

«Increasing the area of perennial plantings in the mountains of Kyrgyzstan would have a positive effect on slowing down the melting process of glaciers in the region, as well as on CO<sub>2</sub> uptake on the planet», - Azamat Temirkulov, associate professor, doctor of political sciences from Bishkek, wrote in his article for CABAR.asia.

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### A brief review of the article:

- Key areas of cooperation in Central Asia have become factors of instability, the most conflicting of which is considered water;
  - Against the background of melting glaciers, a steady demographic growth is observed in the countries of the region. Demographic growth will put additional strain on limited water resources in downstream countries;
  - Decline in the coverage of glaciers in Kyrgyzstan may have the most negative environmental, social, economic and political consequences for the entire Central Asian region, and possibly even for the Eurasian continent;
  - It is necessary to increase the forest area in the mountainous extents where glaciers are located. For this, it is necessary to restore mountain coniferous forests.
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According to the World Bank research, the countries of Central Asia are likely to face the fact that the region will experience more significant warming than the world in average. For example, if the world gets warmer by 4 ° C, by the end of the 21st century the average annual temperature in Central Asia will rise by 7 ° C, compared with the period from 1951 to 1980. This will have an inevitable negative impact on the process of glacier melting, which in turn will lead to issues with water resources for the entire region.

This issue is exacerbated by the economic, demographic and social trends observed in Central Asia. Kyrgyzstan, which has 45% of all water resources in the region, also faces the problem of glacial melting. If these trends continue in Kyrgyzstan, the entire region will risk facing social, economic and political issues.

Increasing forest area in the mountainous regions of Kyrgyzstan, where glaciers are located, could solve this problem.

**Glaciers are rapidly melting in Central Asia**

It has been 28 years since the republics of Central Asia gained independence. In the meantime, new countries once united into one single state and having close economic and administrative-household ties, are now engaged in the protection of their national interests. Often it was to the detriment of collective, region-wide interests.

Pursuing their short-term interests, the new republics questioned cooperation in the general system of energy supply, irrigation, transport communications, as well as in trade and even in environmental protection. This has led to the degradation of regional cooperation in general, including such important areas as border delimitation and security. Key areas of cooperation in Central Asia have become factors of instability, the most conflicting of which is water;

Water is the source of life, and for Central Asia it is also a source of peace, stability and prosperity. Its absence can lead not only to social and economic problems, but also to conflicts. The following reasons are provided for this statement.

Glaciers are rapidly melting in Central Asia. According to the deputy head of the UN Regional Center for Preventive Diplomacy for Central Asia, Fedor Klimchuk, - "Considering the prevailing glaciation trend, glaciologists estimate that by the end of the 21st century, glaciers in the region may disappear completely."[\[1\]](#) Against the background of increasing population in the region, the melting of glaciers will lead to the most acute water deficit. For example, the resources of the *Syr Darya River* are no longer enough for all 25 million people living in the territory that is fed by its waters.

"The natural flow of the *Syr Darya* is about 37 cubic kilometers, and the total use of water resources now makes up more than 130 percent of the natural flow. The needs of residents for water today are provided by accumulating sources. It is no longer possible to provide people with water in the *Syr Darya* basin without reservoirs," - said Sulton Rakhimzoda, First Deputy Minister of Energy and Water Resources of Tajikistan.[\[2\]](#)

The same situation is observed in the Aral Sea basin, which gives an average of 148.5 cubic kilometers per year, out of which 116.7 cubic kilometers is a river flow. Kyrgyzstan accounts for 47.5 cubic km. (Kuzmichenok, 2007). In the glaciers and snowfields of Kyrgyzstan, occupying 5.7 thousand square kilometers, about 13 annual flows are accumulated.



Map of the Aral Sea basin, showing the full flow of rivers and the use of water resources. Photo: ZOI environment network

In the midst of melting glaciers, a steady demographic growth is observed in the countries of the region. According to the forecasts of the international organization Population Reference Bureau, by 2050 the number of Central Asian residents will reach 96 million people. That is, an increase by 30 million people in relation to 2015.<sup>[3]</sup> A larger population will need a correspondingly larger amount of water, both drinking, technical, and for irrigation. Demographic growth will put additional strain on limited water resources in downstream countries.

In addition, one of the main economic activities in the countries of Central Asia is agriculture. In 2013, the share of this sector in the net domestic product was about 10%. For the period 1990-2013, Central Asian agriculture increased by \$ 11.6 billion, or 65.5%, to \$ 29.3 billion.<sup>[4]</sup> The change occurred at \$ 5 billion due to an increase in the population of Central Asia by 14.1 million people. (World Economy, 1970-214).

Unfortunately, the use of new technologies in agriculture of Central Asian countries, such as drip irrigation, has not yet been developed, and priority is still given to traditional methods of extensive irrigation, which requires a huge amount of water resources.

An increase in the number of population will further stimulate demand for agricultural products, which means that it will create an additional burden on the use of water resources.

The degradation of soil and reduction of yields are observed in the agrarian areas of the region, which entails an increase in unemployment rates. The population is actually “pushed out” from rural areas to the cities.

Thus, the rapid melting of glaciers, steady demographic growth and no real alternative economic activity to agriculture, increase risks in ecology, health, agriculture and regional security. Central Asia covers an area of over 4 million square km., but at the same time deserts, semi-deserts and dry steppes occupy more than 70% of the entire territory, which indicates a lack of moisture in the region, except for mountainous areas. Moreover, a reduction of the forested area is currently observed in the mountainous regions (Shukurov, Mustafin, 2007). Further shortage of water resources, especially in downstream countries, threatens to entail in the future the migration trend from downstream countries to upper reaches of the rivers, especially in the Fergana Valley, as well as provoke interstate and local conflicts for the vital resource.

### **Possible consequences of glacial melting in Kyrgyzstan**

The population of Kyrgyzstan and the authorities of the country as well as of other countries in the region traditionally do not pay much attention to environmental issues. However, Kyrgyzstan, where mountains occupy 94% of the entire territory, is a unique country where the issue of mountain ecological systems should be of strategic importance and should occupy a priority place in public administration and in the population’s lifestyle.

### **More than 45% of all water resources of Central Asia are formed in the mountains of Kyrgyzstan.**

More than 4% of the country’s territory is occupied by glaciers and snowfields, on water resources of which the environment, biodiversity, the health and the economic activities of citizens of Kyrgyzstan, Kazakhstan, Uzbekistan and Turkmenistan depend. Figuratively speaking, the mountains of Kyrgyzstan are the “water tower” of the entire Central Asian region.

However, in 20 years the average temperature in Kyrgyzstan has increased from 4.8 ° C to 6 ° C. According to the pessimistic scenario, by the end of this century, the average temperature in Kyrgyzstan may rise by 8 ° C. “Because of its geographic location,

Kyrgyzstan is one of the most vulnerable countries to climate change in the Central Asian region," - said UNICEF climate change specialist Nicholas Molyneux.[\[5\]](#)

The area of glaciers in Kyrgyzstan is terrifyingly reducing. According to scientists, over the past 50 years, Kyrgyzstan has lost more than 30% of its glaciers, and by the end of this century it risks losing more than 80%.[\[6\]](#)

If these forecasts are realized, negative consequences are expected not only in Kyrgyzstan itself, but also in the whole Central Asia.

First of all, drought, reduction of flora and fauna, environmental disasters, such as the Aral Sea, are the direct possible consequences of area of glaciers reduction. As a result, this will inevitably affect the health of inhabitants in the region.

Secondly, the melting of glaciers will also adversely affect the economies of the Central Asian countries. Reduction of the water level in rivers will negatively affect hydropower, weakening the potential of large hydropower plants, which could undermine the entire system of energy security in Kyrgyzstan. Agriculture, being the largest consumer of water in the region, risks critical volume reduction of its products, posing a threat to food security of the entire region, especially with a rapidly growing population.

Third, the shortage of water resources, especially in downstream countries, may entail in the future the migration trend from downstream countries to upper reaches of rivers, which will create additional demographic pressure on natural resources, as well as on the social infrastructure of mountainous countries.

Thus, the reduction of glacier areas can have the most negative impact on the national security of Kyrgyzstan and the entire Central Asian region, since the lack of water in agriculture can create threats of escalating cross-border local conflicts.

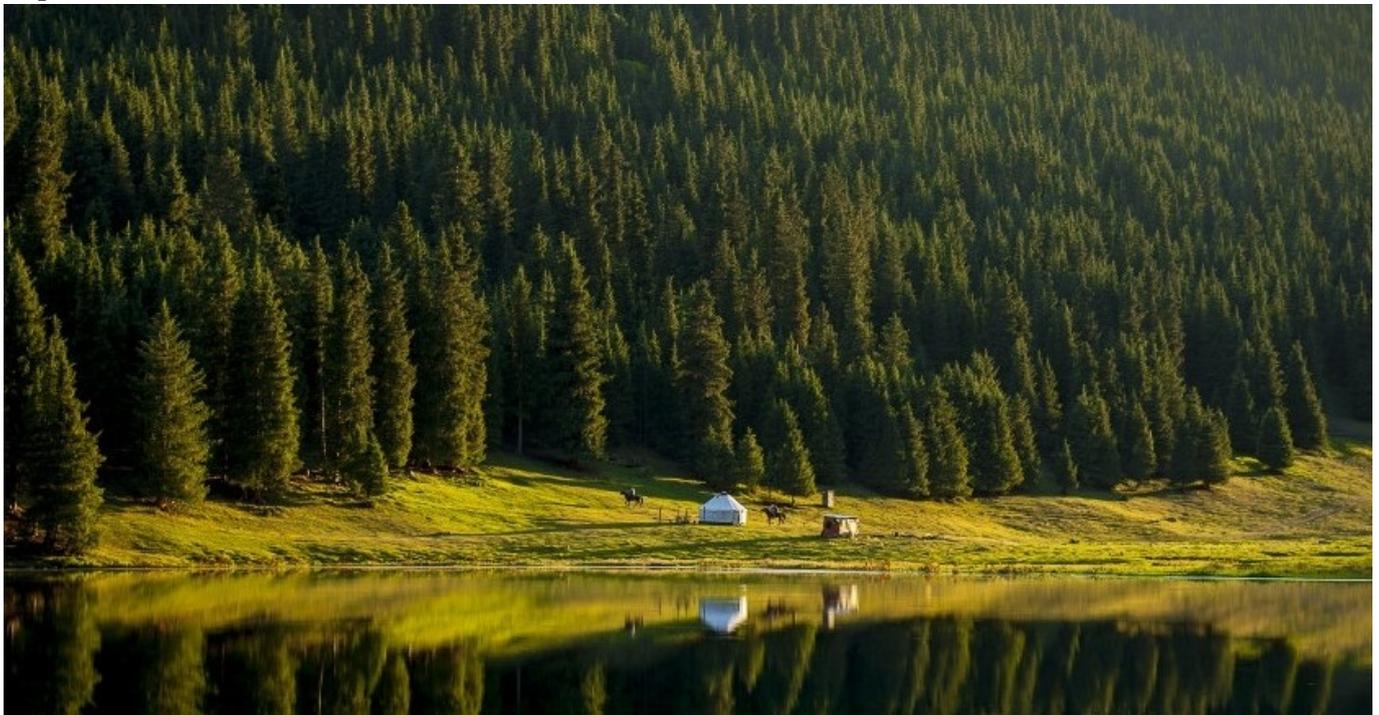
In addition, the reduction of glacier areas in Kyrgyzstan may have the most negative environmental, social, economic and political consequences for the entire Central Asian region, and possibly even for the Eurasian continent.

The cause for melting of glaciers is certainly global warming. However, there is another important reason. That is a reduction in the area of mountain forests in the glacier zones. The forest lowers the air temperature in the area of its location. Besides, the forest increases atmospheric humidity and precipitation, absorbing moisture from the roots and throwing it through the treetops. Increased humidity and increased precipitation in the glacier zone contribute to slowing down of the glacial melting process. Thus, the forest prevents or at least slows down the melting of glaciers. Today, the forest accounts for 5.6% of the entire territory in the country and continues to decline due to extensive animal husbandry and poaching.

### **Conclusions and Recommendations**

Benjamin Orlov, a professor at Columbia University and a member of the working group - Mountain Communities Research Institute at the University of Central Asia, says that "in

this situation, very little can be done because the temperature rises around the world.”<sup>[7]</sup> The professor argues that Kyrgyzstan and Tajikistan “may join other countries to reduce the rapid growth of greenhouse gas emissions.” According to the scientist, there is another solution, which involves reducing the dependence of Kyrgyzstan and Tajikistan on coal, since “the use of coal leads to the formation of soot in Kyrgyzstan and Tajikistan that pollutes the air, and the wind carries some of the soot to the glaciers.” Also, Professor Orlov mentioned that there are measures to save the glaciers from melting, which is when the glaciers are covered with a special cover-up that prevents them from heating. However, the expert considers this method not to be effective.



*Today, the forest accounts for 5.6% of the entire territory in the country and continues to decline due to extensive animal husbandry and poaching. Photo: open.kg*

In my opinion, the following measures could be taken to reduce the glacial melting:

First, it is necessary to protect natural forest ecosystems from excessive anthropogenic pressure and, most importantly, from extensive animal husbandry.

Secondly, it is necessary to increase the forest area in the mountainous areas where glaciers are located. For this, it is necessary to restore mountain coniferous forests in the belt from 1 to 3 thousand meters above sea level, up to 2 thousand meters - to plant deciduous, including wild fruit trees, as well as floodplain forests. In places along the banks of rivers, one can place plantations of fast-growing trees to produce wood.

An increase in the area of perennial plantings in the mountains of Kyrgyzstan would have a positive effect on slowing the glacier-melt in the region, as well as on CO<sub>2</sub> absorption on the

planet. It is the cooperation in the “water tower”, at the source of water resources in the region, by increasing perennial plantings that best meets the letter and spirit of the Paris Convention 2015, [8] which undoubtedly opens up significant financial opportunities for environmental conservation initiatives.

It should be emphasized that work in these areas requires enormous financial and human resources, which Kyrgyzstan does not possess nowadays. In this regard, it is necessary to initiate international cooperation in the field of glacier conservation in Central Asia through increasing forest areas in the mountains of Kyrgyzstan. Not only should the countries of the region, but also all relevant international organizations be involved in this cooperation. This is certainly in the interests of all countries of the region, both upstream and downstream, as well as the interests of the entire world community, since climate change does not know the political boundaries of states.

At the same time, it is necessary to emphasize that any national and international efforts at the governmental level will not be successful if the population of the country continues to follow the old habits of consumer’s attitude to the environment: to graze livestock in forest ecosystems, cut down forests for domestic and commercial needs, completely gather the fruits of the forest without leaving room for natural regeneration.

The preservation of the glaciers of Kyrgyzstan is the most important national task of the 21st century. Time is melting like water... It was necessary to restore ecosystems earlier. In case of the continuation of the glacial melting at the current pace, the development of economy, politics and other spheres of public life will lose all relevance against the background of aggravated water conflicts. History and ancestors endowed us with innumerable wealth, the price of which is life. Preserving this wealth and saving lives is the most important task.

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