BAKU DIALOGUES

POLICY PERSPECTIVES ON THE SILK ROAD REGION

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Sustainable and Climate-Friendly Urban Development: Prologues to Azerbaijan Hosting COP29 and WUF13

Anar Valiyev, Guest Editor

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Mr. Damjan Krnjević Mišković, Co-Editor
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The Case for Transformative Policymaking

Anna Soave

We live in a time of profound and rapid transformation. Trends and multifaceted challenges that have been gradually evolving in the past decade appear to be converging towards radical changes in the urban realm, driven by global geopolitical shifts, cultural dynamism, uneven socio-economic progress, the disruption of labor markets reshaped by the digital revolution, and emerging technological and scientific advancements. All these are, to make matters more even complex, topped by the drive to "go green" due to the increasing evidence of our overuse of finite natural resources and the vulnerability of our ecosystem to climate crisis, and thus to our own wellbeing.

Azerbaijan's comprehensive "Strategic Road Maps," approved in 2016, set the basis for the country's aspirations towards the sustainability and competitiveness of its economic structure through the development of the non-oil sector and its human capital. The more recent policy and reform framework, titled "Azerbaijan 2030: National Priorities for Socio-Economic Development," which was endorsed in 2021, spells out clean-cut priorities for the country aimed at stimulating the growth of its economy, fostering a dynamic, inclusive, and socially-just society, promoting the balanced development of the regions, encouraging innovation and creativity, guiding the return of internally displaced people (IDPs) to their areas of origin in the liberated territories, and promoting decarbonization.

***Anna Soave** is Head of UN-Habitat's Country Office in Azerbaijan with more than 25 years of international experience with a particular focus on post-conflict contexts, low-income informal settlements, and dilapidated historic neighborhoods. The views expressed in this essay are her own.*

National Urban Policy

For Azerbaijan to achieve a more inclusive, balanced, and resilient socio-economic growth across its regions, including, most notably (given the topic of this article), resilient, sustainable, and inclusive "future-ready" cities, stakeholders agree that the country urgently needs to take two critical moves. First, to establish an enabling and interdisciplinary policy framework to improve coordination among different sectors and ministries. Second, to establish innovative collaboration platforms with the private sector and expert partners to address the country's current and projected urban challenges. In this way, it ought to be able to maximize the opportunities offered by urbanization whilst mitigating potential adverse externalities.

A National Urban Policy (NUP) for Azerbaijan is a key to achieving more inclusive, balanced, and resilient socio-economic growth across its regions, including resilient, sustainable, and inclusive "future-ready" cities.

A National Urban Policy (NUP), which Azerbaijan does not currently have, offers governments and policymakers such a framework and, at the same time, a mechanism for implementation. A NUP is a coherent set of decisions derived through a deliberate, government-led process of coordinating and rallying various actors for a common vision and goal that will promote more transformative, productive, inclusive, and resilient urban development in the long term.

Developing a NUP for Azerbaijan is expected to improve coordination and policy coherence between different sectors, compelling institutions to collaborate and share critical data. Establishing incentives for more sustainable, greener, and people-oriented approaches and practices, while strengthening urban-rural linkages through a more optimal allocation of resources, will help reduce urban and administrative disparities within and among regions, and thus support the operationalization of the country's long-term development framework spelled out by the "Azerbaijan 2030" document.

Contextually, the NUP will also reflect the ongoing substantial investments in the physical and ecological recovery of the country's liberated territories (Karabakh and East Zangezur), which is critical for the resettlement of tens and ultimately hundreds of thousands of IDPs to their areas of origin, as well as the country's new ambitious commitment to fully explore its renewable energy potential.

The crafting of a NUP directly involves urban-related actors at all levels: the central government, local authorities, ministries and agencies, financing institutions, the private sector, academic institutions, registered civil society organizations, and so on. Such a collaborative and multi-stakeholder approach amply resonates with UN-Habitat's New Urban Agenda and United Nations member states' commitment to the UN 2030 Agenda for Sustainable Development, in particular SDG11 ("Make cities and human settlements inclusive, safe, resilient and sustainable").

The crafting of a NUP directly involves urban-related actors at all levels: the central government, local authorities, ministries and agencies, financing institutions, the private sector, academic institutions, registered civil society organizations, and so on.

In view of the series of consultation workshops taking place as part of the NUP undertaking, this paper would like to anticipate six forward-looking directions and crosscutting issues that Azerbaijan's NUP could explore to create tangible public value. While they should not be considered exhaustive, they can help stakeholders to determine the scope, drivers, and goals of the much-needed National Urban Policy for Azerbaijan.

Cross-Cutting Approaches and Principles

A "Strategic Visioning for the Future" workshop held at ADA University in June 2024 kick-started the process to collaboratively identify the long-term intentions of the urban policy in alignment with Azerbaijan's national development agenda and its multilateral commitments. Ideally, Azerbaijan's NUP Vision will be able to embrace some, if not all, of the following eight cross-cutting approaches and principles.

Forward-looking and innovative. Leveraging international experience and know-how to improve current policy and approaches that will enable the adoption of good urban planning and city management practices and new technologies more rapidly ("leapfrogging"). It should consider the country's aspiration to acquire regional influence in sectors that have the potential to positively impact demographic pull-factors, national and foreign investments, "green jobs," and future urban growth patterns.

Equitable and inclusive. Focused on poverty reduction and improving the quality of life in urban settlements that provide opportunities for all, aiming to eradicate the persistence of spatial socio-economic and environmental inequalities, particularly in rural villages and towns.

Effective and adaptable. Helping decisionmakers to seize opportunities and mitigate risks, enhancing resilience and adaptability to changing circumstances, as, for example, the reopening of borders and/or the inauguration of new regional connections (as security considerations allow). Contemporary urban policies should be able to evolve based on new evidence, ensuring they remain relevant and effective. Regular assessments can identify areas for improvement and provide evidence of the policy's impact.

Evidence-based and informed. Leveraging technology, such as Geographic Information Systems (GIS) and data analytics, to enhance spatial mapping and enable more efficient and effective urban management of Baku and cities and towns located in other parts of the country. Academic research, case studies, and best practices from other cities and countries can provide valuable insights on what has worked elsewhere and how similar strategies can be adapted to local contexts.

Coherent and mission-oriented. Ensuring that urban policies are aligned with Azerbaijan's national and regional development goals, as well as international commitments (e.g. the SDGs and the New Urban Agenda), and focused on achieving specific, ambitious goals that address major societal challenges.

Interdisciplinary and participative. Fostering cooperation and partnerships between different levels and sectors of the Azerbaijan government, the private sector, academia, and other local stakeholders (e.g., registered civil society organizations) to ensure a

well-coordinated, coherent, and transparent urban policymaking process. With sufficient engagement from local communities during consultations, the resulting policy ought to stand a better chance of reflecting citizens' actual needs, thereby achieving extra attention and support.

Relevant and sustainable. To make sure that policy directives are relevant to the context and the needs of the country but also implementable by harnessing adequate inter-sectoral funding for effective policy implementation, ensuring that growth does not compromise the ability of future generations to meet their needs and aspirations.

Building capacity and consensus. By engaging practitioners and experts in public platforms where participants can share knowledge, good practice, and experiences. To this end, Azerbaijan's State Committee on Urban Planning and Architecture (SCUPA) has already successfully organized two National Urban Forums and will be hosting in Baku the thirteenth World Urban Forum (WUF13) in 2026.

Connecting the Dots

In furtherance of the foregoing, Azerbaijan should inform its urban policymaking by taking into account six forward-looking directions. The first is what we call *connecting the dots*, namely enhancing the role of secondary urban centers in Azerbaijan's future development prospects.

Azerbaijan should inform its urban policymaking by taking into account six forward-looking directions.

Over the past 20 years, Azerbaijan has maintained a highly urbanized rate of 54 percent, characterized by marginal demographic growth and a persisting disparity between cities. As the political, cultural, and commercial capital of the country, Baku hosts over a quarter of its population (2.6 million), followed by the industrial city of Sumgayit (427,600, recorded by the State Statistics Committee) and the historic city of Ganja (330,700), while the rest of the cities and towns have less than 100,000 inhabitants each.

Despite progress, rural areas are still lagging behind. "Rebalancing the spatial distribution of socio-economic growth continues to be a key government policy goal," as the Asian Development Bank (ADB) put it in its mid-2024 *Azerbaijan National Urban Assessment* document, "which can only be achieved over time via a massive decentralization of investments. Baku is slated instead to continue its accelerated growth, boosted by the 2040 Master Plan and its investment program. Secondary cities still display constrained local economies, limited infrastructure, and aging built environments."

An Azerbaijan NUP will need to build consensus on how to implement integrated and more balanced territorial development plans, encouraging better connectivity and cooperation between cities and towns, enabling a better flow of people, products, services, and information, and strengthening supply chains—while taking full advantage of the competitive opportunities of their geographical location and enhancing their commercial, industrial, cultural, historic, social singularities, proximity to transportation corridors, and tourism potential.

The production of reliable spatial data would allow decisionmakers to prioritize investments and readjust policies and strategies as and where required. Any efforts towards administrative decentralization and financial devolution would have to be complemented by providing capacity development to municipal governments and local health and education institutions.

Such measures would help to reduce urban and territorial disparities while increasing the role of small and intermediate cities and towns in enhancing food security and nutrition systems, strengthening human capital through youth upskilling and vocational training (TVET), and providing improved infrastructure including high-speed internet access that can encourage the setup of start-ups and small-medium enterprises (SMEs) as well as the multiplication of tourism initiatives in rural areas.

The Right Kind of Future

The second urban policymaking direction involves *fostering a prosperous, sustainable, and inclusive future* for Baku and the Absheron Peninsula. Since the breakup of the Soviet Union, the metropolitan area of Baku has experienced a profit-driven construction boom, especially in the real estate sector, which has dramatically transformed its urban skyline, land use, and density patterns, but also the extent of its built-up area and the quality of life of its citizens.

This has resulted in a number of acknowledged multi-faceted and interrelated challenges. One is the gentrification of the capital's traditional and low-income residential neighborhoods, where rundown and overcrowded two-floor buildings have been relentlessly torn down to make space for beautification projects, upmarket residential towers, glazed office buildings, shopping malls, and glitzy new hotels.

Another is the inefficient land usage and unplanned low-density urban sprawl across the Absheron Peninsula, where many homes and summer houses have been built over what is still listed as agricultural land.

A third is a high level of informality due to the population influx from the regions, lack of affordable and social housing, and decades of ineffective urban development control.

A fourth is the urgent need to retrofit and even reconstruct the deteriorating prefabricated *khrushchevki* housing blocks constructed in the 1950s and early 1960s.

A fifth is the inadequate and underfunded public transportation system, compounded by regular traffic jams in the city center and along the city's main axes, which costs commuters and businesses valuable time and money.

A sixth is pressure on branding Baku as the main tourist destination in the region and location for international mega-events, which risks exceeding the capital's carrying capacity and negatively affecting residents.

A seventh is elevated levels of air pollution and land and lake water contamination, which affect human health, the economy, and the ecosystem.

And an eighth one is the insufficient attention provided to the mobility needs of children, women, older persons, and people with physical disabilities.

The new Baku Master Plan 2040, conceived by the Berlin-based architectural firm Albert Speer + Partner GmbH (AS+P) and approved in late 2023, charts an ambitious post-industrial transition towards a polycentric capital city supported by regional urban centers (Alat and Mardakan) and sub-centers strategically located at the edge of central Baku, improved connectivity with Sumgayit, a wider and more efficient public transportation system, a new impetus towards environmental protection, remediation of contaminated land and lakes, the establishment of new public open spaces and "Hybrid Green Corridors," and the safeguarding of the capital's cultural and historical assets located downtown, within its Special Protection Zone. The Plan is designed to boost Baku's economic and cultural dynamism within a framework that enhances its livability, environmental sustainability, and inclusivity.

The success of these objectives depends on the government's capacity to mobilize the required $55 billion funding envelope from public and private capital, as well as the political readiness of its local administration to direct investments toward human-centered and sustainable development. A clear pro-poor policy regarding the phased upgrading of underserviced and low-income areas, along with the systematic regularization of selected informal settlements, could significantly alter the trajectory of Baku's metropolitan expansion, offering the chance to reduce spatial inequalities in line with SDG10 ("Reduce inequality within and among countries"), and help to preempt further unplanned growth and the loss of precious land that should be instead earmarked for public facilities and critical infrastructure. The planned rail station in Khirdalan Municipality on the line extending to Sumgayit, for example, will have a transformative impact on this area, immediately improving access to jobs and services for thousands of families living in informal situations.

The early engagement of the designated authorities in policymaking will play an important role in the drafting of a set of Detailed Plans for the priority development areas indicated by the Master Plan 2040, where targeted investments could favor, for example, higher urban densities along transit-oriented development (TOD) axes.

Affordable Housing

The third urban policymaking direction involves *improving access to decent and affordable housing while harnessing the full potential of the sector's value chain for growth*. Home ownership is very important for people in Azerbaijan. Statistics collected in 2023 indicated that over 96 percent of single-family detached homes and over 88 percent of apartments are privately owned. This represents a substantial shift from the 39 percent recorded in 1990, which in turn reflects the impact of successful housing privatization programs since the elimination of the state monopoly in the construction sector.

However, challenges remain, especially related to the maintenance of multi-family apartment buildings. The privatization of the apartment units built during the Soviet period—some dating back to the 1950s and aging very poorly—has transferred the burden of their maintenance to the owners, many of whom cannot afford essential upkeep of common services and spaces, let alone costly renovations. Hence, many households throughout the country live in dilapidated (and often hazardous) housing blocks serviced by deteriorating utilities. To complicate matters, the authorities have also acknowledged the fact that many of the high-rise buildings that were built since the 1990s may not comply with prevailing urban planning norms and standards, raising concerns over health and safety issues, including their physical solidity, in a country that is seismically active and in which many areas are prone to landslides during flash floods.

Although the real estate market in Baku has been growing steadily over the past two decades and overcrowding has been reduced, surveys indicate that there is a persistent disconnect between average salaries and housing pricing. The supply and demand mismatch, exacerbated by the influx of IDPs, internal migrants, and foreign residents (and visitors), is affecting both the homeownership and rental markets, in particular for young households struggling to get on the property ladder.

Even properties constructed on plots without building permits or property deeds are becoming more expensive. The rental market remains underdeveloped, with many vacant apartments purchased as investment properties or inhabited by "ghost" tenants because landlords often prefer not to register rental contracts, effectively leaving tenants legally unprotected. Also, many do not feel the need to update their residence status, which contributes to distorting official population statistics and hampers the proper forecasting of basic service needs.

The country's housing priorities are focused on ensuring that all Azerbaijani citizens have access to safe, decent, and affordable housing. Over the years, the government has taken a number of steps to alleviate the market pressure and address the population's most pressing housing needs by improving the supply of affordable housing units in high-rise buildings through the State Housing Construction Agency (MIDA) at low-rate mortgage loans. From 2000 to 2022, capital investment in housing averaged 7.3 percent, reduced to 5.7 in 2022 and 5.2 percent in 2023.

According to the State Statistical Committee of Azerbaijan, the state built approximately 24,000 subsidized housing units in 2023, which represents an increase of 4.6 times compared to 1998. Also, recent data provided by the State Service on Property Issues showed positive progress in real estate registrations, thus addressing the severe administrative backlog that made the news in mid-2023 of homeowners in Baku and Absheron who possess municipal sale documents but cannot obtain a formal deed from the real estate register. In the meanwhile, SCUPA is investing in systematizing the issuance of construction permits through an electronic permit portal and strengthening building control.

In line with the New Urban Agenda, a comprehensive NUP should underline the social and ecological function of land, emphasizing the strong connection between poverty reduction and housing, land, and property (HLP). The NUP could help to reposition 'Housing' properly at the center of government policy in Azerbaijan, including its commitment to SDG11.

This could be done by focusing on at least six short and medium-term priorities: *one*, reducing the fragmentation of the institutional responsibilities related to the housing sector across multiple ministries and departments; *two*, recording the de facto land use changes from agricultural to residential and fast-tracking the registration of real estate property; *three*, investing in the upgrading and functionality of services, infrastructure, and open spaces of selected informal and under-serviced settlements to deliver adequate living standards and their spatial integration in the wider city, while protecting vulnerable citizens (including IDPs who may decide not to return to their areas of origin in the liberated areas of the country) against forced and arbitrary evictions; *four*, diversifying and expanding housing finance solutions for the delivery of affordable housing in favorably-located land, including loans for individual homes' improvements; *five*, enabling and actively supporting private investments and the support of external partners for the rehabilitation and retrofitting of dilapidated multi-storey residential blocks, which could include establishing Private-Public Partnerships (PPPs) with Housing Associations; and *six*, improving the collection, analysis,

dissemination, and monitoring of spatial data on demographics, land, informality, and housing that can support a better understanding of the sector and offer the grounds for evidence-based forecasting and decisionmaking on public and private investments.

A longer-term policy directive could look into the transformative impact that enhancing the capacity of the housing value chain can play in the development of the entire sector and its contribution to the country's sustainable socio-economic growth. This is particularly the case given the substantial housing and infrastructure investments that the Azerbaijan government is making in the liberated areas to provide sustainable, dignified, resilient, and safe housing for all returnees—an essential component of the Vision of *Agenda 2030* to "leave no one behind"

Components of the housing value chain include improving the release of land for affordable housing and the timely provision of bulk infrastructure in planned extension of cities; encouraging the competitiveness of local industries to increase the domestic supply of construction materials and equipment reducing the environmental footprint of the sector; and enhancing building standards by requiring Certifications in Seismic Resistance, Disability Access and Fire Safety.

In the same way, introducing "Green Certifications" can go a long way in improving energy efficiency, sustainable construction practices, and public awareness; and encouraging reuse processes that contribute to the circular economy, sector investments in innovation, and the adoption of emerging cutting-edge technologies in the construction industry—in line with Azerbaijan's commitments to SDG9 ("Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation").

The widening of job opportunities through upskilling is also critical to the enhancement of the housing value chain. An overarching urban policy should also look into supporting the establishment of technical colleges offering vocational training for skilled and unskilled workers; developing the capacity of sector-wide as well as niche professionals; and imposing strict workplace health and safety standards and monitoring mechanisms to reduce hazards and fatal accidents in building sites.

Resilience

The fourth urban policy-making direction involves *mainstreaming climate and disaster resilience into urban planning to future-proof Azerbaijani cities.* UNECE's 2023 Azerbaijan Environmental Performance Review (EPR), recognizes the country's progress in setting the conditions necessary for implementing the UN 2030 Agenda for Sustainable Development. Since the earlier EPR, Azerbaijan has updated its environmental policy framework, established cross-sectoral governance and institutional structures, and updated its environmental legislation.

Azerbaijan's commitment to transition to a lower-carbon economy has been given an exceptional impetus in the lead-up to its chairing COP29.

Identified priority issues that relate to the urban sphere include the reinforcement of the environmental legal framework; strengthening environmental impact assessment (EIA) mechanisms; boosting strategic planning and implementation efforts to address air, water and soil pollution, and biodiversity loss; facilitating public participation in decisionmaking on environmental matters; enhancing access to environmental information; improving the strategic management of water resources; and enabling waste recovery and recycling at source.

Azerbaijan's commitment to transition to a lower-carbon economy has been given an exceptional impetus in the lead-up to its chairing COP29. Keen to promote its strategic green energy projects to a captive global audience, Azerbaijan announced its intention to reduce emissions by 40 percent by 2050 as a voluntary commitment and is investing in a "Net Zero Emission" zone in the regained territories. The government's drive to "go green" appears to be already positively influencing several sectors, including some of the worst greenhouse gas emitting "offenders" like transportation and construction where more accountable practices are emerging.

International experience shows that quality of education, skills building, innovation, and technology are essential for countries to leapfrog on the green transformation agenda and contribute to SDG13 (the one that links the 2030 Agenda with the COP process, placing the latter under the overall umbrella of the former). The main

challenge to fostering green growth is about how to decouple economic growth from environmental degradation and GHG emissions—particularly in the mindset of urban decisionmakers.

An overarching urban policy can have a strong role in enhancing the development of institutional capacity to create effective standards, regulations, and control; and establishing incentives for financing that can foster greener practices and investments in the construction sector—starting from certifications. The government has the unique opportunity to establish and deploy tools such as outcome-oriented procurement to achieve its ambitious goals.

An intersectoral urban policy can ensure that today's attention to environmental resilience and sustainability in cities will be sustained in the long term by promoting the greening of urban infrastructure and public services.

An intersectoral urban policy can ensure that today's attention to environmental resilience and sustainability in cities will be sustained in the long term by promoting the greening of urban infrastructure and public services. Its national scope can ensure that current efforts to improve, for example, solid waste management practices in Baku are duly expanded to the country's other cities and towns, developing the institutional, technical, and financial provisions to build much-needed transfer stations and landfill sites.

Similarly, cross-sectoral policy considerations on the management of water resources in urban settings could determine whether precious drinking water (the FAO indicates that Azerbaijan is among the 20 countries in the world that suffer most from water shortages) should be used for technical purposes, including agricultural usage, car washing, street cleaning, and park irrigation.

Improved local urban planning and targeted solutions that would help to mainstream climate change action and improve social and environmental equity between neighborhoods include: *one*, curbing low-density greenfield development in favor of brownfield and infill development within the city; *two*, applying nature-based solutions that will minimize the impact of flash-floods, particularly

in low-income settlements; *three*, preventing the location of new settlements in hazard-prone areas to reduce people's exposure to hazards and avoid future evictions or resettlement; *four*, mitigating the urban "heat island" effect by decreasing the number of vehicles on the roads, improving the design of buildings and choice of materials, introducing innovative materials, increasing tree cover over streets and sidewalks, multiplying greenery and water points in public spaces, introducing heat mitigating paint for roofs, and stripping out any unnecessary concrete and asphalt; and *five*, leveraging the capacity of urban forests, parks, and gardens to act as "carbon sinks," absorbing carbon from the atmosphere.

Accordingly, the NUP could even determine the parameters for Azerbaijani cities to develop their own individual Climate Action Plans.

Urban Health

The fifth urban policymaking direction involves *recognizing the value of healthy communities at the center of thriving and resilient cities*. The World Health Organization (WHO) and UN-Habitat recommend that health and health equity should be central to the governance and planning of urban areas. However, health is largely absent in the policy narratives that shape master planning, housing, and transportation. A clear urban health focus could compel the relevant government institutions to collaborate in dealing with the multi-faceted linkages between health and poverty.

One of the main aspects to be addressed in urban settlements is people's living conditions, which are affected by incidences of overcrowding, insufficient ventilation, poor sanitation, domestic hazards, toxic construction materials, substandard/unsafe housing structures, and noise that can disproportionately impact the well-being of older persons, women and girls.

Environmental factors also play a critical role in affecting people's health, in particular those susceptible to asthma and other chronic respiratory diseases. Unfortunately, a wide range of areas in Baku remain afflicted by air pollution, and severe water and land contamination inherited by oil and chemical industries dating back to the Soviet period, which did not practice adequate environmental safeguards and are located dangerously close to human settlements.

Despite drastic remediation efforts and significant improvements, the legacy of industrial pollution still poses challenges. Stepping up commitments through a well-targeted policy would encourage collaborative action between urban planners, experts from the Ministries of Emergency Situations, Digital Development and Transportation, Ecology and Natural Resources, and research institutes to develop a concerted "Clean Air Action Plan" for Baku, Sumgayit, and a couple of other cities.

The distance between homes and public health facilities, poor road conditions, and physical barriers, such as highways, railways, and rivers, also affects people's access to health. Improving road networks, strategizing the location of health services and public transportation routes, and offering reliable digital connectivity in both urban and rural areas will help to overcome the spatial inequalities that are at the forefront of the government's regional and urban priorities.

Spatial considerations that can foster health and health equity in cities include the creation of better-connected places within the city that support healthy lifestyles, open-air physical activities, with local amenities and safe spaces accessible to all, including children, women, older persons, and those with disabilities. Planners, designers, and real estate developers have a critical role in offering more socially inclusive and interactive places that can improve the overall quality of life for citizens, thus contributing to SDG3 ("Ensure healthy lives and promote well-being for all at all ages").

Lastly, road safety is also a recognized matter of public health concern, as emphasized in the country's ambitious State Program of Azerbaijan Republic on Road Safety for 2019-2023. Overall, the country has seen a radical improvement in the public transport system and road infrastructure in comparison to a decade ago, but with nearly 1,640 traffic accidents recorded in 2022 (52 percent resulting in fatalities)—of which 87 percent occurred within urban settlements and 40 percent between a vehicle and pedestrians—there is still scope for improvements.

A strong urban policy would help the government to reduce health vulnerabilities through the dissemination of data on harmful emissions, community involvement, and sustained action on how to decrease cardiovascular health risk and chronic kidney disease, which are increasingly associated with

exposure to heat waves. Hence, many cities have already developed a "Heat Action Plan" as part of their climate strategy, making the best use of cutting-edge technologies to enhance their geospatial data collection capacity so that they can produce accurate thermal imaging maps and reliable heat modeling scenarios.

Green Urban Mobility

The sixth urban policymaking direction involves designing *green policies that encourage sustainable and people-centered urban mobility*. A steady increase in car ownership, along with decades of conventional urban planning and policies that prioritized car movements, under-investments in public transportation, the ill-advised dismantling of Absheron Circular Rail and tramway infrastructure in 2004, and the scattering of roles and responsibilities in this sector between multiple agencies, are at the core of the mobility challenges that Baku citizens face in their daily commutes and other urban travel activities. Outside of the capital, the limited share of railway transport and a relative lack of diversity in transportation means have also played a role in the excessive dependence on road transport for passengers and goods—ultimately creating economic inefficiencies and bottlenecks.

As a result of structural reforms carried out not long ago, the Ministry of Digital Development and Transportation has implemented systematic measures to ensure the sector's sustainability, reliability, safety, and compliance with modern standards—including expanding the use of information and communication technologies (ICT).

In an effort to improve the efficiency of public transport services, in 2023 the ministry created a digital twin of Baku, which is used to plan the latest infrastructure projects and optimize regular routes. Customized mobile applications have been launched to improve ticketing across the metro and bus network as well as electronic payments for street parking. The Baku Master Plan 2024 foresees a considerable increase of metro and suburban railway stations serving the capital and the surrounding Absheron Peninsula.

Also, since the announcement that Baku would host COP29, several overdue initiatives were finally launched—including the remodeling of the public space in front of the May 28 Metro Station (located in the heart of the city) the

purchase of a new fleet of electric buses, tightening the regulations of the taxi sector, establishing a network of bike lanes and bus routes, and the introduction of micromobility equipment.

Outside the capital and the Absheron peninsula, the government is investing heavily in the improvement of the Baku-Tbilisi-Kars railway line that connects the Trans-European and Trans-Asian railway networks (Azerbaijan is indispensable to the optimization of the Middle Corridor), expanding the new Baku International Sea Trade Port, upgrading the capital's air cargo facilities, and rebuilding the damaged network of roads and highways in newly-liberated Karabakh and East Zangezur.

Cities around the world are adopting urban planning principles that prioritize mixed-use development, pedestrian-friendly spaces, and public transportation. This shift away from car dominance in the public realm is part of a broader movement toward making cities more sustainable, livable, and equitable. In Azerbaijan, this transformation requires a combination of courageous policy changes, infrastructure investments, and a cultural shift that the NUP could support by advancing the understanding that mobility and traffic are two different problems and have different solutions.

Mobility is solved by investing in mass public transit and the equitable use of public space, whereas metropolitan traffic can only be addressed effectively by restricting the use of cars. Infamously, many capital cities that have invested in the past in wider roads suffer some of the world´s worst traffic jams because "induced demand" tends to exaggerate the benefits and underestimate the costs of building more roads. Car-centric cities tend to see also an increase of suburban sprawl.

Mobility is solved by investing in mass public transit and the equitable use of public space, whereas metropolitan traffic can only be addressed effectively by restricting the use of cars.

From an urban policy point of view, car use restrictions can take many forms, and their applicability and success depend on contextual factors, public acceptability, and political will. The most obvious solutions are to increase parking restrictions in the public realm but also in private spaces. Today, many urban regulations in other countries restrict or charge for the number of parking spaces new buildings offer. Another form of car use restriction used in other countries is the application of congestion charges in city centers, whose revenue can be invested in increasing the effectiveness of the public transport system.

People-centered mobility policies would not only mandate accessibility standards for all new public transport and infrastructure projects, but would also imply a radical overhaul of how the public realm is designed and managed. In many cities in other countries, local administration bodies and citizens are working together to rethink the shared use of streets and squares to favor social connectivity, economic growth, and environmental sustainability. The establishment of car-free pedestrian zones and low-speed zones in residential neighborhoods can also yield numerous benefits, including the reduction of road fatalities.

Mainstreaming inclusivity in city planning also implies the design of safer and better-conceived public spaces, high-quality sidewalks, and street-level safe pedestrian crossings that are accessible to all, including children, older persons, parents with baby strollers, and people with disabilities—particularly wheelchair users and those with visual impairments.

An urban mobility policy aiming to be people-centered will encourage what we call the "mixity of uses," but also proximity and walkability within each neighborhood. This would allow residents to reach daily necessities and services, such as work, shopping, education, healthcare, and leisure by a short walk, bike ride, or public transit ride from any point in the city (as per the "15-minute city" concept).

Additionally, an urban mobility policy aiming to be people-centered will need to be "child responsive" and promote participatory design processes of public spaces and amenities. Children walking and playing outdoors alone should not be exclusive to rural areas, or memories of a distant past, but should be an indication of a safe, healthy city. There are numerous indications that this is already taking place in various neighborhoods in Baku.

Leaving No One, and No Place, Behind

The formulation and implementation of urban policies are pivotal in shaping a sustainable future for our cities and making the

most of their potential. By adopting evidence-based, inclusive, and forward-looking approaches, policymakers can address the multifaceted challenges of urbanization. The integration of sustainability, technological advancements, and community engagement ensures that urban policies not only meet the immediate needs of the population but also pave the way for positive transformation.

Ultimately, the success of urban policymaking lies in its ability to create vibrant, equitable, and sustainable cities that enhance the quality of life for all residents.

As cities continue to evolve, urban policies must remain dynamic and responsive, fostering innovation and collaboration across all sectors and disciplines. Ultimately, the success of urban policymaking lies in its ability to create vibrant, equitable, and sustainable cities that enhance the quality of life for all residents, and thus, as the UN slogan goes, "leaving no one and no place behind." Through continuous learning and adaptation, urban policies can serve as powerful tools for driving positive change and achieving long-term urban development goals and, in turn, contribute to the fulfillment of the UN 2030 Agenda for Sustainable Development, including its climate action component. BD

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Urban Green Areas in Baku

Crafting a Sustainable and Climate-Resilient City Agenda

Tural Aliyev, Manuel Fischer, Janine Bolliger, Alexandre Hedjazi

In the face of ongoing global environmental dynamics such as climate change, biodiversity loss, and natural resource depletion, one of the most significant challenges of the twenty-first century is mitigating the negative externalities due to urbanization while adapting to the consequences of urban development. Beyond the increasing, ecological footprint of urban areas and the escalating demands for a diverse array of resources, land-use practices significantly diminish the availability of areas essential for sustaining ecosystem services.

This reduction not only impacts biodiversity but also limits nature's capability to provide crucial services like clean air, water, and climate regulation—paradoxically, precisely in cities where their demand would be greatest. Many of these ecosystem services are directly linked to the natural environment in cities, such as green urban areas. Indeed, urban green areas (UGAs) are of high importance as they significantly contribute to vital ecosystem services (e.g., pollination through increased biodiversity), response options and thus resilience to environmental (climate) change (e.g., sponge cities), and human wellbeing, including direct impacts on our physical and mental health (e.g., nearby recreation).

Given these social and environmental advantages, cities have strong incentives and significant potential to actively mitigate and adapt to the loss of urban green spaces. Building urban resilience involves not only mitigating externalities but also adapting to change. Therefore, urban areas serve as crucial entry points for sustainable development, making them essential for tackling pressing environmental challenges.

Taking stock of the workshop organized with diverse stakeholders in Baku, this essay discusses the critical role of UGAs in enhancing ecosystem services, promoting resilience to climate change, and improving human wellbeing in cities. It highlights the complex governance challenges associated with managing these areas, emphasizing the need for interdisciplinary and multi-stakeholder approaches to integrate UGAs into urban planning for sustainable development.

Tural Aliyev *serves as Postdoctoral Researcher at the Swiss Federal Institute (Eawag), is Associated Researcher at the University of Geneva, and is a Scientific Member of the Caspian Scientific Network (CASPISNET).* ***Manuel Fischer*** *is Research Group Leader in Policy Analysis and Environmental Governance in the Department of Environmental Social Sciences at Eawag and Titularprofessor at the Institute of Political Science of the University of Bern.* ***Janine Bolliger*** *is Senior Researcher at the Swiss Federal Institute for Forest, Snow, and Landscape Research (WSL) and Lecturer at the University of Zurich.* ***Alexandre Hedjazi*** *is Senior Lecturer at the University of Geneva's Institute of Environmental Sciences, serves as Director of its Global Environmental Policy Programme, coordinates the work of the Geneva Center of Excellence on Smart Sustainable Cities, and is Co-Chair of CASPISNET. The views expressed in this essay are their own.*

UGAs and SEN

UGAs encompass various urban land uses, including highly-managed parks or cemeteries, tree-lined streets, vegetated rooftops, gardens including vertical green walls, unmanaged short-term vacant lots, lakeshores and seashores, and riversides. These diverse UGAs form a dynamic network of urban green in cities.

UGAs can offer numerous environmental benefits (e.g. heat mitigation, water capture, carbon sequestration, biodiversity conservation), social benefits (e.g. physical and mental health, social cohesion), and economic benefits (e.g. nature positive and circular economy) as part of sustainable urban living. Indeed, as urban populations grow, integrating UGAs into urban planning becomes increasingly important.

One of the most significant challenges of the twenty-first century is mitigating the negative externalities due to urbanization while adapting to the consequences of urban development.

Prioritizing UGAs allows cities to address environmental challenges effectively while improving inhabitants' quality of life, which means that UGAs are important in the context of long-term urban resilience. They can help mitigate externalities or recover from shocks and crises resulting from environmental change while maintaining essential functions and services for the population. In the long term, UGAs offer the potential to adapt to changing conditions and to improve long-term sustainability and quality of life in cities.

This essay discusses the critical role of UGAs in enhancing ecosystem services, promoting resilience to climate change, and improving human wellbeing in cities.

The management of spatially distributed UGAs is complex and subject to the continuous shifting of urban policies and strategies as well as interacting social, cultural, and economic factors. These include governance challenges, social constraints, individual preferences of a broad set of stakeholders, and financial constraints. The governance of UGAs is challenging due to the complexity of demands and actors across many sectors, often with conflicting interests (e.g., biodiversity conservation, leisure, climate mitigation, infrastructure, land use planning) and exacerbated by rapid environmental changes and increasing urbanization.

The governance of UGAs varies in processes, institutions, and stakeholder participation, influencing policy outputs, and transformative potential across distinct urban contexts. Integrating different stakeholders (e.g., local administrations, registered environmental groups, neighborhood associations, private firms, and landowners) into governance processes is crucial for producing broadly supported, effective, and sustainable outputs.

Despite these challenges, UGAs present many advantages. These include a range of valuable resources that contribute significantly to the environmental, social, and economic wellbeing of cities. These areas provide essential ecosystem services (e.g., air and water purification, climate regulation, and biodiversity conservation), which help mitigate urban heat island effects and improve overall environmental quality.

Moreover, UGAs serve as important recreational spaces, offering residents opportunities for physical activities, relaxation, and social interaction, which are crucial for mental and physical health. These spaces can also promote community cohesion and social integration by providing common areas for public gatherings, events, and cultural activities. In addition to their ecological and social benefits, UGAs can enhance the aesthetic appeal of a city, making it more attractive to residents and visitors alike.

This aesthetic value can also translate into economic benefits by increasing property values and attracting new businesses and tourism. Furthermore, UGAs can support urban agriculture and local food production, contributing to food security and promoting sustainable urban living practices. The presence of diverse plant and animal species in these areas fosters urban biodiversity, creating habitats for various species and promoting ecological balance. In other words, UGAs have considerable resources, access, and flexibility to co-develop and co-implement environmental and infrastructure-related projects, resulting in areas of high transformative innovation potential.

In addition to their ecological and social benefits, UGAs can enhance the aesthetic appeal of a city, making it more attractive to residents and visitors alike.

Urban governance can be effectively analyzed through a network lens to better address the resources and challenges of UGAs. One such approach is the framework of social-ecological networks (SEN), coined to assess the complex interdependencies within social-ecological systems. The framework has been put to the forefront of interdisciplinary environmental and sustainability research. A SEN framework conceptualizes, operationalizes, and analyzes the complex interdependencies between social and ecological systems. Examining the relationships among actors, ecological units, and their interactions not only deepens our understanding of collaborative and synergistic ecosystem governance but also uncovers practical management gaps and barriers. As such, the SEN framework offers potential solutions to complex management challenges.

In a SEN framework, social and ecological networks are calibrated

individually but analyzed as interrelated networks. *Social networks* in SEN include nodes representing human or multi-level organizational actors with links representing relevant social interactions, e.g., information sharing and exchange, collaboration, or cooperation. *Ecological networks* describe interrelated UGAs as a functional green infrastructure that supports both ecological habitats and human needs for sustainable cities. The ecological network consists of nodes representing, for example, UGAs as habitats for biodiversity, while links refer to ecological connectivity (movement, dispersal, spatial flow) between the nodes. As such, SENs allow us to conceptualize complex social-ecological systems to assess human-ecosystem relationships in an integrated way.

A SEN framework can help to co-design transformation pathways and generalized recommendations for policymakers based on a shared understanding of how to tackle complex management and planning challenges.

SEN Stakeholder Engagement in Baku

A SEN framework can help to co-design transformation pathways and generalized recommendations for policymakers based on a shared understanding of how to tackle complex management and planning challenges. To achieve this for Baku, a first workshop with 25 international and local participants from agencies and universities, held at ADA University on 5 June 2024, aimed at informing and supplementing a proposal for a global initiative within the context of COP29 related to Sustainable and Climate-Resilient Cities.

In order to include actors relevant for a holistic, integrative, and multi-sectoral governance of UGAs, we relied on actors directly related to UGAs due to their management competencies or their interests related to specific green areas. These included representatives from the State Committee on Urban Planning and Architecture (SCUPA), the Executive Power of Baku City, the Ministry of Ecology and Natural Resources, and the Urban Initiative Focal Unit from the Ministry of Foreign Affairs.

The selection of participants allowed for fruitful feedback loops between science and practice, and the learning and knowledge-transfer process of actors from different backgrounds and contexts. The workshop showed that effective surveying, planning, and long-term evaluation of UGAs as a resource is essential to unlock their full potential to support effective environmental policies tackling pressing environmental challenges.

How, then, are UGAs to be understood? *First*, UGAs are fine-grained and often exhibit high heterogeneity. Using state-of-the-art baseline geospatial information enhances our understanding of the thematic composition, the spatial configuration, and the 2D and 3D structure of UGAs. To this end, remotely-sensed data as well as local surveys to accurately determine ecological and structural diversity may leverage the quantification of UGAs. *Second*, as UGAs are the result of continuously shifting and interacting social, cultural, and economic factors, a spatially dynamic system's framework is key in the context of UGAs. And *third*, UGAs are directly at the interface between human requirements and the environment, requiring a combined ecological and social approach, i.e., social-ecological systems analyses. An inter- and trans-disciplinary approach allows for identifying fits and misfits of management and responsibility between the ecological, the social, and economic/business components of UGAs.

Integrating the SEN framework into Baku's urban planning strategies for UGAs can significantly contribute to the city's sustainable development goals, aligning with global initiatives like those that will be discussed at COP29.

Integrating the SEN framework into Baku's urban planning strategies for UGAs can significantly contribute to the city's sustainable development goals, aligning with global initiatives like those that will be discussed at COP29. This approach not only maximizes the multifunctional benefits of urban green spaces, but it also ensures that these benefits are equitably distributed across the city's diverse population.

The aforementioned workshop concluded with a set of key outcomes designed to ensure the success of the global initiative known as the Global Pledge, which is part of COP29's Multisectoral Actions Partnership (MAP) for Sustainable, Climate-Resilient, and Healthy Cities.

This initiative aims to enhance multisectoral national actions within cities and encourage stronger partnerships to improve global coherence on climate action, urban development, and resilience. It produced three key outcomes.

One, the mitigation potential of UGAs includes carbon storage, reduced urban warming, and flooding potential, and promotion of biodiversity. *Two*, collaboration between registered NGOs, public and state agencies, and ministries as well as volunteers will allow UGAs to become lively, publicly accessible places for (small-scale) commercial activities and neighborhood actions, which, in turn, increase people's sense of place and their well-being (e.g., sports activities) and encourage social mixing. *Three*, educational initiatives are an important channel to increase awareness of the benefits of UGAs—not least because the city's greenness correlates well with high real-estate prices. Underprivileged areas and informal settlements benefit less from UGAs, a social injustice that should be of particular focus when planning green spaces.

The workshop in Baku represented a first step to disentangling the complex social and ecological aspects of its UGA. Several crucial points and related recommendations require consideration for advancing the city's sustainable and climate-resilient agenda within the local context. This essay will examine six of these.

Local Involvement

First, the *role of the population in analysis.* Citizen involvement in urban sustainability efforts is paramount. As a general rule, the more citizens are engaged, the greater the sense of ownership and responsibility toward maintaining and enhancing UGAs. Active participation in planning and decisionmaking processes can lead to more effective and sustainable outcomes.

To foster sustainable urban development, designing and implementing mechanisms that actively engage citizens is crucial. Creating platforms for community input and decisionmaking (e.g., public fora, participatory workshops, and digital engagement tools) can lead to more inclusive and effective initiatives involving UGAs. Empowering local communities with high-resolution data sources, such as NDVI data, Sentinel Hub, and Google Satellite imagery, provides them with the necessary information to participate meaningfully in planning processes. These tools offer detailed insights into vegetation health, coverage, and changes over time, enabling more informed decisionmaking.

However, the data needs to be prepared in a simple and accessible manner to ensure it is truly useful to local communities. This involves translating complex scientific information into clear, actionable insights that can be easily understood and applied by community members. By doing so, residents can more effectively participate in decisionmaking processes, contribute to sustainable practices, and take informed actions to improve their local environment and quality of life.

Increased transparency and access to information help build trust and encourage active involvement in the maintenance and improvement of UGAs. Additionally, there is an ongoing discussion on whether the SEN approach should be prescriptive (i.e., guiding how these interactions should be managed) or whether it should remain descriptive (i.e., mapping existing relationships without suggesting improvements).Regardless, enhancing citizen participation and utilizing high-resolution data are key strategies for achieving sustainable urban development.

There is an ongoing discussion on whether the SEN approach should be prescriptive (i.e., guiding how these interactions should be managed) or whether it should remain descriptive (i.e., mapping existing relationships without suggesting improvements).

Diverse Types of UGAs

We can identify the second way to advance the city's sustainable and climate-resilient agenda with the phrase *promoting diverse types of UGAs for sustainable urban development.* UGAs encompass a variety of spaces, each serving unique functions and providing distinct benefits. Examples include parks, seaside areas, green public and private spaces, boulevards, lakes, and campuses. Public parks, accessible to all, offer recreational opportunities and enhance community wellbeing, while private parks might serve more restricted, albeit equally valuable, roles. Green roofs and community gardens represent innovative uses of urban space, contributing to biodiversity, rainwater management, and food security.

Promoting diverse types of UGAs is essential for catering to the varied needs of urban populations and enhancing urban biodiversity. Studies have shown that there is a direct correlation between vegetation patterns with real-estate values. This suggests that socio-economic factors significantly influence the distribution and quality of UGAs, and vice versa. Therefore, a more equitable distribution of green spaces across different socio-economic areas is critical to ensuring accessibility for all urban residents. Policies should aim to create green spaces in underserved neighborhoods, thereby addressing disparities in access to natural environments and promoting social equity. This approach ensures that all citizens, regardless of their socio-economic status, can enjoy the benefits of UGAs.

Social and Spatial Justice

The third way to advance the city's sustainable and climate-resilient agenda is through the application of the *concept of social and spatial justice*. UGAs provide a multitude of benefits for both the population and the natural environment. Ecologically, they function as corridors, facilitating species movement, reversing biodiversity loss, and promoting biodiversity conservation. They offer habitats for co-existence and create spots for the promotion of environmental awareness with activities such as birdwatching. Environmentally, UGAs contribute to air quality improvement by filtering pollutants, providing cooling effects through shading and evapotranspiration, and enhancing biodiversity and water infiltration to aquafers while acting as carbon sinks, mitigating and adapting to climate change impacts.

Socially and economically, UGAs serve as recreational spaces, promoting physical and mental health. They encourage social mixing by providing venues for community events and interactions, thus fostering a sense of community. Local businesses can thrive around these green spaces, benefiting from increased foot traffic and the attractive environment they provide. The overall improvement in mental and physical health associated with access to green spaces underscores their importance in urban planning.

Integrating UGAs into urban planning as essential components of ecological and social well-being is vital for maximizing their benefits. Urban planners should prioritize green spaces as key elements in city development plans, ensuring they are designed to meet both environmental and community needs across social strata.

Initiatives to address pollution in green and blue spaces should be implemented, transforming these areas into ecological corridors and habitats that support biodiversity and environmental health bringing the benefits from nature to the whole population—regardless of socio-economic status and localization of the latter.

Stakeholder Engagement

The fourth way to advance the city's sustainable and climate-resilient agenda is to *engage diverse stakeholders related to UGAs*. A diverse array of stakeholders is typically involved in the design, implementation, management, and governance of UGAs. Key players include those in charge of parks, various ministries, NGOs, schools, and volunteers. These stakeholders bring different perspectives and expertise, contributing to the holistic management of UGAs, particularly in the context of rapidly urbanizing areas like Baku.

Educational initiatives and national tree-planting programs play crucial roles in promoting the importance of green spaces and encouraging community participation. Municipalities, industries, citizens, and state versus private funding all have significant roles in creating and maintaining green areas. Collaborative efforts among these stakeholders are essential to ensure the sustainability and effectiveness of urban green spaces.

Government bodies are essential for creating and enforcing policies that reduce pollutants and ensure the sustainable management of urban green spaces. Their regulatory power can drive adherence to environmental standards and emissions laws, crucial for mitigating climate change impacts. For instance, stringent laws and regulations can control industrial emissions, safeguarding the quality of air and water in urban areas.

Citizens' groups and registered NGOs often act as advocates for environmental conservation and sustainability. They can mobilize community support, raise awareness, and drive grassroots initiatives that complement governmental efforts. These can also play a pivotal role in holding public and private sectors accountable for their environmental impact.

Educational institutions are key to fostering a culture of sustainability from a young age. By integrating sustainability practices and environmental education into curricula, schools can encourage creative thinking and problem-solving skills related to environmental challenges. Programs that involve children in hands-on sustainability projects, such as school gardens or local clean-up efforts, can instill a lifelong appreciation for the environment.

The private sector's involvement is crucial for funding and implementing green projects. Businesses and their associated philanthropies must adhere to emission laws and adopt sustainable practices within their operations. Companies can also invest in green infrastructure, such as creating green roofs or sponsoring public parks, as a form of corporate social responsibility.

Supporting initiatives that educate and involve children and the public in sustainability practices is another crucial element. Public awareness campaigns, community workshops, and educational programs can help build a collective understanding of the importance of UGAs. These initiatives can empower individuals to take active roles in maintaining and advocating for green spaces in their communities.

Interdisciplinary Approach

The fifth way to advance the city's sustainable and climate-resilient agenda consists in *strengthening interdisciplinary approaches.* To effectively manage and enhance UGAs, it is essential to foster collaboration between various disciplines, including ecological sciences, urban planning, and business management and governance. This interdisciplinary approach can help integrate diverse perspectives and expertise, leading to more comprehensive and sustainable solutions.

Promoting a dynamic and process-based framing of ecosystems can enhance resilience and sustainability in urban environments. By understanding and managing the complex interactions between social, ecological, and economic factors, urban planners and stakeholders can develop more adaptive and resilient green spaces. This approach allows for the continuous evolution and improvement of UGAs, ensuring they remain functional and beneficial in the face of changing environmental and social conditions.

Data Leveraging

The sixth and final way to advance the city's sustainable and climate-resilient agenda involves *leveraging data for decisionmaking.* High-resolution data, such as those obtained from NDVI, Sentinel Hub, and Google Satellite, provide detailed insights into vegetation health, coverage, and changes over time. This data can be instrumental in planning, monitoring, and managing urban green spaces.

Utilizing available high-resolution data allows urban planners to make informed decisions about where to develop new green areas, how to maintain existing ones, and how to address environmental challenges effectively. For example, data can reveal areas with the highest levels of pollution or heat islands, indicating where new green spaces could provide the most significant benefits.

Encouraging data-driven approaches enhances the effectiveness and efficiency of green city initiatives. Data can help identify trends and patterns that inform better resource allocation and project prioritization. For instance, data analysis might show that certain areas of a city have lower tree canopy coverage, prompting targeted tree-planting initiatives in those neighborhoods.

Moreover, data-driven decisionmaking fosters transparency and accountability. By making data publicly available, city planners and government officials can demonstrate the impact of their policies and initiatives, which helps to build trust with the community. This transparency also allows for community input and feedback, ensuring that green space developments align with the needs and preferences of local residents.

Positive Force

UN-Habitat's 2010 annual report was among the first to describe urbanization as a "positive force for transformation" and to highlight the importance of localizing knowledge in cities. This has been our guiding methodological principle in this essay. Utilizing a SEN framework, as noted above, is critical for enhancing Baku's UGA, thus providing significant environmental, social, and economic benefits. Implementing these strategies will help create a sustainable, resilient, and livable urban environment for all the city's inhabitants. Urban areas are a solution to, rather than a source of, environmental challenges.

Moreover, the various outcomes of the June workshop, including this essay, will feed into a process of delivering actionable recommendations to the COP29 Presidency's global initiative on urban sustainability. The collaborative approach we outline in these pages is designed to ensure that initiatives involving UGAs are underpinned by scientific evidence, responsive to community needs, and aligned with global sustainability goals.

Urban areas are a solution to, rather than a source of, environmental challenges.

We have also sought to underline that addressing urban issues in line with the approach taken in this essay represents one of the few potentially synergetic entry points to work towards the successful implementation of the UN 2030 Agenda for Sustainable Development, at the center of which lies the 17 interrelated SDGs. This shift in viewpoint—urban areas as a solution to, rather than as a source of, environmental challenges—requires a critical evaluation in empirical contexts, in Baku and many other cities in the Silk Road region and other parts of the globe. This work will continue at the upcoming World Urban Forum in Cairo and, in two years, at the next one, to be held in Baku. BD

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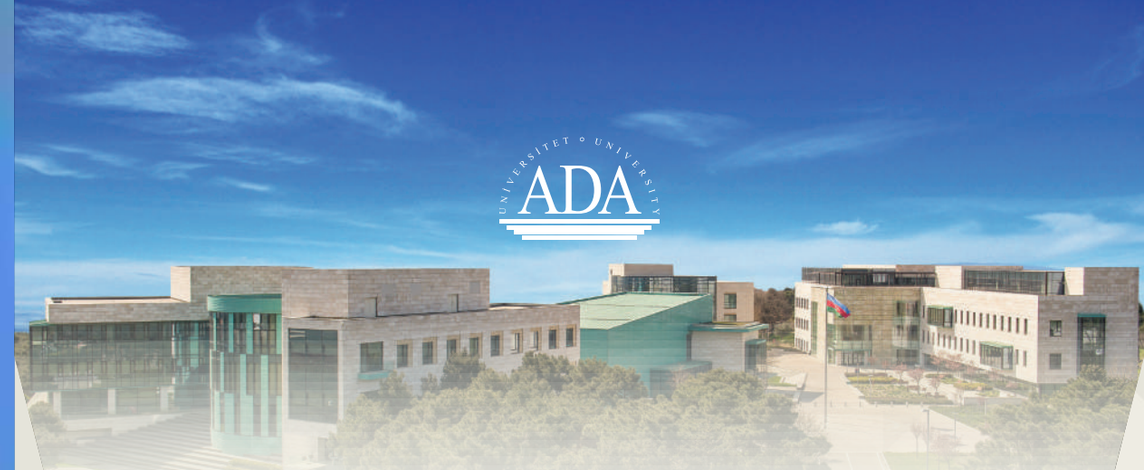

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Long Way Ahead

Applying the Sustainable Cities Implementation Framework in Azerbaijan

Anar Valiyev and Fidan Namazova

In the past 30 years, Azerbaijan has transformed from a majority rural society to a majority urban one**.** The urban population rate grew from 45 percent in 1993 to 57 percent in 2024. Of the total country's population, around 24.3 percent is concentrated in the city of Baku. But the Greater Baku Area, which consists of the urbanized region encompassing the nearby cities of Sumgayit and Khirdalan (both of these are located, as is Baku, on the Absheron Peninsula), is estimated to host around 40 percent of country's population—that is to say, around 4 million people. Ganja, the country's second-largest city, has a population of a little less than 400,000, making the urban primacy index in the country around 7 (unofficially, the number is closer to 10).

Urbanization in the country has been driven by a few main factors. One of the most important is rural-urban migration. During the Soviet period, rural areas had a disproportionally high share of Azerbaijan's population, while agricultural productivity was extremely low. Currently, 35 percent of the labor force, or around 1.5 million people, continue to live in rural areas. Meanwhile, sustainable agriculture in the country may need a much smaller number of people. For the past decades, with the introduction of new agricultural technologies, the number of people migrating from rural areas to cities increased. It is expected that due to increased technological innovation in agriculture, coupled with reliance on large agricultural enterprises, the rural population will continue to migrate to urban areas—and especially to Baku.

***Anar Valiyev** is Associate Professor of Urban and Public Affairs in the School of Public and International Affairs at ADA University. **Fidan Namazova** is a graduate student academic advisor at ADA University. The views expressed in this essay are their own.*

Scene Setting

Azerbaijan has 79 urban areas officially designated as cities, with various levels of population and density. Thus, out of all the country's cities, only one (Baku) has a population of more than 500,000 people; only four cities have a population between 100,000 to 500,000 people. Around 68 cities in Azerbaijan have populations of up to 50,000 people.

In the past 30 years, Azerbaijan has transformed from a majority rural society to a majority urban one.

Beyond the 70 urban areas, there are 269 official urbanized settlements, which consist of towns or villages whose population does not (for the most part) exceed 3,000 people. Population density varies depending on the region while the average density is 117 people per square kilometer of land area. The density in the top cities varies from almost 7,000 people per square kilometer to 500, while the average density in the country is around 117. Baku, despite being the most populous city, has a density of around 1,075. Azerbaijan has a total of 1,698 sub-national governments. The country has 1,607 municipalities, the average size of which is 3,700 inhabitants.

Azerbaijan's economy is skewed toward the urban areas, and specifically toward Baku. More than 75 percent of the country's GDP and 90 percent of exports are formed thanks to the oil and gas sector located offshore in the Caspian Sea or in and around Baku. Meanwhile, agriculture or rural areas produce less than 10 percent of GDP and around 4 percent of the country's exports. The urban areas are the main drivers of economic development, and Baku's role cannot be overestimated in this regard.

Most of the investments of the country is directed to Baku, and the city is the largest financial hub in the Caucasus. Another trend in the country that will affect urbanization trends is the positive demographic situation in Azerbaijan for the past 20 years. The share of the able-bodied population will increase. Most of the new jobs (i.e.,

200,000 or so) will be created in Baku and other urban areas.

Urbanization along the shorelines of the Caspian Sea in Azerbaijan has also amplified in recent years, with ever-increasing pressure on the land-based and marine environment. Population densities along the Caspian Sea shorelines are uneven, and most of the population is concentrated in major urban centers in Baku, Lankaran, Neftchala, and others.

In 2021, Azerbaijan launched a process of building smart cities and villages in the Karabakh Economic Region and East Zangezur.

While the Baku metropolitan area represents the largest urban agglomeration, other cities on the coastline have seen rapid and, in some circumstances, unplanned urban sprawl. Climate change also poses challenges to local economic development linked to tourism and recreational activities being disrupted by precipitation and temperature variation. Moreover, the generation of both solid and water waste (both industrial and municipal) affects the quality of seawater.

In 2021, Azerbaijan launched a process of building smart cities and villages in the Karabakh Economic Region and East Zangezur. This part of the country was liberated in 2020 during the Second Karabakh War, with full administrative control being completed in September 2023. The 30 year-occupation by Armenian forces was characterized by wholescale destruction (entire cities had been leveled and infrastructure destroyed) and the complete ethnic cleansing of the Azerbaijani population. Both regions were under occupation during the land reforms in Azerbaijan, and thus, the land is still under the government's ownership. That fact allows the state to merge or centralize many villages, as well as plan cities much more rapidly and build them from scratch. Yet, it brings additional responsibility to the government in the process of relocating displaced people back to their lands of origin.

The foregoing is part of Azerbaijan's Great Return program, which envisages systematic measures for the return of IDPs back to their hometowns in the liberated areas. The First State Program on the Great Return calls for the return of 10,270 families by 2025 and 34,500 families by 2026. Yet, there must be some idea or concept that would incentivize IDPs to return to these territories and live in better conditions—hence the introduction of the concept of smart city/village. In September 2022, the first smart village (Aghali) was completed, and around 300 people were resettled there. The village is being developed based on five "smart: pillars, i.e., housing, production, social services, agriculture, and sustainable energy. The village envisions the use of modern technologies and practices brought in by specialists from China, Turkey, Italy, and Israel.

The Global Platform for Sustainable Cities (GPSC) developed what is called the Urban Sustainability Framework, which is designed to achieve four main objectives. On this basis, the World Bank conducted a diagnosis of Baku's urban governance structure in 2023.

Over the next decade, Azerbaijan will build numerous other smart villages in Karabakh, which are intended to spur migration back to rural locales and slow down urbanization.

Strategic Framework

Led by the World Bank, the Global Platform for Sustainable Cities (GPSC) developed what is called the Urban Sustainability Framework. This Framework is designed to achieve four main objectives. *First*, to help build a common understanding of sustainability within an urban context. *Second*, to provide practical guidance to cities on how to pursue urban sustainability through integrated approaches. *Third*, to serve as a policy tool to support cities in collecting and integrating data, and using those data sets to define a vision, set targets, monitor progress, and forecast trends—all while being able to compare themselves with peer cities. And *fourth*, to establish a common framework to measure urban sustainability so that cities can diagnose and benchmark their current performance, monitor the impacts of their policy and planning interventions, and share data and knowledge with other cities in the GPSC network and beyond.

It is against this background that the World Bank conducted in 2023 a diagnosis of Baku's urban governance structure in the four dimensions of the Urban Sustainability Framework: *Well-Planned System*, *Basic Services*, *Smart*

& Participatory, and *Financial Soundness*. Although most fully applicable to Baku, the results are also applicable to other Azerbaijani cities.

The first-dimension outcome of the Urban Sustainability Framework was labeled *Well-Planned System*. For the past 15 years, the Azerbaijani government has focused on the development process of relevant legislative frameworks and state programs. Thus, urban development policies and strategies have been prepared and

Figure 1: Azerbaijan's Main Strategic Documents Affecting Sustainable Development

Document	Status	Time horizon	Sectoral Coverage
First Nationally Determined Contribution (NDC)	Submitted in 2017	2017-2030	Economy-wide
Azerbaijan – 2020: A Look to the Future	Adopted in 2012	2011-2020	Governance, transport, energy, water, industry
Strategic Roadmap on the National Economy	Adopted in 2016	2016-2025	Governance, energy, industry, transport
Strategic Roadmap for Development of Logistics and Trade in the Republic of Azerbaijan	Adopted in 2016	2015-2020	Governance, energy, industry, transport
National Strategy of Azerbaijan on the Use of Alternative and Renewable Energy Sources (2015-2020)	Adopted in 2015	2015-2020	Governance, energy
Strategic Roadmap on Oil and Gas Development	Adopted in 2016	2016-2025	Energy, industry
Strategic Roadmap on Development of Utilities	Adopted in 2016	2016-2025	Energy, water
Strategic Roadmap on Development of Heavy Industry and Machinery	Adopted in 2016	2016-2025	Industry

enforced. Nevertheless, Azerbaijan has no national urban strategy or document as such, though several strategies have relevance in the sustainable development space.

Several core national economic strategies and program priorities provide the national direction for urban development, as laid out in Figure 1.

Previously, the State Program on Poverty Reduction and Sustainable Development for 2008-2015 and its predecessor, the Poverty Reduction and Sustainable Development Program (2004-2008), were the core programs driving urban and economic development. Back in 2016-2017, Azerbaijan adopted a Road Map containing key directions for development. One of these regarded social housing, which included the development of urban spaces. Thus, these documents envisioned the redevelopment of certain areas as well as the construction of social housing in areas suitable for the city. Other documents, though not addressing specifically urban spaces, were directed at the development of urban and semi-urban areas. Such initiatives included mostly infrastructural projects such as road construction, water pipeline building, and public works investments.

In the dimension of *Well-Planned System*, Baku's stance is comparatively satisfactory due to the active work of the State Committee on Urban Planning and Architecture (the country's main regulator of urban planning and management). In 2018, the Committee was given additional powers for regulating the construction in Baku and other areas, and the agency had developed and adopted master plans for Baku and dozens of other cities. Strict regulations were implemented for zoning and planning all across Azerbaijan, which brought about transparency and accountability in construction planning. It is important to mention that the Committee began to champion a holistic approach to urban planning, strictly enforcing floor ratio area. Such new policies, coupled with other actions, would allow the city to properly manage remaining territories as well as move closer to contemporary best-practice construction standards.

The second dimension outcome of the Urban Sustainability Framework was labeled *Basic Services*. In general, central and local governments adequately provide basic services to the relevant population. Thus, urban areas have constant electricity (almost 100 percent of coverage), waste collection, water supply (with

limited time in certain areas and frequent interruptions), and gas supply.

Nevertheless, the main shortage in basic service delivery is the absence of a harmonized approach to the provision of services, price regulation, and the need to address the social needs of the population rather than efficiency and effectiveness. Thus, the waste collection fees are low in the country, and local authorities need dotation from the state to properly collect waste and deliver it to waste facilities. A Waste Management System (WMS) is effective only in some districts of Baku. However, the situation slowly improving, as the closure and rehabilitation of dump sites in some districts has led to higher processing rates.

Yet, the situation is not optimal. In 2020, around 3.4 million tons of waste were produced in Azerbaijan, including one-third in Baku. Taking into consideration the current capacity of the country's sole garbage facility (0.5. million tons per year), one can assume that around 3 million tons of waste are either inadequately dumped or disposed of elsewhere, or simply burned. Another challenge in this dimension is the low level of urban water circularity. Only 50 percent of Baku's wastewater is properly treated.

The third-dimension outcome of the Urban Sustainability Framework was labeled *Smart & Participatory*. The use of digital systems and e-governance is developing, albeit mostly at the central level. Thus, the rate of fixed internet connectivity in rural regions is 20 percent lower than in urban areas, and even though overall mobile broadband adoption and coverage are high, there is a significant digital divide in terms of internet quality/speed, use, and affordability between urban and rural areas.

According to a 2022 World Bank report, with an average fixed broadband speed of 23.5 Mbps, Azerbaijan is ranked 111th out of 175 countries surveyed. Furthermore, in rural regions, the cost of internet connection, as well as PCs and mobile devices, may be a barrier to effective internet usage. In another ranking designed by UK internet company Cable, Azerbaijan ranks 175th globally in terms of broadband internet speed, with its 6.61 bits per second download speed, while neighboring Armenia and Georgia boast three to four times faster speeds.

Moreover, digital public services are lagging, stemming from a need for infrastructure, capacity-building, and interoperability issues between various public bodies. The challenge is exacerbated by the fact that not all local municipalities have online systems for service delivery. Most of the e-services are delivered by the centralized ASAN-service, which is a one-window system that operates throughout the country.

Another challenge, which is manifested both at the local and country level, is the absence of disaggregated data and needed information. Local municipal government leaders neither have the capacity nor (in some cases) see a need to optimize their data collection. That brings us to the problem of lacking centralized data at the urban settlement level.

Meanwhile, cities lack participatory planning and budgeting governance processes. Plans and budgets are shared on a public website, but the process of creating them is neither transparent nor predictable. That governance gap points to a lack of structured platforms for dialogue with stakeholders, as well as a lack of transparency and predictability for public/stakeholder participation during the planning process, which limits accountability.

Implementing the Urban Sustainability Framework in Azerbaijan requires that the government to take several critical steps, with data governance perhaps being the most important one.

The fourth dimension outcome of the Urban Sustainability Framework was labeled *Financial Soundness*. An analysis of this area found that there are some challenges in the income-generating abilities of the local governments, lack of finances as well as competence to decide on what are or should be understood to be primarily local issues.

Municipalities and local governments in Azerbaijan have comparatively large tax bases. Despite this last, municipalities have very limited access to financial resources. First, municipalities do not have profit-making enterprises under their jurisdiction. Next, not all municipalities have mineral resources (related to the construction industry). Finally, property tax levied from physical people is very low. Residents of the Baku area tend not to pay municipality property tax, since there is neither an enforcement nor a penalty mechanism in place.

Data Governance

Implementing the Urban Sustainability Framework in Azerbaijan requires that the government to take several critical steps, with data governance perhaps being the most important one. Azerbaijan has very limited data and, in many instances, the data is not disaggregated by regions, sex, and age groups. Moreover, many institutions, including some state agencies, have raised concerns about the reliability of official data, noting that what is officially provided does not correspond with their own findings; in many areas, data does not accurately portray the current situation. There is thus a need for transparent and up-to-date data collection.

The absence of data, or the suboptimal process of data collection, leads to situations in which governmental decisions are not data-driven and evidence-based.

The lack of data makes it difficult to accurately assess the current state of poverty and the enjoyment of the right to food, education, healthcare, and access to adequate housing in the country. Fully accurate figures are necessary to enable the Government to develop a strategic response, as programs and responses are being designed around information that may not reflect the actual situation.

The government will thus need to provide all necessary human, technical, and financial resources for the establishment of a comprehensive system for data collection, analysis, and monitoring. These same resources will also need to ensure that the data collected is disaggregated by age, gender, ethnicity, geographic region, and socio-economic background. The absence of data, or the suboptimal process of data collection, leads to situations in which governmental decisions are not data-driven and evidence-based. Indeed, the government does not always use data to justify its decision, due to the absence of such data or the absence of such a practice.

Beyond the incapacity to properly collect data or an unwillingness to share it publicly, also lacking is the proper capacity to analyze data. Strengthening data collection, monitoring, and reporting at the local level can lead to better identification of priority problems, inform targeted policy planning, and encourage greater accountability and transparency regarding the implementation of proposed policies.

A shift towards a more results-based approach (rather than the current input-driven approach) is required in municipal financing and management systems, so as to provide subnational governments with not only abilities but also incentives to enhance sustainability.

What Should Be Done?

At the governance/strategic planning level, Azerbaijan should commit to four types of reforms. One, introduce evidence-based policymaking and centralized data collection, supported by adequate tools and processes at the urban settlement level. Two, establish a mechanism for linking budgets to strategic priorities. Three, introduce capital investment prioritization and coordination between donor initiatives. And four, broaden the scope of municipal competencies and attributions.

Implementing the Urban Sustainability Framework can tremendously help Azerbaijan's efforts to establish smart cities in Karabakh, help revitalize economically depressed cities, and further strengthen national economic development.

Regarding land-use planning, Azerbaijani state agencies should undertake three types of reforms. One, improve land-use data collection and monitoring and ensure that the cadaster provides transparent, legally validated, and reliable data to landowners, government services, and private investors. Two, build capacity on spatial and integrated urban planning and develop guidelines and tools, namely GIS tools, which can increase access to vital information for planning and create informed strategies more effectively and enable assessment of quality and efficiency of public services. And three, adopt integrated approaches to urban planning, with the role of spatial planning as an umbrella framework for sectoral policy integration and coordination.

It is encouraging that the Azerbaijani government has seriously begun to improve the transportation management system in the past year. The introduction of the AzParking system as well as bicycle and bus lanes have had a significant impact on traffic in Baku.

Yet, further steps should be undertaken. Regarding this aspect, we can enumerate four

such reforms. One, provide for the better overall management of transport. Two, introduce traffic management systems. Three, improve the availability and monitoring of transport data and the local capacity to make use of these systems. And four, extend and develop data collection infrastructure through the installation of sensors, surveillance cameras, and other devices, together with software used for the interpretation of data; and countering urban sprawl with transit-oriented development and land-use planning.

Implementing the Urban Sustainability Framework can tremendously help Azerbaijan's efforts to establish smart cities in Karabakh, help revitalize economically depressed cities, and further strengthen national economic development.

To do this correctly, the state will need to devise its own country-specific framework strategy and actions, not merely reproduce such best practices from abroad. Azerbaijan has particular challenges that require particular solutions.

The country should prioritize educating, nurturing, and developing its own experts and specialists, which should ensure that the resulting Framework is designed (and implemented) in an optimal manner. To that end, it should focus on governance issues as well as encourage (and value) direct citizen participation in decisionmaking processes. This would go a long way towards ensuring that the resources spent on technologies, foreign consultancies, and construction projects contribute effectively to a results-based approach to Azerbaijan's growing urbanization challenges. BD

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Managing Investments in Urban Areas

The Case of Azerbaijani Cities

Shahnaz Badalova

Urban areas in Azerbaijan are experiencing rapid growth and development, fueled by a combination of natural resource wealth, strategic geographic location, and economic reforms. In cities such as Baku, Ganja, and Sumgayit, significant investments have been made in infrastructure, housing construction, and industry. However, effectively managing these investments to achieve sustainable urban development remains a critical challenge. This article examines the policies and strategies for investment management in Azerbaijani cities, learning from both successes and ongoing challenges.

The Rise of Urbanization

Azerbaijan, like many other countries, is experiencing a shift towards urbanization. The capital Baku is the epicenter of this transformation, attracting a large influx of people due to its economic opportunities, modern infrastructure, and cultural opportunities. Other cities, such as Ganja and Sumgayit, are also experiencing growth, albeit at a different pace.

Urbanization in Azerbaijan is driven by three main factors. First, *economic opportunities*. The oil and gas industry has become an important driver of economic growth in Azerbaijan, attracting both domestic and foreign investment. This has created numerous employment opportunities in urban areas, stimulating rural-to-urban migration. Second, *improved infrastructure*. Significant investments in infrastructure, including roads, public transport, and utilities, have made cities more accessible and livable. Third, *educational and healthcare facilities*. Improving access to education and healthcare in urban areas is another factor driving urbanization.

Shahnaz Badalova *is Deputy Head of the Department of Urban Planning and Land Development at the State Committee on Urban Planning and Architecture (SCUPA) of Azerbaijan. The views expressed in this essay are her own.*

Despite the benefits of urbanization, Azerbaijani cities face a number of challenges due to rapid and sometimes uncontrollable growth. Four rise to the mind. First, the concentration of economic activity in urban areas, especially in Baku, has led to regional differences. Second, smaller cities and rural areas lag in development, resulting in uneven economic growth. Third, the rapid influx of people into cities has put a strain on public services such as education, health, and social welfare. Fourth, informal settlements and poor-quality housing conditions have become pressing issues.

Urban areas in Azerbaijan are experiencing rapid growth and development, fueled by a combination of natural resource wealth, strategic geographic location, and economic reforms.

A fifth is equally pressing: increased urbanization has led to environmental degradation, including air and water pollution, loss of green space, and waste disposal problems. Cities such as Baku, Sumgayit, and Ganja are particularly affected by industrial pollution due to their historical development as industrial centers.

To address these challenges and ensure sustainable development, Azerbaijani cities must implement effective urban planning and investment management strategies. Effective land use planning is essential to balance residential, commercial, industrial, and recreational needs. This prevents overcrowding and ensures harmonious development of different parts of the city.

Continued investment in infrastructure such as transportation networks, water supply, sewerage systems, and energy grids is critical to supporting economic activity and improving the quality of life of residents.

Meeting the housing needs of urban populations, especially low- and middle-income groups, is also vital. This involves developing affordable housing projects and upgrading informal settlements. The establishment of the State Housing

Construction Agency under the President of the Republic of Azerbaijan in order to promote the implementation of state policies to improve the quality of life and develop the national economy by meeting the housing needs of Azerbaijani citizens has made a significant contribution to this zone.

Urban planning must include principles of environmental sustainability. This includes preserving green spaces, developing public transport, introducing waste management systems, and introducing renewable energy sources.

Attracting diverse investment to urban areas is essential for economic diversification and sustainability. This involves creating a favorable business environment, providing incentives for investors, and developing sectors that stimulate economic activity.

Providing access to quality educational, health, recreational, and cultural facilities is critical to improving the quality of life of city residents. Investments in social services help create inclusive and vibrant communities.

Three Case Studies

Baku exemplifies both the challenges and successes of urban investment management in Azerbaijan. The country's capital city has benefited significantly from the oil and gas industry, attracting significant investment in infrastructure, real estate, and trade. The city is developing modern business districts, shopping centers, and residential complexes.

Moreover, significant investments have been made in modernizing Baku's infrastructure. The Baku metro system has been expanded, new highways have been built, and international standard seaports are being developed in the city.

Despite problems with industrial pollution, Baku has made progress in achieving environmental sustainability. The city has implemented greening projects, including the building of new parks and the restoration of the Caspian seacoast. Waste management systems have been improved and efforts to reduce air pollution continue. Baku has developed several affordable housing projects to meet the housing needs of its growing population. In addition, investments in health and education facilities have improved access to basic services.

Baku exemplifies both the challenges and successes of urban investment management in Azerbaijan.

The materials of Baku's new master plan include several major projects that can ensure the sustainable development of the city. The master plan proposes to manage the load of the main node and transport system using a sub-node system. To meet the needs of urban residents in recreational areas, green areas, green corridors, landscaping, and lake use are proposed.

Ganja, Azerbaijan's second-largest city, offers insight into managing urban investment in a smaller city setting.

However, the absence of a working master plan for a long time requires that various solutions be proposed, worked on over many years, and problems that have arisen over time be resolved in order for the new master plan to work as planned.

Ganja, Azerbaijan's second-largest city, offers insight into managing urban investment in a smaller city setting. Ganja has focused on diversifying its economy beyond traditional industries. Investments in agriculture, manufacturing, and tourism were prioritized to create new jobs and reduce dependence on one sector of the economy.

The city has invested in modernizing its transport infrastructure, including its road network and public transport systems. Modern utilities and services have improved the quality of life of residents. Ganja has used its rich cultural and historical heritage to attract investment in tourism. The restoration of historical sites and the development of cultural centers have stimulated tourism and created economic opportunities. Investments in health and education facilities have improved access to basic services. The city has also focused on providing affordable housing to accommodate its growing population.

Currently, work continues on a new master plan for Ganja. The main goal of the master plan is the reclamation of unused industrial areas and their waste dumps, which create environmental problems, and their use again as green or multifunctional areas, the transformation of the coastal zone into a recreation area, and the organization of the transition

of individual residential buildings into multi-apartment residential buildings in the city's settlement system.

In short, Ganja is a city in the spotlight. With proper planning, this focus can be channeled to benefit the city and create a more livable and sustainable city model.

Sumgayit, a historically industrial city, faces unique challenges and opportunities in managing sustainable urban investments. Sumgayit has undergone a transformation from a highly industrialized city with significant pollution problems to a more diversified economy.

Priority is now given to investments in clean industries, technology parks, and environmental restoration. Sumgayit has invested in improving living conditions and modernizing its infrastructure. The city has built new residential areas and improved public services to improve living standards. Efforts to attract a variety of investments included the creation of free economic zones and industrial parks.

These initiatives are aimed at creating new economic opportunities and improving quality of life.

Investment Attractiveness

The attractiveness of Azerbaijani cities for investment depends on several factors. Cities that can effectively manage these factors can attract and retain investment, promoting economic growth and development. The presence of well-developed infrastructure such as transport networks, communication systems, and utilities is a major factor influencing investment decisions. Investors are looking for locations with reliable infrastructure to support their operations.

A favorable regulatory environment, including clear policies, streamlined processes, and incentives for investors, can significantly increase the attractiveness of urban areas. Reducing bureaucratic hurdles and ensuring legal protection for investors are important considerations.

The size and purchasing power of the urban population also plays a decisive role in attracting investment. Cities with large and affluent populations offer a significant market for goods and services, making them more attractive for business.

The overall quality of life in urban areas, including safety, health care, education, and recreational facilities, can influence investment decisions. Cities that offer a high quality of life are more likely to attract skilled workers and businesses.

Economic stability and growth prospects are important factors for investors. Cities in countries with stable economies, low inflation, and positive economic prospects are more attractive for investment.

Investors are also increasingly considering environmental factors in their decisions. Cities that promote sustainable development, green spaces, and green practices are more likely to attract environmentally conscious investors.

Proximity to natural resources such as water bodies, forests, and minerals can influence investment decisions. Lastly, cities with access to ports, airports, and logistics hubs are attractive for trade and commerce.

Achieving a balance between attracting investments and ensuring sustainable urban development is crucial for the long-term growth and livability of Azerbaijani cities. This involves crafting policies and strategies that promote balanced development across different urban zones and prevent the over-concentration of investments in specific areas.

Achieving a balance between attracting investments and ensuring sustainable urban development is crucial for the long-term growth and livability of Azerbaijani cities.

Six such policies and strategies rise to the mind. First, *targeted use of urban areas*. These include reclamation of unused industrial areas, landfills and state funding of roads, communication systems, and green spaces. These produce an increase in investment attractiveness. Unused areas can be transformed into locations that feature interesting and innovative projects, which also has a positive effect on the urban environment.

Second, *public-private partnerships*. Collaboration between the public and private sectors is essential for the effective development of the city. Public-private partnerships (PPPs) can leverage the expertise and resources of the private sector to deliver infrastructure projects, housing, and social services.

Third, *incentives for balanced development*. Providing incentives

for investment in underdeveloped or less attractive areas can promote balanced urban development. This includes tax breaks, subsidies, and grants for businesses that invest in these areas.

Fourth, *master planning*. Developing a comprehensive city master plan helps guide development activities and ensures alignment with long-term goals. Master planning involves stakeholder engagement, data analysis, and scenario planning to create a sustainable and inclusive vision for the city.

Fifth, *community participation*. Involving local communities in planning and decisionmaking is critical to creating inclusive urban environments. Community participation helps identify residents' needs and priorities and ensures that development projects benefit all segments of the population.

Sixth, *monitoring and evaluation*. Regular monitoring and evaluation of urban development projects is necessary to assess their impact and make necessary adjustments. This ensures that the investment will produce the desired results and contribute to the overall development goals of the city.

Balanced Development in Baku

Baku offers valuable information on the challenges and successes of achieving balanced urban development. The city has implemented several strategies to attract investment. The city has invested heavily in upgrading its infrastructure to support economic activity and improve the quality of life for residents. Major infrastructure projects include the expansion of the Baku Metro system, the construction of new highways and bridges, and the development of modern airports and seaports. These investments have improved connectivity within the city and with other regions, facilitating trade and commerce.

Moreover, Baku has introduced new zoning rules to control land use and prevent excessive concentration of activity in certain areas. These rules ensure a balanced distribution of residential, commercial, industrial, and recreational uses. The city has designated zones for business and residential areas, industrial areas, and green spaces, which contribute to harmonious urban development.

Baku has also used PPPs to accelerate urban development projects.

PPPs have played an important role in the development of infrastructure, housing, and social services. For example, the development of the White City Baku project, a large-scale urban renewal initiative, involved collaboration between the public and private sectors. The project aims to transform a former industrial area into a modern, sustainable urban area with residential, commercial, and leisure facilities.

In addition, Baku has made progress in promoting environmental sustainability through various initiatives. The city has implemented greening projects, including the building of new parks and the restoration of the Caspian seacoast. Waste management systems have been improved and efforts to reduce air pollution continue. These initiatives contribute to the improvement of the urban environment and improve the quality of life of residents.

Baku has recognized the importance of public participation in urban development. The city has involved local communities in the planning and decisionmaking process for various projects. Public consultations and stakeholder meetings were held to gather information and ensure development initiatives met residents' needs and priorities. This approach helps build a sense of ownership and support for city projects.

Housing Challenges

Housing is a critical aspect of urban development, and Azerbaijani cities face significant challenges in providing affordable and quality housing for their growing populations. Addressing these challenges requires comprehensive strategies that involve both the public and private sectors.

Cities in Azerbaijan have launched several affordable housing initiatives to meet the housing needs of low- and middle-income groups. These initiatives include the construction of new housing units, the renovation of existing structures, and the development of government-supported housing projects. For example, programs have been implemented in Baku to provide affordable housing to young families and low-income households.

Many urban areas in Azerbaijan have informal settlements that lack basic infrastructure and services. Modernizing these settlements is essential to improve living conditions and ensure social inclusion. This includes ensuring access to public services, sanitation, health care, and education.

PPPs play a critical role in solving housing problems, which can leverage the expertise and resources of the private sector to develop housing projects that meet the needs of different income groups.

Access to affordable finance is essential to expanding housing opportunities. Azerbaijani cities have explored various financing mechanisms to support housing construction. These include government subsidies, low-interest loans, and mortgage programs. For example, the State Housing Development Agency (MIDA) in Azerbaijan provides financing options for eligible families to purchase affordable housing.

Promoting sustainable housing development is critical to ensuring environmental and social well-being. Azerbaijani cities are increasingly using green building methods and energy-efficient technologies in housing projects. This includes using renewable energy, creating green spaces, and implementing waste reduction measures. For example, the White City project in Baku emphasizes sustainable design principles and aims to create a green, livable urban area.

The problem of one- and two-story private residential buildings built without permission in the cities of Azerbaijan is a serious problem in urban planning and management. Unauthorized structures often do not comply with a city's master plan or zoning regulations, leading to uncontrolled urban sprawl and inefficient use of land. Buildings constructed without proper permits may not meet safety standards, creating a risk to occupants and the public. These structures can put strain on existing infrastructure such as roads, water, and sewer systems because they are not factored into city development plans. Unauthorized structures can lead to legal disputes over the ownership and use of land, complicating property rights and urban governance.

One of the possible solutions is to implement a program to regulate existing unauthorized structures by assessing them for compliance with safety and zoning standards. If they meet the necessary criteria, they can be legalized with fines and fees to deter future violations.

Meanwhile, city planners must be empowered to more effectively monitor and enforce building codes. This includes increasing inspections and introducing stricter penalties for violations.

Educating the public about the importance of obtaining appropriate building permits and following building codes is another approach. This can help reduce the number of unauthorized buildings.

Simplifying and streamlining the building permit process to make it easier for people to comply with regulations is yet another approach. This may include reducing bureaucratic hurdles and making the process more transparent and accessible. The authorities should also provide incentives for property owners to comply with building codes, such as tax breaks or subsidies for those who obtain the necessary permits and comply with building standards.

By learning from foreign examples and adapting solutions to the local context, Azerbaijani cities can cope with and mitigate the problems created by unauthorized residential buildings.

Moreover, the authorities should also incorporate existing unauthorized structures into official urban development plans by upgrading and upgrading infrastructure to ensure they comply with safety and zoning standards.

Finally, involving local communities in the urban planning process to ensure their needs and perspectives are considered should be implemented, which can help gain public support for law enforcement efforts.

Similar problems have been addressed in other countries through regularization schemes and community participation. For example, in India, the government has introduced regularization schemes in various states where unauthorized structures are assessed for compliance and, if they meet certain criteria, are regularized after paying fines.

In Brazilian cities such as Rio de Janeiro, the government has implemented programs to integrate informal settlements (favelas) into the formal urban structure by providing basic services and upgrading infrastructure.

Addressing the problem of unauthorized construction in Azerbaijan's cities requires a multifaceted approach, including regulatory reforms, public participation, and infrastructure development. By learning from foreign examples and adapting solutions to the local context, Azerbaijani cities can cope with and mitigate the problems created by unauthorized residential buildings.

Promoting Economic Development

Economic development is a key driver of urban growth and prosperity. Azerbaijani cities pay special attention to attracting a variety of investments to create jobs, stimulate economic activity, and improve the quality of life of residents.

A favorable business environment is necessary to attract investment. Azerbaijani cities have implemented various measures to improve the business climate, including streamlining regulatory processes, providing incentives, and strengthening legal protection for investors. In Baku, for example, business centers and free economic zones have been created to attract domestic and foreign investors.

Small and medium-sized enterprises (SMEs) play a vital role in economic development and job creation. Azerbaijani cities are supporting SMEs through various initiatives, such as providing access to finance, offering business development services, and creating networking opportunities. In Ganja, local authorities have created small and medium-sized business development centers to support entrepreneurs and promote innovation.

Diversifying the economy by developing key sectors is critical to long-term growth. Azerbaijani cities focus on sectors such as tourism, technology, agriculture and manufacturing. Sumgayit, for example, is developing technology parks and industrial zones to attract investment in environmentally friendly industries and technology-oriented businesses.

A skilled workforce is essential for economic development. Azerbaijani cities are investing in education and training programs to improve workforce skills and meet labor market needs. Baku has established several vocational training centers and partnerships with educational institutions to provide training in various fields, including technology, healthcare, and hospitality.

Azerbaijani cities have a rich cultural and historical heritage that can be used for economic development, especially in the tourism sector. Cities like Ganja are restoring historical sites and developing cultural centers to attract tourists and create economic opportunities. The development of cultural tourism not only stimulates the local economy, but also preserves and celebrates the country's heritage.

Ensuring social inclusion and improving the quality of life of all residents is a fundamental goal of urban development. To achieve this goal, Azerbaijani cities are implementing various strategies. Access to quality healthcare and education is critical to improving the well-being of residents. Azerbaijani cities are investing in healthcare facilities, expanding access to medical services, and improving the quality of education. Baku has built several modern hospitals and clinics, and the city has also focused on improving educational infrastructure, including schools and universities.

Recreational and cultural amenities improve the quality of life for residents and create vibrant urban communities. Parks, sports complexes, cultural centers, and entertainment venues are being developed in the cities of Azerbaijan to provide residents with recreational opportunities. In Sumgayit, for example, the city has built many parks and cultural centers to promote social interaction and community participation.

Azerbaijani cities are adopting universal design principles to create accessible public spaces, transport systems and buildings. In Baku, for example, initiatives have been implemented to improve the accessibility of public transport and pedestrian infrastructure.

As Azerbaijani cities continue to grow and evolve, several future directions can guide urban investment management to achieve sustainable and inclusive development.

Future Directions

As Azerbaijani cities continue to grow and evolve, several future directions can guide urban investment management to achieve sustainable and inclusive development. Embracing smart city technologies can enhance urban management and improve residents' quality of life. Azerbaijani cities can implement smart solutions in areas such as transportation, energy, waste management, and public services. These technologies can optimize resource use, reduce environmental impact, and provide better services to residents.

Addressing climate change and building climate resilience are critical for sustainable urban development. Azerbaijani cities can implement climate adaptation measures, such as improving

drainage systems, enhancing green infrastructure, and promoting sustainable building practices. These efforts can mitigate the impact of climate change and enhance the city's resilience to environmental challenges.

Promoting balanced regional development is essential for reducing disparities and ensuring equitable growth. Azerbaijani cities can develop regional development strategies that focus on enhancing connectivity, supporting rural areas, and promoting economic opportunities across different regions. This can prevent over-concentration of development in specific urban centers and ensure that all regions benefit from economic growth.

Fostering innovation and entrepreneurship is crucial for driving economic growth and creating job opportunities. Azerbaijani cities can establish innovation hubs, support startup ecosystems, and promote research and development activities. Encouraging a culture of innovation can attract talent and investments, contributing to the city's economic vitality.

Promoting sustainable mobility is essential for reducing traffic congestion, improving air quality, and enhancing residents' quality of life. Azerbaijani cities can invest in public transportation systems, develop pedestrian and cycling infrastructure, and promote the use of electric vehicles. Sustainable mobility initiatives can create a more efficient and environmentally friendly urban transportation system.

Managing investments in urban areas is a complex but crucial task for ensuring the sustainable development of Azerbaijani cities. Effective urban planning and investment management can address the challenges of rapid urbanization, such as economic disparities, social inequalities

The foregoing six future directions can ensure that Azerbaijani cities—this article has focused on three of them—can sustainably develop and continue to prosper well into the future. City planners and state officials have their work cut out for them, but appear ready to meet the challenges of urban development head on. BD

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Smart Cities in Postwar Karabakh

Inara Yagubova and Samra Talishinskaya-Abbasova

Infrastructure plays an essential role in addressing societal needs and climate change policies. The methods and materials used during construction can have an impact (positive *and* negative) on both climate change mitigation and adaptation as well as in engineering a more inclusive society. There is a noticeable shift towards cleaner and sustainable infrastructure worldwide, as countries aim to move closer to fulfilling their net-zero emissions pledges. To achieve net-zero emissions by 2050, an estimated $139 trillion investment in infrastructure will be needed worldwide.

The global infrastructure business has enormous growth potential. By 2050, around 75 percent of infrastructure across the globe will be under construction. This growth is likely to be accompanied by a spike in the global green infrastructure market, which is predicted to reach €10 trillion by 2030.

The fact that infrastructure accounts for 79 percent of global greenhouse gas emissions highlights the importance of investing in green infrastructure worldwide.

Azerbaijan has identified specific goals and targets related to the fight against climate change and diversifying its energy mix to include 30 percent mix of green or renewable energy sources by 2030. The government has linked the country's future economic development to the non-hydrocarbon sector, which has grown in the past few years at a more rapid rate as compared to the hydrocarbon one. Contributing to this higher-growth sector is the application of environmentally friendly technologies, clean energy, waste recycling, and measures to rehabilitate polluted lands.

***Inara Yagubova** is a Senior Research Fellow at the Institute for Development and Diplomacy at ADA University, where she previously served as Project Manager of its Centre for Excellence in EU Studies. **Samra Talishinskaya-Abbasova** is a Sustainability Manager at Unibank OJSC and also works as an Adjunct Instructor at ADA University's Business School. The views expressed in this essay are their own.*

One of Azerbaijan's priorities is the restoration of the environmentally- and physically-devastated territories liberated during and in the wake of the Second Karabakh War. The plan is to turn Karabakh into a net zero-emission zone by 2050. The government puts special emphasis on the establishment of sustainable and smart cities and villages, with one of the motivating factors being mitigating and adapting to climate change.

To accomplish its goals, Azerbaijan has launched a reforestation campaign in Karabakh and built the country's first smart village; other villages and entire cities are being reconstructed as we speak. Moreover, to fulfill its voluntary commitment to reduce greenhouse gas emissions by 40 percent by 2050 (and already by 35 percent by 2030), Azerbaijan has been massively investing in increasing its wind and solar capacity in liberated Karabakh.

To that end, the Ministry of Energy has signed an agreement with BP on the final investment stage of "Project Shafag," a 240-MW capacity solar power plant in the Jabrayil district of the liberated East Zangezur region. With Masdar, a UAE government-owned renewable energy company, the Energy Ministry has signed a two-pronged Implementation Agreement, the first part of which will develop a 1 GW utility-scale onshore solar and wind energy mega-project, including in Karabakh and East Zangezur; the second will develop green hydrogen facilities producing 2 GW of energy from offshore wind sources.

Moreover, to tackle issues like pollution and climate change, as well as to boost the overall quality of life in the liberated territories, green infrastructure can be a game-changer by enhancing environmental sustainability, improving community well-being, and creating more livable cities.

Considering that green infrastructure investment in Karabakh will create more added value, since the infrastructure and urban-rural settlements are being built from scratch, the integration of green infrastructure development into existing policy frameworks is vital.

As a key element of smart cities and the green transition, green

infrastructure development can be boosted through proactive, long-term asset management strategy and investment to meet climate change targets. If green infrastructure development is both properly integrated into policy frameworks and implemented successfully, it can offer services that a functioning society needs: heat, power, mobility, clean water, waste management, and digital communication. It may also facilitate change by raising standards of living, lowering inequality, raising productivity, and promoting environmentally friendly results.

Therefore, this essay examines the opportunities and importance of integrating green infrastructure development into smart urban planning of the cities being constructed in liberated Karabakh. Furthermore, it addresses different investment and finance methods for green infrastructure in Karabakh by drawing attention to successful cases around the globe. The overall objective of the essay is to provide analytical support in the application of the sustainable smart city concept in Karabakh and turning the region into a green zone.

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Policy Framework

The aftermath of the Second Karabakh War, which resulted in the end of the Armenian occupation of 20 percent of Azerbaijan, has accelerated the need to rebuild the towns and villages in the liberated areas. During the 30 years of occupation by Armenian forces, the region's infrastructure – including cities, towns and villages and historical places, schools, kindergartens—was completely and systematically destroyed.

In seven cities (Fuzuli, Jabrayil, Zengilan, Gubadli, Shusha, Aghdam, Kalbajar, Lachin), numerous urban settlements, and about 400 villages, complex reconstruction projects on an unprecedented scale began to take place. Days after the end of the war, Azerbaijan began undertaking reconstruction projects with the aim of returning IDPs to their places of origin with all deliberate speed—by late 2026, more than 150,000 citizens are projected to return to populate the liberated areas. So far, the country has spent approximately $10.2 billion on construction and restoration work in the liberated territories, with Finance Minister Samir Sharifov indicating that the number is expected to reach $11.1 billion by the end of 2024. In 2021-2022 as Aliyev stated on 2 March 2024 at the Summit-level Meeting of the NAM Contact Group, Azerbaijan spent $4 billion on building smart cities and smart villages.

In short, Baku sees the development of modern and smart cities and villages as a solution for regional development and population resettlement in newly liberated regions.

The country has adopted an umbrella document titled "Azerbaijan 2030: National Priorities for Socio-Economic Development" that puts forward a strategic vision of maintaining a high-quality and clean ecological environment. One of its priorities—titled A Clean Environment and a Country of 'Green Growth'—calls for the efficient use of resources and envisions the establishment of green spaces and the efficient harnessing of water resources.

To that end, Aliyev signed a decree on transforming not only the liberated areas (the Karabakh and East Zangezur regions) but also Azerbaijan's Nakhchivan exclave into "green energy" zones. All told, these three regions make up about 25 percent of the country's territory. "The creation of "green energy" sources in these regions will benefit the entire [South Caucasus] region," said Aliyev in a speech that commissioned the Khudafarin hydroelectric complex and inaugurated the Giz Galasi hydroelectric complex on the Araz River in May 2024. This envisions leveraging Karabakh's abundant renewable energy potential. The wide spectrum activities include electricity generation from renewable sources, energy efficiency improvements, adoption of electric vehicles, installation of solar panels on buildings, solar-powered LED street lighting, and smart energy management. Waste energy management is also a key component of the green energy zone initiative.

By using advanced technologies, smart cities optimize resource use, incorporate smart city management systems, and transition to renewable energy sources. Taken together, these represent significant steps towards building sustainable cities in Karabakh and other parts of Azerbaijan.

Smart city and green zone policy frameworks operate mostly independently of each other in the liberated areas; however, serious outcomes can be achieved by their integration. The development

of green infrastructure can be an essential part of both the smart city concept and the overall push towards a green transition to provide integrated solutions for complex urban city challenges while improving resilience.

Green Infrastructure

Green infrastructure is the combination of infrastructure elements with natural elements and multifunctional green spaces. It involves integrating nature-based elements into urban planning and development as an interconnected network of green spaces that are controlled and intended to provide a range of environmental, social, and economic advantages. These places include community and tenement plots, individual gardens, urban wetlands, green walls and roofs, and urban parks.

Green infrastructure offers opportunities for carbon capture, temperature regulation, flood, wind speed, stormwater runoff reduction, and food production. Such networks envisage the application of ecosystem-based approaches in various areas such as energy grids, drainage systems, communications, and transportation to increase productivity, save costs, and adapt to climate change

Experts have established six main categories by which to assess the success of smart cities. They are: *one*, energy efficiency and environmental sustainability; *two*, transportation and mobility; *three*, participation and city governance; *four*, people; *five*, buildings; and *six*, city economics. The smart city policy framework aims to support effective operational networks in the city and aid in decision-making by utilizing technology, data, and information platforms. Considering that the smart cities idea focuses on building resilient cities with appealing living spaces and implementing integrated, sustainable solutions, the application of green infrastructure elements into urban planning is win-win solution for cities.

Despite the promising prospects of sustainable city planning and green infrastructure, the road to sustainability is fraught with challenges. Green infrastructure projects are frequently impeded by financial constraints. These projects frequently face competition from more conventional grey infrastructure solutions that do not provide additional co-benefits. In addition, green infrastructure necessitates long-term planning, with the benefits not being realized in the short term, which makes it difficult to attract investment.

The Importance of Green Infrastructure Investment

The realization of infrastructure projects is crucial to the successful economic development of Azerbaijan's liberated areas. There, residential and non-residential complexes adhering to advanced urban planning guidelines are being established; with the integration of smart city and smart village concepts, the modernity of infrastructure will be ensured. This will also cover the establishment of an efficient waste management system and the restoration of social service infrastructure. Considering its environmental, social, and economic benefits, green infrastructure development is crucial for restoring life to Karabakh and East Zangezur.

The realization of infrastructure projects is crucial to the successful economic development of Azerbaijan's liberated areas.

Green infrastructure investment will play a key role in promoting sustainable development not only by contributing to economic growth through job creation and boosting local industries, but also from a climate change perspective, as carbon emission reduction, climate resilience, sustainable land use, economic and social co-benefits, the promotion of green cities, and long-term climate adaptation.

One of the most direct benefits of green infrastructure investment is the reduction of carbon emissions. By prioritizing renewable energy sources like wind and solar, the Karabakh region can significantly decrease its reliance on fossil fuels. This transition not only lowers greenhouse gas emissions nationally, but also contributes to Azerbaijan's efforts to combat climate change.

As green infrastructure encompasses energy-efficient buildings that consume less energy, fewer emissions will be produced. This dual approach of increasing renewable energy use while enhancing energy efficiency will position the Karabakh region as a proactive participant in global climate action.

Beyond emission reductions, green infrastructure investments can enhance the region's resilience to the adverse impacts of climate change. Effective water management is a key component of this resilience strategy. As climate change leads to more frequent and severe weather events, green

infrastructure solutions provide essential protection against such impacts. Moreover, investing in green spaces, such as urban forests and green belts, helps preserve and enhance biodiversity. Diverse ecosystems are inherently more resilient to climate change, offering a natural buffer against environmental instability.

Sustainable land use is another critical area where green infrastructure investments can have a profound impact. Reforestation and afforestation projects, for example, play vital roles in sequestering carbon, improving air quality, and stabilizing local climates. In regions like Karabakh, where land degradation is a concern, such initiatives can enhance the region's overall environmental health. Additionally, promoting sustainable agricultural practices through green infrastructure investments can improve soil health, increase crop resilience to climate extremes, and reduce the carbon footprint of food production. These practices not only support environmental sustainability, but will also contribute to food security and rural development in the Karabakh region.

The economic and social co-benefits of green infrastructure investments further strengthen the case for this approach. One of the most significant advantages will be job creation. The development of green infrastructure can generate employment opportunities in sectors such as renewable energy, construction, and environmental management. This will not only provide a stimulus to the local economy, but it will also support a just transition to a greener economy and, in turn, ensure that communities are not left behind in the shift towards sustainability. Additionally, green infrastructure investments will improve air and water quality, reducing health risks associated with pollution and extreme weather events. Healthier communities are more resilient to climate-related challenges, creating a virtuous cycle of environmental and social well-being.

Healthier communities are more resilient to climate-related challenges, creating a virtuous cycle of environmental and social well-being.

Promoting green smart cities through infrastructure investments is another essential aspect of addressing climate change in the Karabakh region. Green cities prioritize sustainable living by incorporating public transportation, energy-efficient buildings, and ample green spaces into urban planning. These elements contribute to lower carbon emissions and an improved quality of life for the Karabakh residents. Moreover, green smart cities are better prepared to adapt to the changing climate.

Green infrastructure will also support long-term climate adaptation in the Karabakh region. Unlike traditional infrastructure, which may become obsolete or require costly upgrades as climate conditions change, green infrastructure is often more adaptable and resilient. This longevity reduces the need for frequent resource-intensive maintenance and ensures that the infrastructure can withstand the test of time, even as the climate continues to evolve.

Four Funding Options

For the realization of the aforementioned green infrastructure projects, achieving socio-economic development targets, and promoting green cities and long-term climate adaptation in the Karabakh region, innovative green financing mechanisms should be utilized. Despite the benefits, however, green infrastructure often faces funding gaps.

Public budgets may prioritize traditional infrastructure over green projects; thus, increased investment is necessary to bridge this gap and create sustainable, resilient cities. While public funding is essential, this is not a panacea: private investment is also crucial. Across the G20 countries, private-sector-led infrastructure investments has remained below 0.2 percent of GDP, while studies suggest that 5.0 percent is needed.

Middle- and low-income countries rely heavily on nonprivate players (e.g., the public sector and development banks) for infrastructure financing. Newer financing tools like green bonds, impact investing, and public-private partnerships (PPPs) offer innovative ways to fund green infrastructure. In such ventures, governments, development banks, and private investors act as important collaborators to mobilize capital for green infrastructure projects.

For the successful implementation of green infrastructure projects, policy support is also essential. Governments should prioritize and incentivize green investments through relevant regulation and support mechanisms. In this part of our paper, we will examine four innovative green infrastructure funding options for the Karabakh

region, including PPPs, syndicated loans, green bonds, blended finance, drawing on best practices from other countries.

PPPs offer a viable financing mechanism for green infrastructure projects in the Karabakh region. PPPs involve collaboration between the government and private sector companies to finance, develop, and manage infrastructure projects. This model leverages the expertise and resources of private entities while sharing the risks and rewards between the public and private sectors.

The UK has successfully used PPPs for green infrastructure projects, particularly in the area of renewable energy. The UK's Offshore Wind Programme benefited from PPPs by attracting significant private investment while allowing the government to retain a stake in strategic assets. The program has resulted in substantial increases in renewable energy capacity, demonstrating the effectiveness of PPPs in financing green infrastructure. Brazil also has a well-established PPP program, with successful examples in the transportation, energy, and water sectors. The regulatory framework governing PPPs in Brazil ensures transparency, risk-sharing, and project viability. Engaging stakeholders ensures inclusive decisionmaking and diverse perspectives which fosters buy-in and minimizes conflicts. Brazil conducts consultations during project planning and environmental impact assessments.

In the context of Karabakh, PPPs could be used to fund renewable energy projects, such as solar or wind farms, as well as sustainable urban development initiatives. A state entity could provide initial capital, regulatory support, and land, while private companies could bring in the necessary technology, expertise, and additional financing. This approach could accelerate the deployment of green infrastructure while minimizing the financial burden on the state.

The second green financing mechanism is what bankers call syndicated loans. This involves a group of banks or financial institutions coming together to provide large loans to fund significant infrastructure projects. This mechanism can be particularly effective for financing large-scale green infrastructure projects that require substantial capital investment.

In India, syndicated loans have been used to finance large-scale solar energy projects. The Rewa Ultra Mega Solar Park in Madhya Pradesh, one of the largest solar parks in the world, was partly funded through syndicated loans. This approach allowed for the sharing of risk among multiple lenders while providing the necessary capital to advance the project. The Lake Turkana Wind Power Project in Kenya, one of Africa's largest wind farms, was financed through a syndicated loan involving international and local financial institutions such as the African Development Bank and the European Investment Bank. This syndicated loan structure allowed for the pooling of resources and risk-sharing among multiple lenders, making it possible to fund the $680 million project. The successful implementation of this project, which now supplies about 15 percent of Kenya's electricity, highlights the effectiveness of syndicated loans in financing large-scale green infrastructure in developing countries—a model that could be replicated in Azerbaijan.

In its Karabakh region, syndicated loans could be used to finance major green infrastructure projects such as renewable energy plants, smart grids, or large-scale water management systems. By involving multiple financial institutions, the region could access larger pools of capital while distributing the financial risks, making it easier to fund ambitious projects.

A third financing mechanism is green bonds. These are debt securities issued to finance projects with environmental benefits, such as renewable energy, energy efficiency, and sustainable land use. Green bonds have gained popularity as a green finance tool because they attract environmentally conscious investors and can be issued by governments, municipalities, or corporations.

The Netherlands issued government green bonds in 2019, attracting investments of $6.68 billion for climate change adaptation programs, renewable energy projects, and railway infrastructure. The Netherlands has a strong commitment to sustainability and innovation and the government actively promotes green initiatives. Nigeria's green bond was a landmark achievement in Africa, signaling the country's commitment to sustainable development and climate action. The bond not only helped finance critical green projects, but also set a precedent for other African states to follow. It showcased the potential for green bonds to attract both local and international investors in developing countries, supporting the financing of environmental initiatives in regions with pressing climate challenges.

In the context of Karabakh, issuing green bonds could provide a steady stream of funding for a variety of green infrastructure projects, such as reforestation initiatives, sustainable urban planning, and renewable energy installations. By issuing green bonds, the region could tap into global capital markets and attract investors interested in supporting environmental sustainability. There are indications that something like this could be in the works—unconfirmed reports indicate two Azerbaijani banks, in partnership with the Astana International Financial Centre's Green Finance Centre, will issue green bonds by the end of the year, perhaps during COP29—but it is unclear whether the bonds will focus on Karabakh. Either way, this represents a good start and could come to be seen as a proof-of-concept endeavor.

The fourth mechanism is what is called blended finance, which involves combining public and private sector funding to de-risk green infrastructure investments and attract private capital. This approach uses public funds to absorb certain risks, making green projects more appealing to private investors.

In Kenya, what is called the Climate Investor One initiative blends public and private finance to support renewable energy projects. By using public funds to reduce risk, the initiative has successfully attracted significant private-sector investment, leading to the development of several renewable energy projects across the country.

For the Karabakh region, blended finance could be used to fund projects that may be perceived as high-risk by private investors, such as innovative renewable energy technologies or large-scale reforestation efforts. By leveraging public funds to reduce risk, the region could attract more private capital and accelerate the implementation of green infrastructure projects.

What It's Really About

To achieve long-term sustainability and meet climate change goals, the Azerbaijani government needs to promote responsive and adaptive infrastructure that requires a combination of financial resources, policies, and technologies in the declared green zones. The need for people-centered urban city models that integrate smart infrastructure with nature-based solutions to solve the social, economic, and environmental difficulties of cities and other urban areas while promoting health and well-being has been highlighted by referencing a few cases from abroad.

With this in mind, the term "smart city" in Karabakh should neither be interpreted primarily as a technological concept based on the application of information and communication technologies, nor as a collection of techniques for administering or managing a city as a whole or any of its constituent parts, such as its resources, traffic, and population. Integrating smart and green yields the most favorable outcomes in terms of the environment, society, economy, and health, the application of nature-based solutions in Karabakh can reduce disaster risk and strengthen climate resilience.

The integration and effective implementation of green infrastructure and funding mechanisms into policy initiatives for smart cities in Karabakh can result in this part of Azerbaijan becoming and exemplary model for the entire Silk Road region. Karabakh has a unique opportunity to leverage a range of innovative funding mechanisms to support its green infrastructure development. PPPs, syndicated loans, green bonds, and blended finance all offer viable pathways for financing its transition to a sustainable future.

By drawing on best practices from other countries, these mechanisms could be implemented effectively in Karabakh, ensuring that its green infrastructure investments are both financially sustainable and impactful in the fight against climate change. BD

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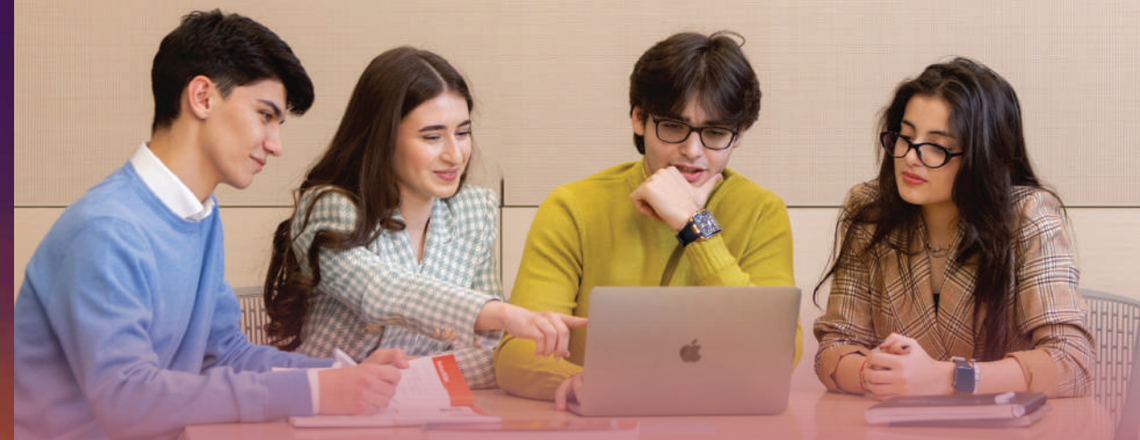

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Smart Cities in Postwar Karabakh

Comparative Insights from the Balkans

Orkhan Nadirov, Vusal Mammadrzayev, and Bruce Dehning

The development of a Smart City concept is essential for many devastated regions including Karabakh. While traditional methods typically address basic infrastructure repairs, implementing smart city solutions can promote long-term sustainability and enhance the well-being of individuals affected by war. The Smart City concept is viewed as a promising solution for challenges in postwar regions, and scholars argue that it effectively aids in developing post-conflict zones. This approach relies on the concept that it enhances emergency forecasting and planning, assesses disasters, and effectively manages and shares geographic information. Failure to implement smart city initiatives in postwar zones could significantly delay recovery efforts and sustainable development, hinder economic growth, and diminish resilience against future disasters.

This paper examines the smart city concept as a vital strategy for the Karabakh region. It draws on lessons from the post-conflict Western Balkans, highlighting the key challenges these regions encountered in developing smart cities and, thus, aims to provide insights for the Azerbaijani government to learn from their experiences.

Orkhan Nadirov *is an Assistant Professor in the School of Public and International Affairs (SPIA) at ADA University.* ***Vusal Mammadrzayev*** *is a Senior Instructor in SPIA at ADA University.* ***Bruce Dehning*** *is an Associate Professor of Accounting Information Systems at Chapman University's Argyros College of Business and Economics.* *This work was supported by Azerbaijan Science Foundation within the project "Smart Cities in Karabakh: From Concept to Reality (Project number: AEF-MQM-QA-1-2021-4(41)-8/08/5-M-08). The views expressed in this essay are their own.*

The Azerbaijani Context

Azerbaijan has been dedicated to implementing the "smart city" concept since the "National Action Plan for the Promotion of Open Government for 2020-2022" was approved by President Ilham Aliyev on 27 February 2020 and, more specifically, his 19 April 2021 executive order to advance both "smart city" and "smart village" initiatives.

Consequently, a working group was formed to promote these concepts throughout Azerbaijan. Currently, the regions of Karabakh and Eastern Zangezur, recently liberated from nearly three decades of Armenian occupation, are being reconstructed using the principles of "green energy," "smart city," and "smart village."

Failure to implement smart city initiatives in postwar zones could significantly delay recovery efforts and sustainable development, hinder economic growth, and diminish resilience against future disasters.

The first village, Aghali, was established in the Zangilan district, and families already reside there. Plans are underway for a second village, Dovlatyarli, in the Fuzuli district, funded by the Azerbaijani government. A third initiative is also being developed for the village of Bash Garvand in the Aghdam district.

However, significant challenges exist, notably the high initial costs associated with these projects, which include infrastructure development and the integration of advanced technologies. Infrastructure has to be built from scratch due to the devastation in the area, and as ADA University's Anar Valiyev has emphasized in various publications, the needs of the returning population (having again become the local population) must be prioritized.

Sustainable financing poses another concern, as these initiatives largely depend on government grants and international aid that may not be consistently reliable. The Azerbaijani government has committed substantial funds to the smart city and village projects, indicating strong initial investment. However, there are worries about the future sustainability of this funding. These projects' economic viability hinges on attracting

private investments and managing operating costs effectively. High infrastructure expenses and regulatory obstacles may deter private sector involvement, making it challenging to ensure the economic health of these projects if reliant solely on public funds.

Overall, the potential for smart cities and villages in Azerbaijan is promising. Its success will depend on addressing the financial challenges, infrastructure needs, and the involvement of both public and private sectors to create sustainable urban environments.

Overall, the potential for smart cities and villages in Azerbaijan is promising. Its success will depend on addressing the financial challenges, infrastructure needs, and the involvement of both public and private sectors to create sustainable urban environments.

Managing Financial Difficulties

By 2030, approximately 150,000 new jobs are anticipated to be created in the Karabakh economic region, as stated by Emin Huseynov, Special Representative of the Azerbaijani President for parts of the liberated regions. The job creation projections include about 5,000 positions in the Aghdam Industrial Park, 15,000 to 17,000 in agriculture, 1,500 to 2,000 in mining, 1,500 to 2,000 in tourism, and around 10,000 to 11,500 in small and medium-sized enterprises (SMEs).

The first phase of the Great Return program aims to be completed by the end of 2026, facilitating the return of 34,500 families, approximately 140,000 individuals, to the liberated areas of Karabakh and East Zangazur, with plans for 34,500 new apartments and homes. This reflects the government's effort to balance job creation with the resettlement of people. However, a significant gap between job creation and resettlement figures could hinder the development of a smart city.

Achieving the target of 150,000 new jobs by 2030 while resettling 140,000 individuals by 2026 is critical. Addressing this four-year gap is essential for the initiative's success, ensuring that the number of new jobs aligns with resettlement efforts, thus contributing to the overall development of the Karabakh region.

Educating the Community

The evolution and prosperity of a city are significantly influenced by its intellectual capacity, which serves as a key indicator of the knowledge and skills possessed by the local population. This intellectual capacity is essential for fostering economic growth and driving innovation. A primary means of enhancing intellectual capacity is through education. Consequently, a country must invest in educational institutions to ensure its population is adequately educated.

Furthermore, the predominant argument for fostering innovation in urban environments centers on the co-location of economic actors and educational institutions. This interaction among government, industry, and academia is conceptualized within the framework of the triple helix model. An examination of different case studies in the United States, Europe, and South America all point to the significant role of educational institutions in achieving a high level of innovation. Furthermore, extensive research indicates that educational institutions play an important role in entrepreneurial activities by providing essential skills and acting as knowledge intermediaries and gatekeepers. Therefore, educational institutions are vital in creating knowledge-based urban economies or smart cities.

President Aliyev signed a decree establishing Karabakh University on 28 November 2023, seen as an important step by the government to increase the intellectual capital of the liberated areas. The main purpose behind the establishment of this university is to address the need for skilled professionals, armed with innovation skills, in the socio-economic life of Karabakh and serve as a symbol of reconstruction and revitalization efforts in the liberated areas.

The university offers a wide range of social sciences, humanities, and engineering programs to be a leading institution in the South Caucasus. Located in the city of Khankendi, the university plans to enroll 1,000 students during its initial phase. "Following our brilliant victory in the Patriotic War, schools built to the most modern standards are now in operation in the liberated territories. The future worthy citizens are studying in these schools. The newly established Karabakh University will undoubtedly rejuvenate the historical educational environment

in the region in the near future," Aliyev said in his congratulatory letter to the participants of the 16th Congress of Azerbaijani Teachers. Consequently, establishing Karabakh University represents a strategic initiative to enhance the human resource potential in the liberated regions.

Nevertheless, this investment should be well-planned to avoid oversaturation of educational institutions. While establishing educational facilities is crucial, excess can result in inefficiencies and the misallocation of resources. Firstly, maintaining and staffing multiple educational institutions incurs significant public financial commitments, potentially leading to the suboptimal use of taxpayer funds. Secondly, the proliferation of schools may dilute educational quality, as resources could become insufficiently allocated among numerous institutions. Thirdly, certain schools may experience low enrollment rates, rendering them financially unviable. Therefore, policymakers and urban planners need to achieve a harmonious balance between the number of educational facilities and the population they serve.

Engaging Citizens

Creating smart cities in Karabakh necessitates the active involvement of citizens. Research indicates that a lack of citizen participation in developing smart cities can result in unsuccessful outcomes. Citizen participation brings numerous benefits. First, the firsthand experiences of citizens contribute to developing more effective plans, solutions, and services. Some citizens possess valuable skills and knowledge that may not be available to city authorities. Engaging these individuals early on can provide critical insights to tackle issues proactively and reduce the chances of failure.

Additionally, actively involving citizens can facilitate the collection of environmental and other data through smartphones and various other technologies. For instance, the UK "FixMyStreet.com" application allows citizens to report problems related to roads and infrastructure. Another noteworthy initiative is the "Green Watch" project, which provides smartwatches to citizens to measure ozone and noise levels in their daily lives in Paris. Such projects significantly lower costs while empowering citizens to take an active role in environmental monitoring and regulation. Additionally, the involvement of citizens fosters democracy within local communities and is beneficial for developing sustainable local environments.

Currently, there is insufficient citizen participation in the development of smart projects in Azerbaijan, which could undermine their long-term effectiveness. Hence, to foster this active engagement, the government must implement various initiatives, including e-participation, open data access, interactive mapping, and proactive communication strategies, to build trust and encourage participation.

Currently, there is insufficient citizen participation in the development of smart projects in Azerbaijan, which could undermine their long-term effectiveness.

Technology now enables the concept of e-participation. These services can be initiated by the Azerbaijan government or by citizens themselves. A popular method for government-led participation is the participation platform. This platform allows citizens to submit their ideas, vote on their favorites, and engage with one another. Through this platform, as citizens contribute, the government can gather valuable information to effectively design and enhance smart city projects.

Furthermore, access to open data is an important factor in achieving higher citizen engagement in smart projects. The availability of data about environmental conditions, energy consumption, and public services helps citizens better understand the operations of smart cities. Therefore, successfully implementing data governance policies and collaborating with tech companies and academic institutions would allow the Azerbaijan government to develop user-friendly data platforms.

According to several studies, another effective tool to achieve citizen engagement is the creation of interactive maps with information about infrastructure projects, park locations, available Wi-Fi hotspots, and other community resources. Such resources would be very helpful in helping citizens recognize and appreciate the benefits of smart initiatives. Moreover, an interactive mapping platform would be even more effective in enhancing citizens' involvement if feedback and

suggestions features were enabled through it. Lastly, proactive communication from local authorities in Karabakh, such as frequent updates on social media, community or town hall meetings, online surveys, newsletters, and suggestion boxes, would ensure citizens' consistent and inclusive involvement in planning and implementing smart initiatives in the liberated areas.

Balkan Insights

Examining smart city initiatives and learning challenges in parts of post-conflict Western Balkans can offer valuable insights into the reconstruction of Karabakh. Here, we will look at three examples, starting with one from the capital of Bosnia and Herzegovina, Sarajevo.

Smart cities utilize insights from communities and businesses to develop technology-driven solutions that improve quality of life. The Smart Sarajevo Initiative, which began in December 2018, is one of the pioneering smart city projects in Bosnia and Herzegovina, which is led by UNDP in partnership with local governmental bodies.

This 15-month program aimed to involve the community, encourage cooperation among various stakeholders, and tap into local expertise to create innovative concepts for a more livable urban environment. It focused on employing technology and digitalization to enhance public services and support a smart urban economy, prioritizing residents' health, and quality of life. A specific pilot area of 2 km² in the central Sarajevo municipality of Stari Grad acted as a testing site for multiple initiatives.

Concurrently, what was called City Mind Lab was established, which consisted of over 120 volunteers to assist in the initiative's development. In 2019, nearly 1,300 individuals participated in shaping a distinct urban vision for the municipal future of Sarajevo, highlighting key priorities and issues that they believed required attention. A survey conducted in March 2019 indicated that residents identified air pollution, inadequate public transportation, and corruption as significant issues.

Our second example focuses on Serbia, where various small-scale smart city projects and technological advancements are emerging nationwide. Though they face numerous challenges, leading cities like Belgrade, Novi Sad, Kragujevac, and Niš are at the forefront. The Serbian government has prioritized digital transformation, recognizing the importance of smart cities for future governance. Initiatives focus on smart mobility, digitizing public services, and implementing smart energy solutions like public lighting and electric vehicle charging stations. Communication improvements, including city cloud data centers and public wifi servers, are also underway.

Standardized data collection and service delivery methods are essential for maximizing the benefits of smart technologies. The Parking Maniac app exemplifies this, helping users locate available parking spots via mobile networks and GPS.

Publicly accessible, machine-readable data will allow private companies and citizens to analyze information and create new applications. Engaging citizens in decisionmaking is crucial for developing smart communities. Serbia's open data initiatives, like the Open Data Hub launched in December 2021, aim to connect stakeholders to enhance public services.

Additionally, the Strategy for the Development of Artificial Intelligence (2020-2025) seeks to leverage AI for economic growth, especially in agriculture and industry, showcasing Serbia's commitment to smart city transformation. A publication titled "Smart Cities of Serbia" Innovation and Resilience of Local Communities in Serbia" (2021) examines the concept of Smart Cities, highlighting its significance beyond just technological advancements in tackling urban issues and fostering sustainable development. It describes smart cities as collaborative environments where various stakeholders work together to achieve economic, social, and environmental sustainability.

The COVID-19 pandemic underscored the vulnerabilities faced by cities, illustrating how health threats intensified pre-existing territorial and social disparities. Despite this, the crisis accelerated the integration of digital technologies into urban living. Emerging challenges led to improvements in digital infrastructure, incorporating measures such as social distancing into the Smart City model. Engaging citizens is vital for creating smart communities, which requires initiatives like open data access, interactive mapping, and proactive communication from local authorities to build trust and participation.

As various reports indicate, several measures must be undertaken to help Serbia's smart city initiatives thrive. A key step

involves enhancing smart management practices and expanding initiatives in this area. Both at the national and local level, governments will need to foster a stronger relationship with the public and actively involve them in implementing significant projects.

Educating the community about the significance of smart cities also remains an unfulfilled task, as there is still a lack of enthusiasm towards these concepts among the populace.

Our third example is Kosovo, whose attempted secession from Serbia is unrecognized by Azerbaijan, together with around half of other UN member states (including, obviously, Serbia itself). Still, its local authorities, have sought to take a few strides in the direction of establishing the basis for incorporating the smart city concept in their urban planning endeavors.

Launched in September 2020 and overseen by the University for Business and Technology (UBT), a project that aims to prepare a Kosovo-wide strategy for "smart and sustainable urban development" as well as prepare smart city strategies for seven cities scattered across the territory was launched. It consists of a mapping study that provides an inventory of smart city innovations and tools currently implemented, initiated, or planned by local self-government units in Kosovo. It also examines how the COVID-19 pandemic has influenced the attention and development of these smart city solutions. Problems that were uncovered by those survey during the project include budget constraints (27.1 percent), a lack of technical expertise (12.5 percent), the necessity for a long-term plan (12.5 percent), inadequate supporting infrastructure (10.4 percent), and insufficient internal capacities (6.3 percent).

However, besides investing in technological infrastructure and funding, there should be a focus on enhancing workforce skills. It is important to train officials in the relevant procedures and policies associated with new initiatives to ensure they have the skills to manage these systems effectively. Another significant drawback is the lack of cooperation among municipalities, which is essential for sharing experiences and lessons learned in smart city initiatives.

Lessons and Challenges

A primary challenge identified from the Western Balkan examples is the financial constraints they encountered, a factor that Azerbaijan must also consider in its future planning. Financial resources can be generated without solely relying on the government budget—i.e., they can be supplemented through international donors, including through the engagement of multilateral organizations like the World Bank and UNDP. Also, fostering public-private partnerships is essential to attract international and local investors to the Karabakh region. Diverse funding strategies are critical for revitalizing and modernizing urban and rural areas in post-conflict zones, ensuring a sustainable and effective reconstruction process in Karabakh.

Data reliability is essential for effectively planning and implementing smart city initiatives in various regions.

Data reliability is essential for effectively planning and implementing smart city initiatives in various regions. Upcoming research should concentrate on collecting high-quality data that reflects the unique context of Karabakh, including socio-economic metrics, the region's geographic features, and ongoing reconstruction and community enhancement projects tailored to these conditions. Such comprehensive information will enable more precise assessments and facilitate better decision-making, ultimately streamlining the implementation process.

Transforming a city into a smarter one starts with recognizing the needs and aspirations of its residents, as well as discovering creative solutions and concepts that can help meet those needs. Therefore, engaging local communities in both the planning and execution stages is vital for the success of smart city initiatives.

Since 2013, the Friedrich Naumann Foundation for Freedom has focused on promoting the smart city concept in the Western Balkans, especially at the local government level. Their mapping studies have been crucial in sharing experiences across the region, which emphasizes practical communication, discussion, and implementation of empirical data through initiatives that include educational programs, cross-border/boundary networking, and dialogue.

Parts of this model could apply to Karabakh: focusing on the local level and strengthening connections to educational institutions, for instance. Also, local population involvement in developing the "smart city" concept, which can foster a sense of ownership and collaboration while enhancing their understanding of technology-related issues.

This approach boosts the relevance and effectiveness of smart city projects and their sustainability. By examining regional successes and conducting further research to address data gaps and specific needs, Karabakh can tackle these challenges and pioneer smart city development in the diverse landscape of this postwar region. BD

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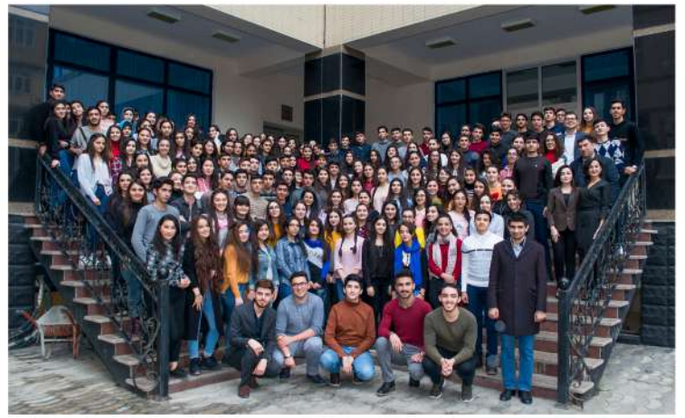

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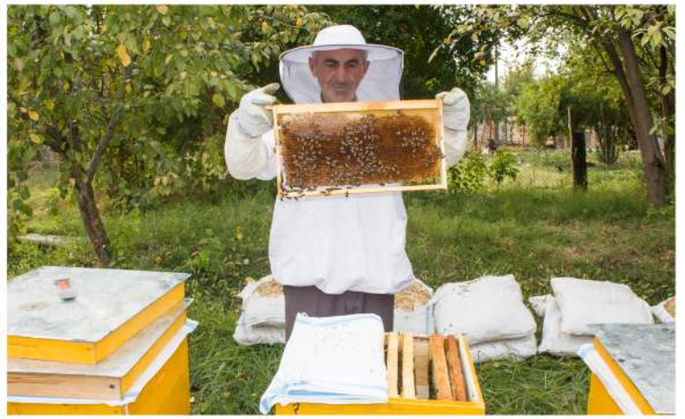

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Cities and Climate

The Future of the Future

Nicolas J.A. Buchoud

The present paper is intended to serve as a background document for the World Urban Forum that will take place in Cairo in November 2024 under the slogan, "Cities and Climate: The Future of the Future."

It is important to learn from the historical foundations of contemporary urban imaginaries and trends. This essay explores some of these as they crystallized during the 1960s and early 1970s, alongside the emergence of planetary or "world systems" understanding. *There is much to learn from the context and impact of futurologist studies produced decades ago, particularly those that looked to the then-distant year 2000. A better understanding of this history is useful to have in mind in the context of envisioning future urban policymaking options, a few of which which will be examined in light of recent events and trends.*

We should also keep in mind that parts of the contemporary Middle East have become cradles of a renewed global momentum for foresight and futurology. This is perhaps best illustrated by the slogan of the 2030 World Expo to be hosted by Saudi-Arabia, "The Era of Change, Together for a Foresighted Tomorrow," and by the fact that high-impact and future-oriented research initiatives and institutions are flourishing in the UAE.

From that perspective, Baku, which will not only host COP29 later this year, but also the World Urban Forum in 2026, provides the ground for an inspiring tale of climate, energy, and urbanization *transformation.*

***Nicolas J.A. Buchoud** is Senior Advisor to the Dean and CEO of the Asian Development Bank Institute (ADBI), founding Co-Editor of* Intersecting*, Co-Chairman of the BRICS Future Urban Forum, and Associate Professor at the Vysokovsky Graduate School of Urbanism of HSE University. The views expressed in this essay are his own.*

From Vancouver to Vancouver

As we entered the third millennium, global demographic statistics compiled by the United Nations confirmed that more and more people in the world were becoming urban dwellers, based on forecasts initially developed in the early 1970s. In response, the first World Urban Forum was convened in Nairobi in 2002—a decade after the Rio Earth Summit—"to promote a merger of the Urban Environment Forum and the International Forum on Urban Poverty," with a view to "strengthening the coordination of international support to the implementation of the Habitat Agenda."

About 70 percent of the world's population is expected to live in urban areas by 2050, as compared to about 57 percent in 2023.

In fact, the acknowledgment of a world that was turning more "urban" than "rural" was gradual. UN Secretary-General Kofi Annan underlined that "rapid urbanization is fast becoming one of the major challenges facing the international community" at the second World Urban Forum in Barcelona in 2004, but it was only at the third Forum in Vancouver in 2006 that "coming to terms with the urban age" really became a striking issue.

The comparison between the state of the world in 2006 with that of 1976, at the time of the Habitat I summit—also held in Vancouver—made a profound impression on the more than 10,000 participants of the 2006 World Urban Forum, which had nearly ten times more participants than the one in Nairobi held only four years earlier. What sparked an even louder global echo was that it forecasted that the "urban population of developing countries would double from 2 to 4 billion in the next 30 years." The assessment of the historic move away from a "rural" to an "urban" planet was accompanied with several operational recommendations, such as the one to "reinvent urban planning." More significant still was that the Vancouver World Urban Forum displayed a strong impression that the North-South divide on urban issues was no longer evident.

The 2006 Vancouver World Urban Forum became a landmark in the recent history of urbanization, as it boosted the development

and connectivity of multiple professionals, scholars, the private sector, and local government networks. This altogether reflected a new, future-oriented vision of development, with urbanization described as a powerful pattern of transformation bearing huge economic and social potential.

That Forum also contributed to the rapid and widespread dissemination of a vision of a world in which cities would become a defining factor of tomorrow. Such a turn was also made possible by the rapid development of the use of smartphones, the emergence of digital social networks, and the exponential development of digital technologies.

Whereas a handful of papers were published internationally regarding the topic of digital communication and information and urban development in the mid-1990s, this started to change by 2008-2009. By then, the number of articles dealing with the issues of smart cities had multiplied by a factor of 2,000. The production of research literature about "sustainable urban development" faced a similar pattern, although not to the same extent as for "smart cities." In fact, half of global research output on cities in the past years has focused on "smart cities," while only a small share has focused on "resilience" and "knowledge" issues. Such an abundant production was disrupted by the outbreak of the COVID-19 pandemic in 2020.

New Intersections

In many (but not all) parts of the world, the management of the COVID-19 pandemic resulted in law-enforced lockdowns lasting several weeks and even several months. The result was suddenly-emptied urban landscapes, emptied streets and highways, emptied railway stations and airports, and uncongested waterways located near major ports, as cargo shipping also faced a steep decline.

The image of a world of interconnected infrastructure and urban systems unfit to manage a pandemic, but which contributed to deepened pandemic risks and their impacts, did not last long, however. As the world started to recover, the pandemic showed that there may be numerous different ways to respond to the forecasts of a planet where about 70 percent of the population is expected to live in urban areas by 2050—as compared with about 57 percent in 2023. In other words, even if the baseline of 2,5 billion more people living in cities by 2050 as announced before COVID-19 still seems accurate today, there may well be more than one kind of urban future waiting for us over the horizon.

Urban issues emerged at the turn of the 1970s as intrinsically linked with the development of "future studies," complex system analysis, and as a matter of deep scientific and cultural cooperation beyond geopolitical and geoeconomic divides.

That cities have long captured the human imagination is really nothing new, as was nicely exposed by the late French historian Jacques le Goff back in the mid-1990s in an original, well-illustrated essay. Yet, since the beginning of the millennium, Hollywood movies and Western-produced video games have forged powerful images of cities that, intricated within the context of widespread urbanization described above, have left little space for the expression of urban imaginaries.

However, the recent emergence and recognition of more diverse imaginaries in Western countries through such trends described as "Afrofuturism" or "Arabofuturs" reflect the growing role of diasporas as cradles of intense creativity and ways to explore new identities at the intersections between multiple artforms. In the past thirty years, Afrofuturism has developed at the junction of pop-culture and cyberculture, but also music (jazz), painting, and other arts, including science fiction authors and moviemakers. It became one of the most successful exhibitions at the National Museum of African Culture and History in Washington DC in 2023-24. "Arabofuturs"—an exhibition at the Institut du Monde Arabe held in Paris in 2024—similarly explores imaginaries and science fiction universes with a strong urban focus.

Both exhibitions also illustrate a wider phenomenon, which is the revival of foresight and futurology as ways to look at and build the future. This phenomenon has expanded in the past decade. For instance, UNESCO established a "Future Literacy" initiative in 2012, which now counts over 110 designated "laboratories" in 44 countries, while "Chairs in Futures Literacy, Future Studies, and Anticipation" have been established in over 30 countries across the globe. Similarly, the Islamic World Educational, Scientific and Cultural Organization (ISESCO), which counts over 50 countries as members, has

been actively promoting "future studies" through international conferences and the creation of Chairs, such as the "Chair for Innovation and Futures in Africa" established in 2023.

The recent revival of future-oriented studies and of the future as a self-standing matter of interest in the spheres of art and culture echo what happened in the mid-1960s and early 1970s. This was a time boiling over with rich debates and numerous initiatives to understand and predict the future. It emerged out of a combination of multiple disciplines and the extensive use of mathematics and statistics to build transformation scenarios.

While the notion of futurology was coined in the early 1940s and "think factories" and "think tanks" started to develop out of North America during the 1950s, by the late 1960s more than 600 such organizations in the United States, more than 300 across Europe, and several in the USSR were actively working on establishing future scenarios. Notably, the International Institute for Applied Systems Analysis (IIASA) was created in 1972 in London and installed in Vienna to "work together on problems other military and space matters."

In 1970, the World Expo was held in Osaka—the first time ever in Asia. It was not only successful in terms of attendance, with over 64 million visitors. Prior to the start of the Expo (it was held under the slogan "Harmony and Progress for Humanity"), a Thinking the Expo study group was formed in 1964 by an anthropologist, a communication scholar, and media theorist. Its members studied the organization and outputs of the various Expos organized since the end of World War II, traveled extensively (including to Latin America), and took care to include developing Asia and Africa in the project. This group gave birth to a Future Studies Research Group in 1966. In 1968, it expanded into the Japanese Association for Future Studies, which hosted the famed second International Futures Research Conference in Kyoto in April 1970.

The Thinking the Expo study group emerged as a point of convergence about the development of new concepts of the future in the context of the overlapping discourses of "future studies," comparative cultural studies, media theory and the information society, and architecture and urban planning. Back then, the *Japanese Journal of Architecture and Building Science* described the Expo site as "a model for the city of the future" while the famed architecture critic Noboru Kawazoe explained that the Japan Expo "was not only about the search for Japan's future but has a broader significance in the history of civilization."

Hence, urban issues emerged at the turn of the 1970s as intrinsically linked with the development of "future studies" at the junction of complex system analysis, at the intersection of multiple disciplines and practices, and as a matter of deep scientific and cultural cooperation beyond geopolitical divides and the confrontation between liberal and planned economic systems. The development of digital computerizing capabilities and the development of the information society was strongly featured during the Osaka Expo; it also played a great role in the early-stage acknowledgment of urbanization as an issue of transnational significance.

The 1970 Osaka Expo and International Future Research Conference (held in Kyoto in the same year) largely contributed to boosting the development and recognition of the Mankind 2000 project. This last was initiated in the mid-1960s out of an International Conference on Disarmament and Peace and gave birth to the international project of the Encyclopedia of World Problems and Human Potential, alongside the creation of the World Future Studies Federation.

Following a similar pattern, Aurelio Peccei, a former top manager at the FIAT automobile company and a founder of Olivetti IT company, convened a group of academics, scientists, planners, diplomats, and other thinkers at the Academia dei Lincei in Rome in 1968. To accompany the creation of this Club of Rome, the principal scientist and director of planning at the System Development Corporation, a pioneering software development company and a military research group based in Santa Monica, Dr. Hasan Özbekhan, wrote a paper entitled the "Predicament of Mankind," which gave its name to the cornerstone research project of the Club of Rome.

The group agreed to promote the development of mathematical models of complex systems to evaluate long-term future trends, and finally used existing modeling of systems dynamics developed at MIT. There, a young team of researchers interpreted them and published the results in a book titled *The Limits to Growth* (1972)—the book became so influential that its fiftieth anniversary was celebrated in conferences around the world, especially

in Japan. Demographics were centerpiece in the report, alongside with the notions of systems and ecosystems forecasts.

The book examined the five basic factors that determine and, in their interactions, ultimately limit growth on this planet, the first of which was population increase (the others were agricultural production, nonrenewable resource depletion, industrial output, and pollution generation). Unsurprisingly (from today's perspective—then, it was revolutionary), cities and urban challenges are referenced.

Infrastructure for the Future

The development of "complex systems" and "world systems" analysis nearly half a century ago is a precious but consistently undervalued source of information and inspiration regarding contemporary urbanization and the related quest for sustainability and climate neutrality.

One of the main exceptions to this assessment took place at the Vancouver 2008 World Urban Forum, which celebrated the thirtieth anniversary of the Vancouver 1976 Habitat I Summit. The Habitat I Summit was established to address the urgency of global human settlement issues through the "formation of an agreed global course of action" and was, at the time, the largest UN conference ever held (it was also the first to use large-scale video-based communication methods).

There are plenty of linkages between the development of forward-thinking, future-oriented research, including ecosystems and human settlements, and the milestone UN urban summits of 1972 and 1976, alongside the connections between the World Expos and the role and composition of "future-looking" societies and research. Taking a closer look at these linkages is all the greater given that futurology during the late 1960s and the early 1970s was also deeply inspired by attempts to build global peace and overcome East-West divides to meet what was coming to be seen as common environmental challenges.

Comparing 50 years ago with today's time characterized by mounting geopolitical uncertainty provides a stimulating benchmark that is even more necessary and relevant in light of the recently concluded UN Summit of the Future, the outcome document of which, titled "Pact for the Future," was defined by the UN Information Service as "groundbreaking."

To many, the era of rather unequivocal globalization that opened about 30 years ago—i.e., in the early 1990s after the end of the Cold War—seems to face a serious downturn. At the same time, evidence provided by the Intergovernmental Panel on Climate Change (IPCC) indicates that mankind and its related activities in the past decades have triggered systems changes and alterations on land, at sea, and in the air. These changes and alterations to our natural environment are outpacing the scenarios from the various future-oriented reports published in the 1970s.

Forecasts about global warming tend to show that the 1.5-degree elevation of average air-surface temperature around the globe—a limit poised by the Paris Agreement at the Climate COP21 in Paris in 2015—was going to be surpassed, as evidenced by the reassessment provided at COP28 in Dubai last year. Recent assessments of biodiversity losses also show these have been accelerating rather dramatically, according to the International Panel on Biodiversity and Ecosystem Services (IPBES).

On the one hand, the affirmation of the "century of the city," the development of global urbanization trends, and interconnected networks of physical, digital, and financial infrastructure give an overall very positive and largely undisputed tone to the historic turn from a predominantly "rural" to an "urban" world. The positive virtues of urbanization were widely celebrated from the Vancouver World Urban Forum (2006) to the World Expo of Shanghai (2010).

On the other hand, a series of initiatives stemming from geoscience and a revival of system analysis started to push forward a new series of Earth System paradigms, aiming to provide renewed quantifications to determine the parameters of what the Stockholm Environmental Institute called a "safe operating space for humanity." The team that popularized the foregoing concept at the end of the 2000s has claimed that "new challenges required new thinking on global sustainability," yet it largely ignored the global impacts of urbanization—and vice-versa.

The Shanghai World Expo celebrated three decades of unmatched material development in China, driven by the growth of interconnected cities and metro-areas. Presented as world-class and exemplary, the China growth and urban development model was meant to provide a model of development the world over.

While the English slogan of the Expo promoted "Better Cities, Better Life," the Chinese version more simply stated that 'Cities Make Life Better,' which provides a slightly more unambiguous meaning. Back then, a Chinese physician from 1910 became famous all over the country as his novel *New China* featured a "phantasmagoric city of underground transportation tunnels, electric lights, and elevated bridges across the Huangpu River." Hence, the mega event, which attracted even more visitors than the Osaka Expo in 1970, did not leave much room for a critical assessment of the negative spillover of urbanization and related infrastructure. It was also a missed opportunity to promote a convergence between geoscience and urbanization, which was only brought into light nearly a decade later.

In 2016, preparations for the Habitat III Summit in Quito raised hopes for a more comprehensive global understanding of the impacts of urbanization and ways to forge stronger public policy tools. The German Advisory Council on Global Change edited a significant flagship report on the transformative power of cities for the occasion, but then publicly regretted the lack of any tangible results of the Habitat III Summit and the weakness of the designated New Urban Agenda adopted at that time.

The Germans (and everyone else) had to wait for 2018-2019, when an IPCC-sponsored conference on urban and climate science in Edmonton and an independent group of scientists appointed by the UN Secretary-General led the effort to recognize that urbanization was among the world's key transformative "megatrends." However, according to a global group of academics and policy analysts, even if "research has recognized the complexity of city-driven dynamics, […] our political realities have yet to catch up." As the same group put it, the "worldwide impact of urban growth upon all Earth systems is still not well recognized by the international policy community."

We still have a long way to go before urban issues are placed front and center on the desks of world leaders.

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Common Crisis, Common Future?

One long decade after the peak of "future" debates and initiatives in the 1960s, the World Commission on Environment and Development edited a report titled *Our Common Future* in 1987, just as the first hints of the end of the Cold War were beginning to be garnered by a few. This report called for "new approaches to environment and development" and introduced the concepts of "sustainable development" and "sustainable world economy" to a wider audience.

Today, the disarray of the UN's 2030 Agenda for Sustainable Development, whose centerpiece is the 17 Sustainable Development Goals, is plain to see: no country is on track to achieve the SDGs by the 2030 deadline. Another level of cross-sectoral and forward-thinking cooperation was called for, hence the aforementioned "Pact for the Future," which includes as annexes a "Global Digital Compact" and a "Declaration on Future Generations." Although no one called it that, this was effectually an attempted reset or do-over—another way to address intertwined economic, social, and environmental crises, including rising inequalities. Yet, the Pact's preparation process had been slow and a consensus was quite hard to build. Moreover, the Pact's language and underlying discursive logic largely ignore urban issues (the term "cities" is found only once in the 66-page document).

The outcome document of the recent UN Summit of the Future largely ignore urban issues (the term "cities" is found only once in the 66-page document).

What if the present-day fragilities of the 2030 Agenda (its slogan, lest we forget, is still "Transforming our Wor4ld") are due to the wrong assumption that the end of the East/West divide at the end of the Cold War would create a strong-enough momentum to turn "sustainability" into a universal, homogeneous, and future-proof rallying point for the world?

In other words, what if "sustainability" was so fully embedded in the macroeconomics of the post-1990s globalization—including the past three decades of intense urbanization—that it would be dependent on globalization, and not vice-versa?

Has this caused what software engineers refer to as a fatal error?

In the beginning of the 1980s, the Independent Commission on International Development Issues, which was chaired by former West German chancellor Willy Brandt, had already emphasized the existence of a "common crisis." It focused on the pervasive and historic North-South imbalance as a threat to long-term planetary livability. And in 2002, a report from the Brandt21 Forum further argued that "globalization cannot be our future, for it imposes growth without uplifting humanity."

Making use of futurology might help us avoid simplistic approaches to overcoming existing forms of globalization and, instead, instill thinking and policymaking that goes beyond them. The need for creative and long-term visions and scenarios echoes the complexity of moving away from hydrocarbon-powered economies, as we were all reminded at COP28. It should therefore be no surprise that all major powers worldwide are developing scientific, research, and political ties with the UAE and Saudi Arabia, which only reinforces what now amounts to the pivotal role those two GCC states play in multiple geopolitical spheres—alongside their appetite for forecasting the future(s).

In addition to all this, the reference to future-oriented studies brings into light inspiring connections between people and ideas. There was not such a great distance between the founders of the Pugwash Conferences on Science and World Affairs (it emerged out of the 1955 Russel-Einstein Manifesto), the development of "think factories" and "think tanks," the establishment of the World Future Federation, the life and work of Ossip Flechtheim, one of the inventors of futurology, a philosopher such as Edmund Husserl, and a prolific writer such as Issac Asimov—to name just a few.

Consider that futurology has never been turned into a fully-fledged social science and that it remains an unconsolidated epistemological field, which means that new concepts and broad intellectual alliances and connections can emerge. This offers the world a chance to reimagine the future or, in other words, to promote synergistic, life-oriented, urban-centered models for the liberation of the future. BD

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