

Climate Change and Urban development in Tbilisi: Challenges and Responses

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Abstract. Urbanization and climate change pose growing risks to global cities, with 70% of the world's population projected to live in urban areas by 2050. Tbilisi, Georgia's capital, faces environmental challenges like air pollution, heatwaves, flooding, and land instability, exacerbated by climate change and rapid growth. In response, the city has adopted several strategic plans, including the Tbilisi Land Use Master Plan, Green City Action Plan, and Resilience Strategy 2030, focusing on sustainable urban development, green infrastructure, and climate resilience. National reforms aligned with the EU framework support these initiatives. Moving forward, integrated planning, technical solutions, public participation, and improved communication are vital for building a safer, greener, and more resilient Tbilisi.

Key words: Urbanization; Climate Change Tbilisi; Sustainable Development; Urban Resilience; Green Infrastructure; Urban Planning; Disaster Risk Reduction; EU-Georgia Association Agreement; Climate Adaptation; Public Participation; Urban Mobility; Environmental Policy; Heatwaves; Flooding.

1. Introduction

Cities are the global future with more population projected to reside in urban areas in the coming decades. By 2050, 70% of the world's population is expected to be living in urban areas.

Humanity faces a dangerous threat from urbanization and climate change, which converge to negatively impact quality of life and stability. Despite these threats, there are significant opportunities. Urban areas, though heavily impacted, can develop strategies for

climate mitigation and adaptation. Cities can help address the need to adapt to climate change and mitigate its drivers, aiming to keep global temperature increases within 2 to 2.4°C above pre-industrial levels, as outlined in the UNFCCC.¹

As Georgia's capital, Tbilisi has a long history that goes back over fifteen centuries. Thanks to its key location on the crossroad of the east and west, Tbilisi became an important cultural, political and economic center of the region, developing into a melting pot of oriental and western cultures, whilst still maintaining its strong identity.

Tbilisi is a self-governing city with defined boundaries, symbols (e.g. flag and coat of arms) and assets, with an ambitious vision to become one of the leading smart, sustainable cities in the United Nations Economic Commission for Europe (UNECE) region and beyond. It has registered an impressive progress in implementing the 2030 Agenda for Sustainable Development (2030 Agenda), capitalizing on the growth opportunities generated by the Association Agreement between Georgia and the European Union (EU).²

2. Urban Development in the Face of Climate Change

According to the most recent data, 59 percent of the country's population lives in urban areas, while Tbilisi accounts for 32 percent of Georgia's population.³ Therefore, Tbilisi faces a number of serious environmental challenges, particularly in the area of urban development and transport. There is no denying that urbanization makes cities richer. Newcomers attracted by the opportunities that the city offers start businesses or join growing companies, which

¹ Cities and Climate Change: Global Report on Human Settlements, United Nations Human Settlements Programme (UN-Habitat), London * Washington, DC, 2011, 9-10

² Smart Sustainable Cities Profile – Tbilisi, Georgia, United Nations, United States of America, 2023, 1-2

³ Population by regions and urban-rural settlement, National Statistics office of Georgia, 2020

fuels all sectors of the local economy⁴. Due to massive recent growth in these sectors, air pollution was the top environmental concern of Georgian citizens in a 2019 opinion poll.⁵ Urban mobility infrastructure have led to overutilization of the existing urban transport systems and a strong increase in motorized individual traffic. The traffic management and transport modes of the city therefore need to be aligned with climate protection goals and to contribute to better living conditions for the population.⁶

Tbilisi's geographic location—a coastal city subject to flooding—is impacted by climate change. Extreme heat and drought have made this climate threat worse in recent decades. The number of days in which the heat index in Tbilisi reached unsafe levels increased by 14 when the temperature values from 1961–1985 were compared to 1986–2010. The maximum temperature of 40.6 °C was recorded in July 2021. The loss of green cover has been aggravating the urban heat island effect, with adverse consequences for biodiversity and human health (WBG and ADB, 2021).⁷ Urban Heat Island effects amplify Tbilisi's heatwaves, impacting human health. Combined with climate change and future urban expansion, this will likely harm the service sector's productivity, affecting labor and increasing adaptation costs.⁸

Apart from the above mentioned impacts, Tbilisi is experiencing some key shocks, such as: Flooding, Seismic risk, Landslides and Ground instability.

In resilience terms, a shock is a sudden or acute event that threatens Tbilisi's immediate wellbeing. A shock could be an earthquake, infrastructure failure, an extreme weather

event, or civil unrest.

During the industrialisation of the city, much of the industrial infrastructure was built into the ravines, which today have become unsafe areas, due to the risk of flooding. During the June 2015 floods, heavy rainfall in the Vere basin and its tributaries triggered large scale landslides and debris flows, putting two motorways out of use. Residential buildings and Tbilisi Zoo located at the low elevations in the River Vere Gorge were significantly damaged or/and totally destroyed. Over 21 people were killed, and over 1000 people lost their homes or businesses.⁹

This terrible shock became a turning point for Tbilisi to join 100RC network in 2016, May. The aims of Resilient Tbilisi can only be achieved through local, national and international partnerships.

3. Governmental Responses and Strategies

Disaster risk reduction and climate change adaptation are crucial for city resilience. To reduce the "urban heat island" effect, attention has focused on urban management, sustainability, planning, and green infrastructure. Integrating these with metropolitan development requires a systems-oriented approach to risk assessments and planning, using current climate data and future projections. Effective multilevel governance and integration are essential, demanding significant governance capacity and financial resources. Efforts are aimed at sustainable development, with international and national policy frameworks, to create future cities that

⁴ Tbilisi: a Growing City with Growing Needs, Yaroslava Babych, Luc Leruth, 2020, available at <<https://iset-pi.ge/en/blog/75-tbilisi-a-growing-city-with-growing-needs>>

⁵ Green City Action Plan for Tbilisi – A Mere Formality?, CEE Bankwatch Network, 2020, available at: <<https://bankwatch.org/publication/green-city-action-plan-for-tbilisi-a-mere-formality>>

⁶ Sustainable urban mobility in Georgia (SUM Tbilisi) - Project implementation and accompanying

measures Consultant, available at: <<https://www.gopa-infra.de/projects/sustainable-urban-mobility-georgia-sum-tbilisi-project-implementation-and-accompanying>>

⁷ Smart Sustainable Cities Profile – Tbilisi, Georgia, United Nations, United States of America, 2023, 6

⁸ Climate Risk Country Profile - Georgia, Asian development bank, World Bank Group, 2021, 2

⁹ Resilient Tbilisi, A strategy for 2030, Tbilisi, Georgia, 2019, 13

are sustainable and improve quality of life.¹⁰

Cities have a vital role to play in the implementation and achievement of commitments within the international climate change framework. They also stand to benefit from the opportunities created by this framework for local responses to climate change.

While Tbilisi's local government manages spatial planning and urban development, key policies are set and implemented at the national level, aiming for inclusive growth addressing economic, social, and environmental sustainability. National reforms advanced in 2014 with Georgia's Association Agreement with the EU, integrating Georgia into the EU regional bloc through the Deep and Comprehensive Free Trade Area (DCFTA). The DCFTA requires Georgia's laws to align with EU standards, driving national legislative and institutional reforms across all sectors. Annex 2 summarizes urban-related policies and laws under the central Government's responsibility.¹¹ As of 2022, Georgia has harmonised over 50 per cent of the EU Regulations and Directives of direct relevance to urban development and has adopted most of the European harmonised standards.

The Ministry of Environmental Protection and Agriculture (MOEPA) handles environmental policy, climate change impact assessments, and climate strategies. In 2022, MOEPA implemented Georgia's 2030 Climate Change Strategy to reduce GHG emissions by at least 35% below 1990 levels by 2030. MOEPA also launched an online portal for publishing Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs), managed by the National Environment Agency, to

improve transparency and public-private consultations, alongside efforts to enhance Georgia's environmental and hydrometeorological monitoring system.¹²

Tbilisi has an ambitious urban development agenda best expressed in the following city planning documents:

- Tbilisi Land Use Master Plan (2019) – defines legal zones and basic parameters for land use and specifies spatial-territorial requirements for environment protection and heritage preservation, as well as economic, transport and infrastructural development necessities and directions for the whole city. The Master Plan, in particular, lays out the following concepts which Tbilisi should strive for: a compact city, green city, well connected city and resilient city. The “green city” concept in the Master Plan refers to an integrated approach for the improvement of environmental and recreational conditions.¹³
- Green City Action Plan 2017-2030 – identifies priority measures for reducing CO2 emissions by around 450,000 tons per year and generating water savings of around 55 million m³ per year¹⁴. In the area of urban transport, the action plan aims to reduce at least 85% of the current air pollution through the introduction of new compressed natural gas buses.¹⁵
- Tbilisi Resilience Strategy for 2030 (2019 edition) – aims at supporting the development of “a resilient and vibrant city, where residents are protected and safe, where there is access to opportunity and healthy natural environments and where we are empowered to plan ahead, ready respond to any challenge”. Goal 8 of the strategy aims to develop Tbilisi’s climate change strategy actions, as follows:
 - ✓ This goal supports two targets within the EU Georgia Association Agenda: • Start implementing new global agreement on Climate Change (Paris Agreement) • Ensure

¹⁰Interdependency between Climate Change and Urbanization, Pallavi Tiwari, Aditi Arora, Kavita Nagpal, 2023, available at: <https://www.researchgate.net/publication/373689845_Interdependency_between_Climate_Change_and_Urbanization>

¹¹ Smart Sustainable Cities Profile – Tbilisi, Georgia, United Nations, United States of America, 2023, 24

¹² For strategic documents on the 2030 Climate Change Strategy of Georgia, see <https://mepa.gov.ge/En/PublicInformation/32027>.

¹³ Green City Action Plan for Tbilisi – A Mere Formality?, CEE Bankwatch Network, 2020

¹⁴ Smart Sustainable Cities Profile – Tbilisi, Georgia, United Nations, United States of America, 2023, 17

¹⁵ Green City Action Plan for Tbilisi – A Mere Formality?, CEE Bankwatch Network, 2020

public access to environmental information and public participation in decision-making. • Infrastructure Adaptation Climate Change Commitment¹⁶

- Sustainable Urban Mobility Plan (2019-2030)
- Tbilisi Transport Plan (2023-2043).¹⁷

4. Conclusion

Growing awareness of the link between urbanization and climate change has spurred national and international efforts to develop policies, goals, and guidelines to mitigate its adverse effects. Supporting Tbilisi in adapting to climate change necessitates collaboration across sectors like ecosystem management, biodiversity conservation, urban planning, energy efficiency, and infrastructure rehabilitation. These actions safeguard city infrastructure and ecosystems for the benefit of Tbilisi's residents in the long term.

With numerous plans under different national and international processes, it is important to have clear instruments for implementation and monitoring. Furthermore, in order to mitigate the impacts of climate change in urban planning and architecture, various technical solutions should be employed. These include green roof systems, ground drainage and rainwater harvesting systems, porous pavement systems, and other innovative approaches.

A step forward would be participatory planning, where public involvement in city development is essential for successful urban planning. Public participation ensures a balanced approach between the public and private sectors.

To sum up, the city should provide citizens with more substantial information about strategic documents, clearly communicating the need for climate action and adaptation, and how these efforts can improve quality of life. Effective communication between scientists, planners, managers, and the public is essential

to make Tbilisi a "green city."

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¹⁶ Resilient Tbilisi, A strategy for 2030, Tbilisi, Georgia, 2019, 13

¹⁷ Tbilisi Transport Plan, 2023, available at: <<https://tbilisi.gov.ge/page/48>>