada	32,350
6	Ukraine	29,000
7	Pakistan	25,600
8	Turkey	19,000
9	Argentina	19,000
10	Iran	16,800

The economic usefulness of land resources should be understood as its monetary expression. For example, the use of agricultural land is measured by its fertility and its quality. In general, the value of land is determined by taking into account all environmental factors.

The basis of agricultural production is ecological, economic and, most importantly, human relations, while maintaining the properties of all elements of the soil.

Globalization, with all its contradictions, has great potential for agricultural development. Properly managed, it will be possible to prevent a global food crisis and a possible famine. To do this, the growth rate of the world's population must be properly forecast and managed. At the same time, long-term forecasts, development programs of agro-industrial complexes and food markets should be developed, taking into account environmental factors related to food supply, especially the ecological environment. The developed programs should meet the requirements of resource-saving green economy in all areas.

In the 21st century, the steady increase in demand for raw materials and energy carriers is due to the growing population and, in parallel, per capita energy consumption. This process will increase the use and risk of nuclear energy. The development of activities to create and enhance technologies for the use of alternative energy sources can protect humanity from many dangers.

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