

Policy Brief: Climate Change, Water Scarcity, and Health Risks in Kyrgyzstan

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Introduction: Global Climate Challenges and Water Scarcity

Climate change, primarily driven by activities such as fossil fuel combustion, industrial processes, and deforestation, poses severe global challenges. Increasing levels of greenhouse gases are leading to glacier melting, rising temperatures, extreme weather events, and disruptions to ecosystems and food security. The World Meteorological Organization reported that 2023 was the warmest year on record, with temperatures reaching 1.45°C above pre-industrial levels (WMO, 2024). This warming exacerbates vulnerabilities, particularly concerning water resources, as global demand increases amidst frequent extreme weather events. These conditions pose heightened risks to public health, especially for children, and threaten water and sanitation infrastructure.

Climate Vulnerability in the Kyrgyz Republic

The Kyrgyz Republic, despite its minimal greenhouse gas emissions, faces significant climate change impacts due to its mountainous terrain and extensive glacier coverage. Average temperatures have risen significantly over the past two decades, with projections suggesting potential increases of up to 4-5°C by the century's end (UNICEF, 2017). This warming trend threatens the country's freshwater supplies, sourced primarily from glacier melt, which supports over 80% of its agriculture (IMF, 2023).

Accelerated Glacier Melt and Implications

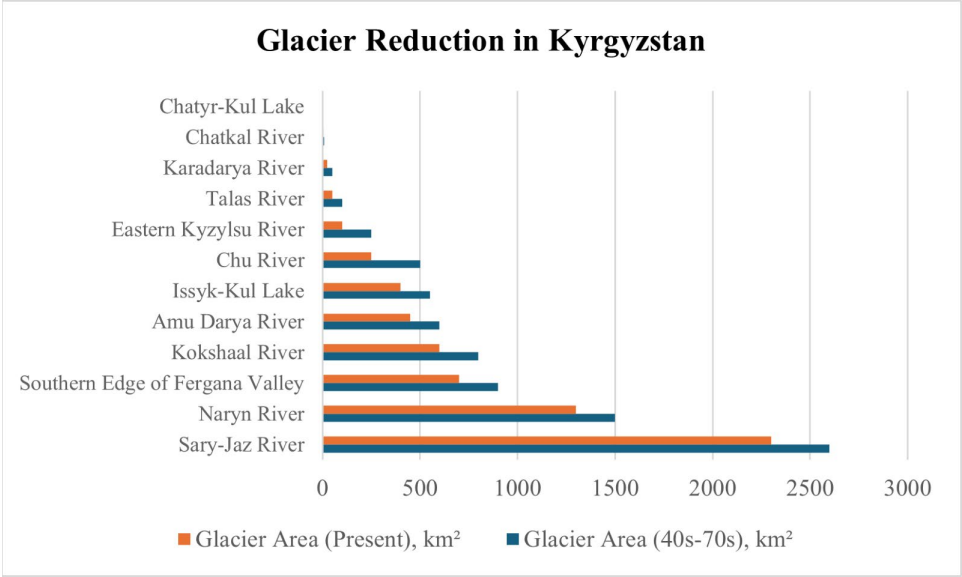
Glacier retreat in Kyrgyzstan is progressing rapidly, with more than 15% volume loss between 1990 and 2020, and projections indicating up to 64-95% loss by 2100 (UNICEF, 2017). This melt contributes to pronounced water shortages, impacting agricultural productivity and public health. Inefficient irrigation systems, which lose up to 27% of water annually (National Statistics Committee, 2020), and changing precipitation patterns exacerbate these challenges, leading to more frequent droughts and increasing the prevalence of waterborne diseases due to inadequate sanitation.

Water Availability in Kyrgyzstan

Understanding the distribution and consumption of water resources in Kyrgyzstan is crucial for assessing the severity of water scarcity and its potential impact on public health, particularly among children. The following statistics illustrate the allocation of water across different sectors, highlighting the volumes consumed for drinking, agricultural purposes, and other uses. This data is essential for identifying critical areas where water scarcity could pose significant risks to health and well-being.

Between 1940 and the present, the number of glaciers has increased by 22% (See Figure 1), primarily due to a rise in the number of smaller glaciers, while the total glacier area has seen a decrease (Catalog of Glaciers of Kyrgyzstan, 2018). This reflects a fragmentation of larger glaciers into smaller ones rather than an increase in glaciated area. As of 2013-2016, Kyrgyzstan has 9,959 glaciers covering a total area of 6683.9 km², a reduction from the 7944.2 km² recorded in the mid-20th century (Catalog of Glaciers of Kyrgyzstan, 2018).

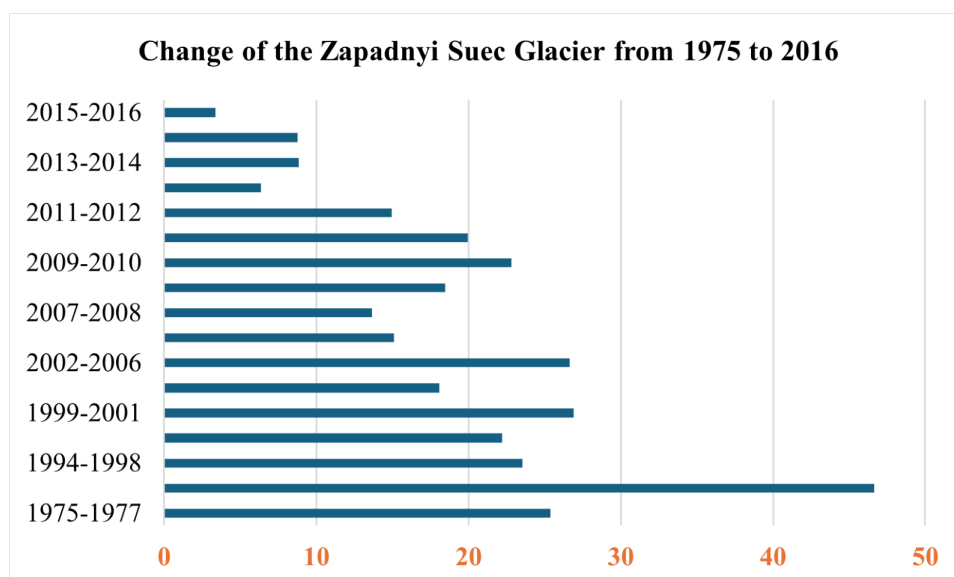
Figure 1. Glacier Reduction in Kyrgyzstan



Source: [Catalogue of glaciers Kyrgyzstan 2018](#)

Measurement of the glacier “Zapadnyi Suek” located on the northern slope of the Zhetim-Bel Ridge in 2017, indicated that the total area of the glacier which was determined as 1.6 km² in 1975, had decreases to 0.97 km² by 2016.The average annual frontal retreat is 8 m/year for the period from 1975 to 2016 (See Figure 2). Over the last 40 years there has been an overall decrease in length of 322 m.

Figure 2. Change of the West Suec Glacier



Source: [Catalogue of glaciers Kyrgyzstan](#)

According to Stat.Kg, in 2020, 8.0 billion cubic meters of water were extracted from natural sources, including underground freshwater, marking a decrease of 0.6 percent from 2019. Total water usage in 2020 reached 5.2 billion cubic meters, which is an increase of 0.5 percent over the previous year. Of this, a significant 94.4 percent was allocated for irrigation and agricultural purposes, 3.5 percent for household and drinking purposes, and 1.6 percent for industrial uses (See Table 1 for details).

Table 1: Main indicators characterizing the use of water resources

Description	2016	2017	2018	2019	2020
Extracted from Natural Sources	7,333.7	7,657.8	7758,0	8,068.7	8,017.9
Including: Underground Horizons	208.7	224.6	245.0	254.8	249.8
Total Water Usage	4,668.7	5,072.4	5,088.7	5,211.1	5,237.5
Production Needs	67.2	69.1	82.5	84.3	82.5
Irrigation & Agricultural Supply	4,435.3	4,821.6	4,817.0	4,920.7	4,942.0

Domestic & Drinking Needs	155.6	157.0	161.1	180.4	185.7
Other Needs	10.6	24.6	28.1	25.7	27.3
Transport Losses	1,841.6	2,128.3	2,085.2	2,242.8	2,198.7
Wastewater Discharged	100,0	101,6	101,1	99,3	123,4
Regulated Cleaned Waters	93.5	95.4	96.1	94.3	118.4
Polluted Wastewater	2.1	2.1	1.9	1.9	1.9
% of Regulated Cleaned Waters	93.5%	93.8%	95.1%	95.0%	95.9%
Polluted Wastewater per Capita (m ³)	0.3	0.3	0.3	0.3	0.3

Source: [National Statistical Committee](#), 2018

As we can see from the Table 1, Kyrgyzstan is experiencing a growing demand for water, primarily driven by its agricultural sector which consumes over 94% of the total water usage, reflecting the country's heavy reliance on water for irrigation. While water extraction shows an increasing trend, there are substantial losses in water transport, suggesting inefficiencies in the distribution system. Additionally, the relatively small allocations for domestic and industrial uses, coupled with significant transport losses, highlight potential vulnerabilities in ensuring sustainable water availability for essential and economic activities. These factors collectively underscore the need for improved water management practices and infrastructure enhancements to address inefficiencies and ensure adequate water supply across all sectors.

Table 2: Proportion of Population Using Safely Managed Water Services by Year (Percentages)

Region	2014	2015	2016	2017	2018	2019	2020
Kyrgyz Republic	88.9%	89.1%	89.9%	90.2%	90.5%	90.8%	91%
Urban Areas	99.1%	99.1%	99.3%	99.5%	99.7%	99.8%	99.9%

Rural Areas	83.3%	83.7%	84.2%	84.7%	85.1%	85.5%	85.9%
Batken	74.3%	73.3%	75.1%	76%	77%	77.9%	78.5%
Jalal-Abad	89.5%	87.7%	88.4%	88.8%	89.2%	89.7%	90.1%
Issyk-Kul	96.8%	96.4%	96.7%	96.9%	97.1%	97.4%	97.6%
Naryn	84.4%	90.3%	91%	91.6%	92.2%	92.8%	93.3%
Osh	72.9%	74.5%	75%	75.6%	76.2%	76.8%	77.4%
Talas	99.7%	99.2%	99.4%	99.6%	99.8%	99.9%	100%
Chui	100%	100%	100%	100%	100%	100%	100%
Bishkek	99.8%	100%	100%	100%	100%	100%	100%
Osh City	96.5%	96.7%	97%	97.3%	97.5%	97.8%	98%

Source: SDGs, [National Statistical Committee](#)

The data from Table 3, illustrates a high level of access to safely managed sanitation services across Kyrgyzstan, with urban and rural areas demonstrating robust coverage rates exceeding 95%. Despite this commendable achievement, the variations in service accessibility across different regions and demographic groups point to underlying disparities. Regions such as Talas and Bishkek nearly achieve universal access, while Chuy shows lower coverage, indicating the need for targeted policy interventions to ensure equitable sanitation services. Moreover, the correlation between higher education levels and better access suggests that enhancing educational initiatives could further support improvements in sanitation access.

Table 3: Proportion of the Population with Sustainable Access to Sanitation Facilities

Region	2010	2014	2015	2016	2017	2018	2019	2020
Kyrgyz Republic	26.4%	28.1%	28.6%	30.2%	31.3%	31.5%	31.5%	34.4%
Batken	3.2%	5.2%	6.7%	6.3%	12%	9.1%	5.9%	4.8%
Jalal-Abad	9.4%	5.6%	5.6%	8.3%	14.4%	9%	6.2%	6%
Issyk-Kul	13.2%	24.2%	27.1%	30%	38.7%	41.4%	30.5%	51.2%
Naryn	5.3%	14.2%	13.7%	17%	17.8%	20.4%	21.8%	27.2%
Osh	9.1%	0.7%	0.5%	0.4%	0%	0.5%	1.7%	0.9%
Talas	3.7%	5.5%	6.5%	6.5%	6.1%	6%	6.2%	7.9%
Chui	48.7%	49.2%	48.7%	51%	48.9%	56.8%	63.3%	64.7%
Bishkek	84.9%	99.4%	98.6%	99.7%	97.4%	96.5%	96.1%	97.7%
Osh City	27.9%	28.2%	29.5%	25.4%	25.5%	30.9%	46.7%	100%

Source: SDGs, [National Statistical Committee](#)

As we see from Table 4, over the decade from 2010 to 2020, Kyrgyzstan has shown a positive yet gradual trend in improving access to sustainable sanitation facilities, with national access increasing from 26.4% to 34.4%. Sustainable access to sanitation refers to the availability and use of improved sanitation systems, such as hygienic toilets and latrines, that safely separate human

waste from contact, and are affordable, safe, and resilient over time without harming the environment (UN, 2023). This slow progress highlights not only the ongoing efforts but also the challenges that remain in achieving widespread sustainable sanitation. Significant regional disparities are evident, with some areas like Issyk-Kul and Bishkek making substantial progress, whereas others like Osh and Batken lag behind (National Statistical Committee of the Kyrgyz Republic, 2022). These disparities underscore the necessity for region-specific strategies and continued investment to overcome geographic and economic barriers, aiming for a more consistent improvement across all provinces.

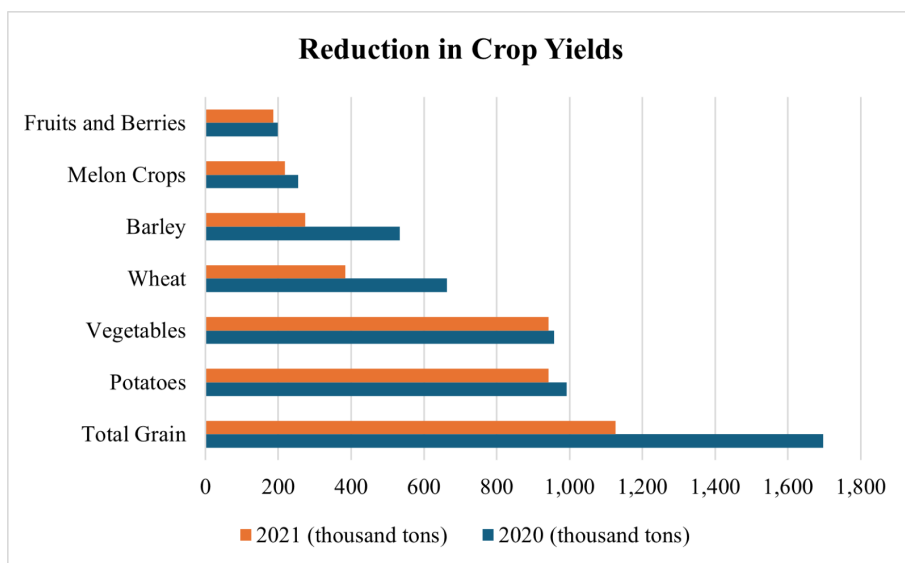
Impact of Water Scarcity on Agriculture, Food Prices, and Malnutrition in Kyrgyzstan

Water scarcity, intensified by climate change, is significantly undermining agricultural output in Central Asia, a region highly vulnerable to climate-related risks according to the FAO's regional review (FAO, 2023). Kyrgyzstan, a high-altitude country with varied climate trends across its territory, is particularly susceptible. The nation frequently faces droughts, floods, mudflows, and landslides, which profoundly impact its agriculture—making it sensitive to temperature fluctuations and erratic rainfall patterns. This sensitivity adversely affects the production of staple crops such as wheat flour, potatoes, and vegetables.

In 2021, Central Asian countries, including Kyrgyzstan, experienced extreme water shortages that led to substantial agricultural losses. Many farmers saw their crops fail due to drought, while livestock perished from a lack of fodder and moisture. This severe water scarcity has contributed to a steady decline in Kyrgyzstan's crop yields over recent years, exacerbated by inadequate irrigation infrastructure. Data from the National Statistics Committee reveal a sharp drop in grain harvests, which fell by 34% to just 1.1 million tons in 2021 from 1.7 million tons the previous year. Specifically, wheat production decreased by a dramatic 42.3%, and barley yields plummeted by 55.8%. Similarly, sugar beet harvests in 2021 also fell by 22.7% compared to the previous year (National Statistical Committee of the Kyrgyz Republic, 2021 in Azattyk, 2021).

This downward trend persisted into 2022, with the total sown area for crops like wheat, barley, and oilseeds continuing to decrease by small, yet significant, percentages. This ongoing reduction in agricultural capacity underscores the critical challenges faced by Kyrgyzstan, where climate change and water scarcity are interlinked threats demanding urgent attention.

Figure 3. Reduction in crop yields



Source: [Azattyk](#), [National Statistics Committee](#)

As for 2023, approximately 661 thousand hectares of spring crops had been sown in the country as a whole, which is 6 thousand hectares less in comparison with the corresponding date of 2022 (See Table 4). The decrease in sowing of spring crops in relation to their area on the same date last year is due to the reduction in sowing of oilseeds - by 14%, leguminous crops - by 11%, cotton - by 10%, perennial grasses - by 3%, spring wheat and spring barley - by 1%. However, it is important to note that sugar beets were an exception, with their sowing area increasing significantly by 45.6% compared to 2022, reflecting a shift in agricultural focus toward this crop.

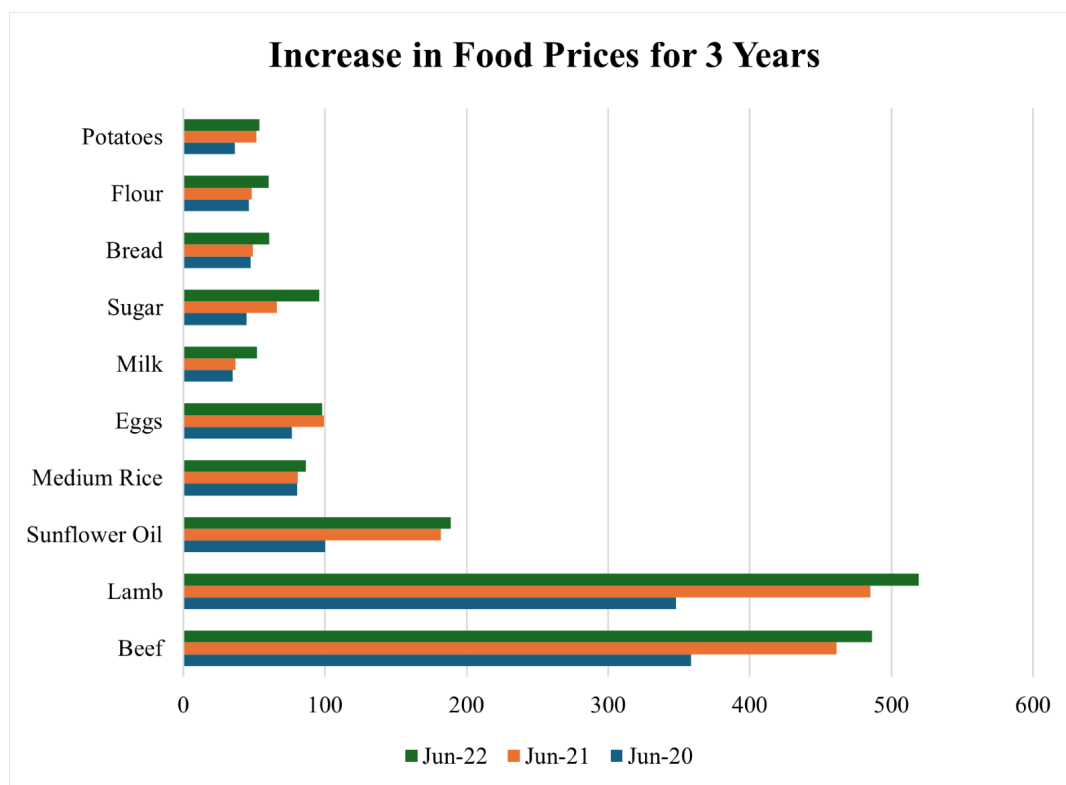
Table 4: Sowing of spring crops by species for 2023

Crop Type	Sown - total, thousand hectares		As a percentage of 2022
	2022	2023	
Sown spring crops – total	666.5	660.7	99.1
of which:			
Barley	221.6	220	99.3
Wheat	101.4	100.4	99
Corn for grain	97.2	101.2	104.1
Leguminous crops	55.3	49.1	88.9
Potatoes	47.3	47.8	101
Vegetables	34	34	100
Oilseed crops	17.2	14.7	85.6
Cotton	21.1	19.1	90.1
Sugar beets	8.8	12.9	145.6

Perennial grasses	29.5	28.7	97.2
Source:	National	Statistics	Committee

The decrease in agricultural crop yields in Kyrgyzstan, driven by water scarcity and extreme weather conditions, has had a direct and significant impact on food prices. As yields for essential crops like wheat, barley, and sugar beets dropped dramatically in recent years, the reduced supply led to a surge in prices. For example, the wheat harvest in 2021 declined by over 40%, leading to a sharp rise in wheat prices by 7 soms by the end of the year (See Figure 4). This increase, coupled with shortages of other staple products, created economic pressure for both consumers and local markets (Akchabar, 2022). The reduction in supply from local farmers forced Kyrgyzstan to rely more heavily on imports, which, in turn, made the country more vulnerable to global price fluctuations and trade restrictions.

Figure 4. Increase in Food Prices



Source: [Akchabar](#)

The price hikes hit the poorest segments of the population hardest, exacerbating food insecurity and increasing the risk of malnutrition. As a large portion of household income in rural areas is allocated to food, even minor increases in staple food prices can push vulnerable families into deeper poverty. In rural areas, malnutrition is becoming a growing concern, with 12% of children under five suffering from stunted growth due to inadequate food intake. Reduced crop yields and

limited access to essential nutrients are exacerbating food insecurity, leaving vulnerable communities at greater risk.

In particular, rising costs of basic foods like bread and vegetables create a domino effect, reducing access to nutritious diets and leading to long-term health consequences. Furthermore, with climate change continuing to disrupt agriculture, the cycle of reduced crop yields and escalating food prices poses an ongoing threat to both food security and social stability in Kyrgyzstan. Immediate interventions, such as improved irrigation infrastructure and sustainable agricultural practices, are crucial to prevent further deterioration of the food supply and to mitigate the impacts of climate change on the economy and public health.

Waterborne Diseases as a Consequence of Water Scarcity in Kyrgyzstan

Water scarcity in Kyrgyzstan is not only an environmental and agricultural challenge but also a pressing public health crisis. The depletion of clean water sources has led to a sharp increase in waterborne diseases, particularly in rural areas where access to safe drinking water and proper sanitation is severely limited. The intricate connection between water scarcity, inadequate sanitation, malnutrition, and disease spread creates a complex public health issue that affects thousands across the country.

In recent years, the decline in water availability has forced many Kyrgyz communities to rely on unsafe water sources. River water volumes, for instance, declined by 2-2.5 times in 2021 compared to previous years, significantly worsening the scarcity problem (Ministry of Water Resources of the Kyrgyz Republic, 2023). As a result, rural areas have become increasingly dependent on sources such as rivers, ditches, and canals, which are vulnerable to contamination. The absence of proper water treatment facilities means that many households are consuming water that fails to meet basic hygiene standards, directly contributing to the spread of diseases.

Regions such as Chuy province exemplify this problem, where outdated and inefficient irrigation systems often result in the contamination of local water supplies (UNICEF, 2017). Water intended for agriculture frequently mixes with sewage and industrial waste, creating unsafe drinking conditions for nearby communities. As water scarcity worsens, so does the use of contaminated water, leading to an uptick in waterborne diseases such as typhoid fever, hepatitis A, and various diarrheal infections.

The lack of access to clean water also impacts hygiene practices. Households and communities are often forced to compromise on basic hygiene due to the scarcity of water, which in turn fuels the spread of diseases. Kyrgyzstan's sanitation infrastructure is notably inadequate, with over 65% of the rural population lacking access to centralized sewerage systems (National Statistical Committee of the Kyrgyz Republic, 2022). This reliance on unsafe water sources, paired with poor sanitation, has resulted in recurrent outbreaks of waterborne diseases.

The World Health Organization (WHO) has cautioned that climate change could further increase Central Asia's vulnerability to both waterborne and vector-borne diseases (2023). Along with the direct health implications, the growing demand for water in agriculture and other sectors will place additional strain on Kyrgyzstan's fragile water systems, making the provision of clean water to the population an increasingly difficult challenge.

Poor Quality Water and Aging Infrastructure in Kyrgyzstan

The widespread reliance on unsafe water sources is a critical factor driving the spread of waterborne diseases across Kyrgyzstan. According to the Department of Drinking Water Supply and Sewerage (DDWSS), 25.51% of the rural population depends on unsafe water sources, such as rivers, ditches, and canals, while 38.32% rely on street pumps that are often poorly maintained and vulnerable to contamination (Li, Alamanov, & Abdyzhapar uulu, 2022). This situation contributes significantly to the public health crisis nationwide.

Across the country, a lack of access to centralized sewerage systems exacerbates the issue. Only 21% of Kyrgyzstan's population is connected to centralized sewerage systems, with this figure even lower in rural areas (Li et al., 2022). In some regions, sewage flows directly into water bodies used for drinking, washing, and irrigation, leading to widespread contamination. The National Statistical Committee has reported rising rates of diseases like typhoid and hepatitis A, particularly in rural areas where water infrastructure is weakest.

Water quality remains a pressing issue across the country. About 11% of Kyrgyzstan's water resources, including 15% of surface water, fail to meet sanitation and hygiene requirements. Rural areas are especially affected, with a severe shortage of safe drinking water. The deterioration of water infrastructure has been a long-standing issue. According to the DDWSS, 267 villages still rely on water pipelines built before 1960, while 396 villages have no water pipelines at all (DDWSS cited in Li et al., 2022). This outdated infrastructure results in contamination before water even reaches households, creating widespread public health risks.

The poor quality of water together with outdated infrastructure leads to the spread of waterborne diseases such as typhoid, hepatitis A, and intestinal infections. Over the years, the national morbidity rate for enteric infections has remained high, ranging from 332.4 cases per 100,000 people in 2001 to 490.2 cases per 100,000 in 2010. Regions like Batken and Jalal-Abad see even higher morbidity rates, with 552.8 cases per 100,000 people in Jalal-Abad and 980 cases per 100,000 in Batken (National Policy Dialogue on Integrated Water Resources Management, 2013). Rotavirus infections contribute significantly to the burden of enteric diseases, with 26% of cases linked to the virus and 81.6% affecting children under 14.

Some regions, such as Batken and Jalal-Abad, face particularly high rates of waterborne diseases. In 2015, the incidence of hepatitis A in Batken was 4,161 cases per 100,000 people, and in Jalal-Abad, the rate was even higher at 5,400 cases per 100,000. These regions also report higher rates of intestinal infections, as contaminated water sources are frequently used. The annual morbidity rate for enteric infections in Jalal-Abad is 552.8 cases per 100,000 people, while in Batken, it is 980 cases per 100,000. Rotavirus, a major cause of diarrheal diseases, accounts for 26% of enteric infections across the country, with 81.6% of cases occurring in children under the age of 14 (DDWSS cited in Li et al., 2022).

The lack of proper sanitation and clean drinking water has also contributed to high rates of parasitic infections, with 40-45% of infectious diseases resulting from helminthiasis. Each year, between 35,000 and 45,000 people in Kyrgyzstan are affected by parasitic infections such as enterobiasis, ascariidiasis, lambliasis, and hymenolepidiasis. A report from the British Department for International Development (DFID) highlights that between 61% and 79% of children in some rural areas are infected with one of these four primary parasitic infections (DFID cited in National Policy Dialogue on Integrated Water Resources Management, 2013).

In addition, access to clean drinking water is a challenge even in urban areas. In Bishkek, only 67.3% of the population has access to clean water, while in Osh, this figure drops to just 12%. Nationwide, 390 villages lack access to clean drinking water, leaving many communities exposed to unsafe sources (Li et al., 2022).

The lack of proper disinfection processes in many water supply systems further compounds the issue. Many water distribution networks do not include adequate disinfection, which leaves residents vulnerable to bacterial and viral contamination. In remote areas, water distribution systems are in such poor condition that they contribute to the spread of diseases like typhoid fever and dysentery.

Efforts by the Kyrgyz government aim to address these water crises, with plans to provide clean drinking water to acutely affected villages by 2024. However, progress remains slow due to outdated infrastructure. Of the 1,394 water sources required to meet national needs, 159 (11%) are surface water sources, and 348 pipelines do not meet sanitary standards. Many pipelines, including 153, lack proper sanitary protection, and 188 pipelines have non-functional disinfection installations, making contamination almost inevitable in some areas (Li et al., 2022).

Waterborne diseases like typhoid, paratyphoid, salmonella, dysentery, and helminthiasis, all spread through oral-fecal transmission, are linked to poor water quality and warm climates. As Kyrgyzstan faces increasing challenges from water scarcity, aging infrastructure, and climate change, the spread of these diseases will likely continue to rise, further endangering public health (Bekturganov et al., 2016).

According to World Bank and WHO data, Kyrgyzstan's worsening health indicators are linked to the poor quality of water and sanitation services. In 2005, there were 122,800 cases of waterborne diseases reported, and that number has likely risen in recent years due to further degradation of infrastructure and the impacts of climate change (Bekturganov et al., 2016). Without significant investment in repairing and upgrading water and sanitation infrastructure, waterborne diseases such as hepatitis A, typhoid fever, and intestinal infections are likely to persist, especially in the most vulnerable regions.

Climate change is also expected to worsen Kyrgyzstan's vulnerability to waterborne diseases. Changes in precipitation patterns, rising temperatures, and the collapse of the Soviet-era water management infrastructure have already led to the resurgence of infectious diseases such as typhoid, tuberculosis, and malaria, which had been almost eradicated by the end of the Soviet period. The return of malaria, in particular, highlights the impact of deteriorating water management systems on public health. As climate change continues to reshape weather patterns in the region, Kyrgyzstan's vulnerability to both waterborne and vector-borne diseases is expected to increase.

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