

FEATURES OF CLIMATE CHANGE AND ADAPTATION TO ITS IN TAJIKISTAN



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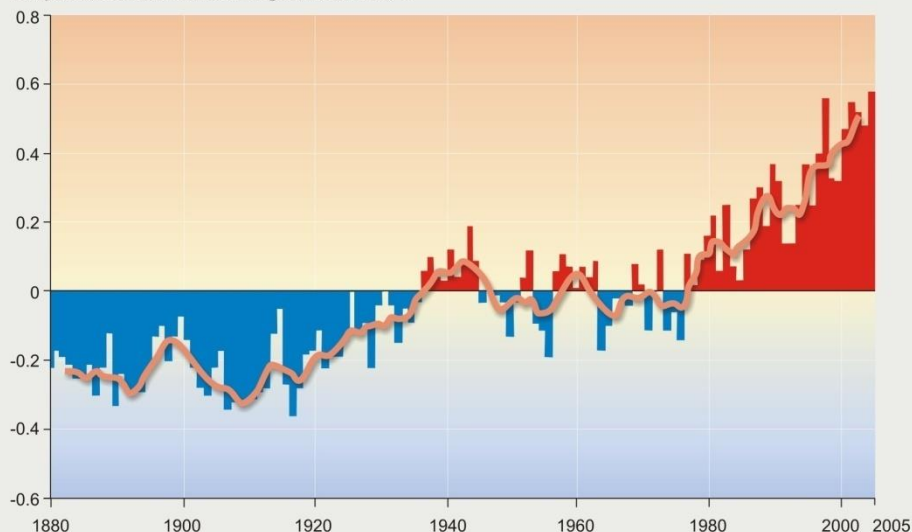
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Global temperature anomalies

Abstract surface and ocean observation data

Temperature deviation as of long-termed norm, °C



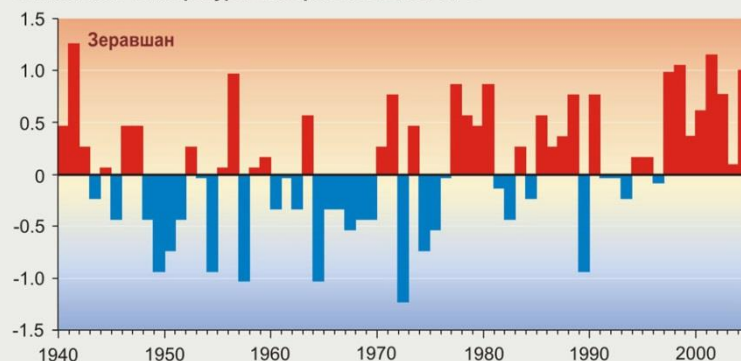
Source: National Aeronautics and Space Administration (NASA)

Climate warming trends in the highlands of Tajikistan, especially in the Pamir and Zeravshan mountains, are in line with regional and global rates.

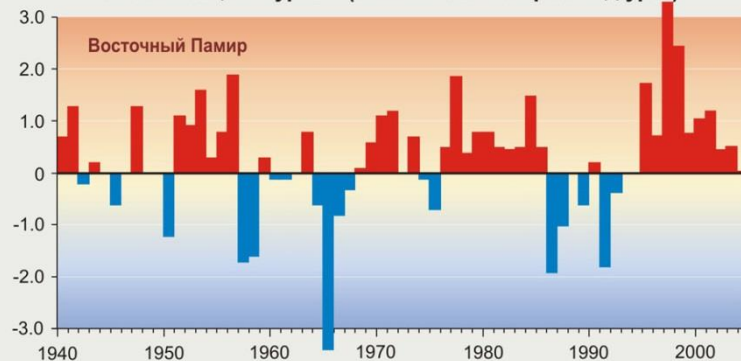
Изменение средней годовой температуры

Метеостанция Дехавз (высота 2561 метров над ур.м)

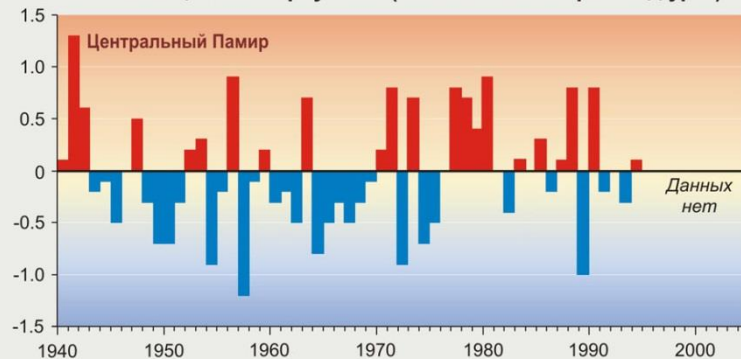
Отклонение температуры от нормы 1961-1990 гг, °C



Метеостанция Мургаб (высота 3576 метров над ур.м)



Метеостанция им. Горбунова (высота 4169 метров над ур.м)



Источник: Агентство по гидрометеорологии РТ

Particularly vulnerable areas and sectors of the Tajik economy

Water sector



Agriculture



Population healthy



Forests recourses



Natural ecosystems

UN projections for climate change A UN climate report published this year suggests that by the 2040s, the Earth will almost certainly pass a key temperature increase of 1.5 degrees Celsius. This means that the dire high-emission scenarios - and accompanying environmental changes - depicted in the scientific study are becoming increasingly likely.

It should be noted that of the warmest years in human history, the period between 2000 and 2021 is the warmest year since records began in 1880). Experts from Australia and Sweden expressed a new version, according to which the influence of mankind on the climate today is 170 times more significant than, in fact, the influence of nature.

Climate change in Central Asia

It should be noted that the Central Asian (CA) region is currently experiencing serious environmental problems, in most cases related to climate change. Solving these climate problems requires the joint efforts of state bodies, NGOs and citizens of the entire region.

Vulnerability of the ecosystem of Tajikistan to climate change

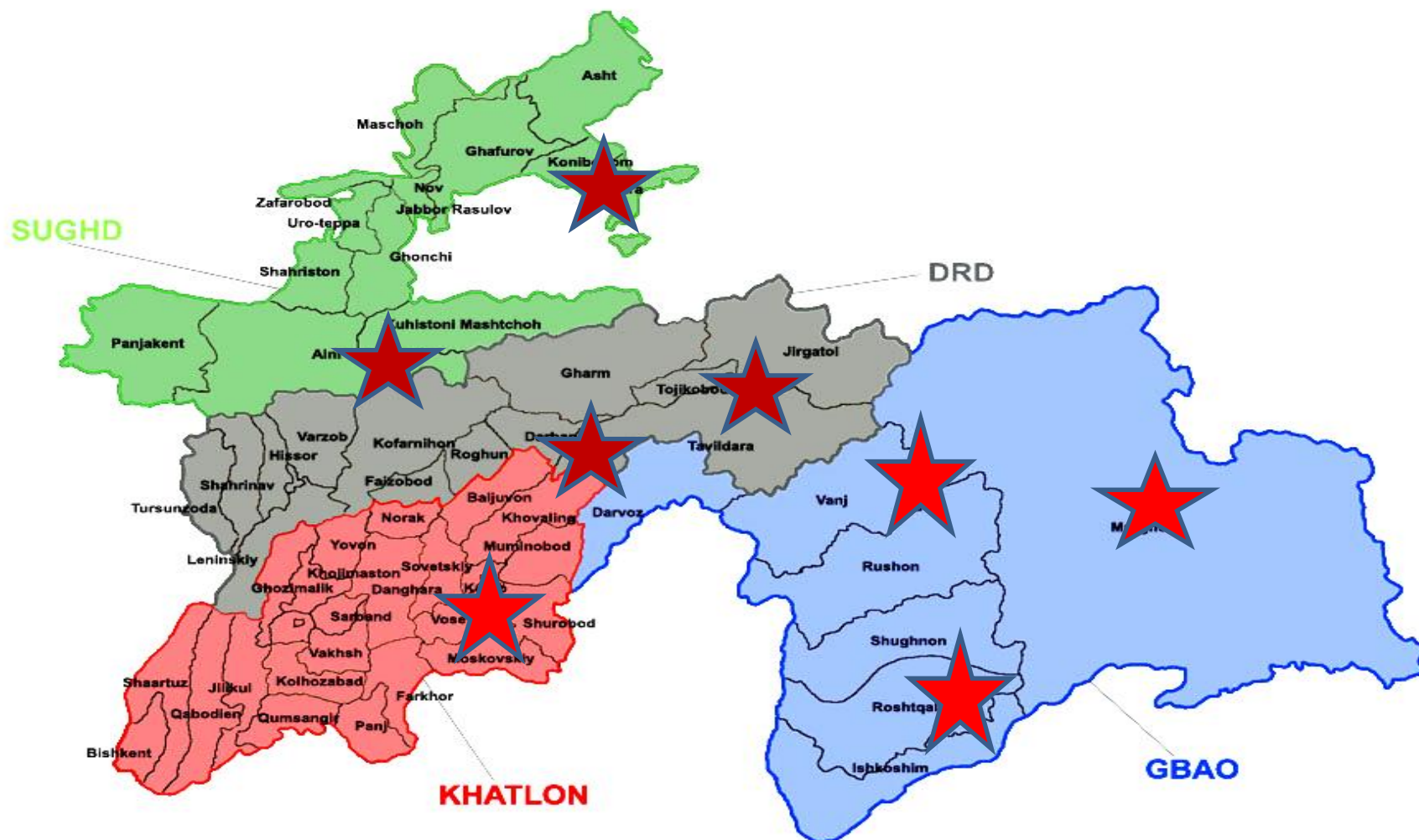


- The ecosystem of the mountainous territory of Tajikistan (constituting 93% of the total territory of the republic) is very susceptible to anthropogenic and geodynamic influences. The slightest violation of the mountain ecosystem can lead to dangerous consequences. Desert landscapes are the most vulnerable. Approximately 95% of the country's territory is at increased risk of environmental destabilization. A good example of this is the vast territory of the high-altitude desert of the Eastern Pamirs, where in recent years wind erosion has been one of the factors of strong environmental risk. About 80 thousand lands are in a difficult reclamation state.



The most vulnerable mountain ecosystems of Tajikistan to climate change

Map of Republic of Tajikistan



- The mountainous relief and the diversity of the climate determine the richness and originality of the forms of the flora of Tajikistan. There are "representatives" of the north and south, west and east. Among the plants, along with local species - saxaul, pistachio, juniper, wormwood and saltwort - there are Mediterranean plants - Pontic hawthorn, walnut, fig, plane tree and others.

Flora



- The flora of Tajikistan is distinguished by the following most characteristic types of vegetation and belt groups of formations. The total area of forestry lands and specially protected natural areas in Tajikistan is 1,961.7 thousand hectares. Of these, 1,780.6 thousand hectares are under the jurisdiction of the State Institution of Forestry and Hunting of the Committee for Environmental Protection under the Government of the Republic of Tajikistan. According to the information of the National Center for Biodiversity, there are more than 9,700 species of flora in Tajikistan. More than 850 species of various endemic vegetation are especially valuable, which is 1.5 and 2 times more than in other Central Asian republics.

Fauna

- The animal world is represented by a wide variety of species. Thus, 84 species and subspecies of mammals, 346 species of birds, 47 species of reptiles, 52 species of fish, 2 species of amphibians, and more than 13 thousand species of invertebrates inhabit the territory of Tajikistan. This is largely due to the convenient geographical position of Tajikistan within the Eurasian continent and the diversity of habitats, ranging from the hot deserts of southern Tajikistan to the cold highlands of the Western and Eastern Pamirs (340-7495 m above sea level)



- The analysis showed that a number of ecosystems in Tajikistan are experiencing problems of soil degradation, such as erosion, waterlogging, deforestation, salinization, etc. These problems are caused by both the effects of climate change and human impacts. As a result, the quantitative and qualitative characteristics of the soil change, leading to the decline of the ecological and economic situation.

- Due to climate change in recent years, in the conditions of our republic, there have been significant changes in the dynamics of the state of the ecosystem. Due to flooding, more than 100 hectares of farmland are flooded every year. Part of the land due to water erosion is lost in the mountainous regions of the republic. Ecosystems are also heavily degraded due to anthropogenic human action and climate change.

Land recourses

The special conditions of Tajikistan, which contribute to the development of soil degradation processes, are semi-arid climatic conditions and high variability in the amount of precipitation. Therefore, it is important to improve plowing methods and irrigation rates, increase the planting of soil cover and introduce the cultivation of drought and salt tolerant crops.

- Desertification has become one of the country's most pressing problems. The development of new land on steep mountain slopes, deforestation and overgrazing have led to a decrease in the resilience of the highlands, exacerbated by various natural and human-induced environmental impacts.

- Even the sparsely populated mountainous regions of the Pamirs have also become the object of human impact. As a result of the total human impact on the mountain ecosystem, the general situation for mountain plants has changed, including for rare types of medicinal herbs, soil degradation has worsened, useful plant species have disappeared, and weeds are growing in their place. All these factors have led to the gradual depletion of biological diversity and, as a result, to desertification.

Pasture

- The total area of pasture land in the republic is about 3 million hectares, which is more than 80% of the country's agricultural land. The largest areas of pastures are in Khatlon region and DRD and account for 60% of the national pasture area. Forest and pasture lands are almost completely at the disposal of the state. Unregulated grazing and deforestation have led to a reduction in the habitat of many species, including rare and endangered ones. On pasture lands, among other things, there is a change in the composition of the herbage towards the predominance of non-eaten grass species and a decrease in the productivity of useful biomass by 15-

Forestry

- The total area of the state forest fund of the Republic of Tajikistan is 1.8 million hectares, including 1.79 million hectares under the jurisdiction of the forestry authorities. Of this territory, tree and shrub vegetation occupies 410 - 430 thousand hectares of land, or about 3% of the country's territory or 23% of the area of the state forest fund. The forest resources of Tajikistan are very diverse and include over 200 species of trees and shrubs, including rare, relic and endangered species. The main types of forests are coniferous, broad-leaved, small-leaved, tugai, sandy-desert (saxaul) forests and xerophytic woodlands.

ADAPTATION

- Adaptation is a strategy that is needed at any level to complement climate change mitigation measures. Adaptation has the potential to mitigate many of the negative effects of climate change and enhance the beneficial effects, but it will come at a cost and will not prevent all damages. Anthropogenic and natural systems will adapt to climate change on their own to some extent. Extreme events, variability and rates of change are all key factors in responding to vulnerability and adaptation to climate change, not just changes in average climate conditions

Urgent adaptation measures

- Increasing the environmental education of the population of the country;
- Development and widespread use of alternative energy sources in mountainous settlements;
- Restoration and improvement of the system for monitoring the degradation of mountain range ecosystems;
- Creation of conditions for promoting the sustainable use of the tourism and health potential of the mountainous area, as well as the organization of ecotourism and agrotourism;
- Determining the environmental and economic efficiency of developing the potential of natural resources in mountainous areas;
- Breeding of more adapted varieties of plants and animal species.

Minimizing the Impact of Climate change

- i) reducing climate pressures such as pollution, overexploitation of resources,
- ii) reducing climate-related pressures where possible, for example through the application of improved practices for adapted and integrated water resources management;
- (iii) strengthening protected area networks, including by expanding the scope, quality, connectivity and, as appropriate, through the establishment of corridors and ecological networks, and by enhancing the biological resource in situ;
- iv) restoration of degraded ecosystems and ecosystem functions; v) promoting adaptive management by strengthening monitoring and evaluation systems.

The impact of climate on crop yields





Adaptation through the creation of seed local agrobiodiversity fund



Adaptation through the creation of seed local agrobiodiversity fund



Adaptation through the collection of seed material of cereal crops (farmer Zoid Karimov, Ayni district, Veshab village, collection since 1975)



A drought-resistant variety of corn, bred by a rural farmer - Gayratsho Makhmadshoev, Rasht district, Podzhe village, yields crops without irrigation.



The grafting process in the nursery, Navnihol village, Vahdat district,



Preparing and extracting potato seeds

Potato berries in 35-45 days after they are harvested, they ripen, then can seeds be isolated from them?



Berries, seed and potato harvest





Gissar



Rasht



Vahdat

**Nurseries - the
basis for
adaptation to
climate change**



Tajikabd



Lyakhsh



Rasht



Varzob

CONCLUSION

1. According to experienced farmers, local varieties are the most resistant to many pests and diseases and almost every year give a good harvest, because these varieties have acclimatized well to local environmental conditions for many years of growth, 2. It is necessary to create conditions for the further preservation of local varieties of grain, fruit and fodder and other crops in the field, 3. The creation of seed banks and nurseries is one of the ways to increase the adaptation of communities to climate change on the ground and create conditions for seed independence, 4. Strengthening the connection of research institutes with dekhkan farms, farmers and women seed growers in the future.

Key Activities for Climate Change Adaptation

- Collecting the necessary information with farmers, experts and communities about climate change and agrobiodiversity on the ground, Generalizations of the received information and their analysis, Organization of seminars, round tables, discussions for farmers, women, youth, communities and schools on the topics of climate change and conservation of agrobiodiversity, Publications on climate change and agrobiodiversity, Establishment of demonstrative fields and breeding nurseries in rural areas, Cooperation with local NGOs, government agencies and international organizations on climate change and local agrobiodiversity conservation.

Adaptation measures

- Raising awareness of the population and communities about climate change;
- Creation of fruit nurseries and seed funds on the ground;
- Cultivation of drought-resistant and early maturing varieties of agricultural crops; Integrated method of plant protection,
- Drip irrigation; Introduction of innovative methods in agriculture;
- Expansion of organic farming;
- Strengthening cooperation between scientists and farmers on adaptation to climate change;
- Organization of a trip and exchange of experience on adaptation of communities,
- Demographic issues (family planning) and future resource management.

**Thanks for
attention!**