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## Control and orientation of urbanization of cities in developing countries: a case study of Kinshasa, Democratic Republic of the Congo

### ABSTRACT

Urbanization is key to the development of a city. It is part of the Sustainable Development Goals. Developing countries are called upon to modernize and build urban infrastructure. There are several problems in developing countries: undirected and uncontrolled urbanization. This has several consequences, including the proliferation of slums, uncontrolled construction, erosion, flooding, and an increase in the crime rate. It is possible to combat these consequences and mitigate their effects by implementing solid urban planning that takes into account subdivision plans, the reinforcement of embankments, the expansion of the urban area, the construction of infrastructure, and their diversification.

### ARTICLE HISTORY

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### KEYWORDS

Developing countries;  
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Urbanization is one of the pillars of development and is defined as a spatial and temporal process of city development that takes into account the concentration of the population (Anne-Lise & Antoine, 2017). It is now accepted that 56% of the world's population, or 4.4 billion inhabitants, live in cities. This number is growing rapidly, with forecasts showing a trend of doubling the current number in 2050 (World Bank, 2023b).

In order to achieve their goals, developing countries are called upon to implement the Sustainable Development Goals (SDGs) (World Bank, 2013). These objectives emphasize the importance of the construction and renovation of infrastructure, but this construction must be controlled to avoid the growth of slums and crime.

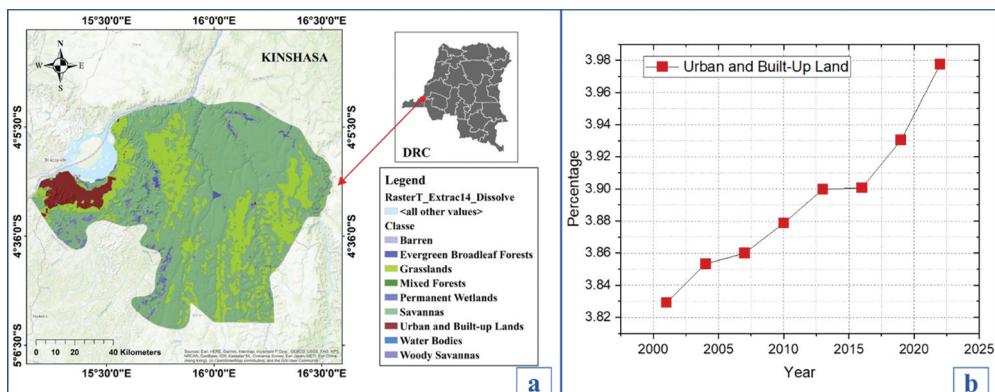
Urbanization is an important factor in reducing poverty, which is the number one objective for sustainable development (UN, 2023). This objective highlights economic growth, job creation, and the reduction of inequalities.

The city of Kinshasa is considered a megalopolis, and its population is growing rapidly. It multiplied sevenfold from 2005 to 2009 (United Nations Development Programme, 2009) and shows urban growth of more than 4% per year since 2010 (UN, 2022). According to the draft National Strategic Development Plan, the population in DR Congo will increase from 133 to 191 million between 2030 and 2040 to reach 278 million in 2050 (UN, 2023). Several factors, such as war, result in rural exodus (Gillian & Karen, 2019), which increases the demand for housing, which in turn, through a ripple effect, increases the need for construction.

Unfortunately, town planning is not controlled and mastered in the city of Kinshasa. Using land use and land cover data from MCD12Q1 and the International Geosphere-

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**Figure 1.** a) land use and cover map of the city of Kinshasa in 2022. b) evolutionary curve of the urban and built-up land class from 2001 to 2022 with intervals of 3 years.

Biosphere Program classification (Damien & Mark, 2018), we note that the urban area only represents nearly 4% of the total land cover in 2022, and it is concentrated in a small locality made up of a few municipalities (Figure 1a). The urban area is in regular expansion, and the occupancy rate presents a curve that evolves from 2001 to 2022 (Figure 1b).

The lack of control over urbanization causes several effects, such as the proliferation of slums due to a housing crisis (Nzuzi, 2017), cases of crime commonly called the 'Kuluna phenomenon', uncontrolled construction, which causes cases of death during erosion, and landslides during torrential rains. It is now estimated that 2.9 million people in Central and West Africa have been displaced due to major flooding problems (United Nation Development Programme UNDP, 2023). The city of Kinshasa is crossed by several rivers, which are captured for the treatment of water intended for human consumption. The pressure on the need for housing pushes the population to build in major river beds during dry seasons. During the rainy season, water occupies the major beds while flooding the houses built there. An example case is the flooding observed between December 2023 and early January 2024 in Kinshasa caused by the rising waters of the Congo River, which overflowed far from its major bed, flooding several households in the municipality of Ngaliema. Similar cases have been recorded, caused by rising water levels in rivers crossing the urban part of the city of Kinshasa, such as the N'djili and Lukunga rivers. Other cases of flooding have been reported recently due to a problem with drains to channel runoff water to the outlet and sanitation networks blocked by plastic waste (UNDP, 2023). Another worrying problem is traffic congestion in cities. The city of Kinshasa is subject to traffic jams, which are linked to the poor quality of road infrastructure, the old planning of the city carried out during the colonial era, and poor road regulation. Other reasons include torrential rains and a lack of citizenship.

These mentioned elements can be avoided and mitigated by urbanization control and orientation plans taking into account political geography (Karen, 2000). This consists of urban planning, which takes into account laws and guidelines, and constitutes a coherent tool for public action (Caroline & Hanja-Niriana, 2007).

The government of the Democratic Republic of Congo should review the urban planning done during the colonial era. These old plans were made taking into account a small population which was estimated at more than 400,000 inhabitants in Kinshasa in 1960 with an urban growth of 8% (Wolff et al., 2002). This number rise to 12.8 million inhabitants, with population growth of 5.1% in 2022 (Statista, 2023; World Bank, 2018). It will also be necessary to build and modernize infrastructure; manage and develop rivers that flow in urban areas while respecting their protection perimeters (Amandine, 2013; Sylvain, 2017); draw up subdivision plans by identifying risk areas with uneven terrain to apply soil reinforcement processes using geotechnical methods such as the improvement and reinforcement of soils under seismic action (Association Française du Génie Parasismique AFGP, 2012); use the plant properties for sandy and clayey soils in embankment reinforcement (Noorasyikin et al., 2022); or other methods described in recent scientific work (Aaqib & Preetpal, 2023; Alexia & Anil, 2023; Nasrin et al., 2023; Zhang et al., 2019). To guide urban planning, the government should develop and implement plans for the expansion of urbanization in the least-populated municipalities. To do this, rapid means of transport will have to be put in place; build centers of attraction, financial and commercial centers to prevent the population from concentrating in city centers; solve the problem of electrical energy and access to drinking water; and strengthen the way of life of the population by building schools and hospitals. It is also important to take into account the environmental and social management plan for proper integration of urbanization. For proper implementation of these plans, the central government should share responsibilities with local administrations in charge of municipalities under the technical support of public services such as the Road Office (OR), the Roads and Drainage Office (OVD), and the Congolese Agency for Major Works (ACGT). These plans should involve the Ministry of Land Affairs through its structure (Cadastre DR Congo), which is responsible for the allocation of real estate titles.

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