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NEGATIVE IMPACTS OF CLIMATE CHANGE ON POPULATION LIFESTYLE AND WELL-BEING: A GLOBAL AND REGIONAL ANALYSIS

Adizova Hamida Rahimovna

Lecturer, Bukhara State University,

Bukhara, Uzbekistan Email: h.r.adizova@buxdu.uz

ABSTRACT: This article examines the multidimensional negative impacts of climate change on the lifestyle and overall well-being of populations worldwide, with particular attention to Central Asia and Uzbekistan. Drawing on data from the World Health Organization, the 2025 Lancet Countdown on Health and Climate Change, the World Bank, UNICEF, and recent peer-reviewed climate-health studies, the article systematizes evidence across four interconnected domains: heat-related mortality and morbidity, mental health and psychosocial well-being, food and water security, and economic livelihoods. The findings demonstrate that heat-related mortality has risen by 23% since the 1990s, reaching an average of 546,000 deaths annually worldwide, while heat exposure caused an estimated 640 billion lost labour hours and US$1.09 trillion in productivity losses in 2024 alone. Central Asian countries, and Uzbekistan in particular, are shown to be disproportionately vulnerable: heatwave-related excess deaths in Uzbekistan range from 19 to 21 per 100,000 people annually, with projections of up to 23,000 annual deaths by 2090, while 91% of the country's children are already exposed to climate-induced heatwaves. The article concludes that climate change is reshaping daily life through compounding pathways — physical health, mental health, livelihood security, and access to basic resources — and proposes a set of adaptive policy measures tailored to highly exposed arid and continental regions such as Uzbekistan.

Keywords: climate change, lifestyle, population health, heatwaves, mental health, food security, Central Asia, Uzbekistan, public health, adaptation.

1. INTRODUCTION

Climate change has shifted from a long-term environmental concern to an immediate determinant of how populations live, work, and maintain their health on a daily basis. According to the 2025 Lancet Countdown report, produced in collaboration with the World Health Organization (WHO), 12 of 20 key indicators tracking climate-related health threats have reached record levels, demonstrating that continued reliance on fossil fuels and insufficient adaptation are already exacting a measurable toll on human life and livelihoods [1]. The WHO further estimates that climate change could cause approximately 250,000 to 400,000 additional deaths annually between 2030 and 2050 through its combined effects on heat exposure, infectious disease, malnutrition, and the resilience of health systems [2, 3].

Unlike many environmental hazards that act through a single pathway, climate change influences population lifestyle through several interconnected channels simultaneously: it intensifies extreme heat and weather events, undermines food and water security, disrupts livelihoods and labour productivity, and erodes mental health and social cohesion [4]. These effects

fall disproportionately on already vulnerable groups, including children, older adults, outdoor workers, low-income communities, and people with pre-existing health conditions [4, 5].

Central Asia, and Uzbekistan in particular, represents a region of acute concern. Its arid and semi-arid continental climate, combined with a heavy reliance on irrigated agriculture and limited water resources, makes the population highly susceptible to the compounding effects of rising temperatures [6]. Recent modelling studies indicate that Uzbekistan and Kazakhstan are projected to experience the steepest increases in heatwave frequency, duration, and associated mortality among all Central Asian states [7].

The purpose of this study is to synthesize current global and regional evidence on the negative impacts of climate change on population lifestyle, encompassing physical health, mental health, food and water security, and economic livelihoods, and to derive policy-relevant conclusions with specific reference to Uzbekistan and the broader Central Asian region.

2. MATERIALS AND METHODS

This study is based on a descriptive-analytical review and synthesis of data from authoritative international sources, including the 2025 Lancet Countdown on Health and Climate Change [1], World Health Organization fact sheets and reports on climate change and health [2, 3, 8], World Bank regional heatwave mortality assessments for Europe and Central Asia [9], UNICEF reports on the socioeconomic impacts of heatwaves on children [10, 11], the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report findings on mental health [12], and peer-reviewed scientific studies examining heatwave trends and health risks in Central Asia and Uzbekistan specifically [6, 7, 13]. Methods applied include comparative-statistical analysis, descriptive synthesis of quantitative indicators, and thematic categorization of climate-health pathways into four domains: mortality/morbidity, mental health, food and water security, and economic livelihoods.

3. RESULTS

3.1. Heat-related mortality and morbidity

Global data show a consistent and accelerating rise in heat-related mortality. According to the 2025 Lancet Countdown report, the rate of heat-related mortality has increased by 23% since the 1990s, pushing total heat-related deaths to an average of 546,000 per year worldwide [1]. In 2024 alone, the average person was exposed to 16 days of dangerous heat that would not have occurred without climate change, while infants and older adults faced more than 20 heatwave days per year on average — a fourfold increase over the past two decades [1]. Earlier WHO estimates (2000–2019) place average annual heat-related deaths at approximately 489,000, with 45% occurring in Asia and 36% in Europe [8]. Single extreme events illustrate the acute risk: the 2003 European heatwave caused more than 70,000 deaths, the 2010 heatwave in the Russian Federation caused approximately 56,000 excess deaths over 44 days, and the summer of 2022 alone produced an estimated 61,672 heat-related excess deaths across Europe [8, 13].

Vulnerability to heat is highly unequal. Heat-related mortality among people over 65 years of age increased by approximately 85% between 2000–2004 and 2017–2021 [8]. In the United States,

farmworkers — 78% of whom are Hispanic or Latino — are 35 times more likely to die from heat-related causes than workers in other occupations, and heat-related cardiovascular deaths are projected to increase by 233% by mid-century if current trends continue [5]. Beyond heat itself, air pollution compounds these risks: exposure to fossil-fuel-derived fine particulate matter (PM2.5) contributed to 2.09 million of the 6.4 million total deaths attributable to PM2.5 in 2021 [4].

3.2. Mental health and psychosocial well-being

The IPCC's Sixth Assessment Report (2023) concluded with very high confidence that climate change has already negatively affected mental health globally [12]. Documented effects of heat exposure on mental health include increased hospital admissions for psychiatric conditions, elevated rates of suicide attempts, and worsened mood and sleep disruption, partly mediated by impaired thermoregulation among individuals taking certain psychiatric medications [12, 14]. Beyond acute heat effects, climate-related disasters — floods, droughts, and storms — generate both immediate psychological distress (anxiety, acute stress reactions) and long-term disorders linked to displacement, loss of livelihood, and disrupted social cohesion [4]. A 2024 study conducted in the United Arab Emirates found that increased heat exposure measurably affected physical, mental, and social health domains simultaneously among adult residents, underscoring the need for integrated, rather than siloed, public health responses [14].

3.3. Food security, water scarcity, and economic livelihoods

Climate-driven droughts and heatwaves are increasingly undermining food systems. Nearly 50% of the global land area was affected by at least one month of extreme drought in 2023 [4]. The combined effects of droughts and heatwaves were associated with an additional 124 million people facing moderate or severe food insecurity in 2023, following an estimated 151 million additional people affected in 2022 due to reduced crop yields, water shortages, and disrupted supply chains [1, 4]. Heat exposure also directly affects labour productivity: in 2024, heat caused an estimated 640 billion potential labour hours to be lost globally, equivalent to approximately US$1.09 trillion in productivity losses [1].

These pressures interact directly with agriculture-dependent economies. In Central Asia specifically, agriculture contributes between 5% and 24% of GDP across the countries most affected by recent extreme heat events and employs up to 50% of the regional workforce in some areas, meaning that heat- and drought-related disruptions translate rapidly into household income loss [15].

3.4. Regional case study: Central Asia and Uzbekistan

Central Asia is identified by recent multi-ensemble climate modelling (1959–2100, 700 locations) as a region facing some of the steepest projected increases in heatwave-related mortality. Under the SSP2–4.5 scenario, historical heatwave magnitudes of 12–23°C are projected to shift to 26–31°C, effectively making previously moderate-to-severe heatwaves the new climatological norm; under SSP5–8.5, magnitudes rise further to 29–36°C [7]. Kazakhstan and Uzbekistan show the steepest near-term increases in heatwave-related mortality rates among all Central Asian states [7].

A World Bank assessment covering 70 cities across the Europe and Central Asia region found that heatwave-related excess deaths in Uzbekistan currently range from 19 to 21 per 100,000 people annually — comparable to Astana, Bishkek, and Tashkent, while Ashgabat shows a higher rate of 25 to 28 per 100,000 [9]. Under continued warming, the same assessment projects that major Central Asian cities, including Tashkent, could experience between 10,000 and 23,000 heat-related deaths per year by 2090 [9].

Children represent a particularly exposed group: UNICEF reports that approximately 9.5 million children in Uzbekistan — 91% of the country's child population — are already exposed to climate-induced heatwaves, with Uzbekistan projected to be among the ten countries globally most affected by heat stress by 2030 [10]. The same UNICEF analysis found that the share of GDP lost to heat stress in Uzbekistan is expected to double between 1995 and 2030, with International Labour Organization data showing working-hour losses in agriculture, construction, and services rising from 0.04% in 1995 to a projected 0.15% in 2030 [10].

A detailed 40-year temperature analysis (1980–2020) using NCEP/NCAR reanalysis data confirmed that July is the hottest month in Uzbekistan, with Bukhara and Khorezm regions identified as the most heatwave-prone areas of the country [6]. Climate projections under CMIP6 models indicate a persistent warming trend, with mean temperatures expected to rise by 3 to 3.5°C by 2067, particularly in the southwestern lowlands [6]. The acute risks of such warming were illustrated in March 2025, when an extraordinary early-season heatwave pushed temperatures up to 15°C above seasonal norms across Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan, and Kyrgyzstan, disrupting wheat sowing in Kazakhstan and damaging flowering fruit crops, including cherries and apricots, in Uzbekistan and Tajikistan at a critical point in the agricultural calendar [15].

The table below summarizes the principal regional indicators discussed above:

Indicator	Value
Heatwave-related excess deaths in Uzbekistan (annual)	19–21 per 100,000 people
Heatwave-related excess deaths in Ashgabat (annual)	25–28 per 100,000 people
Projected annual heat deaths, major Central Asian cities, by 2090	10,000–23,000
Children in Uzbekistan exposed to climate-induced heatwaves	9.5 million (91% of children)
Projected mean temperature rise by 2067 (SW lowlands)	+3 to 3.5°C
Working-hour losses, agriculture/construction/services (1995 vs. 2030 projected)	0.04% → 0.15%

4. DISCUSSION

The evidence reviewed indicates that climate change does not affect population lifestyle through a single mechanism but through a set of compounding and mutually reinforcing pathways. Rising heat directly increases mortality and morbidity, particularly cardiovascular and respiratory disease, while simultaneously degrading mental health through both acute physiological stress and the longer-term psychosocial consequences of displacement and economic insecurity. At the same time, heat and drought undermine the food and water systems and labour markets on which daily life depends, creating a feedback loop in which physical health, mental health, and economic security deteriorate together rather than independently [1, 4, 12].

Uzbekistan exemplifies how these global pathways converge with acute force in arid, agriculture-dependent, continental-climate settings. The combination of already-elevated heatwave mortality (19–21 per 100,000 annually), near-universal child exposure to heatwaves (91%), and a doubling of heat-related GDP losses projected between 1995 and 2030 suggests that climate change is already altering daily routines, agricultural calendars, and household economic security in the country, rather than representing only a distant future risk [9, 10, 15]. The disproportionate projected mortality increases in Uzbekistan and Kazakhstan relative to neighbouring Central Asian states further suggest that region-specific, rather than uniformly applied, adaptation strategies are required [7].

These findings are consistent with the global pattern identified by the IPCC and the Lancet Countdown: vulnerability to climate change is not distributed randomly but concentrated among children, older adults, outdoor and agricultural workers, and lower-income households — groups that are also prominent within Uzbekistan's exposed population [1, 5, 10, 12]. This convergence of global and regional evidence strengthens the case for prioritizing heat-health adaptation in national public health and social protection planning.

5. CONCLUSION

1. Climate change is altering population lifestyle worldwide through four interconnected pathways: rising heat-related mortality and morbidity, deteriorating mental health, declining food and water security, and eroding economic livelihoods and labour productivity.

2. Global heat-related mortality has risen 23% since the 1990s to an average of 546,000 deaths per year, while heat-related economic losses reached an estimated US$1.09 trillion in 2024 alone.

3. Central Asia, and Uzbekistan in particular, is disproportionately exposed: heatwave-related excess deaths already range from 19 to 21 per 100,000 people annually, 91% of children are exposed to climate-induced heatwaves, and projected mortality could reach 10,000–23,000 deaths per year in major regional cities by 2090.

Based on these findings, the following measures are recommended: (1) establish heat-health early warning systems integrated with national meteorological services, with particular focus on the most heatwave-prone regions such as Bukhara and Khorezm; (2) expand urban cooling infrastructure and green space, especially in rapidly growing cities; (3) develop targeted social protection mechanisms for outdoor and agricultural workers most exposed to heat- and drought-related income loss; (4) integrate mental health support into climate adaptation and disaster-response planning; and (5) strengthen water-efficient and heat-resilient agricultural practices to safeguard food security under projected warming of 3–3.5°C by 2067.

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