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Review Article

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Impacts of International Climate Agreements on Urban Life: The Case of Beylikdüzü District

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Abstract

In recent times, extraordinary weather events occurring around the world have frequently brought climate change to the forefront. The environmental, social, and economic problems caused by climate change are becoming increasingly evident each day. In order to cope with these issues, humanity is developing strategies both on an individual and organizational level. Developed countries, in particular, are making serious efforts to reduce carbon emissions and promote renewable energy. International efforts such as the Paris Agreement, the Kyoto Protocol, and the United Nations Framework Convention on Climate Change aim to address this struggle on a global scale.

Unfortunately, global economic competition continues to drive an increase in greenhouse gas emissions. Often, due to this economic rivalry, many countries either do not become parties to these emission reduction agreements or fail to implement them even if they do. Although international and local non-governmental organizations exert pressure to reduce carbon emissions and expand the use of renewable energy, not much progress has been made so far. However, the growing global awareness of climate change, along with demonstrations, political pressure, and public sensitivity in many countries, offers hope for the future.

The recent efforts by local governments in response to the demands of local communities and non-governmental organizations regarding carbon emissions and renewable energy are promising.

Keywords Climate Agreements · Urban Impact · Sustainability · Beylikdüzü

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Introduction

The fight against climate change takes place across a broad spectrum, starting from individual efforts and extending to international agreements. One of the most important components of this struggle is local governments.

The initiatives carried out in Beylikdüzü, a district of the Istanbul metropolitan area located in the northwestern part of Turkey, are among the most notable examples of this effort. As of the end of 2024, the district has a population of 415,290 (TUIK, 2025). It also has a high level of education. Observations indicate that the local population is highly sensitive to issues such as climate change, air pollution, and renewable energy. In recent years, Beylikdüzü has experienced not only rapid population growth but also a swift process of urbanization. This has led to significant changes in infrastructure, transportation, industry, and green spaces.

During this process, important steps have been taken by the Beylikdüzü Municipality in response to the demands of the local population, focusing on reducing greenhouse gas emissions, promoting the use of renewable energy, and preserving the ecological balance.

The expansion of green spaces, improvements in public transportation, the development of bicycle lanes, and the construction of smart buildings that prioritize energy efficiency have contributed to reducing emissions and enhancing the overall livability of the district. This study examines the efforts made by the local government unit, Beylikdüzü Municipality, from past to present to mitigate the negative impacts of climate change. Additionally, a SWOT analysis is conducted to shed light on what could be done in the future."

Transportation

Beylikdüzü, located on the western side of Istanbul, lies on routes connecting Asia and Europe. Therefore, it holds a strategic position. As one of Istanbul's newly established districts, it generally has a modern urban appearance. Its wide vehicle roads, bicycle lanes, and broad sidewalks are the first noticeable features.

Priority has been given to expanding public transportation in the district. The metrobus passing through the northern part of the district and the extensive bus network are prominent. Additionally, the 24,441-meter-long bicycle paths integrated with main roads have reduced dependence on private vehicles. Special attention has been paid to connecting bicycle paths to main transportation hubs, parks, and public transportation lines from the city center, aiming to encourage bicycle use.

Efforts are being made to reduce fossil fuel consumption. Carbon emissions from vehicles are one of the main causes of environmental degradation in the district. Beylikdüzü has been one of the districts with the best air quality in Istanbul from past to present. During the Ottoman Empire, an asthma hospital was built in this area because of its very clean air (Uzun & Kaya, 2012). Increasing the use of electric vehicles to preserve this air quality will further reduce carbon emissions. For this reason, the widespread adoption of electric vehicles is being encouraged in the district (CSB, 2022).

Green Areas

Although Beylikdüzü is one of the smallest districts of Istanbul in terms of land area, it has one of the highest proportions of green space. Thanks to its geographical location, favorable climate, 12.4-kilometer coastline, and an average elevation of 70 meters, Beylikdüzü has historically been an attractive area for settlement due to its suitable topography. However, increasing urbanization over time has begun to threaten these natural advantages. In response, the Beylikdüzü Municipality has recently launched large-scale green infrastructure projects aimed at enhancing environmental sustainability. These projects not only aim to restore ecological balance but also seek to improve the district's social and economic fabric. To date, a total of 4,354,009 square meters of green space have been allocated and 236 new parks have been established, reflecting a strong commitment to sustainable urban development (Beylikdüzü Belediyesi, 2023).

One of the most significant green space initiatives in Beylikdüzü is the Life Valley Project, which has become a model across the country. This project stands as a tangible example of the district's efforts to enhance environmental sustainability and quality of life. Spanning an area of 1,215,000 square meters and consisting of six phases, Life Valley aims to counter urban sprawl and provide residents with a living environment in harmony with nature. As green spaces continue to diminish due to rapidly increasing urbanization in Istanbul, Life Valley offers Beylikdüzü residents a place to reconnect with nature. In addition to its natural beauty, the project includes facilities for sports, walking trails, bicycle paths, children's playgrounds, and open-air activity areas, enabling a wide range of social, cultural, and athletic activities. Furthermore, social venues such as an amphitheater host cultural events and open-air concerts, promoting community engagement and well-being.

Life Valley also stands out for its environmentally friendly design. To ensure environmental sustainability, the project incorporates natural waterways, efficient irrigation systems, and recyclable materials. Bicycle and pedestrian paths are

an integral part of Life Valley's design. These paths not only provide access to different parts of the valley but also meet the growing demand for sustainable transportation in the district. Moreover, the extension of these paths beyond the valley into the urban area helps expand the transportation network and contributes to creating a greener urban environment by reducing dependence on fossil fuels and lowering greenhouse gas emissions(Okuş et al, 2007; Gazioğlu, 2013) .

One of the most notable shortcomings observed is the absence of rainwater harvesting systems and solar panels. Integrating these into the valley would promote both water and energy conservation and further contribute to sustainability. Additionally, Life Valley supports biodiversity by accommodating various plant species, revitalizing natural habitats, and strengthening the city's ecological balance.

Energy Efficiency

In addition to reducing greenhouse gas emissions, the district municipality is also working on decreasing the use of fossil fuels. Improving the energy efficiency of existing buildings through thermal insulation plays a significant role in reducing the carbon footprint.

Furthermore, as a result of joint efforts with the electricity authority, the modernization of power grids has been carried out and smart energy systems have been implemented. In most parts of the district, solar-powered street lighting has been installed. The municipality aims to foster a culture of sustainability and innovation by promoting cross-sector collaboration.

Water Management and Infrastructure

It has been observed that efforts regarding the proper use of water resources in Beylikdüzü are insufficient. More effective work should be carried out on topics such as greywater systems (recycling water from sinks, showers, and laundry), rainwater harvesting, and water reuse. Rainwater harvesting systems can store precipitation to meet non-potable needs such as irrigation and industrial use. Expanding these systems in Beylikdüzü is of great importance for sustainable water management and water security.

Old drainage systems in Beylikdüzü have been modernized and their capacities increased, thereby establishing a healthy infrastructure system. Improving the infrastructure has ensured efficient drainage of rainwater and minimized water accumulation, flood, and landslide risks in sensitive areas. Additionally, constructing systems such as water storage ponds and retention basins could allow temporary storage of excess water during heavy rainfall periods.

Groundwater management is equally important in Beylikdüzü for water use efficiency and environmental sustainability. High groundwater levels in the region pose serious risks such as landslides and soil liquefaction, especially in areas with unstable ground structures. To reduce these risks and ensure effective use of water resources, a sustainable groundwater management strategy is necessary.

Social and Economic Impacts

Beylikdüzü has a socio-economically diverse population that includes different income groups as well as a high level of education. This diversity affects the various groups living in the area at different levels. Individuals living particularly in low-income neighborhoods are disproportionately affected by the challenges or opportunities arising from climate policies. To address these inequalities, municipalities can implement various incentive policies. To address these inequalities, municipalities should implement various incentive policies. Providing incentives to promote the widespread use of renewable energy can improve the quality of life for disadvantaged groups.

As a rapidly growing commercial center, Beylikdüzü has the potential to create new employment opportunities through the transition to a green economy. In this regard, initiatives such as BEYKAM (Beylikdüzü Investment and Development Center), established by the Beylikdüzü Municipality, serve as a communication bridge between the local community and industry, contributing to the creation of new job opportunities. Emerging sectors like green energy, sustainable construction, and energy efficiency are opening new employment fields. In particular, the growth of the renewable energy sector offers an important opportunity for strengthening the local economy. Vocational training and certification programs implemented during this transition process will contribute to broader social and economic transformations.

In Beylikdüzü, the social and economic impacts of climate agreements are actively managed through the local municipality's engagement in line with the principles of sustainable development. By adopting innovative policies that promote environmental sustainability while also enhancing the economic well-being of the local population, local governments can make Beylikdüzü a model for balanced and inclusive growth

Social Awareness and Education

Beylikdüzü Municipality organizes various educational programs and public awareness projects to increase social awareness about climate change and environmental sustainability, and continues its efforts in this area

systematically. These activities, carried out by local authorities and non-governmental organizations, aim to inform the public about the local and global impacts of climate change, encourage environmentally conscious behaviors, and promote sustainable lifestyles. In this context, the education and awareness efforts in Beylikdüzü not only raise the community's sensitivity to environmental issues but also actively encourage individuals and communities to participate in climate action and adopt eco-friendly habits.

Firstly, educational programs organized by various institutions and organizations in Beylikdüzü aim to address knowledge gaps about climate change and guide the local population towards environmentally friendly practices. These training initiatives, usually held in spaces with high social interaction such as municipal conference halls, schools, universities, and civil society associations, cover topics including climate change, carbon emissions, energy efficiency, waste management, and natural resource conservation. Through these programs, the goal is to increase social responsibility on climate change and environmental sustainability and to encourage individuals to make environmentally friendly choices in their daily lives.

Various workshops, seminars, and conferences organized facilitate the public's development of eco-friendly practices and their transition to sustainable lifestyles. Various public projects aimed at raising environmental awareness are also carried out in the district. These projects, implemented through local media and civil society organizations, aim to reach a broad audience to promote eco-friendly behaviors. Informative campaigns are organized on topics such as recycling, energy saving, water consumption reduction, and the protection of green spaces, conveying messages encouraging the public to adopt these environmentally friendly habits (kaya et al. 2006).

In addition to visual and interactive information efforts conducted on streets, parks, and public spaces, raising environmental awareness through social media is also targeted. These projects not only aim to inform individuals but also to foster a culture of sustainability across the community and make environmental responsibility a collective behavior.

Conclusion

The rapid urbanization and strategic location of Beylikdüzü serve as an important example of how cities can balance growth with environmental sustainability. By adopting policies that prioritize energy efficiency, sustainable transportation, green infrastructure, and resilient urban planning, Beylikdüzü not only addresses local environmental challenges but also contributes to global efforts to combat climate change.

Initiatives implemented in the district, such as the Life Valley project, the expansion of green spaces, and the modernization of transportation systems, demonstrate a strong commitment to creating a sustainable and livable urban environment. Furthermore, Beylikdüzü's focus on social justice and community participation ensures that climate actions are equitably distributed across all segments of society, enhancing both inclusivity and resilience. Policies aligned with climate agreements can lead to positive transformations not only in environmental sustainability but also in the city's economic, social, and cultural structures.

Implementing such policies in Beylikdüzü will reduce the city's environmental footprint while also bringing significant improvements to the quality of life of its residents. Especially increasing green areas, improving air quality, and investing in energy efficiency will provide direct environmental and health benefits to urban dwellers.

For sustainable success in addressing climate change, Beylikdüzü Municipality must continue to develop innovative solutions, collaborate with stakeholders, and invest in advanced technologies. Strengthening public awareness and education programs is crucial to fostering a culture of environmental responsibility and promoting sustainable behaviors. Additionally, access to international funds and green investment programs can help provide the financial resources necessary to scale these initiatives. To ensure active participation of the local community in the process, regular information meetings, workshops, and pilot projects should be organized (Bakan, 2022; Çetin & Demir, 2021; Demirtaş, 2020).

In conclusion, Beylikdüzü's efforts to implement climate agreements at the local level serve as a model for other rapidly urbanizing cities. Prioritizing sustainability, resilience, and inclusivity, Beylikdüzü Municipality should not only aim to improve the quality of life of its own residents but also contribute to the global fight against climate change. Beylikdüzü must strengthen its leadership in sustainable urban development. The steps taken under the guidance of climate agreements will help solve current environmental problems and create a more livable city for future generations.

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