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## GLOBAL AND REGIONAL TRENDS IN CLIMATE CHANGE

***Annotation:** This article analyzes global and regional trends in climate change, highlighting its negative consequences and solutions. In particular, the impact of climate change on soil and water resources in the Karakalpakstan region was considered.*

***Keywords:** Climate change, global warming, water resources, drought, ecology, land reclamation.*

Today, climate change remains one of the most pressing problems facing humanity. Global warming, droughts, extreme weather events, and the melting of glaciers are among the negative consequences of this process [1]. Central Asia and the Aral Sea region are particularly vulnerable to climate change [2]. This article analyzes global and regional trends in climate change, its main problems, and ways to solve them.

The main goal of the article is to analyze current trends in climate change, assess its impact on the Aral Sea region, and identify ways to solve these problems.

The issue of climate change is being studied by many scientists around the world. The UN Intergovernmental Panel on Climate Change (IPCC) publishes reports annually, outlining global trends and forecasts[3]. Various scientific studies are also being conducted by organizations such as NASA, NOAA, and the World Bank[4]. In Central Asia and the Aral Sea region, the research of E. A. Chub, I. Abdurakhmanov, B. S. Kamilov, U. Salimov, S. Khodzhaev, V. A. Novikov plays an important role in studying these problems [5].

In recent decades, a 1.1°C increase in global temperature has been observed[6]. According to the IPCC, if greenhouse gas emissions are not reduced, global temperatures may rise by 3-4°C by 2100[7]. This increases the risk of rising sea levels, droughts, and floods.

From a regional perspective, the average annual temperature in Central Asian countries has increased by 1.5-2°C [8]. In the Republic of Karakalpakstan, drought and salinization processes are intensifying. This negatively affects agriculture, water resources, and public health.

### **Main problems of climate change**

**- Drought and water scarcity: Precipitation is decreasing in the region, and soil fertility is declining.**

- Extreme weather events: A sharp rise in temperature increases the number of heat waves.

- Decrease in water resources: The water volume of major rivers, such as the Amu Darya and Syr Darya, is decreasing.

Soil salinization: The melioration status of irrigated areas is deteriorating.

The above-limit use of water resources can be seen in the following table (Table 1).

Table 1

Water intake in the Republic of Karakalpakstan in 2018-2020

№	Tumanlar nomi	2018 gidrologik yilda, mln.m3		shu jumladan				2019 gidrologik yilda, mln.m3		shu jumladan				2020 gidrologik yilda, mln.m3		shu jumladan			
		Limit	Amalda	Limit	Amalda	Limit	Amalda	Limit	Amalda	Limit	Amalda	Limit	Amalda	Limit	Amalda	Limit	Amalda	Limit	Amalda
1	Nukus sh.													31,66	33,16				
2	To'rtko'l	448,6	444,8	89,6	89,6	359,0	355,2	531,5	528,1	111,0	110,1	420,5	418,0	398,0	470,0	100,0	120,2	298,0	349,8
3	Beruniy	710,0	699,8	210,0	210,0	500,0	489,8	600,4	597,4	200,4	199,8	400,0	397,6	600,0	634,9	200,0	222,8	400,0	412,1
4	Ellikqal'a	475,7	471,0	95,7	95,7	380,0	375,3	530,7	528,1	113,2	113,0	417,5	415,1	408,0	472,5	100,0	117,2	308,0	355,3
5	Amudaryo	811,8	789,8	252,0	250,0	559,8	539,8	816,8	802,7	186,5	183,5	630,3	619,2	686,0	722,5	205,0	241,7	481,0	480,8
6	Xo'jayli	349,9	333,9	62,2	59,2	287,7	274,7	317,5	312,1	64,5	63,5	253,0	248,6	304,0	312,3	70,0	69,0	234,0	243,3
7	Taxiatosh	113,6	107,0	27,8	25,2	85,8	81,8	98,0	93,1	17,0	15,9	81,0	77,2	90,0	131,0	25,0	30,9	65,0	100,1
8	Sho'manoy	350,9	311,2	74,9	72,7	276,0	238,5	459,9	457,7	76,9	76,4	383,0	381,3	360,0	369,2	85,0	77,0	275,0	292,2
9	Qonliko'l	295,4	284,8	55,4	51,6	240,0	233,2	377,4	373,8	59,4	58,7	318,0	315,1	388,0	372,3	70,0	66,0	318,0	306,3
10	Qo'ng'iro't	311,9	302,0	61,9	59,6	250,0	242,4	479,9	463,7	72,9	71,6	407,0	392,1	392,0	415,1	70,0	80,9	322,0	334,2
11	Nukus	364,3	359,9	41,7	38,1	322,6	321,8	450,2	445,0	50,1	50,0	400,1	395,0	371,0	386,3	58,0	48,0	313,0	338,3
12	Kegeyli	427,2	419,6	67,2	62,8	360,0	356,8	614,6	608,2	92,1	91,9	522,5	516,3	422,4	495,7	95,0	110,0	327,4	385,7
13	Chimboy	329,5	300,0	49,5	48,0	280,0	252,0	606,9	606,0	77,9	77,7	529,0	528,3	423,6	442,1	85,0	104,0	338,6	338,1
14	Qorao'zak	337,6	308,5	67,3	66,0	270,3	242,5	523,3	520,3	71,0	70,9	452,3	449,4	464,0	375,6	79,0	101,0	385,0	274,6
15	Taxiako'pir	303,8	275,7	59,8	58,8	244,0	216,9	428,8	427,6	58,3	58,3	370,5	369,3	397,0	302,4	72,0	78,0	325,0	224,4
16	Mo'ynoq	67,7	37,0	16,2	10,2	51,5	26,8	60,4	54,4	8,9	7,4	51,5	47,0	77,5	138,4	8,5	22,0	69,0	116,4
17	Bo'zatov													84,0	223,7	10,0	53,1	74,0	170,6
Jami tumanlar		5731,0	5465,4	1234,3	1199,8	4496,7	4265,6	6931,3	6848,6	1261,6	1250,0	5669,7	5598,6	5823,5	6263,6	1334,5	1541,4	4489,0	4722,2
Jami manbada		5990,3	5639,5	1344,5	1299,8	4645,8	4339,7	7182,5	7097,1	1355,7	1344,2	5826,8	5752,9	6389,7	6648,2	1373,0	1580,1	5016,7	5068,1

In recent years, the total irrigated land area of the Republic of Karakalpakstan is 514.627 thousand hectares, the area of non-saline lands is 152.045 thousand hectares (30%), the area of saline lands is 362.582 thousand hectares (70%). In terms of the level of salinity, the highest areas are the Muynak district - 94%, Bozatau district - 86%, Chimbay district - 77%, and the lowest areas are the city of Nukus - 100%, but the total area is small (2,193 thousand hectares). Takhiatash district - 73% saline, 39% moderately saline, Khojeyli district - 73% saline, 27% non-saline - this is a lower indicator compared to other districts.

The overall level of salinity did not change significantly, but strong salinity decreased, and moderate salinity increased. The most problematic areas for salinization remain the Muynak, Bozatau, and Chimbay districts. Measures to reduce salinity are yielding results, but this process requires a long-term approach. Improving the melioration state of soils, efficient use of water resources, and improving the crop rotation system will remain important factors in reducing salinity.

To mitigate the negative impacts of climate change, it is necessary to implement the following measures:

- Development of alternative energy sources: widespread introduction of solar and wind energy.
- Effective water resource management: Application of drip irrigation and water-saving technologies.
- Expansion of forests and green areas: combating desertification and ensuring environmental sustainability.
- Improvement of climate monitoring: Development of scientific research and monitoring systems.

**Conclusion.** Climate change is a pressing issue at the global and regional levels, and its impact is growing. Central Asia and the Karakalpakstan region, in particular, are suffering serious damage from this process. Therefore, based on scientific research, it is important to strengthen alternative energy, water resource management, and environmental measures. Only then can we achieve a reduction in the negative consequences of this global problem.

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