

**Czech University of Life Sciences Prague**  
**Faculty of Economics and Management**  
**Department of Economics**



**Bachelor thesis**

**Natural resources - case study of Uzbekistan**

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## BACHELOR THESIS ASSIGNMENT

Sitora Khakimova

Economics and Management

Thesis title

**Natural resources – case study of Uzbekistan**

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### Objectives of thesis

The aim of thesis is to explore and analyze the impact of the mining industry on the economic growth of Uzbekistan. Uzbekistan is richly endowed with natural resources. Today, mining is very important and risky question, there are examples of major mining projects, which are indispensable elements in the economy and have an extensive effect on rapid economic expansion. Objective is to determine the role of mining natural resources on GDP through scientific analysis and various methods to reach purposeful complete results.

### Methodology

The thesis will be divided into two parts, theoretical and practical part. Comparative and descriptive methods will be used in the thesis.

## **The proposed extent of the thesis**

40 pages

## **Keywords**

Uzbekistan, Natural resources, Scarcity

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## **Recommended information sources**

BERRY, R A. – KANT, S. Economics, sustainability, and natural resources : economics of sustainable forest management ; edited by Shashi Kant, R. Albert Berry. Dordrecht: SPRINGER, 2005. ISBN 1-4020-3465-2.

KOUNDOURI, P. Econometrics informing natural resources management : selected empirical analyses. Cheltenham: Elgar, 2004. ISBN 1-84376-922-0

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## **Declaration**

I declare that I have worked on my bachelor thesis titled “Natural resources – case study of Uzbekistan” by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any third person.

In Prague on \_\_\_\_th March, 2018

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Sitora Khakimova

# Natural resources - case study of Uzbekistan

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## Пřípadová studie o přírodních zdrojích v Uzbekistánu

### Summary

The aim of this thesis capable with analyzing of natural resources in Uzbekistan. Attention of readers drawn to the definition of the main determinants that influence on economic indicators. The thesis divided into two parts, theoretical and practical. Theoretical part of the work includes an introduction, focusing on the concepts of the topic and explains the context for understanding the issue, using the opinions of the most important scientists. In the practical part there are made analysis with specific data for Uzbekistan in the area of natural resources in the economy of Uzbekistan. Comparative and descriptive, also correlation-regression analysis methods have been used in the thesis to make more visible the role of natural resources in the economy of Uzbekistan.

**Key words:** Natural Resources, Uzbekistan, scarcity.

## **Souhrn**

Cílem této práce je analýza přírodních zdrojů v Uzbekistánu. Upozornění čtenářů na definici hlavních determinantů, které ovlivňují ekonomické ukazatele. Práce byla rozdělena na dvě části, teoretické a praktické. Teoretická část práce obsahuje úvod, který se zaměřuje na pojmy tématu a vysvětluje kontext pro pochopení problému s využitím názorů nejdůležitějších vědců. V praktické části se provádí analýza se specifickými údaji pro Uzbekistán v oblasti přírodních zdrojů v ekonomice Uzbekistánu. V práci byly použity srovnávací a deskriptivní metody korelace a regrese, aby byla viditelnější role přírodních zdrojů v ekonomice Uzbekistánu.

**Klíčová slova:** Přírodní zdroje, Uzbekistán, nedostatek

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## Introduction

The problems of economic growth and the scarcity of natural resources in any country in the world are paid close attention. Therefore, this topic is quite relevant not only for economists, but also for politicians, lawyers, as well as for the entire population and causes genuine interest.

The parameters of economic growth, their dynamics are widely used to characterize the development of national economies, and in the state regulation of the economy.

The current stage of development of the world economy is characterized by ever-increasing levels of consumption of natural resources, a sharp complication of the process of interaction between nature and society, intensification and expansion of the sphere of manifestation of specific natural-anthropogenic processes arising from technogenic impact on nature. In the beginning of the century it is the successful solution of the main global problems that will lay the foundation and will predetermine the possibility of the world community's transition to sustainable development.

In each country, the role of natural resources is determined by a combination of factors: the state of its own resource base, the level of economic development, the degree of participation in world integration processes, etc. At the stage of extensive growth, natural resources are a powerful accelerator of social and economic progress. The uneven nature of providing countries with natural resources, as well as their consumption, puts forward a number of patterns in the economic development of different countries. One of them is related to the need to find ways of more rational use of natural resources in conditions of their shortage. This problem is especially acute for developed countries. Their version of industrial development has recently been a resource-saving way of economic development<sup>1</sup>. (Galaeva, E.V 2009)

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1) Galaeva, E.V. Macroeconomics / E.V. Galaeva, A.A. Korsakova. - M: Moscow International Institute of Econometrics, Informatics, Finance and Law, 2009. - 250 p.

Vladimir Gusarov. Statistics: Proc. manual for universities. - Moscow: UNITY-DANA, 2017

Currently, the main feature of the development of the world economy is the constantly increasing volumes of consumption of natural resources. In addition, in foreign economic activities, natural resources also play an important role. Therefore, more and more important is the study of the natural resource potential of the world as a whole, of individual continents and countries, the analysis of systems of their economic use that have evolved in the various socioeconomic structures of the modern world community. That is why this topic is the most relevant and is of great practical interest for research.

The purpose of this thesis is to examine the essence of economic growth, the main theories and models of economic growth, as well as to study the concept and essence of the natural resource potential and possible solutions to the deficit of natural resources.

## Objective and Methodology

### 2.1. Objectives

The aim of this thesis is to explore and analyze the impact of the mining industry on the economic growth of Uzbekistan. Uzbekistan is richly endowed with natural resources. Today, mining is a very important and risky question, there are examples of major mining projects, which are indispensable elements in the economy and have an extensive effect on rapid economic expansion. The objective is to determine the role of mining natural resources on GDP through scientific analysis and various methods to reach purposeful complete results.

### 2.2. Methodology

The thesis will be divided into two parts, theoretical and practical part. Comparative and descriptive methods will be used in the thesis.

## 3. Theoretical part

### 3.1. The essence of natural resources

There is an opinion that nature has created a resource potential. In this connection, it is assumed that in its development it could anticipate the emergence of a consumer of these resources in the person of man. However, this judgment is erroneous. This is due to the following circumstances:

1. Nature, developing according to the laws of chance, accumulated energy and bioenergy potential, not knowing that someone and someday such a potential will take advantage.

2. The result of nature's activity is a real manifestation of the laws of conservation: matter, energy and information in nature itself. The man who appeared on one of the coils of endless interactions and transformations in nature, gradually managed to understand what results of these transformations in it he could use for survival in the conditions that he presented all the same nature. At the same time, as the value of the material transformations of nature, as well as their needs for them, people realized as they developed and studied themselves. Therefore, the concept of a natural resource is a developing concept. Today, it

is identified with the level of formation and development of man as one of many species of living organisms<sup>2</sup>. (Hasanova G.B., 2011)

Thus, if nature offered man first the environment for his existence, then he gradually transformed nature into a means of his development, or rather, a means to realize his own ambitions in her cognition.

Next, we will directly disclose the notion of natural resources. Here it is worth paying attention to the fact that, on the one hand, natural resources can be characterized as a set of objects and systems of animate and inanimate nature, that is, components of the natural environment surrounding and which are used in the process of social production to meet the material and cultural needs of human and society. On the other hand, natural resources can be considered as a space-time category - their volume is different in different regions of the globe and at different stages of social and economic development of society.

Thus, the natural resources of the world economy are diverse and include energy, land and soil, water, forest, biological (flora and fauna), mineral (minerals), climatic and recreational resources. They are a necessary condition for the development of the economy and, in aggregate, form the natural-resource potential of the world economy.

In the world practice, when determining natural resources, it is customary to single out several categories according to the degree of their technical and economic accessibility and study.

1. Available, or proven, or real reserves are the volumes of a natural resource identified by modern methods of exploration or survey, technically accessible and economically viable for development.

2. Potential or general resources are resources established on the basis of theoretical calculations, reconnaissance surveys and including, in addition to accurately determined technically recoverable reserves of natural raw materials or reserves, the part that is currently not available for technical or economic reasons (for example, deposits of brown coal at great

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<sup>2</sup>Hasanova G.B., Social ecology: a manual for schools / G.B., Hasanova. 2011. ISBN 978-5-406-04556-5

depths or fresh waters, conserved in glaciers or deep layers of the earth's crust). Potential resources are called the resources of the future, as their economic development will become possible only in conditions of a qualitatively new scientific and technological development of society<sup>3</sup>. (Protasov V.F. 2005.)

The foregoing explains that not all natural resources "lie on the surface" and can be easily calculated and taken into account. So, the volumes of groundwater, many types of minerals, raw materials for a variety of chemical industries are determined and refined as a result of complex, often expensive scientific or technical research.

Thus, the technical and technological imperfection of many processes of extraction and processing of natural resources, considerations of economic profitability and a lack of knowledge about the volumes and quantities of natural raw materials make it necessary to divide the natural reserves into the above-mentioned categories.

Thus, the analysis of this section allows us to conclude that:

1. Natural reserves are a multilateral concept that includes:

- Energy resources
- Land resources
- Hydropower resources
- Water resources
- Forest resources
- Biological resources
- Mineral resources
- Agro-Climatic resources
- Recreational resources

2. Natural resources are characterized by varying degrees of study and accessibility, which makes them divided into real and potential resource categories.

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<sup>3</sup>Protasov V.F. Ecology, health and environmental protection. Moscow: Finance and Statistics, 2005. 672 p.

## 3.2 Types of natural resources

Analyzing the previous paragraph, we can talk about the dual nature of the concept of "natural resources", reflecting their natural origin, on the one hand, and economic significance - on the other.

The classification of natural resources is understood as the division of the totality of objects, objects and phenomena of the natural environment into groups according to functionally significant characteristics.

On this basis, there are many classifications of natural resources. Let's consider some of them.

### **Classification of natural resources on the basis of genesis is to allocate resources:**

- Lithosphere (minerals, land and soil resources);
- Hydrosphere (glaciers, land and ocean waters, energy of current waters, sea tides);
- Atmosphere (climatic, recreational, wind energy)<sup>4</sup>. (BERRY, R A. – KANT, S. )
- Economics, sustainability, and natural resources: economics of sustainable forest management; (edited R. Albert Berry. Dordrecht: SPRINGER, 2005.)

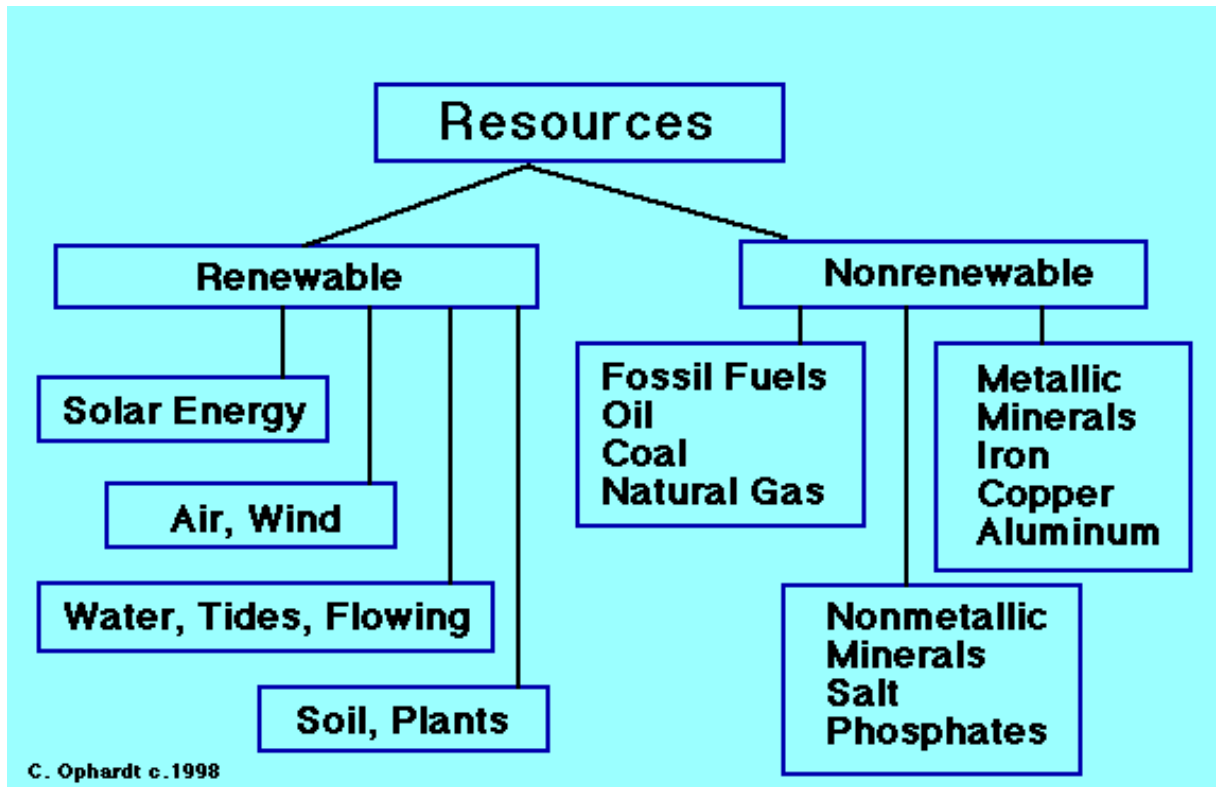
Classification by the principle of exhaustibility divides natural resources into exhaustible and inexhaustible. The latter include, for example, climatic resources, the energy of the sun, wind, current waters, and sea tides. Almost all other natural resources are exhaustible.

Exhaustible resources are formed in the Earth's crust or landscape, but the volumes and rates of their formation are measured by the geological time scale. At the same time, the demand for such resources on the part of production or for the organization of favorable living conditions for human society far exceeds the volumes and rates of natural replenishment. As a result, the resources of the natural resource are inevitably depleted.

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<sup>4</sup> BERRY, R A. – KANT, S. Economics, sustainability, and natural resources: economics of sustainable forest management; edited by Shashi Kant, R. Albert Berry. Dordrecht: SPRINGER, 2005. ISBN 1-4020-3465-2.

Figure 1 Classification of natural resources



Source:

[https://www.bing.com/images/search?q=Types of Natural Resources&Form=IRIBIP](https://www.bing.com/images/search?q=Types+of+Natural+Resources&Form=IRIBIP)

The group of exhaustible resources includes resources with unequal rates and volumes of formation. This allows for their additional differentiation. Based on the intensity and speed of natural education, resources are divided into subgroups:

- Exhaustible non-renewable - that part of natural resources that, as they are used by man, "disappears" from the natural environment and does not self-recover in the course of the cycle of substances in the biosphere during a time commensurate with the rate of economic activity of man. This is mainly the resources of the lithosphere (minerals), formed during a long geological history.
- Exhaustible, but renewable (naturally or with the participation of a person) - mainly these are resources of biological origin - plant and fauna.



Inexhaustible natural resources in turn represent resources, the reduction of which is insignificant even in the process of very long use. These include, above all, climatic and water resources.

#### Classification by the method of restoration divides natural resources into:

- Naturally renewable, i.e. those that can be restored after their use to the original state by means of natural processes: food and non-food biomass, water, air, the restoration of which (including purification) provides biological, climatic and hydrological processes. It should be remembered that the performance of these processes has a limit, and a person can, by investing certain funds, increase their activity;
- Anthropogenically renewable, which in principle can be recovered from the waste for re-consumption only by the society itself (mainly metals - from scrap metal, other types of mineral raw materials);
- Non-renewable, which, in principle, can not be restored for reuse (this is primarily energy resources such as coal, oil, natural gas)<sup>5</sup>. (Protasov V.F. Ecology, health and environmental protection. Moscow: Finance and Statistics, 2005.)

It should be noted that in the total volume of world resource use a significant share (99.7%) is made of natural renewable resources (including 3.6% - specific weight of water, followed, according to approximate calculations, by air - 10.9% and plant biomass - 3.7%). The share of the second group of resources is only 0.1% and 0.2%<sup>6</sup>. ([www.undp.org](http://www.undp.org))

The most common classification of natural resources is classification according to their origin. With the help of it is made: resources of natural components and resources of natural and territorial complexes. The resources of natural components include:

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<sup>5</sup> Protasov V.F. Ecology, health and environmental protection. Moscow: Finance and Statistics, 2005.

<sup>6</sup> [www.undp.org](http://www.undp.org)

- Mineral resources (a set of specific forms of mineral substances in the earth's crust that are a source of energy, various materials, chemical compounds and elements);
- Climatic resources (inexhaustible natural resources, including solar energy, moisture and wind energy);
- Water resources (hydrosphere resources - the World Ocean and land waters);
- Plant resources (forests, crops, etc.);
- Land and soil resources (lands that are systematically used or suitable for use for economic purposes and differ in nature-historical features);
- Resources of the animal world<sup>7</sup>. (Fomicheva EV 2004.)

Resources of natural-territorial complexes are forestry, recreational, mountain-industrial and other resources.

**By the nature of trade, all natural resources can be divided into groups such as:**

- Resources of strategic importance, trade should be limited, as it leads to the destruction of the defense power of the state (uranium ore and other radioactive substances);
- Resources having a wide export value and ensuring the main inflow of foreign currency earnings (oil, diamonds, gold, etc.);
- Resources of the domestic market, which, as a rule, have a widespread distribution, for example, mineral raw materials, etc.

The last classification, which must be distinguished among many others - is the classification of natural resources depending on economic use. It divides natural resources into the following groups:

- Energy, which includes a variety of types of resources used at the current stage of development of science and technology for energy production, for example, combustible minerals;

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<sup>7</sup>Fomicheva EV Fomicheva EV Economics of nature management: textbook / E. V. Fomicheva. -M.: Dashkov and K, 2004. -395 p.

- Non-energy, including a subset of natural resources that supply raw materials for various industries or participate in production for technological needs, for example, forest resources; resources of agricultural production (land-soil, vegetable and other resources)

In analyzing this paragraph, it was clarified that the natural resources used by human society are diverse and for their study a classification is necessary. It should be noted that only the main types of division of natural reserves were studied, when there is a great number of their classifications, in other words, the considered division is conditional.

### 3.3 The role of natural resources in the world economy

Natural resources in their totality constitute an important factor of social production, which in economic theory is determined by the general concept of land. Without natural resources, the production process is unthinkable.

For example, mineral resources form the basis for the production of industrial products in the world economy. Here it should be noted that changes in the extraction and consumption of raw materials in international trade affect not only the economic situation in individual countries and regions, but also have a global character.

In most countries with a developed market economy, natural resources (especially minerals) are consumed more than they have. Missing resources are imported mainly from developing countries. Because of this, huge raw materials flow to three main processing centers: North America, Western Europe, East and South-East Asia. This state of affairs raises two problems: the dependence of developed countries on the supply of raw materials and the raw-material orientation of exports of many developing countries. Thus, the uneven distribution of mineral resources in the bowels of the Earth, as well as the different provision of countries with land and forest resources, contribute to the development of the international division of labor and, on this basis, international economic relations<sup>8</sup>. (KOUNDORI, P. 2004)

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<sup>8</sup> KOUNDORI, P. *Econometrics informing natural resources management: selected empirical analyses*. Cheltenham: Elgar, 2004. ISBN 1-84376-922-0.

It should also be noted that the use of all natural resources is closely intertwined. So, land resources (agricultural land) usually give more volume of production, if they are cultivated by the technology, which is driven by fuel (mineral resources), and also with the use of artificial fertilizers (made on the basis of also mineral resources).

The importance of the resource factor in the economic development of the territories is constantly changing. This indicator depends on the quality, quantity, location and a number of other various indicators of available natural resources.

One of these integrating indicators is the economic valuation of natural resources - i.e. the establishment of the possibility and expediency of their involvement in production at the current level of development of science and technology. In this case, it is necessary to determine and evaluate:

1. The size of reserves (volumes of resources) in general and their concentration per unit area.
2. Their qualitative composition (composition of forest types, quality of wood, composition and fertility of the soil, for oil, for example - qualitative composition, viscosity, etc.).
3. Operating conditions (for minerals: the size of the seams, the depth of their occurrence, the difficulties of exploration, development of deposits and development, as well as the possibility and expediency of exploitation of any natural resources: land, water, forest).
4. Degree of development and occupancy of the territory on which there is a deposit of minerals or other resources (including the level of population and the availability of the region's labor resources in these natural and climatic conditions).
5. Conditions of transportation, including the places of sale and use (availability of necessary transport and other infrastructure).
6. Expenses of production per unit of production (cost price).
7. The combination of natural resources and minerals in a given territory, the possibility of their integrated use.

8. Requirements for environmental protection and reclamation of the territory<sup>9</sup>. (Shumilov OS, Sokolovsky NK 2012)

Another no less important characteristic of natural resources is the indicator of resource availability of a given territory, i.e. the relationship between the magnitude of explored reserves of resources and the scale of their use. It turns out that this indicator can be calculated by the following formula:

The size of the explored reserves may increase in the course of geological development, and the volume of annual production changes, so the resource availability has an approximate value. This term reflects the relative magnitude of any type of natural resource in terms of the time period for which it can be fully developed.

$$R = f/e$$

Where R is the resource supply,

f - Fund of resources,

e - Extraction of resources<sup>10</sup>. (Khoustova A.P. 2006)

So, the availability of mineral resources is expressed in terms of the number of years for which there is enough proven reserves for their modern use. And the availability of forest, land, water resources is determined by the volume of their reserves per capita.

It can be concluded that not all countries in the world have the same amount of natural resources. Only a few states possess practically all known natural resources - territorial, mineral, forest, water, land, etc. Among such countries can be identified Uzbekistan, the

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<sup>9</sup>Shumilov OS, Sokolovsky NK Economics of Nature Management: Textbook. 2nd ed.-M.: INFRA-M, 2012.- 362pp. - (Higher education)

<sup>10</sup> Nature use, environmental protection and economics: Theory and practice: Textbook / Ed. A.P. Khoustova.-Moscow: Publishing house RURON, 2006.

United States, and China. Some states are inferior to them, but also highly endowed with resources. These include Brazil, India, and Australia<sup>11</sup>. ([www.uznature.uz](http://www.uznature.uz))

Many states of the world have reserves of global importance of one or several types of resources. For example, the countries of the near and Middle East are allocated significant oil and gas reserves; Chile, Zaire, Zambia - with copper reserves, Morocco and Nauru are famous for phosphorites, etc.

Thus, natural resources are the backbone of the primary sector of the economy, leading the collection of industrial and agricultural raw materials and its primary processing for subsequent consumption. It was found out that this concept is very diverse and therefore has a complex structure. In this regard, natural resources have been considered above from various sides: from the point of view of renewability, designation, conditions of occurrence, extraction, etc. It was also revealed here that in determining the value of the resource factor in economic development, the two most important factors are the economic valuation of natural resources and the resource availability.

### 3.4 The problem of rational use of natural resources

Annually, the Earth's bowels lose about one hundred billion tons of resources extracted by humans. Ninety billion of them eventually become waste. That is why the question of saving resources is especially relevant today. At the beginning of the last century, mankind used only twenty elements of Mendeleev's table, now their number exceeded ninety. Over the past forty years, the amount of consumed resources has increased twenty-five times, and the amount of their waste - a hundred times.

One of the most important problems of modern society is the rational use of natural resources. The rapid development of science and technology has many positive effects for

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<sup>11</sup> [www.uznature.uz](http://www.uznature.uz)

man, but nature suffers from this. A person can not influence the natural conditions that are necessary for mankind to exist, and to maintain the necessary conditions.

At present, it is obvious that there are no unlimited resources. There is a problem of reconciling human needs in natural resources with the requirements of rational use. This is what the economy really offers:

1) The use of recycled materials, regeneration-processing of industrial waste and garbage.

For example, recycling of waste paper reduces the production of new paper by almost half. Organic mass from the waste is used for obtaining fertilizers, scrap is sent for remelting.

Recycling waste life is not used yet - garbage is simply stored. In the United States, the main way of storing waste, despite the high cost and shrinking territories, remains burial. In a more economical Europe, they prefer to burn garbage. This method is estimated economists as profitable: since the cost of reproduction is not reflected in the cost of production, the resulting environmental effect is summed up with direct, economic.

2) Wastewater treatment. The basis of this technology is the use of natural processes of vital activity of bacteria that decompose waste.

3) Reclamation of industrial territories - restoration of spaces with a disturbed environment for the purpose of re-use. For example, in England large areas of coal copies were planted with vegetation. After 20 years, the soil cover was completely restored, and this area was again given under plowing, without damaging the surrounding landscape.

4) Use of new energy sources: wind, solar, tidal energy<sup>12</sup>. (Fomicheva E. V 2004.)

Thus, practice shows that natural energy resources can be replaced by alternative ones, "man-made", but this requires considerable expenditures.

Another way to economically use resources is to improve technology. On the one hand, the extension of the service of goods by improving their quality will significantly save materials and natural resources. On the other hand, it also has a certain moral meaning: the consumer will strive for longer, use a quality product, not seeking to quickly part with it and

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<sup>12</sup> Fomicheva EV Fomicheva EV Economics of nature management: textbook / E. V. Fomicheva. -M.: Dashkov and K, 2004.

acquire a new one. However, in practice, polluting technologies remain preferable for the majority of producers, because of the lower production costs and the lower costs of commodity circulation.

All the above principles were based on the reproduction of the environment, i.e. in preventing damage to nature. At the same time, it creates a number of economic problems of micro and macro level.

1) The level of damage. It is necessary to correctly determine the costs of environmental protection. Sometimes this is difficult to do, because it is not always possible to identify the specific culprit and assess the extent of the damage.

2) Who should compensate for damage: the producer or the consumer? The costs are usually borne by the polluter-producer, which is the enterprise. However, being not interested, in their increase, it transfers production costs to society, raising the price for ecological products.

3) Who pays, and who makes a profit. Often, various groups of people are paid for pollution control measures and profit from them.

4) The need for control over damage. The state should pursue a policy of control over environmental pollution through the introduction of legal sanctions, emission standards on the one hand, and a system of incentives and incentives for producers on the other.

In general, the rational use of natural resources implies the revision of traditional production principles, the location of enterprises, the development of technology, the calculation of costs, in other words - a systematic approach based on the greening of economic development.

Experts identify the following opportunities for the implementation of environmental economics:

- Production of one type of product to reduce damage to the environment;
- Development of non-waste technologies, efficient cleaning systems, as well as control and measuring equipment, which allows the processing of products from secondary components and waste industries.



- Establishment of interrelations between the results of economic activity and the indicators of the ecological compatibility of the output, technology of its production<sup>13</sup>. (Shulgin, V.A. 2008.)

At the enterprise it is expedient to differentiate the costs of equipment related to the production of products and bringing it to a certain level of ecological quality, with the replacement of it with another, more environmentally friendly.

The main objectives should be to reduce the man-made load, maintain the natural potential and natural processes in nature, reduce losses, comprehensively extract useful components, use waste as a secondary resource.

For the assessment of ecologically acceptable solutions among the main criteria it is supposed to take into account the degree of achievement of the proper quality of the environment and the main natural complexes. The rationale for the principle of environmental friendliness is an integral part of the management system that influences the choice of priorities in providing the national economy with natural resources and services within the planned consumption levels.

Thus, the economic approach to environmental problems implies that when evaluating the rationality of the production process, it is necessary to take into account both the harm to nature and the costs of society to eliminate it. At the same time, production should not aim only at creating material goods, this process must go hand in hand with the preservation of the natural environment. The achievement of this unity is possible only in the context of the greening of production, characterized by the systematic development of technological and management solutions, both for the effective use of natural resources and for improving the quality of the environment; taking into account in the calculation of environmental factors that affect the development of production, and harm to the environment. It is necessary to ensure a reasonable (integrated, economical) use of natural resources that meets the ecological peculiarities of a certain territory; carrying out ecological orientation of economic activity, planning and justification of managerial decisions

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<sup>13</sup> Shulgin, V.A. National Economy: Textbook / VA Shulgin - Moscow: Izd-vo Ross. econ. Academician. 2008.

expressed in progressive areas of interaction between nature and society, environmental attestation of workplaces, improvement of technology of products<sup>14</sup>.( Yusupov, K.N. 2008)

Due to their unusual nature, economic and environmental problems require non-standard solutions. In addition to economic solutions, the interaction of the economy and the environment should be aimed at achieving the main goal - providing an enabling environment for the whole society, which is possible only with a harmonious economic and environmental approach based on humanistic and moral principles. This approach has already been developed and is called the concept of sustainable development.

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<sup>14</sup>Yusupov, K.N. National Economy: A Textbook / K.N. Yusupov, A.V. Yangirov, A.R. Taimasov - Moscow: KNORUS, 2008. - 370 p.

### 3.5. Possible solutions the problem of scarcity and rational use of natural resources

In an effort to improve the conditions of his life, man constantly increased the pace of material production, without thinking about the consequences. As a result, most of the resources taken from nature are returned to it in the form of waste, often poisonous or unsuitable for disposal. This poses a threat to both the environment and the individual. Therefore, one of the most important problems of mankind, the immediate solution required, is the problem of scarcity of resources and their rational use.

#### **There are several possible ways to solve this problem:**

##### **1. Reutilization, as one of the most important areas of production to reduce the costs of primary resources.**

Reutilization, or recycling, is the reuse or reuse of resources.

In the world there has been a noticeable progress in the development of recycling. For example, for the period 1985-1995, the secondary use of glass in the world increased from 20 to 50%, and metals - from 33 to 50%, today these figures are even higher.

In the last twenty years, Germany has undergone significant changes in waste management: from simple burial, the country has gone through a process of recycling and the wise use of secondary resources.

German recycling technologies are leading around the world.

Since the early 1980s, recycling has received active support and development, today approximately 95-98% of paper and glass in Germany is collected and processed<sup>15</sup>. (Andrianov V 2016)

The second very important law in this direction is the law on the processing of packaging. Many companies have started the production of computer boxes and simple

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<sup>15</sup> Andrianov, V. National Wealth, Natural and Manpower Resources of Russia / V. Andrianov // Society and Economy. - 2016. - №4.

materials without the use of adhesives, paints or composite materials, which facilitates the secondary use of packaging.

Manufacturers of cars and TVs are increasingly creating their products in light of their easy disassembly. There was a concept of "industrial symbiosis". "Symbiosis" is the cohabitation of two organisms useful to each other. "Industrial symbiosis" is when the unused resources of one enterprise become raw materials for another enterprise, usually from another area of production.

For example, in the Danish town of Kalunburg, the hot water of power plants is used by the nearest fish farm. It is from this firm serves as fertilizer for farmland, and soot from the operation of power plants goes to the production of cement.

This symbiosis is not only ecological, but economically beneficial. The quantity of waste is sharply reduced, for which placement at landfill sites is expensive to pay. Reduce the consumption of primary resources in the production of building materials, when crushed stone is replaced by slag and ash from thermal power plants.

## **2. Resource-saving technologies.**

At present, a huge amount of metal goes to the shavings. Some machines weigh a lot, which makes it difficult to recycle them. Powder metallurgy is one of the most important ways to save metal. If at the metal processing of casting and rolled products in chips, 60-70% of the metal leaves, then in the manufacture of parts from press powders, the loss of materials does not exceed 5-7%. This not only saves raw materials, but also energy, reduces pollution of the atmosphere and water. Without chips, you can do without using precision casting, sheet and bulk cold stamping.

In any production, a large amount of water is used. So, in the production of 1 ton of steel, 150-230 m<sup>3</sup> of water is required, for making kapron fiber - 5000 m<sup>3</sup> of water, 1 ton of nickel - 4000 m<sup>3</sup> of water<sup>16</sup>. (CBD Fifth National Report - Uzbekistan. UNDP Uzbekistan 2016.)

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<sup>16</sup> CBD Fifth National Report - Uzbekistan. UNDP Uzbekistan 2016.

### **3. Complex use of raw materials.**

Significant savings in primary resources can be ensured by the integrated use of raw materials, i.e. obtaining from it many useful substances.

An example of the integrated use of raw materials in coal mining: a method of degassing coal seams from a surface by wells.

The method is designed to reduce the gas evolution from the adjacent coal seams and the worked-out space to the development of a treatment site in order to extract the usable methane to be used, improve the safety of mining operations and the productivity of the bottom face by the gas factor.

In the production of oil, associated gas is lost, and it is the raw material for the chemical industry. Natural and associated gas receives a huge amount of goods.

When processing oil, you can get even more variety of goods: gasoline, mazut, kerosene, naphtha, light gas oil.

It is much more profitable to produce their goods than to bring from abroad for the currency, and there to supply raw materials - oil and gas. Valuable raw materials for the chemical industry - sulfur, its compounds, sulfur dioxide, which is released into the atmosphere by industry, enterprises and transport. In Uzbekistan they are higher than in Japan by 20 times, 3 times than in the USA and England.

### **4. Increasing the efficiency of product use.**

One of the most important aspects of resource saving is to increase the efficiency of using resource-intensive products and extend its service life from agricultural machinery, cars to clothing and footwear. Repairing a product than replacing it with a new one is not only economically viable, it also creates new jobs especially in the repair of household appliances, computers, and cars. Doubling the life of the car by half reduces the use of resources necessary for its production. The company "Toyota" re-uses sea freight containers, whose initial service life is 20 years.

In the Federal Republic of Germany, it is permitted to quarterly arrange cumbersome things near the house. Things are redistributed: they are taken away by those who hope to

repair them. It happens that there is nothing to export. To collect clothes for homeowners on the eve of the mailboxes put special packages, where it is packed, what else you can carry, take away charitable organizations.

In the US there is a system of "Sale". Things that were in use are sold at low prices. We have commissions for these purposes. You can not expose, for example, old cars, polluting the atmosphere or household appliances, the use of which is environmentally hazardous. But this is not beneficial to the manufacturer. In the US, only 17% of such goods are reused, in other countries - less. While in Uzbekistan much more sulfur, iron, copper, aluminum and other scarce resources are being spent.

#### **5. Information technology as one of the ways to reduce the expenditure of some resources.**

Electronics of the last decades of the twentieth century created telecommunications networks. Savings paper, materials, energy, spent on printing production and delivery of printed products. There is no need for long-distance and long-term business trips. Using the Internet saves material resources, time and energy. Today they are talking about the information "post-industrial civilization". Information media itself is changing too. They become smaller in size, even miniature.

Information technologies allow reducing power consumption and material consumption of the corresponding products and changing the whole industrial sphere radically. In 2004, a new mine was opened in Kemerovo, with a capacity of 3 million tons of coal per year, using computers and modern technologies.

#### **6. Economic regulation of nature use.**

In connection with the problems of population growth and the lack of resources, an important place in ensuring environmental protection and managing the use of natural resources is played by economic methods of regulation, whose role as the development of market relations should increase.

The basis of the economic mechanism of nature management is the payment of nature use. Any natural or legal person using natural resources is obliged to pay an appropriate fee in the form of taxes or special payments.

The system of paid use of natural resources and taxation should stimulate the rational use of natural resources by enterprises, organizations, individuals, and ensure the formation of centralized sources of financing for their protection and reproduction.

The payment for natural resources includes a payment for the right to use natural resources and a fee directed at the reproduction and protection of natural resources. At the same time, fees are charged at various rates for the use of natural resources within the limits set by the state authorities and for over-limit use. As a rule, the fees for over-limit use exceed the usual rates by five or more times. For each type of natural resources, a system of payments has been developed.

## 4. Practical part

### 4.1. Economic growth and the problem of consumption of natural resources of Uzbekistan

The nominal volume of gross domestic product for 2016 was more than 1 billion 50 million US dollars (Table 2). The real increase in gross domestic product (in comparable prices) is estimated at 2.35%. The GDP deflator, which makes it possible to determine the value of the current volume of newly created added value in base year prices, was 1.0180. The GDP per capita in current prices was 2304500.8 soums. And increased by 3.2%. At the same time, it should be noted that the development of the agricultural sector in the republic played a decisive role in this increase<sup>17</sup>. (CBD Fifth National Report - Uzbekistan. UNDP Uzbekistan 2016)

**Table 1 Basic indicators of GDP of Uzbekistan for 2013<sup>18</sup>**

Indicators	Units	2016	In% compared to 2015
Gross domestic product at current prices	thousand soums.	1169103800	102,35
The GDP deflator		1,0180	X
GDP per capita in current prices	soums	2304500,8	103,19
Incomes of the state budget to GDP	%	24,43	X
Expenditures of the state budget to GDP	%	30,79	X

Source: [www.stat.uz](http://www.stat.uz)

<sup>17</sup> CBD Fifth National Report - Uzbekistan. UNDP Uzbekistan 2016.

<sup>18</sup> [www.stat.uz](http://www.stat.uz)



**Table 2 Main socio-economic indicators of Uzbekistan**

Indicators	Units	2016	In% compared to 2015
Gross domestic product	Million soums.	1169100,0	102,35
The volume of industrial production (estimate)	Million soums.	883300,8	87,7
Index of physical volume of industrial production	%	81,7	X
The volume of investment in fixed assets (valuation)	Million soums.	201400,1	115,4
Volume of gross agricultural output	Million soums.	213000,0	140,4
in all categories of farms	%	103,63	105,51

Source: [www.stat.uz](http://www.stat.uz)

The volume of industrial production for a full range of enterprises for 2016 amounted to about 796 million US dollars, or 87.7% in relation to the corresponding indicator of 2015.

To a large extent, such a reduction is caused by the unstable work of a number of leading budget-forming industrial enterprises with a high energy intensity of production, whose indicators were reduced against the backdrop of weak external economic conditions. This is despite the fact that the state continues to provide substantial financial support, providing tariffs below the market ones (the amount of support for only three budget-forming enterprises in 2016 amounted to approximately 99 million US dollars, for January-February 2017 - 31 million US dollars). In turn, the increase in production was observed in food, light and flour-and-cereals industries<sup>19</sup>. (CBD Fifth National Report - Uzbekistan. 2016.)

<sup>19</sup>CBD Fifth National Report - Uzbekistan. UNDP Uzbekistan 2016.

As a result, the volume of products produced without taking into account the parameters of the Navoi Metallurgical Plant OJSC, JSCKizilkum Cement Plant and JSC CharvakGRES, which are in the state support procedure, exceeded the comparable level of 2015 by 16.6%.

However, the world situation and the current situation in the real sector of the economy led to a decrease in exports in 2016 compared to 2015 by 15.8% (mainly due to a reduction in exports of metals and products from them - by 113.8 million US dollars, or 50%, fuel and energy products - by 50.2 million US dollars, or 26%, clothing - by 12.3 million US dollars, or 45%) and imports by 8.6% (including including by reducing imports of fuel and energy products by 162.1 million US dollars, or by 17.9%, metals and products from them - by 50 , 6 million US dollars, or 27.3%).

At the same time, the aggregate foreign trade turnover of the economic entities of the republic for the specified period has formed in the amount of 2 billion 232 million US dollars, decreasing by 10.6% compared to 2015<sup>20</sup>(CBD Fifth National Report - Uzbekistan 2016.)

Taking into account the analysis of the condition, factors and conditions for the development of the economy of the republic, possible forecast socio-economic trends for 2018-2020 have been identified.

The forecast for the development of savings in 2018-2020 is based on the effectiveness of implementing a set of measures aimed at dynamic growth based on the use of modern tools and mechanisms of public administration, as well as the positive influence of foreign policy factors on the development of the social and economic sphere.

The projected nominal volume of GDP, in case of development of the expected trends in 2017, will increase by 16.6% to the expected level of 2016, while the absolute nominal value of the aggregate indicator will amount to 1367100.7 million soums. The real growth of the economy (GDP in comparable prices) in 2018 will be compensating and is estimated at 6.3%.

In 2018, real growth of the economy (GDP in comparable prices) will slow down slightly and amount to 2.9%. The nominal volume of GDP is estimated at 1529700.9 million soums or 111.9% of the forecast level of 2018.

The structure of GDP formation in 2019 will be characterized by the consolidation of a positive trend of increasing the share of the material sector, in which higher added values are created.

In 2018, the contribution of the material production sectors in the structure of GDP formation will increase by 0.53 percentage points to 33.48% in relation to the forecast level of 2017, by increasing the share of newly created value added in the industrial sector by 0.16 percentage points to 25.75%, the absolute value of which is 3 939.0 million soums and will increase by 12.6%<sup>21</sup>. (CBD Fifth National Report - Uzbekistan 2016.)

The predominant component in the structure of the gross domestic product in 2018 will remain the created added value of the service industries, whose size will expand by 10.8% compared to the level of 2017, while its contribution to the aggregate indicator of economic development (GDP) as a result of more the active increase in value added in commodity production will be reduced by 0.60 percentage points and will be 62.74% against 63.34% in 2014.

In 2019, the growth of the economy will somewhat accelerate, the real increase in GDP (in comparable prices) will be estimated at 3.9%, the absolute nominal value of the aggregate indicator will increase by 12.9% to 1727400.5 million soums.

The effectiveness of the economy will be characterized by the predominance of equity participation in the structure of GDP formation of the added value of service sectors with an upward trend in the share of newly created value in the material production sectors (+0.30 percentage points).

In PMR, albeit with a small number of enterprises, there is a need to protect the environment and rational use of natural resources.

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<sup>21</sup>CBD Fifth National Report - Uzbekistan. UNDP Uzbekistan 2016.

The average annual cost of basic production facilities for environmental protection in 2016 amounted to 62500 million soums. Of these, 69.8% of the total value (43600 million soums) account for the value of fixed assets for the protection and rational use of water resources; the share of the cost of fixed assets for the protection of atmospheric air and environmental protection from production and consumption wastes is 21.4% (13300 million soums) and 8.8% (5500 million soums), respectively<sup>22</sup>. (CBD Fifth National Report - Uzbekistan 2016.)

The amount of accrued fees for permissible and over-standard emissions of pollutants in 2016 amounted to 1657900 thousand soums, in fact, 1614200 thousand soums were actually paid or 139.2% to the level of 2015

As compensation for damage caused by violation of environmental legislation, organizations of the republic were charged and fined and paid in the amount of 1200 thousand soums, which is 52.0% less than in 2015.

The current costs of the organizations of the republic for environmental protection measures and rational use of natural resources in 2016 are characterized by the following data:

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<sup>22</sup>CBD Fifth National Report - Uzbekistan. UNDP Uzbekistan 2016.

**Table 3 The current costs of the organizations of the republic for environmental protection measures and rational use of natural resources in 2016<sup>23</sup>**

	2016, millions soums.	In % (times) by 2015	Structure,%
Current costs for environmental protection - total	226743,3	88,4	100
including:			
- protection and rational use of water resources	168039,8	92,9	74,1
- protection of atmospheric air	36931,0	53,5	16,3
- protection of the environment from pollution with production and consumption wastes	14688,3	3,0	6,5
- protection and rational use of land (land reclamation)	7084,2	4,2	3,1
Expenditures for capital repairs of the main production facilities intended for environmental protection – total	4498,7	42,3	100
including:			
- fixed assets, for trapping, neutralizing harmful substances that pollute the atmospheric air	668,7	15,2	14,8
- fixed assets, for wastewater treatment and rational use of water resources	3673,7	60,4	81,7
- special equipment for land reclamation	156,3	103,1	3,5

Source:<sup>23</sup> [www.stat.uz](http://www.stat.uz)

## 4.2. Reserves and use of natural resources in Europe

The countries of Europe (without the countries of the former USSR) occupy an area equal to 487 million hectares, but it has more than 30 states with a population of almost 500 million people. European countries are very heterogeneous in terms of natural conditions, in terms of size and volume of natural resource potential.

In the depths of Europe, 12% of the world's fuel and energy potential is concentrated, including 20% of the world's fossil coal reserves; large reserves of metallic ores (mercury, lead, zinc, etc.), native sulfur, potassium salts and a number of other types of minerals. But almost all European countries depend to one degree or another on the import of raw materials, especially fuel and energy.

In the depths of foreign Europe are concentrated various minerals. Some types of mineral raw materials form quite large concentrations and can fully meet the needs of the pan-European economy (fossil coals, natural gas, mercury, lead-zinc ores, potassium salts, graphite, etc.). However, most of the mineral resources in Europe are quantitatively insignificant and among them - oil, manganese and nickel ores, chromites, phosphorites. Therefore, Europe imports large quantities of iron and manganese ores, tin, nickel, uranium concentrates, copper, tungsten and molybdenum, bauxite, and oil. The demand for mineral raw materials for the European industry continues to increase steadily, although the scale of European consumption and processing of minerals far exceeds its specific raw materials supply.

Europe as a whole concentrates about 1/5 of the world's coal reserves, significant natural gas resources, but Italy, Sweden, France, Spain, Switzerland either completely lack these fuels or are not provided with enough. Great Britain is forced to import bauxite, nonferrous metal ores; Germany - iron ore, natural gas, oil<sup>24</sup>. (<sup>1</sup> Andrianov, V.)

The European territory has favorable climatic resources for growing many agricultural crops. In Europe, it is possible to grow a wide range of cultures of temperate and

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<sup>24</sup> Andrianov, V. National Wealth, Natural and Manpower Resources of Russia / V. Andrianov // Society and Economy. - 2016. - №4.

subtropical belts: early-ripening grains, vegetables and grass mixtures - in the north, and in the south - olives, citrus and even cotton.

The land area of Europe (without reservoirs) is small - 473 million hectares, of which 30% (140 million hectares) are plowed, cattle graze 18% (84 million hectares), forests (33% (157 million hectares) 92 million hectares (19%) - is occupied by populated areas, transport highways, mining developments, rock outcrops, glaciers.

The modern structure of the use of the land fund of Europe has evolved over many centuries, therefore it reflects the features of the historical development of the economy of this part of the world.

The agricultural development of the territory in the north, in the center and in the south of Europe differs significantly. The highest coefficient of agricultural use in Romania, Poland, Hungary, Eastern Germany, Denmark - more than 80%. In the west of Central Europe, plowed land is less: in the west of Germany and in France - 50%, in the UK - 40, in Ireland - only 17% of the agricultural fund. In the subtropical south, where there are few plains, arable land occupies only 1/3 of the land used in agriculture. For example, in Italy plantations occupy up to 17% of all agricultural land, in Spain - 16%, in Portugal - 14%<sup>25</sup>. (Gusarov V.2017)

Reserves for expanding arable land in foreign Europe are few, according to the FAO survey - only 6 million hectares.

Natural water is one of the most important and scarce natural resources in Europe. The population and various branches of the economy use huge volumes of water, and the size of water consumption continue to increase. The qualitative deterioration of water caused by uncontrolled or poorly controlled economic use is the main problem in modern water use in Europe.

The total water reserves concentrated on the surface or in the depths of Europe are quite significant: their volume is close to 1,600,000 cubic kilometers.

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<sup>25</sup>Vladimir Gusarov. Statistics: Proc. manual for universities. - Moscow: UNITY-DANA, 2017. - 463 p.

The modern economy of European countries annually takes from water sources for the needs of industry, agriculture and for water supply to settlements about 360 cubic kilometers of clean water. The need for water and water consumption is steadily increasing as the population grows and the economy develops. According to calculations, only at the beginning of the XX century industrial water consumption increased 18 times in Europe, significantly outstripping the growth of gross national product in terms of growth.

The countries of Europe have a sufficiently high agro-natural potential, as they are located in the temperate and subtropical geographic zones, have favorable thermal resources and moisture supply. But the increased population density, characteristic of Europe in all historical epochs, contributed to the long and intensive use of natural resources. Low fertility prompted Europeans to pay attention to the development of various ways to improve the soil and increase their natural fertility. It was in Europe that the practice of artificial improvement of the chemical composition of the soil cover with the help of organic and mineral fertilizers was born, variants of crop rotation systems and other agrotechnical measures were developed.

Forests cover in the foreign Europe 157.2 million hectares, or 33% of its territory. For each European, an average of 0.3 hectares of forest (in the world this rate is 1.2 hectares). A long history of economic development of European lands was accompanied by an intensive reduction of forests. Forests that were not affected by economic activity in Europe are almost not preserved.

Operational forests in Europe are 138 million hectares with an annual increase of 452 million cubic meters. They perform not only production, but also environmental protection functions. According to FAO and UNECE, the volume of forest production in Europe in 2000 will reach 443 million cubic meters.

Europe - the only part of the world, in which in recent decades, the area of forests is increasing. And this happens despite the high population density and the severe shortage of productive land. The Europeans' long-overlooked need to protect their very limited land resources and fertile soils from erosion destruction and regulate flood runoff was reflected in the overestimation of the protective functions of forest plantations. Therefore, the soil and



water conservation role of the forest, its recreational importance, has increased immeasurably.

Europe has a dense water transport network (navigable sections of rivers and canals) with a total length of over 47 thousand kilometers. The network of waterways reached in France almost 9 thousand kilometers, in Germany - more than 6 thousand km, in Poland - 4 thousand km., In Finland - 6,6 thousand kilometers.

The largest river in Europe is the Danube; it crosses the territory of eight states and annually transports more than 50 million tons of cargo. Its drainage basin differs in its climatic and morphological complexity. The most difficult was the stretch of the Danube in the area of the breakthrough of the Carpathians. At the beginning of the 1970s, the complex hydraulic complex Djerdap (dam, two hydroelectric power stations and navigable floodgates) was built, which improved the transport capabilities of the river.

The Rhine River, crossing the territory of the five states, is the main transport artery of Western Europe. The Rhine and its tributaries pass through the major industrial centers of Germany (North Rhine-Westphalia, Frankfurt-on-Main, etc.), France, Switzerland, so the freight traffic on the river exceeds 100 million tons per year<sup>26</sup>. (Gusarov V. 2017)

There is a trans-European system of navigable canals that connects the rivers of the Central European Plain - the Bug, the Vistula, the Odru, the Elbe, and the Weser.

### 4.3 Reserves and use of natural resources in Uzbekistan

The natural resources of Uzbekistan differ in size and diversity, insufficient knowledge, uneven distribution across the country with the greatest concentration in poorly-lived regions with unfavorable natural conditions, depletion of reserves in well-developed areas.

Mineral resources (minerals) are natural formations of the earth's crust of organic and inorganic origin used in the sphere of material production. In the direction of use, they are

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<sup>26</sup> Vladimir Gusarov. Statistics: Proc. manual for universities. - Moscow: UNITY-DANA, 2017. -

divided into fuel and energy (oil, natural gas, coal, uranium ore, oil shale, and peat), metal ore (ferrous, non-ferrous, rare, precious metals) and nonmetallic (chemical, construction materials, technical ore). Mineral resources are among the non-renewable types of natural resources.

Quantification of mineral reserves are determined by geological surveys. By degree of study, they are divided into categories: A - studied and explored with the greatest detail, B - previously explored without an exact spatial position, C1 - explored deposits of complex geological structure, and poorly explored reserves of minerals in new areas and C2 - prospective reserves. In addition, the forecast reserves for estimating new deposits, basins and promising areas are allocated. Explored and forecast reserves are combined into general geological reserves.

Mineral resources are the mineral and raw material base of industrial potential, they ensure economic and defense security of the country. The mineral and raw materials base created in the country plays an important role in the mineral and raw materials complex of the world. In Uzbekistan, about 20,000 deposits of minerals have been discovered and explored, of which more than one-third have been introduced into industrial development. Large and unique deposits (about 5%) contain almost 70% of reserves and provide 50% of the extraction of mineral raw materials. In terms of the volume of explored gas reserves, Uzbekistan ranks sixth in the world, coal - the fifth, oil - ninth, nickel, platinum and platinum, diamonds, and a number of other minerals - first-tenth in the world. There are large reserves of apatites, potassium salts, fluor spar and other non-metallic mineral resources.

According to some estimates, the recoverable value of the explored and estimated reserves of the main groups of minerals in world market prices is about 2 trillion. Of these, about three-quarters are oil, gas and coal. However, this huge mineral and raw material potential has been studied and mastered only partially. In the country, the existing harmonious system of geological service was destroyed, geological exploration works were minimized.

The low competitiveness of a significant number of explored deposits is noted at their revaluation according to the criteria of a market economy. In addition, the fields are dispersed throughout the territory, many of them have a low quality of ores, an unfavorable

geographic location. The best resources are depleted: gas deposits in the Kashkadarya region are depleted by 70-80%, there are few active stocks of apatites on the Karshi, placer gold in Navoi, Olmalik, Angren and Bukhara, iron ore deposits in Tashkent region have been completely depleted. Chromium, mercury, manganese, iron ore, as well as up to 80% of bauxite Uzbekistan is forced to buy.

Stocks of fuel and energy resources have been explored in almost all economic regions of the Uzbekistan, but most of them are concentrated in the east of the country - in Western and Eastern part of state.

The main balance reserves of Uzbekistan's gas are located in Kashkadarya in the Muborak district. Gas reserves are also found in Fergana and the Bukhara.

According to the explored oil reserves, Uzbekistan is one of the leading oil-producing countries in Central Asia. Oil deposits are located in 5 regions of the Uzbekistan, but its main reserves are concentrated in Bukhara, Andijan and Kashkadarya region.

The second place after fuel and energy resources in the material sector is occupied by metal ore minerals.

Ferrous ores include iron, manganese and chrome. Uzbekistan's explored iron ore reserves rank second in Central Asia after Kazakhstan.

In terms of explored reserves of non-ferrous and rare metals, Uzbekistan occupies a prominent place in the world's mineral and raw material potential. Our country stands out for copper reserves, lead and zinc, nickel. Uzbekistan has large reserves of titanium ores, tin, tungsten and molybdenum, there are reserves of aluminum raw materials (bauxites and nephelines).

Important stocks for the country's economy are the reserves of precious metals and diamonds. Uzbekistan has large reserves of gold, silver, platinumoids and diamonds. Most of the deposits are located in the region Navoi.

Among nonmetallic minerals, the most important are apatite and phosphorite ores, potassium salts, which are raw materials for the production of mineral fertilizers. The main reserves of this group of raw materials are located in the northern part of the country

(Karakalpakstan). In addition, Uzbekistan is well provided with reserves of fluorspar, piezo-optical and quartz sand, facing stone, chalk and dolomite.

Water resources are suitable for use of surface and groundwater of any territory.

Surface water resources of Uzbekistan include renewable water resources (river runoff), the total volume of which is estimated at 270 km<sup>3</sup>, lakes (32 km<sup>3</sup>), glaciers (10 km<sup>3</sup>), reservoirs (92 km<sup>3</sup>). Annually renewed river flow is concentrated in the basins of the largest transborder rivers: Sirdarya and Amudarya.

The natural resources of groundwater are about 90 km<sup>3</sup> / year and more than a third of them are concentrated in the largest artesian basins of the Central part of the country – Tashkent and Samarkand regions.

Agricultural land is 67% of the country's land fund, including arable land - 50%. Uzbekistan is characterized by high availability of arable land per capita - 0.85 hectares (on the average - 0.14 hectares). More than 4/5 arable land of Uzbekistan is concentrated in Central Uzbekistan, the Tashkent and Samarkand regions<sup>27</sup>. (www.stat.uz)

Biological resources are biological objects included in human economic activity as an object of labor and means of production.

The animals of the Uzbekistan are diverse. However, due to the northern position, the fauna of Uzbekistan is relatively poor in terms of the number of species. Our country stands out in the Central Asia for stocks of game animals and commercial fish.

In general, Uzbekistan's natural resource potential is almost equal to the resources of industrial and agricultural use. Industrial resources are significantly dominant only in the regions of Navoi and Kashkadarya, where the fuel and energy resources are the basis of the potential. In all other regions, agricultural resources are allocated to the capacity structure.

Each region of the country has many kinds of natural resources, but in different proportions, which creates the basis for integrated development of the economy of the region

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<sup>27</sup> [www.stat.uz](http://www.stat.uz)

and strengthening of ties with other regions for mutual supply of the missing types of resources.

#### 4.4. Correlation-regression analysis of anthropogenous effect on the state of natural resources

Correlation analysis is a method of studying the relationship between the interdependence of factors that are random variables (for example, between yields, the quality of arable land and the amount of fertilizers applied, the production of gross output and fund-raising, etc.). Its role is to identify the dependence of one attribute on the other (others), establish the form and direction, and the degree (measure) and tightness of the relationship between them.

Using the correlation method, it is possible to measure the relationship between two characteristics (pair correlation), three or more signs (multiple correlation). Taking into account the form of communication, linear and curvilinear correlation are distinguished. The linear pair relationship between the signs is represented by an equation of the direct form:

$$X_0 = a_0 + a_1 x_1$$

Where:  $x_0$  - the resultant indicator (dependent variable);

$x_1$  - factor (independent variable);

$a_1$  - coefficient of regression;

$a_0$  is the initial coefficient.<sup>28</sup> (Nikolaeva, I.P. 2008)

For a pairwise linear dependence, the tightness of the bond is characterized by the correlation coefficient. It can have values from 0 to +1. The "+" sign indicates the nature and direction of the connection. If, with an increase or decrease in the values of a factor characteristic, the value of the effective indicator also increases or decreases, then such a

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<sup>28</sup>Nikolaeva, I.P. Economic theory. Transforming economy / I.P. Mykolaeva. - Moscow: UNITY, 2008. - 310 p.

connection is called a straight line. In this case, the correlation coefficient is taken with the sign "+". The "-" sign indicates a feedback. The closer the value of the correlation coefficient to 1 or to the diagonal of the coordinate grid (the correlation field), the closer the connection. To measure the tightness of the relationship between the result (function) and factorial characteristics, the correlation relation is used in the curvilinear connection<sup>29</sup>.

The coefficient of linear correlation +0.15 indicates the absence of a connection between the signs. Poor communication is characterized by a correlation coefficient from +0.16 to +0.20, weak communication from +0.21 to +0.30, moderate - from +0.31 to +0.40, average - from +0.41 up to +0.60, high - from +0.61 to + 0.80, very high - from +0.81 to + 0.90, full communication - from +0.91 to +1.0.

### **Regression analysis**

Regression analysis is the study of the dependence of a random variable (a performance indicator - a function) on several other independent variables (arguments). Economic phenomena develop under the influence of numerous and diverse factors. Some of them can neither be taken into account nor measured. They are characterized by features of randomness and uncertainty. They are due to the fact that between the factors there are complex relationships. Often they act in opposite directions.<sup>30</sup>

If the form of communication is not established, then groupings are conducted with an appropriate analysis of the influence of factors on the outcome, or changes in the means by groups are studied, the parallel series are compared, and the graphs are constructed. The relationship between factorial and resultant characteristics can be linear (direct) or curvilinear (parabolic, etc.). The equation of connection is called the regression equation.

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<sup>29</sup>Nikolaeva, I.P. Economic theory. Transforming economy / I.P. Mykolaeva. - Moscow: UNITY, 2008. - 310 p.

<sup>30</sup> Yusupov, K.N. National Economy: A Textbook / K.N. Yusupov, A.V. Yangirov, A.R. Taimasov - Moscow: KNORUS, 2008. - 370 p.

With a direct pair relationship between the signs, the linear equation is applied:

$$Y_x = a_0 + a_1 x$$

To find these coefficients, it is necessary to solve the system of equations. The coefficients of regression show how many units on average the magnitude of the effective indicator changes with the change of each factor or one with the constancy of others by 1% or one.

$$831 = 7a_0 + a_1 2008582: 7$$

$$241056479 = a_0 + a_1 * 585659251174$$

$$118, 71 = a_0 + 286940, 2857$$

$$241056479 = a_0 + a_1 * 585659251174$$

After mathematical transformations we get:

$$a_0 = 217265$$

$$a_1 = 17419$$

We obtain the equation:

$$y = 217265 + 17419x$$

Let us determine the coefficient of pair correlation. For this we compile and fill out the table No.4.

**Table 4 Calculation table for determining the coefficient of pair correlation<sup>31</sup>**

№	X costs	Y - the number of objects having pollution	X*Y	X-Xav	(X-Xav) <sup>2</sup>	Y-Yav	(Y-Yav) <sup>2</sup>	X <sup>2</sup>
2010	245678	107	26287546	-41262,3	1702576222,367	-11,714	137,2244898	60357679684
2011	255468	109	27846012	-31472,3	990504768,082	-9,714	94,36734694	65263899024
2012	267549	110	29430390	-19391,3	376021961,653	-8,714	75,93877551	71582467401
2013	266366	119	31697554	-20574,3	423301232,653	0,286	0,081632653	70950845956
2014	295086	119	35115234	8145,714	66352661,224	0,286	0,081632653	87075747396
2015	327143	129	42201447	40202,71	1616258235,939	10,286	105,7959184	107022542449,00
2016	351292	138	48478296	64351,71	4141143131,510	19,286	371,9387755	123406069264,00
2017	2008582	831	241056479		9316158213,429		785,429	585659251174,00

Source: uznature.uz own calculations

**Table 5 Calculation table for determining the coefficient of pair correlation<sup>32</sup>**

№	YX	(y-yx) <sup>2</sup>
2010	4279682647	1,8315710
2011	4450214357	1,9804410
2012	466065323	2,1721710
2013	4640046619	2,1530010
2014	51403203	2,6422810
2015	5698721182	3,2475410
2016	6119372613	3,7446710
2017	25705505944	1,77716710

Source: uznature.uz own calculations

<sup>31</sup> Own calculations according to data in [www.uznature.uz](http://www.uznature.uz)

<sup>32</sup> Own calculations according to data in [www.uznature.uz](http://www.uznature.uz)



**Table 6 Calculation table for determining the coefficient of pair correlation<sup>33</sup>**

X <sub>av</sub> =	286940,2857	Y <sub>av</sub> =	118,714
X*Y <sub>av</sub> =	34436639,857		
SDF x =	36481,225	SDF y =	10,593
K correlations =	0,96		

Source: uznature.uz own calculations

X<sub>av</sub> - the average value of the factor sign

$$X_{av} = \Sigma x / n = 2008582/7 = 286940,2857$$

Y<sub>av</sub> - is the average value of the resultant trait

$$Y_{av} = \Sigma y / n = 831/7 = 118,714$$

SDF-standard deviation of the factor sign

$$SDF_x = \frac{\sqrt{\sum (x - x_{cp})^2}}{\sqrt{n}}$$

$$SDF_x = \sqrt{9316158213429/7} = 36481,225$$

SDF-standard deviation of the resultant characteristic

$$SDF_y = \frac{\sqrt{\sum (y - y_{cp})^2}}{\sqrt{n}}$$

$$SDF_y = \sqrt{785,429/7} = 10,593$$

r-coefficient of pair correlation

$$r = \frac{xy_{av} - (x_{av} \times y_{av})}{SDF_x \times SDF_y} = \frac{34436639857 - (286940,2857 * 118,714)}{36481,225 \times 10,593} = 0,96$$

The square of the linear correlation coefficient is called the linear coefficient of determination:

$$r^2 = d$$

$$(0,96)^2 = d$$

$$d = 0,9216$$

<sup>33</sup> Own calculations

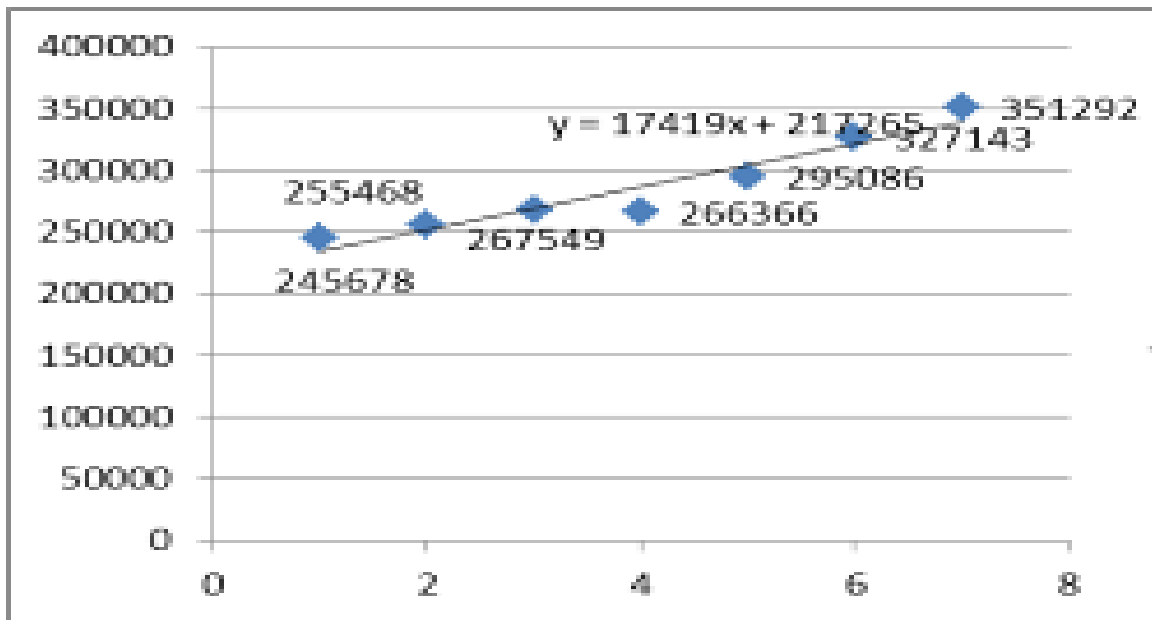
**Table 7 Cheddock Scale<sup>34</sup>**

Indication of tightness of communication	0,1-0,3	0,3-0,5	0,5-0,7	0,7-0,9	0,9-0,999
Characteristic of the strength of the connection	weak	medium	notable	high	very high

Source: Shumilov OS

For  $r = 1$ , the bond is functional, for  $r = 0$  there is no connection. If the coefficient of correlation with the sign "+", then the connection is direct, if "-", then the connection is inverse.

**Figure 2 The correlation field**



Source: own calculations

In the model under consideration,  $d = +0.9216$ , this indicates a very high connection.

<sup>34</sup> Shumilov OS, Sokolovsky NK Economics of Nature Management: Textbook. 2nd ed.-M.: INFRA-M, 2012.

## Conclusion

The problem of rational use of natural resources and the impact of their limitations on the country's economic growth is not new. Undoubtedly, economic growth leads to an increase in the country's wealth as a whole, expanding its potential in combating poverty, hunger and solving other social problems. That is why a high level of economic growth is one of the main targets of economic policy in many countries of the world.

At the same time, natural resources are means of subsistence, without which man cannot live and which he finds in nature.

After my work, I can draw the following conclusions:

1. Economic growth is one of the most important indicator of the country's development and the standard of living of the population. The economic growth is influenced by many indicators, the main of which are capital, land, labor and entrepreneurship;
2. Economic growth can be defined as the growth of real GNP or the growth of real GNP per capita. It ensures the growth of production, used to solve domestic and international socio-economic problems.
3. The state can play a significant role in economic growth with the correct conduct of flexible fiscal, monetary, pricing and investment policies.
4. In our time, consumption of natural resources is increasing, while non-renewable sources of resources can soon run out.
5. Natural resources are a necessary (but not mandatory) condition for the development of the economy.
6. One of the most important problems of modern society is the rational use of natural resources.

7. In addition to economic solutions, the interaction of the economy and the environment should be aimed at achieving the main goal - providing and enabling environment for the whole society, which is possible only with a harmonious economic and environmental approach based on humanistic and moral principles.

8. Recycling, integrated use of raw materials and others can be referred to possible ways of solving the deficit of natural resources and their irrational use.

At the same time, despite the complicated and ambiguous economic situation in the world, the deteriorating economic situation of a number of neighboring states, the results of the socio-economic development of the republic on a number of indicators in general in the existing external environment in 2016 can be characterized as positive if we compare the situation - external influence and internal capabilities.

Speaking about the protection of the environment and the rational use of natural resources, it can be noted that the state spends a lot of money to improve our environment and strives to reduce the deficit of natural resources.

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### Internet resources:

23. [www.stat.uz](http://www.stat.uz)
24. [www.uznature.uz](http://www.uznature.uz)
25. [www.undp.org](http://www.undp.org)