

# MANAGEMENT OF NATURAL RESOURCES IN THE CENTRAL ASIAN REGION

Mukhammadjon Khikmat<sup>1</sup>, Daina Znotina<sup>2</sup>

<sup>1</sup> M.soc.sc., Rezekne Academy of Technologies, Rezekne, Latvia, e-mail: [maga31282@gmail.com](mailto:maga31282@gmail.com)

<sup>2</sup> M.soc.sc., lecturer, Rezekne Academy of Technologies, Rezekne, Latvia, e-mail: [daina.znotina@rta.lv](mailto:daina.znotina@rta.lv)

**Abstract.** *The term "natural resources" refers to both the natural and socio-economic realms. Natural resources - bodies and forces of nature - are linked to ensure close interaction in the process of nature management. Currently, this specific region has some vulnerable issues such as biodiversity loss and land degradation that are connected with poor resource management. The activities of modern society are followed by enormous changes in nature, which are reflected in the Earth's exterior appearance as well as the states of geosystems. Modern production is distinguished by the inclusion of significant reserves of natural resource potential. However, its participation and application are ineffective. Sustainable development necessitates the management of natural resources in a sustainable and integrated manner. The main purpose of the work is to investigate the main natural resources of the Central Asian region, and to show the cost of poor management. The methods that were used are synthesis, analysis, comparison method, and forecasting method. The novelty of the research is the attention paid to the mismanagement of natural resources in a specific region.*

**Keywords:** *development, management, natural resources, potential, social economics.*

**JEL code:** *N5, O1, Q2.*

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## Introduction

The concept of "natural resources" belongs to both the natural and socio-economic spheres. By linking these areas, natural resources - bodies and forces of nature, ensure their close interaction in the process of nature management. Natural resources - space-time category; their volume is different in different regions of the world and at different stages of the socioeconomic development of society. Central Asia is a dynamic and diverse region that is experiencing steady economic growth and new development possibilities. Smart management of the region's energy and water resources is critical to the region's continued growth, prosperity, stability, and well-being. Despite the fact that Central Asia is becoming more globalized, national aspirations such as food security and reliable energy services continue to drive development decisions.

The aim of the present paper is to investigate the main natural resources of the Central Asian region, to show the cost of poor management.

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The first part of the paper deals with the concept of natural resources potential. The second part introduces the classification of main resources in this specific region.

**Research tasks:**

- discuss the theoretical aspects of natural resources;
- analyze the natural resource potential of the Central Asian region

**Research period:** is modern economy of recent years 2011-2021.

**Research methods:** analysis, observation and secondary data collection

**Research problem:** mismanagement of natural resources and the cost of it.

**Hypothesis:** An important point in the rational use of natural resources is planning and forecasting the use of natural resources. When planning, one should take into account the ever-increasing rate of use of natural resources and make a prospective calculation of their consumption on the basis of mathematical forecasting methods.

### The concept of natural resource potential

The natural resource potential of the territory is the totality of the natural resources of the territory that can be used in the economy, taking into account the achievements of scientific and technological progress. The natural resource potential of the territory is the most important economic factor, one of the qualities by which the economic and geographical position is assessed. The most important basis for the economic development of any region and one of the main conditions for the location of productive forces on its territory is the set of natural conditions and resources characteristic of it. The quantity, quality, and spatial combination of resources, the degree of supply is the most important factor in the location of the population and its economic activity (Kerimov et al., 2018).

Any type of resource is beneficial for the economy of the region and rises the potential of natural resources of any specific country in Figure 1.



**Fig. 1 Types of natural resource potential** (Ezoteriker, 2021)

The functioning of national economies and the entire world economy is based on economic resources (factors of production) - natural, labor, capital (in the form of real capital, i.e. in the form of means of production, and financial, i.e. in monetary form), entrepreneurial, as well as scientific (scientific and technical, information knowledge). Taken together, economic resources form the potential of a national economy or a region of the world, or the entire world economy.

Location, operating conditions, and the nature of the use of natural resources affect the directions and rates of regional development. Natural conditions and resources, their territorial distribution, and spatial combinations are the most important factor in the emergence of economic specialization of regions, the formation, and development of territorial systems of different ranks (economic regions, territorial production complexes, industrial districts, nodes, and centers). It is important to take into account the spatial distribution of natural resources to determine the natural prerequisites for the development of the economy and more rational use of natural resources. In this regard, the economic assessment of natural conditions and resources is an important component of the economic and geographic characteristics of a territory, primarily from the point of view of explaining and analyzing the factors that determine the formation of its economic specialization (Simakova, 2013).

Central Asia is a dynamic and diverse region that is experiencing steady economic growth and new development possibilities. Smart management of the region's energy and water resources is critical to the region's continued growth, prosperity, stability, and well-being. Despite the fact that Central Asia is becoming more globalized, national aspirations such as food security and reliable energy services continue to drive development decisions.

The concept of natural resource scarcity has up until this point defined economic analysis generally, and particularly that pertaining to the market for natural resources, with many of the theoretical concepts being closely related to resource allocation issues at the micro- and macroeconomic level. According to the increasing supply-demand ratio on the market, on the one hand, and the way in which these resources are used in the manufacturing process, on the other hand, natural resources (raw materials and energy) are scarce in this sense says (Bulearca et al., 2011).

### **Socio-economic importance of natural resources**

The natural environment serves as the natural basis for human economic activity. All human production activity can be represented as a process of transforming nature into forms that are acceptable for use. From the point of view of the needs of society, all bodies and forces of nature can be conditionally subdivided into two groups: those directly involved in material production and the sphere of non-material services (natural resources) and all the rest (usually referred to as natural conditions). Natural

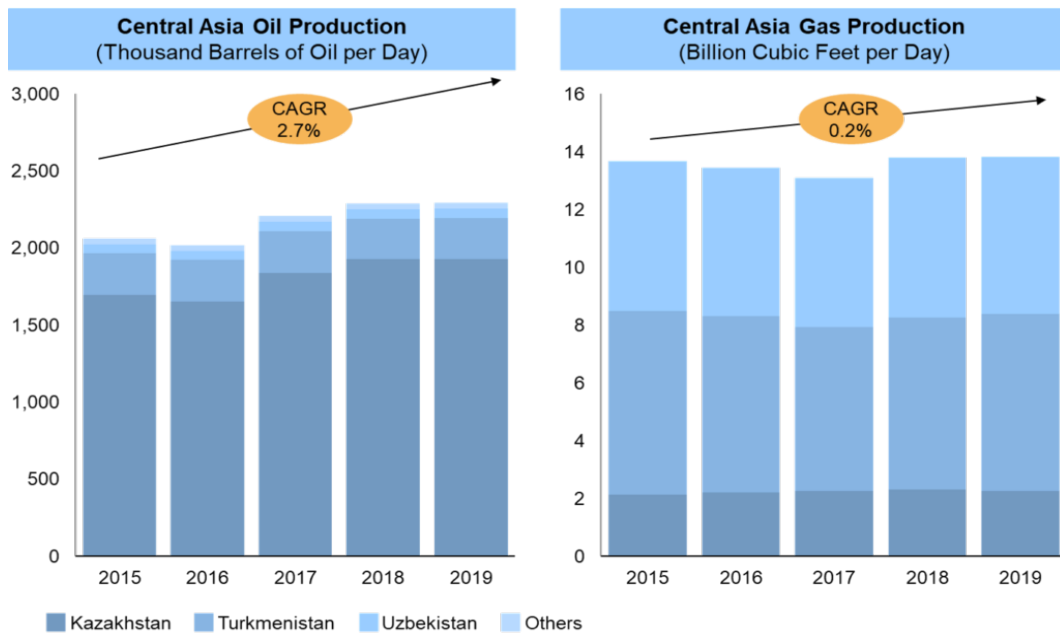
conditions are elements of nature that are not directly used in the production process but affect the lives of people. The dependence on the natural conditions of agriculture, the mining industry, certain types of transport, recreational activities, etc. is especially strong. Natural conditions can be favorable (optimal temperature regime, sufficient air humidity, etc.) or negatively affect human economic activity. Alpine relief, harsh climate, permafrost, swamps, deserts complicate the economic development of the territory.

Natural resources' economic importance is determined by the amount of two main variables: current income flows and prospective future income flows. The first is mostly determined by production costs and market demand, while the second is determined by abundant resources and management strategy. Present and future income flows must be included to fully comprehend the true value of natural resources. If income is derived from the depletion of natural capital, the former can be a false predictor of how natural resources will influence economic development over the years. Resource-rich countries may provide the groundwork for long-term development and poverty alleviation by managing natural resources responsibly - in the case of renewable resources - and as sources of revenue for future growth - in the case of non-renewable resources (OECD, 2011).

### **Natural resources of the Central Asian region**

Central Asia, once shrouded in secrecy and famed for its trans-Asian trade via the Silk Road, is now an open, dynamic region connecting Eastern Europe and West Asia. It is a region rich in natural resources, such as oil and gas, and home to a diverse range of animals and plants. Central Asia, which includes Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, is a vast land mass that separates Eastern Europe and the Caucasus from East and South Asia.

Oil and gas production in the region has grown at 2.7 percent and 0.2 percent per year, respectively, over the last five years (Figure 2). Although Kazakhstan produces some gas, the majority of it is reinjected to boost local oil recovery. On the contrary, Turkmenistan and Uzbekistan export the majority of their gas to China, Russia, and Azerbaijan. The produced gas can also be exported to neighboring European countries such as Turkey and Georgia, as well as India and Pakistan in Asia.



**Fig. 2 Oil and gas production in Central Asian region in the period of 2015-2019 (AdiAnalytics, N.D.)**

Central Asia is rich in energy resources. Kazakhstan, Uzbekistan and Turkmenistan, located in the lower reaches of the rivers, have significant reserves of oil, gas and coal, as well as significant potential in the field of generating wind and solar energy. The upper reaches of Tajikistan and the Kyrgyz Republic have significant, but not fully utilized, hydropower potential (Batsaikhan & Dabrowski, 2017).

The presence of such diverse energy systems implies the possibility of meeting the seasonal demand of all countries for electricity in the most economical and environmentally friendly way: with the maximum use of inexpensive hydropower in the summer and reliable sources of thermal energy in the winter when the climate is cold, limits the production of hydropower. At the same time, countries can build capacity to develop sources of wind and solar energy in the future.

Cotton played a key role in Central Asia's industrialization and collectivization programs, particularly in Uzbekistan. Uzbekistan has the most share of cotton production among other countries of Central Asia. Moreover, in accordance with international quality parameters, approximately 86% of Uzbek cotton fiber can be attributed to fiber with high tenacity.

### **The cost of poor resource management**

According to (Bulearca et al., 2011), market failures and excessive monopolies - are "the finest friends of conservatism," and this topic has been debated frequently. It should be underlined that monopolies can occur in

both the manufacturing and mining sectors, affecting depletion rates and, consequently, the cost and price of mining and fossil fuel products. In this regard, it is important to comprehend how monopolistic behavior in the mining sector might vary from totally competitive behavior. The goal of every firm is to extract resources in a way that maximizes the present value of earnings over time, and this needs to be emphasized once more.

Mismanagement and inferior technology are the primary causes of Kazakhstan's environmental problems, which include toxic waste (often radioactive), water pollution, and industrial pollution. Previous nuclear tests' radiation levels, as well as vast geological uranium deposits and uranium mining waste, pose significant environmental and health risks. More social issues, such as poverty and security, which both leads to environmental degradation, must be addressed in Kyrgyzstan. Lack of governance, ethnic conflicts, and poverty wreak havoc on already vulnerable ecosystems (often mountainous).

In comparison, it appears that the Kyrgyz government is the only one in Central Asia that explicitly states in its policies the link between environmental stress, poverty, and security risks.

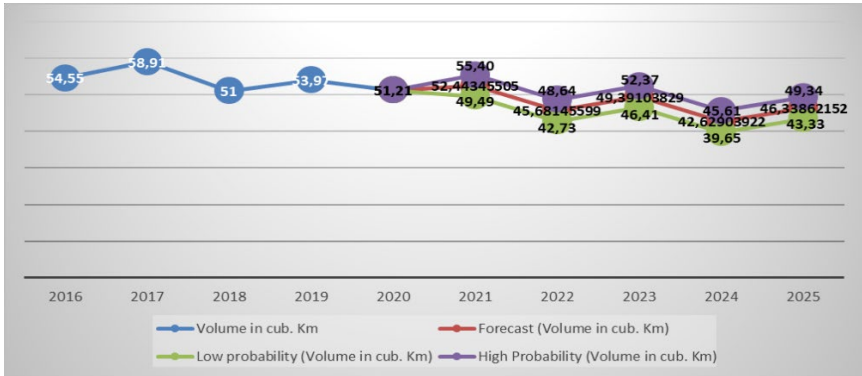
Central Asia's environmental issues are diverse. The collaboration of the Central Asian Republic can be advanced further by addressing environmental concerns. The environmental issues in Central Asia are various. The Aral disaster, as well as biodiversity loss, are two global issues. The degradation of land is severe, and water resources are diminishing and degrading in quality. Climate change is a new threat. Droughts, heat waves, and mudslides are becoming more common. Some issues that should be addressed are as follows: Social adaptation to such changes is becoming increasingly difficult; economically, we must spend significantly more resources to produce the same amount of crop in drought and water-stressed conditions. Conservation and maintenance of nature are financially viable.

According to (Lockwood et al., 2010) the majority of environmental problems are "wicked problems," requiring new institutional and policy solutions. The emergence of this category of policy challenge is characterized by complexity and contestation resulting from diverse problem causes, divergent problem viewpoints, different problem-solving approaches, and disjointed institutional environments. Along with that, there is a transition from government to governance, which is partly a reaction to the need for fresh ideas to deal with these issues. "The interplay among institutions, processes, and traditions that determine how authority and responsibility are exercised, how choices are made, and how citizens or other stakeholders have a voice" is what we mean when we say "governance." A system of government that favors cooperative methods among governmental and non-governmental players from the commercial sector and civil society has come

to be known as "new governance." It is now widely acknowledged that dealing with wicked problems is, in large part, a problem of interaction. This new paradigm of governance. These governing structures are particularly noticeable in policy domains affected by the sustainability discourse, which places unique demands on institutions and policy and has an explicit ethical underpinning in concepts of participation, accountability, stewardship, and duty of care.

**Water resources utilization volume forecasts using linear regression method**

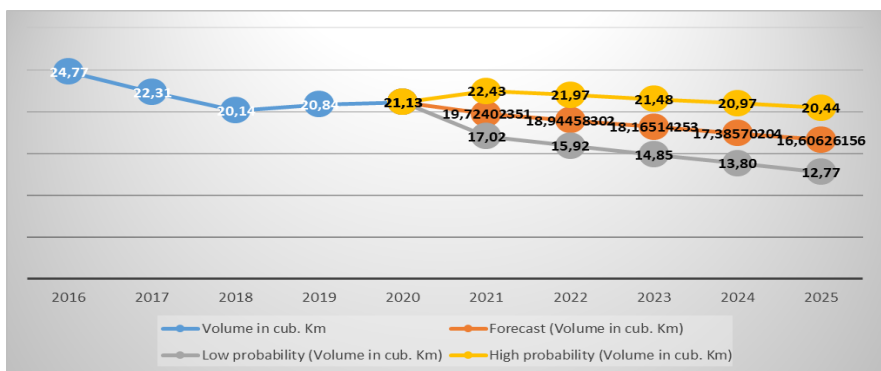
Recently, the impact of global climate change has been acutely felt in the Central Asian countries, especially this year. Drought and water shortages have led to a reduction in agricultural crops and the loss of livestock not only in the countries of the so-called "lower reaches" - Kazakhstan and Uzbekistan, but also in Kyrgyzstan - the country of the "upper reaches", where several transboundary rivers of Central Asia are formed.



**Fig. 3 Water utilization forecast in Uzbekistan in the period of 2016-2025 (compiled by the authors)**

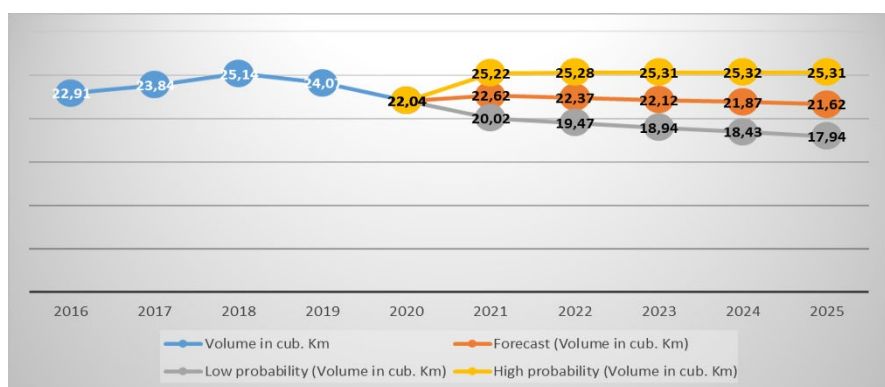
The highest volume of water resources used in Uzbekistan was in 2017, almost 59 cubic kilometers (Figure 3). Coming to 2020 the utilization of water dropped to 51,21 cubic kilometers. However, according to linear regression calculation, the result shows that by 2025 the water resources use will come to the point of 46,33 cubic kilometers.

Certainly, the difference in water resource utilization by 2025 is not so big, but according to the forecast after calculation, the result is positive. The authors' guess that such a scenario could happen due to new programs toward sustainable water resource use and new technologies that are being integrated into irrigation systems.



**Fig. 4 Water utilization forecast in Kazakhstan in the period of 2016-2025 (compiled by the authors)**

Compared to Uzbekistan, Kazakhstan uses twice less amount of water resources. Not so long time ago the use of water was highest in this specific period almost 25 cubic kilometers. It can be seen that coming to 2020 the rate drops noticeably to 21,13 cubic kilometers (Figure 4). According to the calculations done by the authors, the forecast shows that by 2025 the utilization of water resources will drop significantly to almost 17 cubic kilometers.

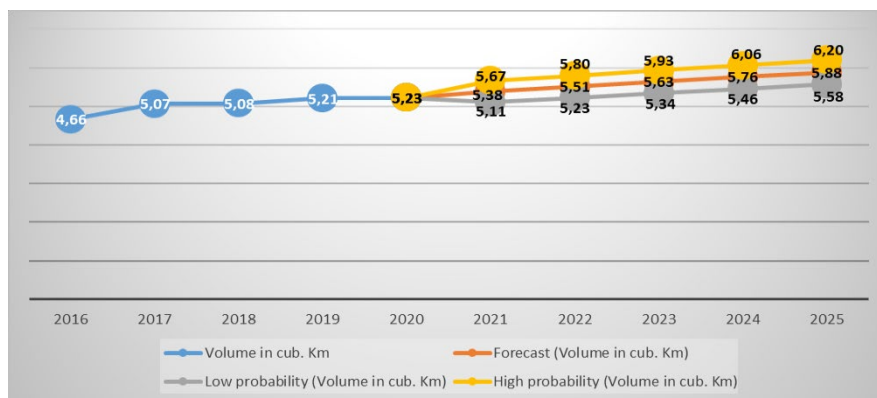


**Fig. 5 Water utilization forecast in Turkmenistan in the period of 2016-2025 (compiled by the authors)**

Turkmenistan has the most scarce amount of water resources overall in the Central Asian region (Figure 5). Even if this state is abundant with oil and gas resources, water remains the actual issue on a national level in Turkmenistan.

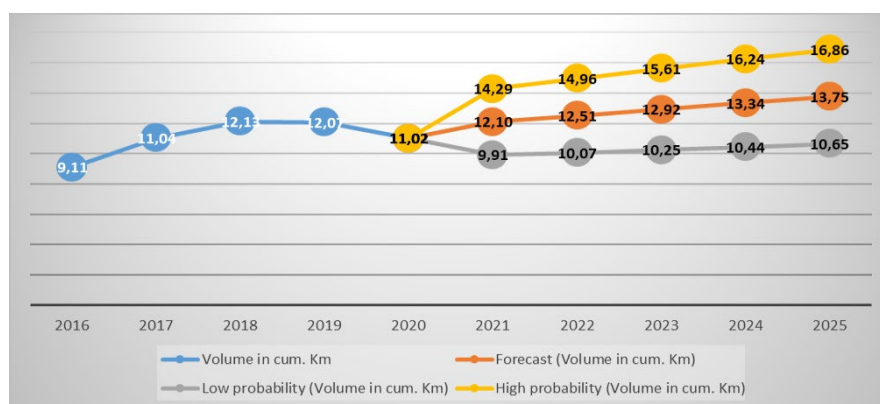
The authors assume the case of Turkmenistan as follows; the state does not have a strong policy for supporting sustainable water use programs. The country pays more attention to the mining of other precious resources while water becomes a scarce resource due to climate change, especially in this region.





**Fig. 6 Water utilization forecast in Kyrgyzstan in the period of 2016-2025 (compiled by the authors)**

The Figure 6 shows the water resources use in Kyrgyz Republic in the period of 2016-2025 years. In 2016 at the beginning of this period the rate is 4,66 cubic kilometers of water. Through the next years the water resources use rises due to fact of rising population and heavier load on irrigation of lands for agriculture. Coming to the 2020 it showed 5,23 cubic kilometers. By 2025 the rate has a stable rise but the volume is not significantly more it comes to 5,88 cubic kilometers during a calendar year.



**Fig. 7 Water utilization forecast in Tajikistan in the period of 2016-2025 (compiled by the authors)**

The Figure 7 shows the least volume of water resources utilization in 2016. Coming to 2020 the rate shows 11,02 cubic kilometers. Starting from 2021 by 2025 according to calculations done by the authors the forecast indicates a stable rise pointing to almost 14 cubic kilometers.

In the conditions of transboundary surface water resources, in the very near future, Central Asian states may face the issue of providing water resources. This is connected both with the problem of low water supply and quality of water consumed, which is objectively facing all the states of the region, and with an increase in water demand in this region. Obviously, the

solution to this problem should be comprehensive and full-scale. It is necessary to solve not separate tasks, but the whole issue, combining actions at the domestic and international levels. In this regard, the authors consider it necessary to carry out a set of measures in the following areas:

1. Promote partnerships between public sector, civil society and private sector stakeholders, ensuring that these partnerships remain equitable and transparent, protect the interests of consumers and investors, and ensure compliance with strict environmental regulations.
2. Ensure the expansion of the information base to support effective planning and decision-making, strengthen management capacity. To this end, in modern conditions, it is expedient to develop a unified Information system (database) of the state and management of water resources.
3. Ensure the use of the potential of the scientific sphere. To do this, it is advisable to develop a network of subordinate scientific organizations that provide scientific support for the current and future activities of state bodies. At the state level, it is necessary to coordinate disparate and partially duplicated scientific research and scientific and technical developments.
4. To develop a draft of a new long-term Agreement on the use of water and energy resources, within which it is necessary to provide for the development of an effective water distribution scheme.
5. The activities of departments that ensure the management of water resources of the state, as a whole, largely depend on the appropriate information support, the correct organization of information flows to provide the necessary support in decision-making.
6. In general, the strategic goal of the national policy on water resources should be the implementation of long-term comprehensive measures aimed at eliminating the negative consequences of limited water resources and creating conditions for economic growth, solving social and environmental problems, and regulating interstate water relations.

### **Conclusions and suggestions**

1. Multiple levels of environmental governance have two consequences for accountability. In order for higher level governing authorities to receive the cooperation of other governing bodies and stakeholder groups, it is first necessary for governmental authorities at all levels to demonstrate that they are fulfilling their assigned responsibilities. Secondly, it is also necessary for acceptance that accountability transcends downward and outward in addition to upward.
2. Justice is a complex and challenging aspect of environmental governance. The following elements call for guidance: (i) the novelty of juggling

competing public and private interests, (ii) the clear and equitable assignment of roles and responsibilities and stakeholder acceptance of those roles and responsibilities, (iii) the conflicts between priority areas and equal and fair resource allocation, and (iv) the needs of those who lack a voice, such as nonhuman animals and coming generations.

3. The capability notion recognizes that tackling difficult problem challenges often necessitates taking into account how well the institutional, organizational, and human resources at hand will serve that purpose. Some of these are leadership, knowledge availability, organizational processes, and an abundance of material and human resources.
4. The natural resource potential of the territory is the most important economic factor, one of the qualities by which the economic and geographical position is assessed. One of the most essential bases of societal economic development is the efficient extraction and utilization of natural resources. Conservation, rational and comprehensive use of this method is part of the tasks of rational nature management.
5. The low level of intraregional trade in Central Asia, which accounts for less than five percent of the total trade, makes the region one of the least economically integrated regions in the world and prevents the stream of investment.
6. Presently, natural resource degradation causes environmental pressures such as qualitative and quantitative impacts on water resources, overexploitation, desertification, soil erosion, deforestation, and environmental degradation.
7. In the future, the governments of the countries of Central Asia need to increase the volume of foreign investment by providing favorable tax rates and maintaining good transport and infrastructure network, in order to increase the volume of gas and oil production, as the region is abundant with these resources.
8. Ecological institutions should establish more widely water reuse practices. For an instance, Greywater systems and rainwater collection systems should be used on a whole national level. It will result on less water consumption and resources will be managed more sustainably.
9. The forest area in the Central Asian region should be expanded. As having present environmental issues climate change is also becoming one of the main global problems, the presence of bigger forest areas would be the perfect solution of many environmental issues of the region. This should be managed seriously by governments of the states.

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