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# ASSESSING PROGRESS TOWARDS URBAN PROSPERITY

11 SUSTAINABLE CITIES  
AND COMMUNITIES



An Application of the City Prosperity  
Index in the City of **Gaborone, Botswana**





# ASSESSING PROGRESS TOWARDS URBAN PROSPERITY

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Aerial view of Gaborone, Botswana © Flickr / Fekard

## Foreword

Cities as engines of economic growth have to be productive, liveable, sustainable and prosperous. This can only be propelled by good policies based on reliable, relevant and accessible data. The City Prosperity Index (CPI) tool, which is a global initiative designed to allow cities to create information and baseline data on a set of urban indicators has been applied in Gaborone to measure its performance. A prosperous city must strike a balance in the performance of all the above six CPI dimensions as they are mutually interdependent and can influence each other through various policy driven linkages. This report provides an opportunity to city leaders, planners, policy makers to empirically measure the performance of Gaborone in comparison with other cities globally.

Gaborone has moderately weak prosperity which challenges all stakeholders to strengthen and implement urban policies. The areas that are weak and need prioritization include economic agglomeration, social infrastructure, street connectivity, health, economic equity, air quality, sustainable energy and public participation.

The improvement of these will steer the city towards the attainment of the Sustainable Development Goals, particularly goal 11 – “*Make cities & human settlements inclusive, safe, resilient and sustainable*”.

I would like to acknowledge the United Nations Human Settlement Program (UN-Habitat), United Nations Economic Commission for Africa (UNECA) for their technical and financial support. A special appreciation goes to our partners in this project- Statistics Botswana, Ministry of Local Government and Rural Development, Ministry of Land Management, Water and Sanitation Services and Ministry of Finance and Economic Development. This project demonstrates the interconnectedness of urban indicators, and the need for integrated urban development. I therefore appeal for concerted effort in planning and managing our city.



A stylized handwritten signature in black ink.

**Bareng C. Malatsi**  
Acting Permanent Secretary,  
Ministry of Infrastructure & Housing  
Development.



A stylized handwritten signature in black ink.

**Lebuile Israel**  
Town Clerk, City Council



A stylized handwritten signature in black ink.

**Dr Burton Mguni**  
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## Acknowledgements

This report is a result of tireless efforts over a period of two years put together by a team of urban planners, environmentalists, engineers, social scientists, civil society, law enforcement agents, economists, cartographers and statisticians who served in the Local Project Team. This team worked diligently to collect and compute data on human settlement indicators.

This project could not have been possible without the enduring support of the UN-Habitat and the United Nations Economic Commission for Africa (UNECA) who provided technical and financial support to the team members through collaborative efforts with the Ministry of Infrastructure and Housing Development, the country project coordinators, Statistics Botswana, Ministry of Local Government and Rural Development and Ministry of Finance and Development Planning.

Special thanks to all the different Government Ministries and Departments, parastatals, academia, and civil society for their valued contributions through representatives in the Steering Committee and the Technical Working Group who gave strategic direction and technical support (Please refer to Annexure 2 for list of team members).

We specifically acknowledge the following people for their significant contribution to the report production and related data generation processes.

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## List of Abbreviations and Acronyms

<b>BDS</b>	Botswana Demographic Survey
<b>BMTHS</b>	Botswana Multi-topic Household Survey
<b>COFC</b>	City of Francistown City
<b>CPI</b>	City Prosperity Index/Initiative
<b>DHMT</b>	Department of Health Management Team
<b>DLGDP</b>	Department of Local Government & Development Planning
<b>DOH</b>	Department of Housing
<b>DTCP</b>	Department of Town & Country Planning
<b>DWMPD</b>	Department of Waste Management and Pollution Control
<b>GCC</b>	Gaborone City Council
<b>GHG</b>	Greenhouse Gas
<b>ECA</b>	Economic Commission for Africa
<b>ECE</b>	Early Childhood Education
<b>EPR</b>	Employment to Population Ratio
<b>GDP</b>	Gross Domestic Product
<b>ICT</b>	Information, Communication Technology
<b>LED</b>	Local Economic Development
<b>MFED</b>	Ministry of Finance and Economic Development
<b>MYSC</b>	Ministry of Youth, Sports and Culture Development
<b>NMES</b>	National Monitoring and Evaluation System
<b>NUA</b>	New Urban Agenda
<b>QOL</b>	Quality of Life
<b>SDG</b>	Sustainable Development Goal
<b>UN-DESA</b>	United Nations Department of Economic and Social Affairs
<b>UN-HABITAT</b>	United Nations Human Settlements Programme
<b>UNODC</b>	United Nations Office on Drugs and Crime

# Executive Summary

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## Background

The tremendous economic growth that Botswana experienced since independence was accompanied by a considerable increase of its urban population, from only 9% of the total population in 1971 to 54% in 2001 and 64% in 2017. Based on UN projections, it is expected that this share of urban population will increase to 84% by 2050, translating into 2.8 million urban dwellers in 2050, from a little more than 50,000 urban dwellers in 1971 and 1.4 million urban residents in 2017. It is evident that the increasing number of urban dwellers provides a great opportunity to achieve sustainable economic growth and development, if authorities at local and national levels have access to relevant, timely, accurate and disaggregated data to inform the design and implementation of programmes and policies in order to maximize the dispersed energies and potential of urban centres for the common good of all. Specifically, city level data is critical for informing actions and decisions that respond to the felt needs at the local level.

In many countries however, such data is often not available, which makes decision making become based on limited analysis of the overall picture/situation, often resulting in projects that address effects, as opposed to real causes of many urban problems.

## Objectives

The main objective of this study is to provide an assessment of urban development in two main cities in Botswana - Gaborone and Francistown – through data and evidence generated on various dimensions of urban prosperity, highlighting prevailing opportunities for and challenges to sustainable urban development in the country. This is part of a project titled “**SDG 11: Monitoring and reporting on human settlement indicators in Africa and Latin America**” that UN-Habitat, the Economic Commission for Africa, the Ministry of Infrastructure and Housing Development, Statistics Botswana, and the cities of Gaborone and Francistown have implemented between 2017 and 2019. The ultimate objective is to strengthen the capacities of local and national governments to monitor and report on SDG 11 and improve the availability of and access to data and statistics at city and urban national level for the formulation of evidence-based policies. This report presents findings from the application of CPI in Gaborone, against 58 indicators spread across the 6 CPI dimensions, and provides information that is useful for both understanding performance in different sectors and structuring future development programmes to respond to the prevailing needs.

***Overall, Gaborone has a moderately weak CPI, but high performances are recorded in some indicators***

## Methods

Data and evidence are generated from an adaption and application of the City Prosperity Initiative (CPI) and its related index in Gaborone, Botswana. The CPI is a platform that addresses in a single framework the environmental, social and economic components of city prosperity for the formulation, implementation and monitoring of policies and practices on sustainable development. The associated index is a composite measure used to assess the overall performance of cities in terms of urban prosperity based on six (6) key dimensions:

- a)** Productivity,
- b)** Infrastructure development,
- c)** Quality of life,
- d)** Equity and social inclusion,
- e)** Environmental sustainability and
- f)** Governance and legislation.

By 2019, CPI had been applied to evaluate urban performance in 539 cities in 54 countries from all world regions, with most of these cities using the information generated for data-driven and informed decision-making processes. Data used for the computation of the index come from various sources including administrative data, recent demographic and socio-economic surveys such as the Botswana Multi Topic Household Survey of 2017, the Botswana Demographic Survey of 2017, maps from the Department of Surveys and Mapping and the Department of Town and Country Planning, as well as spatial data from satellite imagery and other open source geospatial data platforms.

## Key Findings

Gaborone has a moderately weak basic CPI (score of 50.98), and a weak extended CPI (42.47). The best performing dimensions are the quality of life and equity and social inclusion, both of which score moderately weak in the CPI scale. On the other hand, environmental sustainability is the least performing CPI dimension, with very weak values recorded in the CPI scale (42.2 for basic CPI and 23.07 for extended CPI).

The best performing indicators in Gaborone include City Product per capita (USD), Employment to Population Ratio, Sufficient Living Area, Green area per capita, Subnational Debt and Land Use Mix.

On the other hand, the least performing indicators in Gaborone include Economic Density, Mean Household Income (USD), Average broadband speed, Gini Coefficient (reversed), PM 2.5 Concentration and Number of Public Libraries. Based on the data produced for this report, Gaborone portrays a huge level of inequality, where, in addition to the high level of inequality reported (Gini coefficient of 0.67), the city product per capita and mean household income are on opposite sides of the measurement scale.



### **Productivity:**

When only the city product per capita and old age dependency ratio are considered, Gaborone performs extremely well in the economic growth sub-index, implying that a) there are massive opportunities for production and employment creation within Gaborone, and b) the working age population has little burden in terms of providing economic support to the elderly, both of which increase the opportunities for wellbeing in the city. This coupled with solid performance of the city on the employment sub-index (80.95 in the basic CPI ranking) makes Gaborone a highly productive city and an attractive place to live.

Data on employment shows that in Gaborone, there is relatively low unemployment rate (12.4%) and a high rate of employment to population ratio (61.5).

These high performances in the productivity dimension are however curtailed by poor performances in other important aspects of productivity, which include the mean household income and economic density all of which point towards an unequal society.

***High levels of inequality, if not well checked will derail Gaborone's progress***

***Economic strength and employment offer unique opportunities for Gaborone's rapid development***



### **Infrastructure development:**

Due to its national importance as Botswana's administrative and economic capital, Gaborone has the most well-developed infrastructure systems in the country. However, while the existing systems are well developed in comparison to other cities in the country, Gaborone's performance in terms of infrastructure development is quite low against global standards, and more investments are required to make the city more productive, and if utilisation of the diversity of opportunities from within and outside Botswana will be attained.

The best performing aspects of infrastructure in Gaborone include provision of basic services such as shelter, improved water, improved sanitation, sufficient living area and access to electricity. This high performance in provision of basic services demonstrates the significance of the government's investments in these sectors over the years, which has a positive impact on the quality of life of the city's residents (Quality of life is the best performing dimension in Gaborone).

A major setback to Gaborone is little investment in the ICT sector, which has resulted in a low level of internet access (50.3%), low home computer access (29.4%) and very low average broadband speed.

The city's broadband speed is more than 42 times lesser than the global broadband internet speed of 11.03 Mbps (Atlas and Boots, 2019).

The limitations in internet speeds and access will be a major challenge for Gaborone's future development, especially if the city is to keep at par with a fast-changing world where less physical and more virtual and "smart" systems are foreseen to shape future urban economies and development trends.



### Quality of Life:

Quality of life is the best performing dimension in Gaborone, despite its overall moderately weak ranking in the CPI scale (58.88 under the basic CPI and 53.47 under the extended CPI). Education, a key pillar to a city's prosperity is the best performing sub-dimension, with a recorded literacy level of 95.8%. This high performance is a result of the government's prioritisation and investment in the education sector over the years, which has been aimed at developing local human capital and increase local skilled labour. Access to early childhood education however remains a major challenge to date (which is closely linked to high costs associated with privately owned lower education institutions) but is projected to continuously improve as the number of government-owned institutions that offer pre-school education continue to increase.

Performance in this dimension is however significantly negated by low performances in the health sub-dimension, which includes high levels of under-five mortality, maternal mortality. A productive city is a healthy city, where all necessary investments are made to ensure to ensure high life expectancy at birth, low mother and child mortality and high vaccination levels which assure a healthy population. In Gaborone, this is an area which needs urgent attention, not only to safeguard today's needs, but also ensure a healthy population in the long term. The government is currently implementing several programs in this sector, with high impacts foreseen in the long term.



### Equity and social inclusion:

Gaborone depicts moderately high levels of economic inequality (Gini Coefficient of 0.67), which implies that there is a large gap between the rich and the poor people in the city. This is collaborated by the high variations in the city product per capita (very high performance) and the mean household income (very low performance).

In addition, the City depicts significant inequalities in the employment sector, where the rate of youth unemployment (25.6%) is double that of the average national unemployment level (12.4%). Despite the fact that majority of the city's population (42.1%) is youthful population between the ages 15-34 years (Statistics Botswana, 2018 BDS). This is a major limitation for the city's productivity, with an indication of the city not investing enough in its youthful population to reap a demographic dividend. Despite these limitations, Gaborone is making progress to promote a more equitable society, especially with regards to gender inclusion, which performs strongly. The City also performs well in terms of housing provision (low share of slum households), which is an area where inequalities are often exhibited in a city.



### Environmental sustainability:

Gaborone performs relatively well in the solid waste collection (98.7% of waste collected). The city however also records a high level of PM2.5 concentration (20.4 ug/m<sup>3</sup>), CO<sub>2</sub> emissions (43.42 metric tons per capita), and records very low levels of solid waste recycling (0.24%) and share of renewable energy consumption, which is measured as the share of electricity produced from renewable sources (0.59%) (Government of Botswana, 2019b). Based on these results, the air quality sub-index is very weak (25 in the CPI scale), implying that the city residents are exposed to dangerous levels of air pollution, which in turn affects their health.

The recorded values are in contravention of the high share of green area per capita recorded in the city, which would ideally promote air sequestration. The air quality could be having a significant effect on the quality of life of the urban residents, and in turn increasing respiratory diseases. Directed policies and actions are urgently needed to promote air quality in the city.

### Urban Governance and Legislation:

The urban governance and legislation dimension is one of the least performing sub-dimensions in Gaborone. The city's municipal finance mechanism is very weak, as demonstrated by both its low own revenue collection (36%) and ease of doing business rating (at least 48 days needed to start a business). Equally, access to information on various city aspects by citizens performs very poorly (only 20%), and the city also records a low voter turnout (43%). All these factors cumulatively contribute to a very weak score in the urban governance and legislation sub-dimension, despite its critical significance in attainment of sustainable cities. Deliberate actions are needed to improve the performance in these aspects, which when compounded with the city's high performance in subnational debt (only 9.19% of the city's total revenue is in subnational debt) will significantly improve the city's performance. Gaborone is a rapidly sprawling city characterized by low densities which has also made it difficult for provision of urban level services such as sanitation. In addition, the rapid sprawl with low densities is likely to negatively impact on service delivery to all parts of the city. Policies and development guidelines are needed to promote densification in the city, with foreseen benefits associated with urban agglomeration.

***Gaborone city performs poorly in urban governance and legislation, and records a weak municipal finance capacity***

## Conclusion

In summary, the adaptation of the CPI in Gaborone provides data and evidence that can serve as baseline for the monitoring of progress towards sustainable urban development and also enable the city authorities as well as local and national stakeholders to gauge their performance and formulate inter-sectoral policy interventions. Together with the ministry of Infrastructure and Housing Development and other relevant agencies, city authorities will be able - through a cross-sectoral and integrated approach - to identify and address

the multi-dimensional nature of urban development, and collectively monitor planning investments as well as the urban transformations in the country. However, access to data and information is poor and needs to be greatly improved. In the long run, it is paramount to put in place the necessary mechanisms to enable access and use of relevant, timely, accurate and disaggregated data to inform the design and implementation of programs and policies in Gaborone. The following is recommended for that purpose:

### Recommendations to enable access and use of relevant, timely, accurate and disaggregated data

**Streamline data collection tools** to CPI requirements and develop a data sharing strategy on urban indicators.

Set up a **clear institutional and regulatory framework** that will promote data sharing across sectors.

**Set up a research and/or data unit** within the Council that is in-charge of collecting relevant data and generating evidence to help in decision-making in Gaborone, acting as a local urban observatory.

**Establish a National Urban Observatory** to pursue the monitoring of the urban transformation and support evidence-based policies and actions and formulate transformative actions in cities and urban centres.

**Implement the National Spatial plan** in terms of harmonization of administrative boundaries.

**Reinforce capacitation and skills transfer** through additional capacity building activities at the local level.



73%

*People in Gaborone  
within the working age  
population (15-64 years  
old) in 2017*



42.1%

*Youthful population in Gaborone  
(15-34 years) in 2017*

# Chapter 1: Introduction

## 1.1 Overview

Despite their recognized importance in fostering sustainable development, cities and urban areas in both developing and developed countries are suffering from an acute crisis of accurate, timely, and useful information, hindering their capacity to develop sound and informed policies and actions to help them provide adequate services to their residents. Most of city and local authorities recognise that they do not have appropriate means and tools to understand urban dynamics and challenges with accurate data and information. In many parts of the world especially in least developed countries, lack of good quality, relevant, accessible and timely data on cities is a key element impeding progress in not only monitoring and reporting on global frameworks such as the 2030 Agenda for Sustainable Development and the New Urban Agenda (NUA), but also in formulating policies and designing programs that respond to urban dynamics and challenges. This suggests that many cities around the world, planners and decision-makers are operating in an environment of uncertainty, allocating resources to immediate and pressing issues rather than investing in progressive change over the long term. Yet, as recognized by the UN Sustainable Development Solutions Network (SDSN) ‘data and metrics are essential for development goals to be met’<sup>1</sup>, either at national or subnational level.

Cities require monitoring systems to support their vision and long-term plan for sustainable development, through periodic assessments on their state of development and evaluation of policy outcomes and impact of specific plans and actions.

Through generation of reliable, timely, disaggregated, and accessible urban data, these systems can not only help track progress towards achieving development goals and identify setbacks and impediments to such progress, but also support the formulation of evidence-based policies.

To help address the challenges related to access and use of urban data worldwide, UN-Habitat has, over the past two decades, developed tools and methodologies for urban data collection and analysis. This has been achieved through partnerships with countries, cities around the world, as well as with other development agencies and institutions. One of the major tools developed by UN-Habitat in 2012, and which has been tested and adopted by various local, national governments and international organizations is the City Prosperity Initiative and its related index, the City Prosperity Index (CPI). CPI is a composite index which not only allows countries and cities to collect data on their performance against 62 indicators across six urban dimensions<sup>2</sup>, but also acts as a practical framework

for the formulation, implementation and monitoring of policies and practices on sustainable development and increased urban prosperity. By 2019, CPI has been applied to evaluate urban performance in 539 cities in 54 countries spread across all world regions, with most of these cities using the information generated for data-driven and informed decision-making processes.

<sup>1</sup> 5 Sustainable Development Solutions Network (2014), Indicators and a monitoring framework for SDGs: Launching a data revolution.

<sup>2</sup> The six dimensions of the CPI include productivity, infrastructure development, quality of life, equity and social inclusion, environmental sustainability, and urban governance and legislation. The most elaborated version of the CPI is based on 72 indicators.

This report presents results from an application of the CPI in Gaborone City, Botswana. In addition to presenting data and performance across each indicator and dimension, the report also summarises the prevailing opportunities and challenges to sustainable development in Gaborone and in Botswana at large, and makes recommendations which, if implemented would promote prosperous growth of the city. The report is part of a project titled “SDG 11: Monitoring and reporting on human settlement indicators in Africa and Latin America”, whose implementation in Botswana started in 2017, through a collaboration between UN-Habitat, the Ministry of Infrastructure and Housing Development, Statistics Botswana, and the cities of Gaborone and Francistown. The main objective of the project is to strengthen the capacities of national governments and support the design of monitoring tools to improve the availability of and access to data and statistics at city and urban national level for the formulation of evidence-based policies. As such, the project is in line with Botswana’s efforts to strengthen urban data collection, analysis and dissemination capacities, effective science-policy links and relevance to monitoring urban SDGs and the NUA as well as for tracking the progress made across several urban development and transformation pathways in Botswana.

It is estimated that 64% Botswana’s population live in urban areas in 2017, (Statistics Botswana, 2017). Based on UN projections, it is expected that this share of urban population will increase to 84% by 2050 (UN-DESA, 2018). In light of this increasing urbanization, the Government of Botswana and its development partners have been making concerted efforts to put in place mechanisms to ensure the urbanisation process contributes to national socio-economic development and poverty reduction, and does not lead to slum explosions and urban poverty or other negative effects of unplanned

urbanisation. Indeed, the increasing number of urban dwellers provides a great opportunity to ensure sustained economic growth and development, if the government designs and implements programmes and policies in order to maximise the dispersed energies and potential of cities for the common good of all.

In line with these efforts, the country has started domesticating the implementation of the 2030 Agenda and its related Sustainable Development Goals (SDGs) and the NUA, with the first output being the development of a national implementation plan. While the government remains committed to leaving no one and no place behind, Botswana, like many other African countries faces challenges such as the lack of a proper monitoring and reporting mechanism to support national and subnational actions and frameworks; lack of, or undeveloped systems; limitations in specialised skills; and poor institutional coordination; all of which are key for tracking progress and informing actions that result in successful implementation of the development agendas. The country’s efforts to create clean, sanitized, liveable, economically vibrant, responsive and inclusive cities require a strong monitoring framework, which would not only guide the collection of data and information for better understanding of urban trends and contribution of cities to national development and transformation, but also ensure decision making processes which affect majority of the urban population are informed by accurate and up to date data.

This report is a first step in setting up the required urban monitoring framework for Botswana, not only because it produces and presents disaggregated city level data, but because it also illustrates overall city performance across multiple dimensions and indicators. Through this analysis, the report showcases how multiple actors and institutions can work synergistically to promote sustainable development, where no one and no place is left behind. The adoption of the CPI as a standard and holistic urban monitoring framework will allow the ministry of Infrastructure and Housing Development and other relevant agencies through a cross-sectoral and integrated approach to identify and address the multi-dimensional nature of urban development, and collectively monitor planning investments as well as the urban transformations in the country.

# 64%

**Botswana population living in urban areas in 2017**



Data contained in this report is therefore invaluable to planners, policy makers and everyone involved in decision-making, both at national and local Governments. It will enable the city authorities as well as local and national stakeholders to gauge their performance and formulate inter-sectoral policy interventions.

The report is structured into six main sections. The introductory section lays out the context and purpose of the report; Sections 1-4 provides an overview of the socio-economic, demographic and cultural contexts of Gaborone city; and Sections 5-6 focuses on the CPI, the data used and findings and their interpretation. The conclusion section summarizes the key findings and recommendations for the production and use of urban and city-level data for Gaborone, which can also be applied in other urban settings in Botswana.

## 1.2 Urbanization, Development in Botswana

Botswana is one of the fastest growing and most successful economies in sub-Saharan Africa, with its economic growth averaging 5% per annum over the past decade (The World Bank Group, 2015). Since gaining independence in 1966, the country has experienced remarkable economic growth fuelled particularly by considerable mineral wealth (diamonds), good governance, and careful fiscal and sound economic management. The discovery and exploitation of these precious stones resulted in tremendous growth which in conjunction with a relatively small population of approximately two million, has turned Botswana into an upper middle-income country, with a GDP per capita of about \$18,100 in 2017 (The World Bank Group, 2015).

The economy grew at a rate of 4.4% in 2018 and is expected to remain at around 4% until 2021 (The World Bank Group, 2015).

Botswana is also known to be one of the least corrupt and best destinations to do business in Africa. However, the country remains vulnerable to structural changes and short-term external shocks such as market fluctuations due to its reliance on diamonds and an economy driven by the public sector. For example, the country's GDP shrunk by 5.2% (negative growth) in 2009 when the values of diamonds plummeted by 72% during the global financial crisis in the second half of 2008 (Kent & Ikgopoleng, 2011). In addition, it is often suggested that the economic growth has not been pro-poor with income inequality being one of the highest of the world with a Gini coefficient of 0.52 (Statistics Botswana, 2018). At the same time, unemployment rate in general and youth unemployment in particular are high at about 18% and 37% in 2018 respectively (Statistics Botswana, 2018).

The sustained economic growth that Botswana experienced during the 40 years following its independence was accompanied by an increase in number and size of its urban centres<sup>3</sup>, which together with rural-to-urban migration has led to a considerable rise in its urban population (Oucho, Campbell, & Makamaamb, 2014). In fact, the number of urban centres has increased more than 10-fold, from only 5 settlements in 1971 to 53 in 2017 (Department of Town and Country Planning, 2018). On the other hand, from a predominantly rural country after independence with only 9.1% of this population living in urban centres in 1971, the country rose rapidly to become predominantly urban by 2001, with half of its population being urban residents (54%).

**\$18,100**  
**Botswana GDP per Capita**  
(2017)

3 In Botswana, urban areas are defined as any settlement with at least 5 000 people of which 75% of the workforce is engaged in non-agricultural activities.

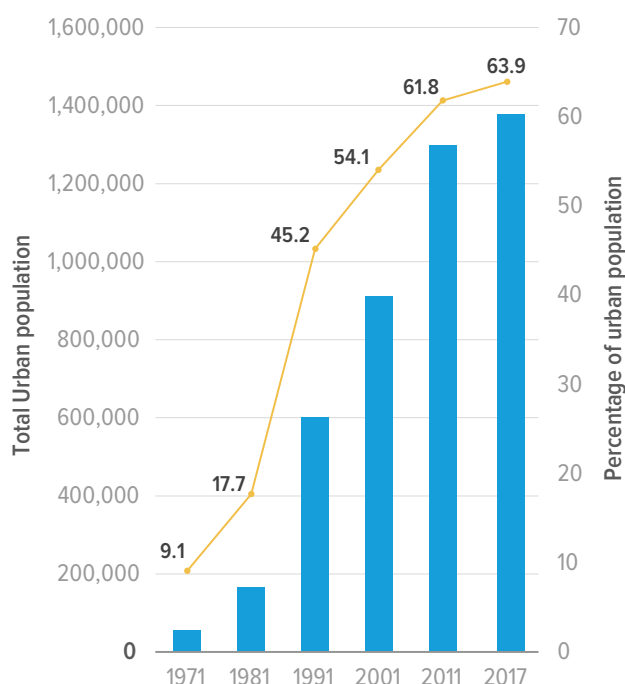
This translates into an increase of its urban population from a little more than 50,000 in 1971 to about 1 million in 2001. In fact, the annual growth rate of the urban population was 11.2% during the period 1971-81, 12.8% during the period 1981-91 although it declined to 4.2% and 3.5% during the periods 1991-2001 and 2001-2011 respectively. In 2017, about two-thirds of Botswana population lives in urban areas (64%), i.e. about 1.6 million urban residents.

Rural populations move to urban areas mainly in search of better economic opportunities in the secondary and tertiary sectors or better living standards; they are pushed to leave by poor living conditions and lack of basic services in their rural settings. The mining industry resulted in rural to urban migration as there were large income disparities between urban industrial and rural agrarian sectors. More significantly, low agricultural commodity prices, weak policies, climatic changes – droughts and desertification, presented a push factor for populations and forced rural populations towards urban centres (Oucho et al., 2014).

Data from the latest Botswana Multi-Topic Household Survey indicates that poverty incidence in 2016 was much higher in rural areas (24%) than in cities/towns (9%) and urban villages (13%) (Statistics Botswana, 2018). In 2016, 93% of the urban population in cities/towns and 86% in urban villages had access to potable piped water (either indoors or outdoors) compared to only 43% of their counterparts in Rural Areas. Also, whereas the majority of households had access to electricity in cities/towns (82%) and urban villages (79%), only 35% of their rural counterparts were provided with this basic social service.

However, there are strong rural-urban linkages as most urban households maintain strong ties with their rural homes where they own land and cattle posts, which are often used as safety net for difficult economic times (Kruger, 1998). Also, recent data show that out-migration from major urban centres (Gaborone, Francistown, Lobatse, Selebi Phikwe, Orapa and Jwaneng) exceeds in-migration, suggesting that major urban centres may be less attractive to other residents (Statistic Botswana 2017). The net out-migration from urban centres such as Gaborone and

**Figure 1: Urbanization Trends in Botswana**



Francistown could be due to increase in land prices that cause residents to move out to the suburban fringe of neighbouring districts or return to their home places (Navaneetham & Dwivedi, 2014), with high net in-migration experienced in Kweneng East, Central Palapye and North East District (Statistics Botswana, 2017).

It is expected that the share of urban population will reach 84% by 2050, culminating in about 2.8 million urban residents (UN DESA, 2018). The effects of this urban growth shall be experienced mainly by the country's two (2) major cities of Gaborone and Francistown. In addition to the reclassification of rural settlements to urban spaces, most of the existing urban centres, particularly Gaborone and Francistown are continuing to grow outwards and are rapidly sprawling to their neighbouring rural areas. This has resulted in a symbiotic relationship between the cities and their hinterland as they depend on each other for manpower, agricultural produce and accommodation (Ministry of Lands and Housing, 2015).

## 1.3 Overview of the City of Gaborone

This section provides a brief overview on the historical, geographical, demographic and socio-economic backgrounds of the city of Gaborone.

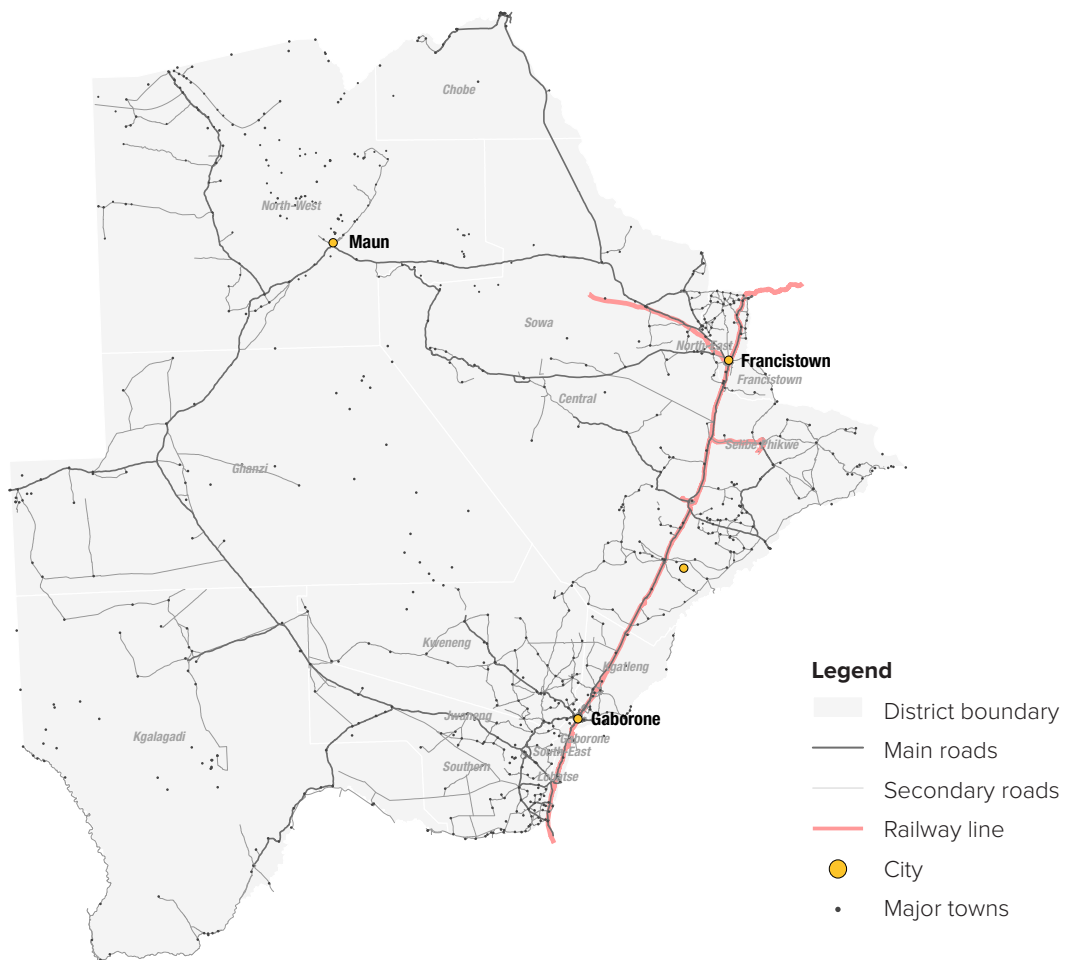
### 1.3.1 Historical Background

Gaborone is the capital city of Botswana. The city has grown from a very tiny human settlement that started as the homestead of the Batlokwa tribe following their relocation from the Magaliesberg area of South Africa in the 1880s. The settlement grew into a city that was latter known as Gaborones, a name given after the then chief of Batlokwa, Chief Gaborone. In 1965, the capital of the Bechuanaland Protectorate<sup>4</sup> relocated from Mahikeng,

South Africa to Gaborones following political pressure and calls for independence from the traditional leaders. This move gave Gaborones prominence as a new administrative capital.

At independence in 1966, the first choice for capital city was Lobatse. This was later abandoned in favour of Gaborones which had freshwater, access to railway line and central location. The development of the city started in earnest in 1964 on the garden city concept. In 1969, the city changed its name to Gaborone. Gaborone was classified a city in 1986 to serve as an administrative, commercial, and political centre of the country.

**Map 1: Location of Gaborone in Botswana**



4. The Bechuanaland Protectorate was established on 31 March 1885, after the three Dikgosi (Botswana traditional leaders) appealed to the British Government to ward off annexation by the Dutch and German settlers. The British government regarded the protectorate as temporary; hence the administrative capital was Mafikeng, South Africa, outside the protectorate's borders between 1885 and 1964 (Parsons, 1999).

### 1.3.2 Geography and Location

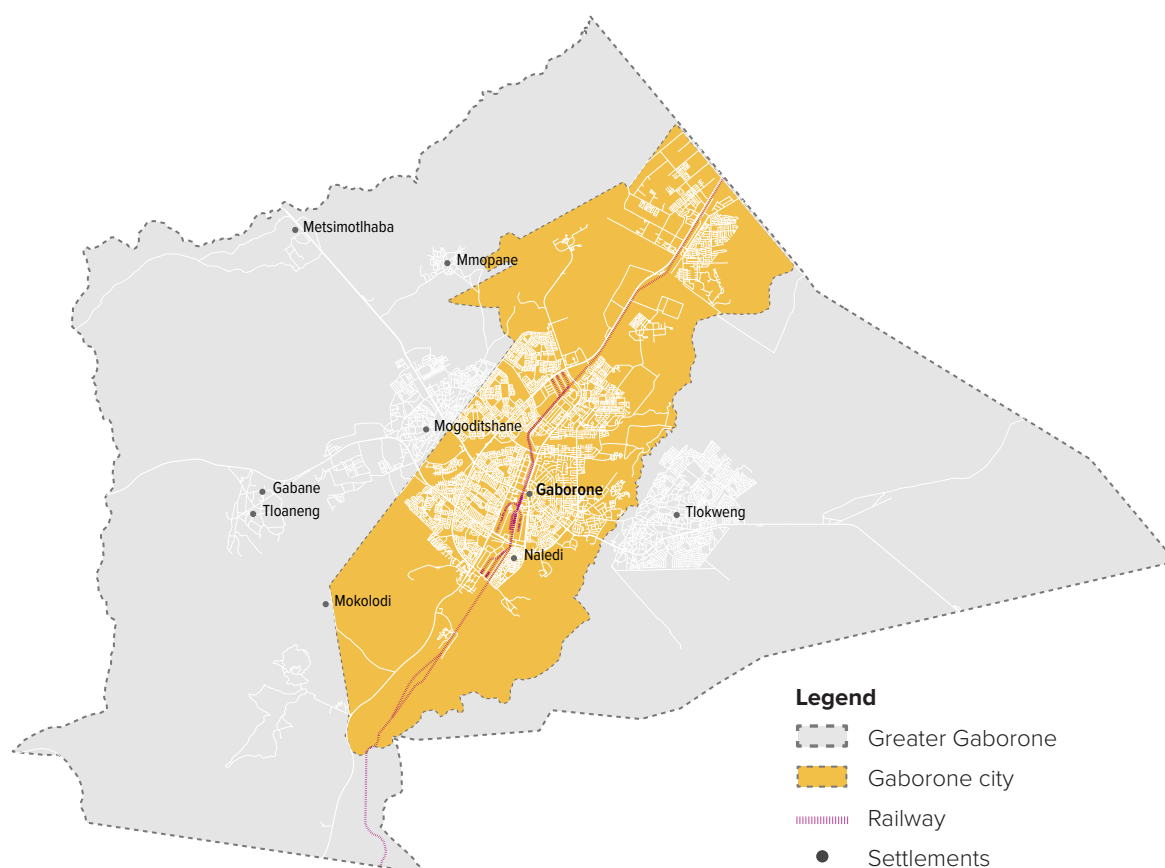
According to Gaborone Development Plan, 2007, the city was initially built for a population of 20,000 people but has exceeded 200,000 which has exerted pressure on the demand for land and services. Gaborone City is located in the South East Region of Botswana, as delineated by the National Settlement Policy of 1998, and covers an area of about 199.295 km<sup>2</sup>. Geographically, Gaborone lies between latitudes 20° 30' S and 24° 45' S and between longitudes of 25° 50' E and 26° 12' E. The area lies within the South Eastern Region (SER) of Botswana which is the most advanced planning region in the country in terms of socio-economic indices and infrastructural development. In the district context, Gaborone is located to the north-eastern part of the

South East District, which itself lies on the south-eastern edge of the country, bordering the Republic of South Africa.

The South East Region which has the highest concentration of population in the country comprises of the rural districts of South East, Kweneng, Southern and Kgatleng, as well as the urban districts of Gaborone, Lobatse and Jwaneng.

Gaborone City is a road distance of 439 km's south of Francistown, the country's second largest city; approximately 1000kms south of Maun, the district headquarters of Ngamiland District and 70kms south of the urban district of Lobatse (Map 1).

**Map 2: Context Map of Greater Gaborone** (Data adapted from Open Street Map (OSM))

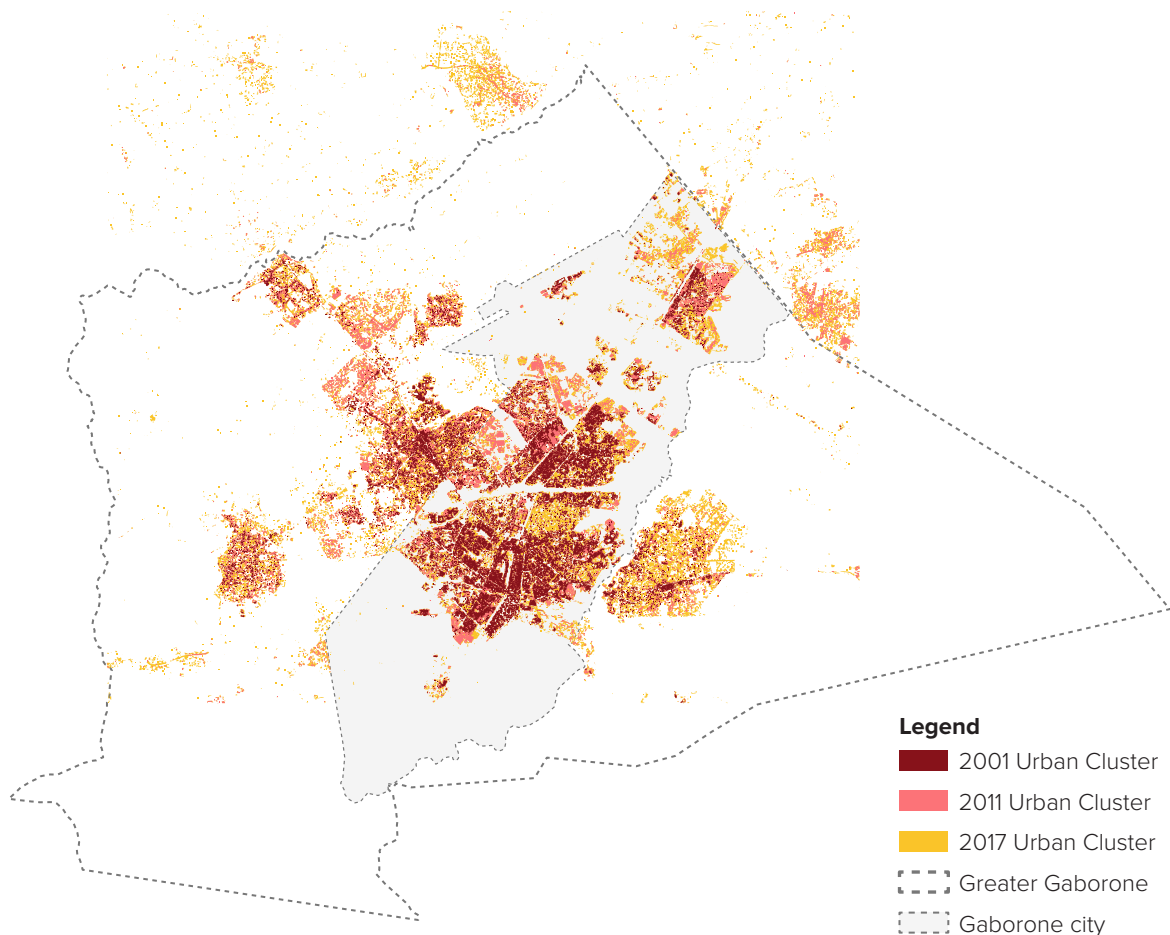


5. Botswana Demographic Survey report, 2017 records a net out migration rate of -12,210.

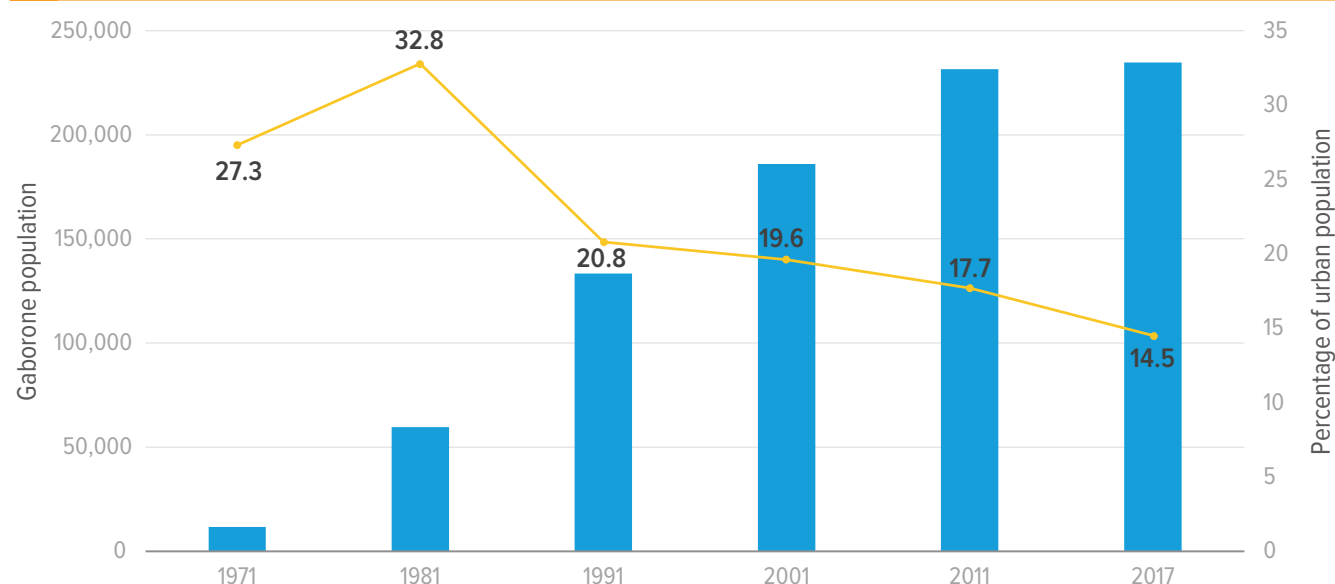
The city is bordered to the east by Notwane River which serves as a structuring element and natural boundary between the city and Tlokweng (Batlokwa Tribal Territory). To the west it is bordered by Mogoditshane (Bakwena Tribal Territory); while in the north the city abuts Kgatleng district (Bakgatla Tribal Territory) boundary; and to the south, the city is bordered by freehold farms which fall within the jurisdiction of the South East District. Map 2 shows the location of Gaborone City in a National and District context.

Map 3 shows the evolving boundaries of Gaborone City over time. A recent study (Gwebu, 2014) indicates that the presence of tribal land, coupled with the presence of commercial farms elsewhere has constrained the spatial growth of Gaborone because land acquisition is lengthy and expensive. From these locational and boundaries contexts, it is obvious that the City is hemmed-in, with no available land for future spatial expansionary needs. This has presented a major challenge in terms of accommodating the ever-increasing population and providing for the needs of various land use categories as highlighted in the Gaborone Development Plan, 2009-2021 (Government of Botswana, 2008).

**Map 3: Expansion of Gaborone** *(Extracted from land sat satellite imagery)*





**Figure 2: Evolution of Gaborone population** (Source: Statistics Botswana, 2018, BDS)

### 1.3.3 Demographic Background

Compared to most countries in sub-Saharan Africa, Botswana is at an advanced stage of the demographic transition, with significant decline of its fertility and mortality rates. In 2018, Botswana's population was estimated at just over 2.2 million people (Statistics Botswana, 2017) and is projected to reach 3.4 million by 2050. Its total fertility has gone down from about 6 children on average per woman in the 1960s to about 3 children in 2017 (Statistics Botswana, 2017), which is also much lower than the average of about 5 children for sub-Saharan Africa. In addition, under-5 mortality has considerably declined from as high as 152 deaths per 1000 in 1971 to 48 deaths per 1000 live births in 2017 (Statistics Botswana, 2017). This is reflected in the evolution of the population of its second city, Francistown.

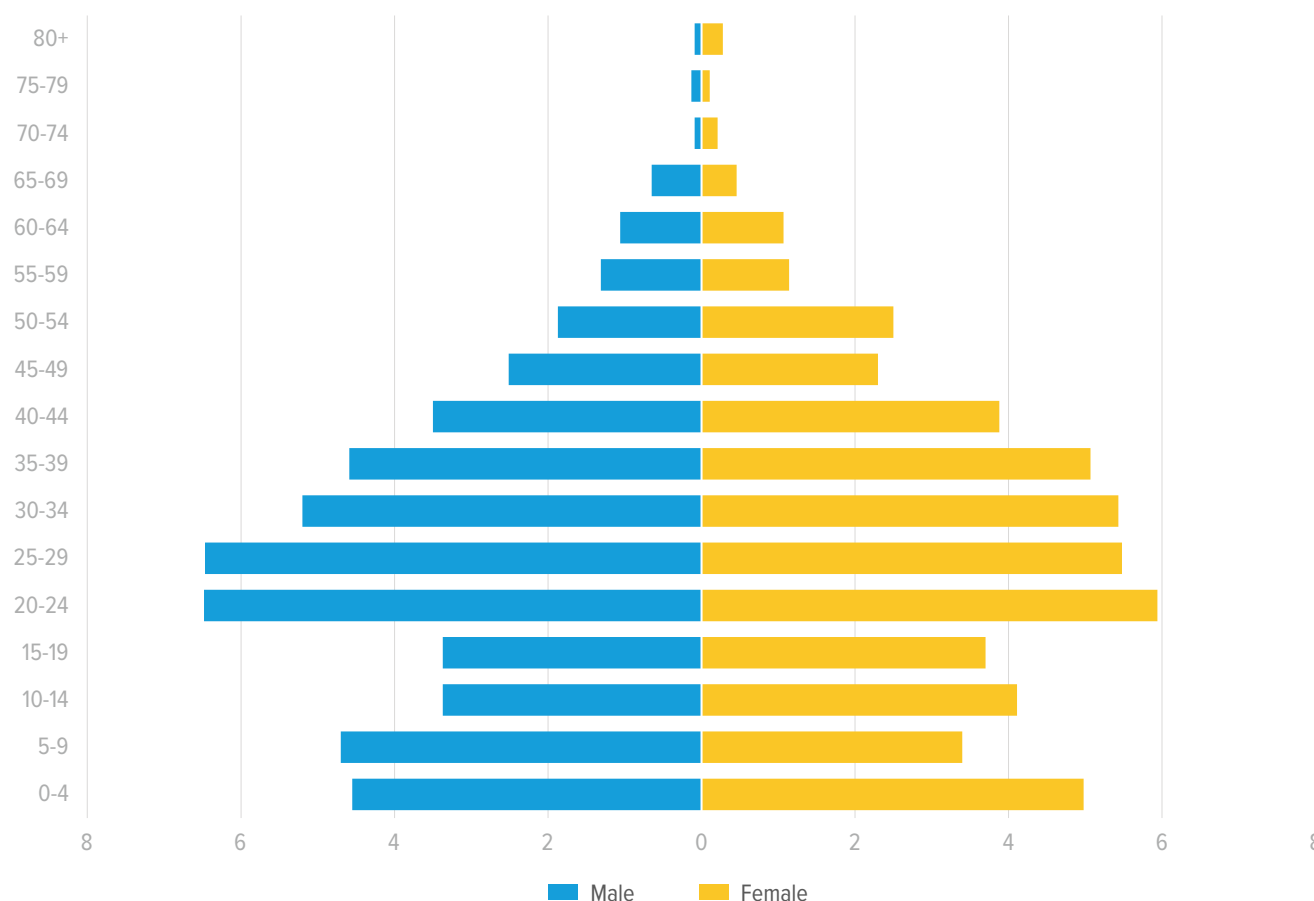
Gaborone had a population of only 17,718 inhabitants in 1971 when the first census was conducted. Thereafter, the city experienced a tremendous population growth between 1971 and 1981 where it reached 133,468 inhabitants.

This could be attributed to massive rural-urban migration phenomenon due to the perceived and real economic opportunities that existed by then. Compared to the rest of the country, Gaborone has not only better infrastructure and social amenities, but also better job opportunities. Consequently, most of rural residents moving to urban areas flock to the surrounding areas of Gaborone. The other contributory factors were the changing political landscape as people were more liberated and freer to move and the establishment of Gaborone as the first administrative capital of Botswana.

In general, while the Gaborone population has been growing steadily over time, its importance in the total urban population has been reducing from 1981. In 1981, about 33% of urban dwellers in Botswana were living in Gaborone; this percentage declined to 15% in 2017, as illustrated in figure 2 below. This decrease is attributed to the growth of other urban centres and the migration of people from Gaborone to the surrounding villages and other districts (Government of Botswana, 2018b; Statistics Botswana, 2017)<sup>6</sup>.

6. Approximately USD 16.9m

**Figure 3: Distribution of population by sex in Gaborone** *(Botswana Census, 2011 & BDS, 2018)*



The population distribution of Gaborone in 2017 depicts a youthful population, with 25% of the population aged less than 15 years and 42% aged 15-34 years. Overall, close to 3 out of 4 people in Gaborone (73%) are within the working age population (15-64 years old). A major challenge facing Gaborone is that, its demographic trends which depict a growing youthful

population has not been commensurate with growth in job creation, resulting in a high unemployment rate. As a result, the city has a high youth unemployment rate, recorded at 25.6% in 2017 (Statistics Botswana, 2016). Figure 3 below shows the distribution of population by age and sex in 2017.

### 1.3.4 Socio-Economic Background

Gaborone is the economic, political and administrative headquarters for government, parastatals, embassies and the Southern African Development Community (SADC). It is an economic hub and home to financial, real estate and insurance companies. It is mainly a service industry with very limited manufacturing activities.

The city largely depends on South Africa for goods and trade and has the highest share of the Botswana's economic output. In 2017, Botswana's Gross Domestic Product was slightly higher than one hundred and eighty billion pula (BWP180,112,700,000<sup>6</sup>) (Statistics Botswana, 2018-GDP Quarter 1, 2018).

The main challenge related to urbanization in Botswana relates to the over-dominance of Gaborone, the commercial and administrative capital of the country at the expense of other locations. Gaborone has greater opportunities for work, better infrastructure and social amenities, and public services compared to the rest of the country.

The city is governed by Gaborone City Council, which is composed of a political and an administrative wing. The Council

has 30 Councillors representing the different wards of the city, a Mayor who is head of the political wing, and a Town Clerk who heads the Administrative wing. Gaborone has international and national linkages which set it apart as an economic hub in Botswana. The Sir Seretse Khama International Airport provides linkages with Maun, Kasane, Francistown in the country; and Johannesburg and Cape Town in South Africa. It is also located along the Cape to Zimbabwe railway, which is important for trade between Zimbabwe and South Africa.

The city is also home to most high-level educational facilities in the country, some of which include University of Botswana, Limkokwing University, Botswana University of Agriculture and Natural Resources, Botswana Accountancy College, Ba Isago University, and Botho University. This has to a large extent contributed to Gaborone's youthful population (15-34 years) which accounts for approximately 42.1% of the city's population in 2017 (Statistics Botswana, 2018 BDS).

The planning implication of this demographic trend is the need for affordable accommodation, transport, employment, recreation and sports facilities.

***Population distribution of Gaborone in 2017 depicts a youthful population, with 25% of the population aged less than 15 years and 42% aged 15-34 years.***



Gaborone, Botswana © Flickr / brazilian.old.man.

1

### **Productivity dimension**

Measures the average achievement of the cities in terms of creating wealth and how it is shared.

2

### **Infrastructure Development Dimension**

-measures the average achievement of a city in providing adequate infrastructure for accessing clean water, sanitation, good roads, and information and communication technology.

3

### **Equity and Social Inclusion Dimension -**

measures the average achievements in ensuring equitable distribution of and access to the benefits of prosperity,

4

### **Quality of Life Dimension**

measures the average achievement in ensuring general wellbeing and satisfaction of the citizens.

5

### **Environmental Sustainability Dimension-**

Measures the average achievement of cities in protecting the urban environment and its natural assets.

6

### **Urban Governance and Legislation Dimension-**

Demonstrates the role of good urban governance in catalysing local action towards prosperity



# Chapter 2: Applying The City Prosperity Index In Gaborone

## 2.1 Overview of the City Prosperity Index (CPI)

The City Prosperity Index (CPI) is a composite index used to measure the overall performance of cities based on six key dimensions: a) productivity, b) infrastructure development, c) quality of life, d) equity and social inclusion, e) environmental sustainability and f) governance and legislation. The index, which is computed using city level data measures how cities create and distribute socio-economic benefits and prosperity. The level of prosperity of a city is measured through the extent to which the city has achieved all these six dimensions of prosperity.

CPI offers a platform for urban data collection and evidence-based decision making. As a data platform, CPI has 62 indicators ((72 for the most elaborated version of the CPI) which helps in identifying dimensions that are performing well or poorly so that appropriate corrective measures can be put in place. The Index not only builds on the use of existing data and information from various sources such as household surveys, censuses, policy documents, and other databases, but also contributes to the development of local and national databases with new sets of information from sources such as geospatial analysis and community generated data (UN-HABITAT, 2012).

Given that the indicators have different measurement units and scales, they must be standardized using various approaches in order to enable the computation of the composite index.

This standardisation transforms a variable from its original measurement unit into a dimensionless measure that ranges between 0 and 100, but also considers the fact that there is a direct relationship between each indicator and the CPI (UN-HABITAT, 2012).

Below is a summary of what is measured in each dimension.

- **Productivity dimension** measures the average achievements of the cities in terms of creating wealth and how it is shared. It also measures cities' contribution to economic growth and development, generation of income, provision of decent jobs and equal opportunities for all.
- **Infrastructure Development Dimension** measures the average achievement of a city in providing adequate infrastructure for accessing clean water, sanitation, good roads, and information and communication technology. These are essential in improving living standards and enhancing productivity, mobility and connectivity.
- **Quality of Life Dimension** measures the cities' average achievement in ensuring general wellbeing and satisfaction of the citizens.
- **Equity and Social Inclusion Dimension** measures the cities' average achievements in ensuring equitable distribution of the benefits of prosperity, reduction of poverty and the incidence of slums, protection of rights of minority and vulnerable groups, gender equality, and equal participation in the social, economic, political and cultural spheres.
- **Environmental Sustainability Dimension** measures the average achievement of cities in protecting the urban environment and its natural assets. This should be done simultaneously while ensuring growth, pursuing energy efficiency, reducing pressure on natural resources and reducing environmental losses through creative and environment-enhancing solutions.

● **Urban Governance and Legislation Dimension** has the purpose of demonstrating the role of good urban governance in catalysing local action towards prosperity, including the capacity to regulate the urbanisation process. The CPI is constructed incrementally as follows:

● **The Basic City Prosperity Index** which is useful for cities that want to compare their level of development and overall performance with other cities in the regional and global arena.

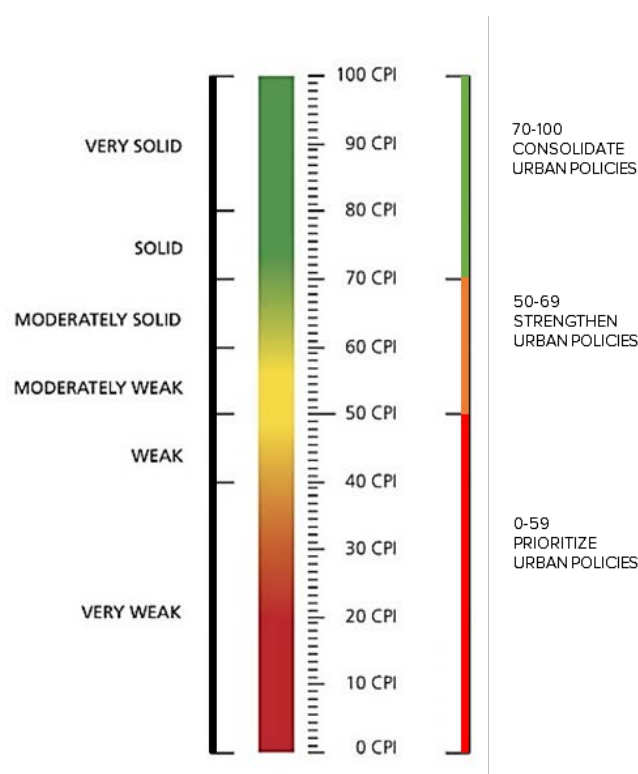
The Basic City Prosperity Index uses a set of commonly available indicators that exist amongst all cities, acting as a platform for regional/global benchmarking and for comparison purposes.

● **The Extended City Prosperity Index:** This index is a more advanced version of the basic model. Its main function is the integration of more indicators that are not commonly available in all cities, but which are of specific contextual relevance to them. Cross-city comparability is thus not the primary objective of the extended CPI. This Index allows for a detailed political and technical dialogue that is essential for the development of evidence-informed public policies (UN-HABITAT, 2019).

● **The Contextual City Prosperity Index:** This index represents the most advanced and complete stage of the process. In addition to the basic and extended indicators, a certain number of indicators capturing the policies and actions implemented in the city are measured. As such, the contextual index contributes to assessing the performance of the city, through monitoring the impact of local initiatives and projects that are needed to implement the city's vision in order to achieve shared prosperity and sustainable development.

In practical terms, for the calculation of the CPI, each dimension is made up of a series of sub-dimensions, which in turn include many variables/indicators that contribute to the calculation of the specific index. As such, sub-indices are computed for all the sub-dimensions, which are aggregated to produce six indices for all the six dimensions. The overall CPI value is then calculated as an average of the indices for the six dimensions. Figure 4 shows how the overall CPI value -which ranges from 0 to 100 - can be interpreted based on the different categories defined to assess the status of prosperity in a given city.

**Figure 4: Scale of prosperity**



*Each CPI dimension is made up of a series of sub-dimensions, which in turn include many variables/indicators that contribute to the calculation of the specific index.*

## 2.2. Linkage between CPI and SDGs

The City Prosperity Index can be used to monitor and report on progress made by cities on the 2030 Agenda for Sustainable Development as it is based on indicators that are strongly linked to the SDGs. In total, 1 in 4 of all SDG targets that can be measured at local level are covered by the CPI. Specifically, all 10 targets and indicators of Goal 11 are integrated in the CPI. Overall, the

CPI measures progress on city/urban goals in a comprehensive and integrated manner, bringing together urban SDG indicators in a single framework that covers the environmental, social and economic components of city prosperity and sustainability (see figure 5).

**Figure 5: Linkages between CPI and SDG 11 targets**



## 2.3 Applying CPI in Gaborone

### 2.3.1 Data and data sources

CPI indicators are comprised of spatial and non-spatial indicators as presented in Table 1. In Gaborone, data used for non-spatial indicators was derived from socio-economic and demographic reports, particularly the Botswana Multi Topic Household Survey of 2017, the Botswana Demographic Survey of 2017, economic surveys as well as administrative data. In instances where data was unavailable, proxies were used.

On the other hand, spatial data was computed based on maps from the Department of Surveys and Mapping and the Department of Town and Country Planning, as well as from satellite imagery and other open source geospatial data platforms.

In some instances, such as collection of data on public transport stops and open spaces, ground truthing was also done to verify and update information on the existing maps and/or information extracted from satellite imagery. CPI indicators are comprised

of spatial and non-spatial indicators. Table 1 summarizes the indicators adopted for the computation of CPI in Gaborone, as well as the sources of data for each indicator.

**Table 1: Data Sources**

DIMENSION	SUB-DIMENSION	INDICATORS	BASIC CPI	EXTENDED CPI	DATA	SOURCE, YEAR
PRODUCTIVITY	Economic Strength	City Product per capita USD	X		Available	Calculated from BMTHS, 2016, Population Projections and National Accounts, 2016
		Old Age Dependency Ratio	X		Available	Botswana Demographic Survey, 2017
		Mean Household Income*		X	Available	BMTHS, 2016
	Economic Agglomeration	Economic Density	x		Available	BMTHS, 2016, Population Projections and national Accounts, 2016, Gaborone Land-use Map, 2017
		Economic Specialization*		X	Available	Calculated from BMTHS, 2016, Population Projections and National Accounts, 2016
	Employment	Unemployment Rate	x		Available	BMTHS, 2016
		Employment to population ratio*		X	Available	BMTHS, 2016
		Informal employment*		X	Available	BMTHS, 2016
INFRASTRUCTURE	Housing Infrastructure	Improved shelter	x		Available	BMTHS, 2016
		Access to improved water	x		Available	BMTHS, 2016
		Access to improved sanitation*		X	Available	BMTHS, 2016
		Access to electricity*		X	Available	BMTHS, 2016
		Sufficient living area*		X	Available	BMTHS, 2016
		Population density*		X	Available	
	Social Infrastructure	Physicians Density	x		Available	BDS, 2017
		Number of public libraries*		X	Available	MYSC, 2018
	ICT	Internet Access	x		Available	BMTHS, 2016
		Home computer access*		X	Available	BMTHS, 2016
		Average broadband speed*		X	Available	ICT report, 2014
	Urban mobility	Use of public transport	x		Available	Ministry of Transport and Communication (MTC), 2016 (Government of Botswana, 2015c)
		Average daily travel time	x		Available	MTC, 2016
		Length of mass transport network*		X	Not applicable	

DIMENSION	SUB-DIMENSION	INDICATORS	BASIC CPI	EXTENDED CPI	DATA	SOURCE, YEAR
		Traffic fatalities*		X	Available	Botswana police report, 2018
		Affordability of transport*		X	Not Available	
	Street connectivity	Street intersection density	X		Available	Open source Data, 2017
		Street density	X		Available	Open source Data, 2017
		Land allocated to streets	x		Available	Open source Data, 2017
QUALITY OF LIFE	Health	Life expectancy at birth	x		Available (National level)	BDS, 2017
		Under-five mortality rate	x		Available (National level)	BDS, 2017
		Vaccination coverage*		X	Available	BMTHS, 2016
		Maternal mortality*		X	Available (national level)	BDS, 2017
	Education	Literacy rate	x		Available	BMTHS,2016
		Mean years of schooling	x		Available	
		Early childhood education*		X	Available	BDS,2017
		Net enrolment in higher education*		X	Available	BMTHS,2016
	Safety and Security	Homicide rate	x		Available	Botswana Police Report ,2017
		Theft rate*		X	Available	Botswana Police report, 2018, (Government of Botswana, 2018a)
	Public Space	Accessibility to public open spaces	x		Available	Landsat image, 2017; Gaborone land use map, 2014 (Government of Botswana, 2014)
		Green area per capita*		X	Available	Landsat image, 2017; Gaborone land use map, 2014
EQUITY & SOCIAL INCLUSION	Economic Equity	Gini Coefficient	x		Available (Urban level)	BMTHS, 2016
		Poverty rate	x		Available	BMTHS, 2016
	Social Inclusion	Slum households	x		Available	BMTHS,2016
		Youth unemployment	x		Available	BMTHS,2016
	Gender Inclusion	Equitable secondary school enrolment	x		Available	BMTHS,2016
		Women in local government*		X	Available	City Administrative Data, 2018
		Women in the workforce*		X	Available	BMTHS,2016
	Urban diversity	Land use mix		X	Available	Land use Map, 2014

DIMENSION	SUB-DIMENSION	INDICATORS	BASIC CPI	EXTENDED CPI	DATA	SOURCE, YEAR
ENVIRONMENTAL SUSTAINABILITY	Air Quality	Number of monitoring stations	x		Available	DWMPC, 2018
		PM 2.5 Concentration*		X	Available	DWMPC, 2018 (Government of Botswana, 2018c)
		CO2 emissions*		X	Available	Botswana National Greenhouse Gas (GHG) Inventories Report for 2014 and 2015 (Adedoyin et al., 2016)
	Waste management	Waste collection	x		Available (Proxy)	BMTHS, 2016
		Wastewater treatment	x		Not Available	
		Solid waste recycling share*		X	Available	Statistics Botswana 2017
	Sustainable energy	Share of renewable energy consumption	x		Available	Ministry of Mineral Resources, Green Technology & Energy Security, 2018
URBAN GOVERNANCE AND LEGISLATION	Participation	Voter turnout	x		Available	Independent Electoral Commission, 2014 (Government of Botswana, 2018d)
		Access to public information	x		Available	Gaborone City website/ Facebook page, 2018
		Civic participation*		X	Not Available	
	Municipal finance and institutional capacity	Own revenue collection	x		Available	Gaborone City Council administrative data, 2018
		Days to start a business	x		Available	World Bank Group Flagship Report, Doing Business 2019, Economy Profile, Botswana (Government of Botswana, 2019a)
		Subnational debt*		X	Available	Gaborone City Council administrative data, 2018
		Local expenditure efficiency*		X	Available	Gaborone City Council administrative data, 2018
	Governance of urbanization	Land-use efficiency	x		Available	Gaborone Satellite images, 2011 & 2017
*This indicator is not used in the basic index						

As shown in table 1, some indicators were not computed due to lack of data from the relevant ministries/offices, and/or lack of baseline inputs required for their computation. Despite a diversity of challenges on data availability at the city level, 94% of the required data was collected at the city level, as national

aggregates or as proxies where the direct indicator information was unavailable. Out of 62 indicators, 53 had the required information at city level, 5 were captured through proxies or natural/urban level data, 1 was not applicable to Gaborone and 3 had no data at all.

### 2.3.2 Data challenges

The following challenges were encountered during data collection:

- a) Unavailability of data on some indicators which include wastewater treatment, share of renewable energy, civic participation and affordability of transport.
- b) Some indicators have partial or no data at all and proxies had to be used in their computation. For example, to compute solid waste collection, data on households with regular access to solid waste collection was used instead of the proportion collected out of total waste generated by the city. In some instances, there was no data at the city level hence national or data for urban areas was used, e.g. Gini coefficient, maternal mortality and carbon dioxide emissions.
- c) Administrative data is mostly kept in manual records, and requires compilation and verification, which is time consuming and costly.
- d) Differences in delineation of boundaries by different organizations, which makes it difficult to segregate information for Gaborone City as a unique entity. Differences were noted in the planning boundary, city administrative boundary and the police districts.
- e) Lack of Spatial Analyst and Network Analyst licenses which are integral to the computation hence some analyses were conducted with the assistance of spatial data team at UN-Habitat, Nairobi.
- f) Difficulties in accessing public data from various stakeholders.

#### **Data Challenges:**

- **Unavailability of data at city level**
- **Inaccessibility of Data**
- **Inappropriate Data Storage Methods**



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## 2.4 Findings and Interpretation of the CPI for Gaborone

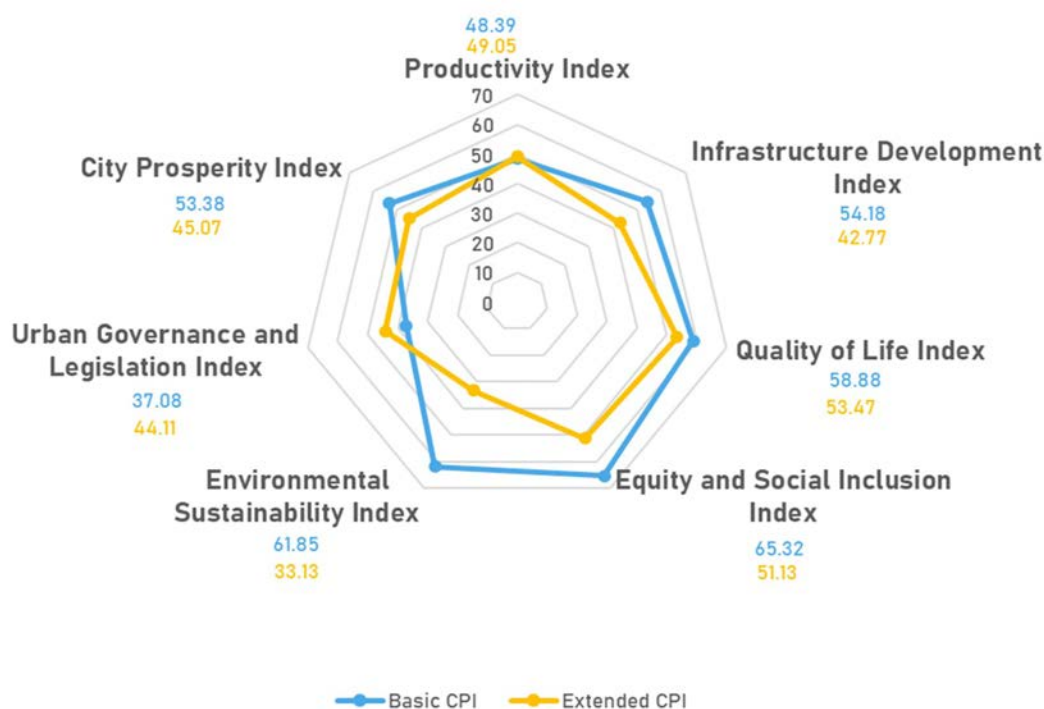
This section assesses the prosperity of Gaborone using and interpreting the CPI results

### 2.4.1 Overall CPI for Gaborone

Table 2 below shows a summary of the CPI dimensions for Gaborone in 2018. Generally, Gaborone performs well in the basic CPI as opposed to the extended CPI. The results for Gaborone are 53.38 and 45.07 for basic and extended CPI respectively. According to the scale of prosperity, this shows that Gaborone has moderately weak prosperity in the basic CPI and weak prosperity in the extended CPI.

The main strengths lie with Equity and Social Inclusion (ESI) and Quality of Life (QOL), which are moderately solid under the basic CPI. These three factors should be strengthened further to ensure their solid factors of the basic CPI in Gaborone. These are important areas of opportunity for Gaborone, which require some additional efforts from local and national authorities to ensure they contribute better to the city's prosperity.

**Figure 6: Gaborone City Prosperity Index (CPI)**



The weakest dimensions are the Urban Governance and Legislation (UGLI) and Productivity (P) which score low in both the basic and extended CPI. The extended CPI is generally weak and needs to be strengthened. Indeed, Gaborone scores worse when other sub-dimensions are considered in the extended CPI. The Equity and Social inclusion, which was “moderately solid” under the basic CPI became “moderately weak” under the extended CPI.

Similarly, the Environmental sustainability went from “moderately solid” under the basic CPI to “very weak” under the extended CPI. In the same vein, Infrastructure Development is “moderately weak” under basic CPI and “weak” under extended CPI.

**Table 2: A summary of Gaborone City Prosperity Index**

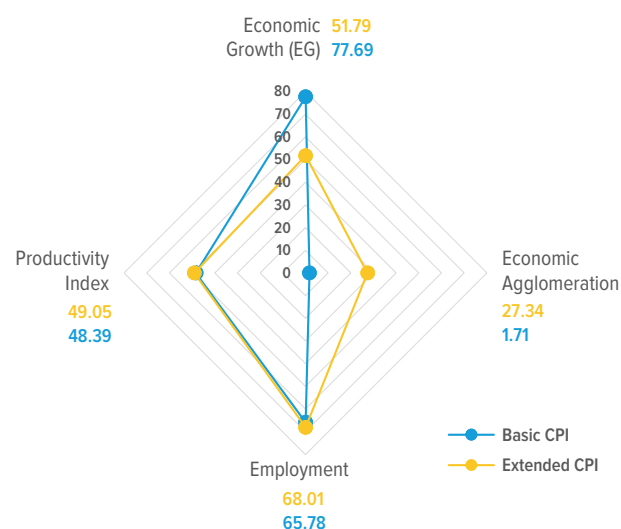
City Prosperity Index	Basic	Prosperity scale	Extended	Prosperity scale
Productivity Index (P)	48.39	Weak	49.05	Weak
Infrastructure Development Index (ID)	54.18	Moderately Weak	42.77	Weak
Quality of Life Index (QOL)	58.88	Moderately weak	53.47	Moderately weak
Equity and Social Inclusion Index (ESI)	65.32	Moderately solid	51.13	Moderately weak
Environmental Sustainability Index (ES)	61.85	Moderately Solid	33.13	Very weak
Urban Governance and Legislation Index (UGL)	37.08	Weak	44.11	Weak
<b>Overall City Prosperity Index</b>	<b>53.38</b>	<b>Moderately weak</b>	<b>45.07</b>	<b>Weak</b>

Source: as in table 1 / Calculations from authors.

### 2.4.2. Productivity Dimension

A prosperous city is one that fosters economic development and enables an environment for job creation through the implementation of effective economic policies and sector reforms. Under the CPI, the Productivity Index is estimated using three sub-dimensions, namely economic strength, economic agglomeration and employment. The concentration of economic activities improves competitiveness and efficiency due to economies of agglomeration and scale. This results in creation of employment, improved income levels and livelihoods.

In terms of productivity, Gaborone has a weak score of 48.39 for the basic CPI and 49.05 for the extended CPI, which is mainly driven by poor performance under economic strength and economic agglomeration. There are some weak areas under these sub-dimensions, which need to be addressed to make the city's productivity structure balanced (Figure 7).

**Figure 7: Productivity Index for Gaborone, 2018**

Source: Calculations from authors.

Table 3 shows the performance of Gaborone in the productivity dimension, with data suggesting that Gaborone scores well on economic strength but poorly on economic agglomeration. In fact, using the basic CPI, the city performs well on economic strength due to low old age dependency ratio<sup>7</sup> and relatively high city product per capita. However, due to a very low mean household income, the city eventually scores poorly when using the extended CPI. This could be attributed to lack of diverse economic activities in the city. There is need for robust and diverse initiatives to improve the weak links in this dimension. Action plans and deliberate efforts that promote industrialisation and clustering of economic activities should be adopted. In addition, the city has very poor mean household income and weak economic specialisation.

However, the city has a low old age dependency ratio of 3%, which means there are 3 people aged 65+ for every 100 people aged 15-64. The economic burden on the working age group is therefore low, which is favourable for strong economic growth.

On the other hand, the lower old age dependency could be attributed to the fact that culturally when people reach old age they usually relocate to the rural areas, cattle posts and lands.

Overall, the employment sub-dimension scores moderately well under both basic and extended CPI, which is mainly driven by relatively low unemployment rate and informal employment and high employment to population ratio. The low informal employment (29 in informal employment for 100 adult population) means that the city's economy is mainly formal, which is favourable to productivity, adequate incomes and working conditions for its labour force. The Employment to Population Ratio (EPR) is an indicator that reflects the ability of the economy to provide employment to its population.

For Gaborone, the EPR is high (61.5 employed for 100 adult population) i.e. the city has an ability to create jobs for its population. However, this alone is not enough to assess the level of decent work in the city or its deficit. It may be useful to examine earnings, hours of work (full or part-time jobs), and quality of jobs to have a better idea of labour market conditions in Gaborone.

Gaborone's weak economic agglomeration is mainly driven by low spatial distribution of productivity (economic density) and low economic specialisation.

## **Gaborone performs poorly in terms of economic strength and economic agglomeration**

7. Old Age Dependency ratio is the ratio of the total number of people aged 65+ to the number of people of working age and is meant to capture the burden on the productive population.

**Table 3: Gaborone Productivity Index, 2018**

Sub-dimension	Indicator	Unit	Value	Scale Interpretation	
				Basic	Extended
Economic strength	City product per capita	USD	12,208.76	Solid	Moderately Weak
	Old age dependency ratio	# per 100 active population	3.0		
	Mean household income *	USD	1,076.7		
Economic agglomeration	Economic density	USD/km <sup>2</sup>	14,618,836.23	Very weak	Very weak
	Economic specialization*	Dimensionless (value between 0 and 1)	0.066		
Employment	Unemployment rate	%	12.40	Moderately Solid	Moderately Solid
	Employment to population ratio*	%	61.5		
	Informal employment *	%	28.6		

\*This indicator is not used in the basic index

Source: Calculations from authors.

The widespread urban sprawl in the city may have the effect of lowering productivity per unit area of a city. Being the capital city, Gaborone is the hub of markets, commercial enterprises, large scale industries and innovation. Data from Statistics Botswana suggest that main economic activities in the city include public administration and defence, administrative and service activities, manufacturing, accommodation and food service, education, construction, transport & communication, and wholesale & trade. Gaborone exhibits some of the highest per capita income and relatively low unemployment at 12.4% but the city will continue to have a low productivity index if it does not resolve the issue of economic agglomeration. The very weak economic density and specialisation means that Gaborone is missing out on productivity efficiency and economies of scale.

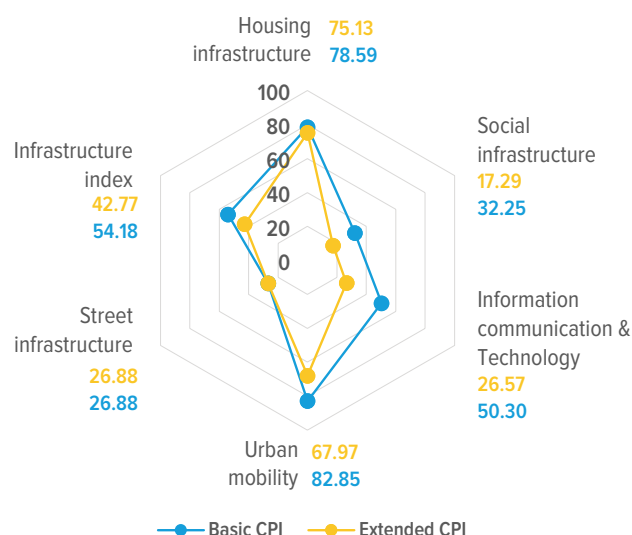
In general, it is acknowledged that Botswana's relative success in spurring relatively strong economic growth has been pegged to its diamond reserves that may not last forever and high public investments. Efforts already undertaken to diversify its economic base to achieve sustainable development and prosperity for all

should be strengthened. A diversification strategy that ensures the economic is less dependent on government spending but boosts the private sector to take on a more dominant role in the economy will benefit Gaborone as the capital city.

This means improving economic infrastructure as well as augmenting skilled manpower in the country. In addition, job creation strategies should be intensified to improve livelihoods.

### 2.4.3 Infrastructure Dimension

Physical infrastructure is a key element of a prosperous city. For a city to function well, it needs functioning infrastructure such as housing, social services, ITC, Urban mobility and street connectivity. Basic services and facilities like water supply, sanitation, sewage disposal, and education and health facilities have a direct impact on the quality of life and overall prosperity of the citizens. Transportation, power and communication facilities contribute to economic development and industrialization and encourage trade and mobility of labour. Investment in infrastructure is therefore essential for economic growth and poverty reduction.

**Figure 8: Infrastructure Index for Gaborone, 2018**

Overall, Gaborone scores poorly under the infrastructure dimension, 54.18 under basic CPI and 42.77 under extended CPI (Figure 8). This is mainly driven by poor performance under all sub-dimensions except housing infrastructure and urban mobility which perform very well, suggesting that housing and transport conditions are generally good in Gaborone. Indeed, housing infrastructure index is the strongest sub- dimension followed by urban mobility; however, their performances are weighed down by the poor scores under social infrastructure, ICT, and street connectivity.

Housing Infrastructure is performing well as evidenced by high levels of improved shelter, water, sanitation and sufficient living area. This is mainly attributed to housing programmes targeting the low-income households and upgrading of low-cost neighbourhoods. However, there is still a challenge of non-connection of water and sewer at individual plot level. The continued use of pit latrines in urban areas is undesirable as it

**Table 4: Infrastructure Index, 2018**

Sub-dimension	Indicator	Unit	Value	Scale Interpretation	
				Basic	Extended
Housing	Improved shelter	%	93.80	Solid	Solid
	Access to improved water	%	95.50		
	Access to improved sanitation *	%	99.10		
	Access to electricity *	%	84.20		
	Sufficient living area *	%	92.90		
	Population density*	# /km <sup>2</sup>	1,747.17		
Social Infrastructure	Physician density	# / 1000 population	0.93	Very weak	Very weak
	Number of public libraries	#/100,000 population	1.14		
ICT	Internet access	%	50.30	Moderately weak	Very weak
	Home computer access *	%	29.40		
	Average broadband speed *	Kbps (kilobytes per second)	0.26		
Urban Mobility	Use of public transport	%	56.00	Very solid	Moderately solid
	Average daily travel time	Minutes	23		
	Traffic fatalities *	# / 100,000	19.54		
Street Connectivity	Street intersection density	# / km <sup>2</sup>	25.60	Very weak	Very weak
	Street density	Km / km <sup>2</sup>	5.69		
	Land allocated to streets	%	13.98		

\*This indicator is not used in the basic index

Source: as in table 1 / Calculations from authors.

contravenes urban development standards and compromises the environment. The weak link in this sub-dimension is population density, which is low and may contribute to high cost of services, urban sprawl and poor land use efficiency.

ICT performs moderately weak in the basic CPI due to relatively low internet access, while the extended CPI is weakened by low possession of computer at home computer and weak broadband speed. On the other hand, urban mobility is performing well due to relatively high access to public transport and short travel time.

The least performing sub-dimensions are Social infrastructure and street connectivity. The social infrastructure dimension performs poorly due to the limited number of public libraries and low physician density. Compared to many African countries, Botswana invests a lot of resources to fund public healthcare, which has significantly contributed to raising and improving living standards of Botswana since independence. However, the country does not have enough trained health providers which can be attributed to high attrition rates and failure to lure externally trained citizen doctors back to the country. The establishment of a local medical school in 2015 is anticipated to reduce the dependence on expatriate doctors (Nkomazana et al, 2014). Evidently, although urban centres such as Gaborone have more trained health workers than other zones, this remains insufficient if compared to other countries and cities elsewhere in the world.

Street connectivity is negatively affected by low intersection density, street density and land allocated to streets. Gaborone has a low percentage of land allocated to streets (13.98 %), and a low overall street density (5.69/km<sup>2</sup>). In addition, the street intersection density is too low at 25.60/km<sup>2</sup>, which constrains permeability and walkability in the city.

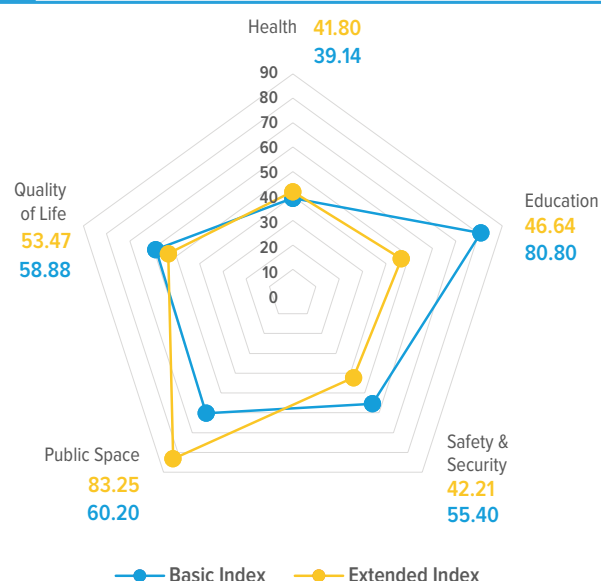
In order to enhance quality of infrastructure, there is a strong need to improve connectivity and permeability of the urban space to promote safe pedestrian movement and reduce traffic congestion in Gaborone. In addition, investments should be made in ICT and public libraries to improve access to information and promote the culture of reading and hence contribute to the vision of a knowledge-based society.

## 2.4.4 Quality of Life Dimension

Quality of life dimension is an important determinant of a city's prosperity as it measures its achievement in terms of provision of important amenities such as social services, education, health, recreation, safety and security. These are key elements of a high standard of living that enable citizens to maximize their individual potential and lead long fulfilling lives.

The Quality of Life index for Gaborone is 58.88 as per the basic CPI and 53.47 under the extended CPI, which is rated moderately weak, according to the scale of prosperity. The basic CPI performs relatively well in terms of education due to high literacy rate. Investment in education is one of the country's national priorities in order to develop local human capital and increase local skilled labour. The successive Botswana governments have heavily invested in education with several education programmes implemented to improve the skills base of its population (Government of Botswana, 2015b). As a result, overall time spent in schooling has increased over time, students who have complete secondary school have an increased and varied choice of post-secondary education options to get enrolled in, and literacy is increasing among adults (from 34% in 1991 to 96% in 2016) (Statistics Botswana, 2017).

**Figure 9: Quality of Life Index for Gaborone, 2018**



**Table 5: Quality of Life Index for Gaborone, 2018**

Sub-dimension	Indicator	Unit	Value	Scale Interpretation	
				Basic	Extended
<b>Health</b>	Life expectancy at birth (Years)	Years	66.80	Very weak	Weak
	Under 5 mortality rate	# / 1,000 live births	56.00		
	Vaccination coverage*	%	59.80		
	Maternal mortality *	# /100,000 live births	143.2		
<b>Education</b>	Literacy rate	%	95.80	Very solid	Weak
	Mean years of schooling	Years	9.30		
	Early childhood education*	%	43.50		
	Net enrolment rate in higher education*	%	28.10		
<b>Safety and security</b>	Homicide rate	# /100,000 inhabitants	27.26	Moderately weak	Weak
	Theft rate *	# / 100,000 inhabitants	3,877.41		
<b>Public space</b>	Accessibility to open public areas (%)	%	66.5	Moderately solid	Very solid
	Green area per capita *	m <sup>2</sup> /inhabitant	109.70		

\*This indicator is not used in the basic index

Source: as in table 1 / Calculations from authors.

However, access to early childhood education remains limited despite the increase in the number of education institutions that offer pre-school education in the country, especially in urban centres such as Gaborone. Unaffordability has been identified as a key factor since most institutions are privately owned. To increase access to early childhood education, pre-school programmes were introduced in 15% of government primary schools and will be rolled out in phases (Government of Botswana, 2015a). Similarly, enrolment in tertiary education remains low suggesting that there is still much room for

improvement in this area. This is reflected in the lower score for the extended Quality of Life index which includes an education sub-index that takes into consideration indicators related to early childhood education and net enrolment rates in higher education.

The health sub-dimension is very weak due to high maternal and under five (5) mortality rates<sup>8</sup>. Despite a decline in the maternal mortality rate (MMR) from 148 deaths per 100,000 live births in 2012 to 143.2 deaths per 100,000 births in 2015 (Statistics Botswana, 2017), MMR remains a cause of concern in the country as it is far from the target of 46 deaths per 100,000 live births to be achieved in the 11th National Development Plan. This is in spite of tremendous strides to ensure that almost all mothers (99.8%) deliver in a healthcare facility where they are attended to by a trained birth attendant (Statistics Botswana, 2017).

**Gaborone has a low percentage of land allocated to streets (13.98 %), and a low overall street density (5.69/km<sup>2</sup>)**

8. National statistics were used as city level administrative data may be biased since Gaborone houses Princess Marina hospital, the only referral health care centre serving the entire southern region. As a result, it records high levels of under-five and maternal deaths consisting of both referrals and city residents.



Despite the high HIV/AIDS burden, child survival has improved over time due to sustained interventions over the years. In 1971, 152 out of 1000 children would die before their 5th birthday, it is the case for only 56 out of 1000 in 2017. Still, compared to countries with similar level of development or that have achieved rapid fertility decline such as Mauritius and Thailand, Botswana is not doing well in terms of survival of her children. It is important to investigate the root causes of maternal mortality and under-5 mortality that persist inspite of improved access to health facilities.

The safety and security sub-dimension is moderately weak under the basic CPI (55.4) and weak for the extended CPI (42.2). The relatively high homicide rate may be linked to gender-based violence (GBV). While there is no clear explanation, evidence shows that GBV is high in the country. The 2018 Botswana National Relationship Study has revealed that slightly over a third of women in the country (37%) reported experiencing some form of GBV in their lifetime. The same

study revealed that 21% of men reported experiencing some form of violence. It is therefore imperative to develop sustained gender transformative programs and raise awareness on GBV and negative gender norms (UNFPA, 2019).

Gaborone has a good performance in terms of public space (score of 60.2 and 83.25 under basic and extended CPI respectively). Specifically, the public space index under extended CPI is ranked as very solid due to the high green area per capita, which is necessary for improved quality of life and air quality. It is however important to promote the usage of and improve security in these public spaces.

***Gaborone has a high green area per capita, which is necessary for improved quality of life and air quality.***





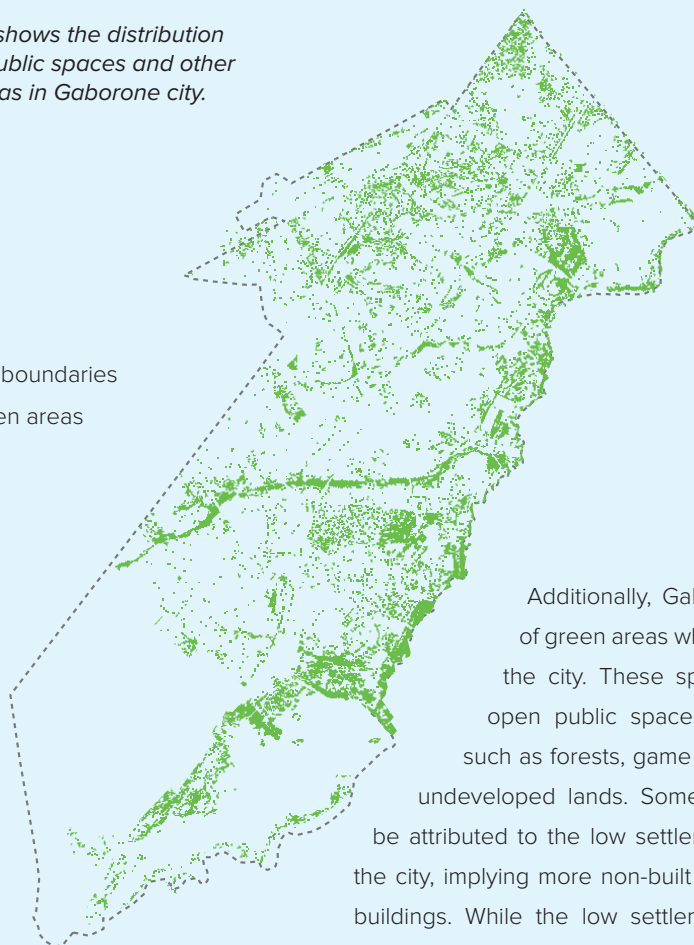
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**BOX 1: Spatial analysis of open spaces and green areas****Map 4: Distribution of open spaces and green areas in Gaborone**

*The map shows the distribution of open public spaces and other green areas in Gaborone city.*

**Legend**

-  City boundaries
-  Green areas



Gaborone displays a structured network of open spaces, which are spread throughout the city. These spaces range from small resting areas by the roadside and park lets in residential and commercial neighbourhoods to large recreational parks and ecological corridors. The existing pattern of open public spaces in the city makes it easy for people to access them within 400 meters walking distance from their homes, significantly contributing to a strong performance for this CPI sub-dimension on open spaces.

Additionally, Gaborone depicts a network of green areas which are spread throughout the city. These spaces extend beyond the open public spaces into other green areas such as forests, game parks and agricultural and undeveloped lands. Some of the green areas can be attributed to the low settlement densities throughout the city, implying more non-built up/ green areas between buildings. While the low settlement densities in the city (which is itself growing outwards) could be attributed to other challenges associated with sprawl, more green areas in the city contribute to better air quality in Gaborone, and in turn better quality of life.

***Presence of open spaces, green areas, and their distribution contributes to better quality of life in Gaborone***

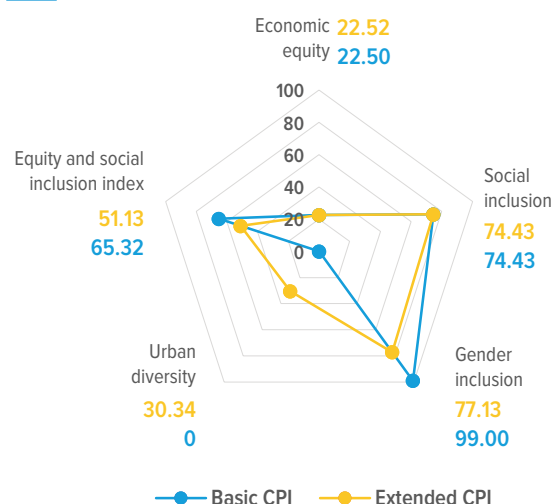
### 2.4.5 Equity and Social Inclusion Dimension

Equity and inclusion are crucial in leaving no one behind as stipulated in the 2030 Agenda for Sustainable Development. A city is prosperous if income inequality, slum households and gender inequality are low (UN-Habitat, 2012). Overall, the equity and social inclusion is the second-best performing dimension of the City's prosperity. Gaborone has a moderately solid performance under basic CPI (65.32) but moderately weak under extended CPI (51.13). The highest scores are in the Gender and Social inclusion sub-dimensions, which are solid, both for basic and extended CPI. These are however, offset by the low economic equity sub-dimension.

It is often suggested that the economic growth that Botswana has experienced since independence has not benefited all the segments of its population as income inequality is one of the highest of the world with a Gini coefficient of 0.67 for cities/towns such as Gaborone in 2016 and has even increased since 2010 (Statistics Botswana, 2018). Clearly, income inequality is more pronounced in cities/towns that contribute the most to the national economy.

In terms of social inclusion, the percentage of slum households is low due to relatively good level of access to basic services such as water, sanitation and durable housing. However, youth unemployment remains high in Gaborone with 1 in 4 youth being unemployed in 2017.

**Figure 10: Equity and Social Inclusion Index for Gaborone, 2018**



Youth unemployment in Botswana is often linked to the perceived incompatibility between graduates' skills set and the demands of the economy, suggesting that the education system as currently organised is not adapted to the labour market. Obviously, there is still a lot to do for programmes/strategies such as the National Human Resource Development Strategy (NHRDS), Graduate Volunteer Scheme (GVS), and National Internship Program (NIP) that were put in place by the government to address not only the issues of quality of education but also the mismatch between training programmes and skills set required in the job market.

**Table 6: Equity and Social Inclusion Index**

Sub-dimension	Indicator	Unit	Value	Scale Interpretation	
				Basic	Extended
Economic equity	Gini Coefficient	Dimensionless (value between 0 and 1)	0.67	Moderately weak	Moderately weak
	Poverty rate	%	4.30		
Social Inclusion	Slum households	%	10.30	Solid	Solid
	Youth unemployment	%	25.60		
Gender Inclusion	Equitable secondary school enrolment	Dimensionless	0.99	Very solid	Solid
	Women in local government *	%	22.50		
	Women in local workforce *	%	56.30		
Urban diversity	Land use mix*	Dimensionless	0.49	Very weak	Very weak

\*This indicator is not used in the basic index

Source: as in table 1 / Calculations from authors.

The gender inclusion sub-dimension performs well in both the basic and extended CPI, scoring 99.00 and 77.13 respectively. It is noteworthy that there is not much difference between men and women in terms of secondary school enrolment in Gaborone, which may reflect efforts at national levels to achieve gender equality and equity at all levels. It is widely recognized that education among women is very impressive even at secondary and tertiary level and female labour participation is relatively good (Statistics Botswana, 2018).

Botswana not only has a National Policy on Gender and Development but has also signed a number of international declarations, conventions and treaties on gender including UN Convention on the Elimination of all forms of Discrimination Against Women (CEDAW), the African Charter on Human and People's Rights on the Rights of Women in Africa; the SADC Declaration on Gender and Development, the Beijing Declaration and its Platform for Action (1995).

However, as the relatively low level of women representation in local government suggests, some challenges still exist, and existing laws and policies should be enforced to achieve gender equality in the country.

Gaborone performs poorly in terms of land use mix, standing at 0.49 which means that the mixing of land uses within a square kilometre is not optimal. It is therefore necessary to put in place planning reforms that will encourage both horizontal and vertical mixing of land uses in Gaborone.

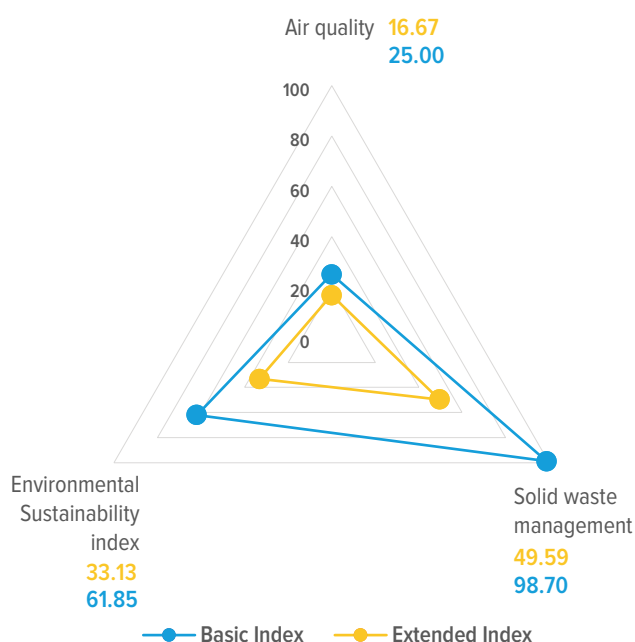
**1 in every 4 youth in Gaborone were unemployed in 2017 which is often linked to the perceived incompatibility between graduates' skills set and the demands of the economy,**

## 2.4.6. Environmental Sustainability Dimension

Environmental sustainability is a key component of sustainable development. Prosperous cities ensure that as they grow and develop economically, the environment is not destroyed or degraded but remains healthy and liveable; the city's natural assets and resources are preserved for future generations.

The Environmental Sustainability dimension is one of the least performing dimensions in Gaborone. The Environmental Sustainability index has a moderately solid score of 61.35 under basic CPI and very weak score (33.13) under extended CPI (Figure 11). Although the share of solid waste collected by the city and adequately disposed is high, the low levels of indices related to air quality lead to an overall low environmental sustainability index in the extended CPI. This shows that the city generally performs poorly in keeping a balanced and sustainable environment. The Air Quality index under basic CPI is very weak at 25.00 due to high concentration of PM 2.5.

**Figure 11: Environmental Sustainability Index for Gaborone, 2018**



**Figure 12: Foamy final effluent discharged by Glen Valley Wastewater Treatment Works (GWWTW)**

Similarly, for the extended CPI, the index is 16.67 due to high carbon dioxide concentration levels. Deliberate efforts should be made to intensify monitoring of particulate matter and carbon dioxide emissions and implement corrective measures.

Although there are no statistics on the level of wastewater treatment, it is acknowledged that wastewater in Gaborone does not always meet BOBS 93:2012 standard due to the old infrastructure which requires rehabilitation (Government of Botswana, 2019c). This has resulted in bad odour, particularly on the northern side of the city.

However, the Rehabilitation of Glen Valley Wastewater Treatment Plant and Sewer Network Emergency Works projects is underway and is anticipated to be complete in May 2020. Solid waste management at household level and public places is the responsibility of the city council, while it is the responsibility of the business owners in commercial and industrial areas. On average, waste is collected once a week. However, solid waste recycling share is very low as sorting at source is still negligible. Only 0.24 percent of waste was reclaimed at Gamodubu landfill in 2017 (Statistics Botswana, 2018).

**Table 7: Environmental Sustainability Indicators**

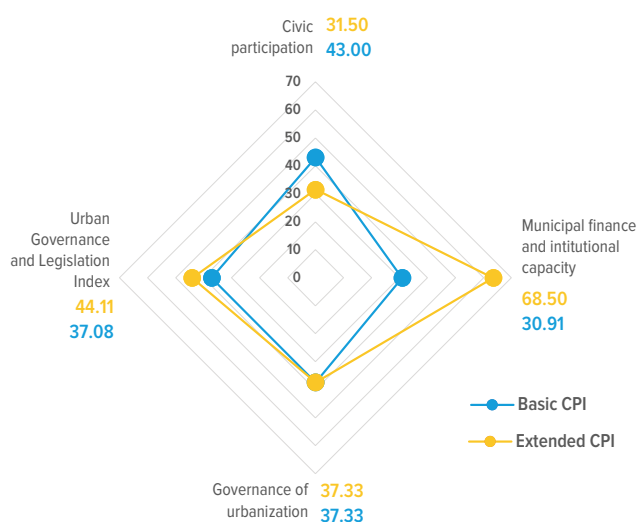
Sub dimension	Indicator	Unit	Value	Scale Interpretation	
				Basic	Extended
Air quality	Number of monitoring stations	#	4.0	Moderately weak	Very weak
	PM 2.5 concentration *	Micrograms per cubic meter (ug/m3)	20.4		
	CO <sub>2</sub> emissions*	Metric tons per capita	43.42		
Waste management	Solid waste collection	%	98.7	Weak	Very weak
	Solid waste recycling share *	%	0.24		
*This indicator is not used in the basic index					

Source: as in table 1 / Calculations from authors.

## 2.4.7 Urban Governance and Legislation Dimension

Governance and legislation are key elements of orderly and prosperous cities and sustainable urbanisation. A prosperous city seeks to increase civic participation to foster democracy and align policy and government actions with the needs and the will of all its residents (UN-HABITAT, 2012). Citizens are empowered when structures are put in place for effective participation in decision-making and planning. Finance is also a critical factor in the ability of local authorities to meet the rising needs of urbanisation, which include services and infrastructure development. The urban governance and legislation dimension is one of the least performing sub-dimensions in Gaborone. It is however the only dimension where the extended CPI is greater than the basic CPI. The low ranking of the basic CPI is attributed to low financial capacity of local authorities, voter apathy and poor access to information by the city residents which impedes community participation and engagement in the development of the City. The improvement in the extended CPI is mainly driven by better scores in municipal finance and institutional capacity notably a low subnational debt and high local expenditure efficiency. The low subnational debt is mainly attributed to the fact that central government funds all development projects for local authorities. The budget does not however adhere to the 70:30 apportionment rule between development and recurrent budgets; hence most of the budget goes towards administration at the expense of capital projects (Government of Botswana, 2015a).

**Figure 13: Urban Governance and Legislation Index for Gaborone, 2018**



As indicated in Table 8, Gaborone scores poorly for almost all the indicators except sub-national debt, local expenditure efficiency, and land use efficiency. Revenue collection is poor probably because over-reliance on central government for funding. The sources of revenue are limited such that the 90 percent annual collection target is seldom met. Furthermore, the number of days needed to start a business (48 days) is extremely high and stifles competitiveness. The recently introduced online registration by Companies and Intellectual Property Authority (CIPA) is anticipated to shorten this time period.

**The urban governance and legislation dimension is one of the least performing sub-dimensions in Gaborone**



**Table 8: Urban Governance and Legislation Index**

Sub-dimension	Indicator	Unit	Value	Scale Interpretation	
				Basic	Extended
Participation	Voter turnout	%	43.00	Weak	Very weak
	Access to public information*	%	20.00		
Municipal finance & Institutional capacity	Own revenue collection	%	36.06	Very weak	Moderately solid
	Days to start a business	Days	48.00		
	Subnational debt *	%	9.19		
	Local expenditure efficiency*	%	92.18		
Governance of urbanization	Land use efficiency	Dimensionless	1.88	Moderately solid	Moderately solid
*This indicator is not used in the basic index					

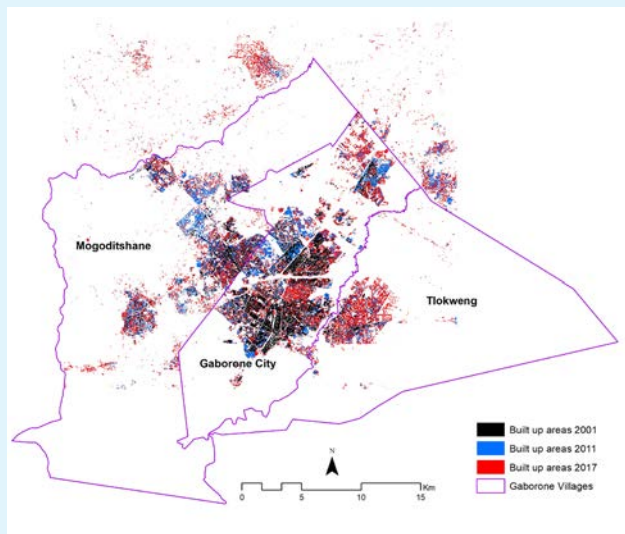
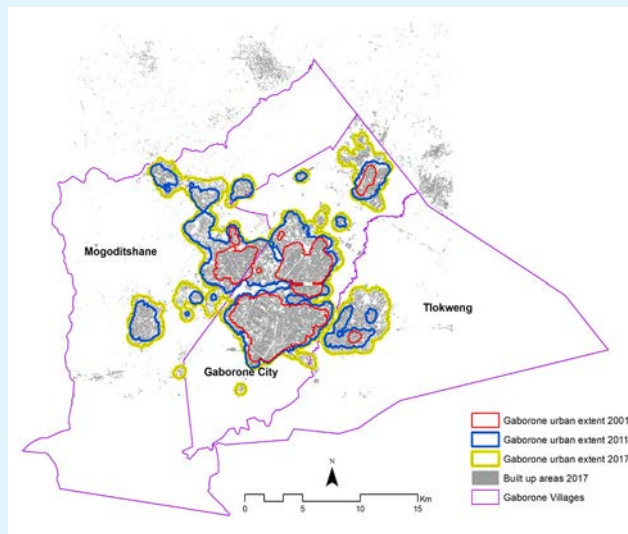
Source: as in table 1 / Calculations from authors.

Public participation is the weakest link as evidenced by low voter turnout, limited access to public information and ineffective public consultation processes and structures. Out of approximately 171,121 eligible voters, only 72,819 (43%) cast their vote in the 2014 elections. At the national level, only 52 % of eligible voters cast their votes. This is due to lack of effective measures to combat voter apathy and mobilize people to register and cast their votes (Maundeni, 2015). Access to public information and ineffective public consultation processes and structures also contributed to low public participation. This can be attributed to the fact that citizen engagement process in Botswana is rooted in the consultative framework of the traditional 'kgotla<sup>9</sup>' democratic system of governance (Obasi & Lekorwe 2014).

This conventional method of public consultation and engagement has been seen to be unattractive to the youth and inconvenient in cities. Instead, there is a preference for online communication and feedback channels. Despite efforts to have one window of government through e-government facility, information that is of interest to the public is not shared online. The last update on the website was made in 2016, and limited information of services offered is available. The last update on the website was made in 2016, and limited information of services offered is available. The Gaborone City Council Facebook page is more active and interactive. However, it lacks critical information like tenders, budgeting and expenditure. There is clearly an urgent need for active engagement of communities so that planning is with, not for the people.

***Public participation is the weakest link as evidenced by low voter turnout, limited access to public information and ineffective public consultation processes and structures.***



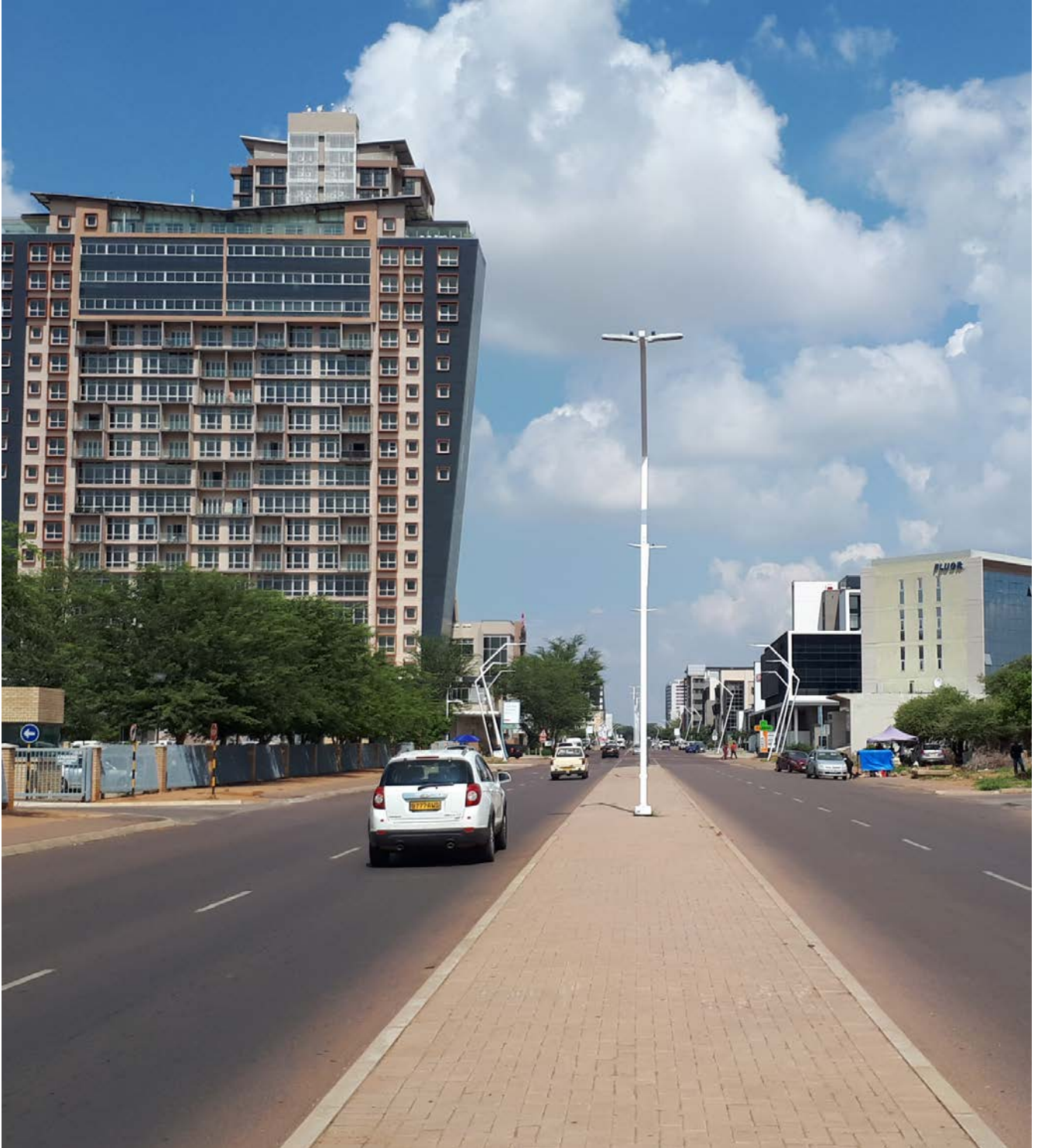
**BOX 2: Urban expansion in Gaborone city****Map 5: Built up areas in Gaborone  
2001 – 2017****Map 6: Delineated urban extents 2001, 2011 and  
2017 based on built up density**

Gaborone is a rapidly sprawling city. Between the periods 2001 to 2011 and 2011 to 2017, Gaborone expanded at an annual rate of 7.6%, implying a rapid uptake of land from other uses to urbanised activities. As a result, between 2001 and 2011, the urbanised land<sup>1</sup> in the larger Gaborone area (which extends beyond the core city to Tlokweng and Mogoditshane villages) increased by 63 km<sup>2</sup> (from only 55.8 to 118.8 km<sup>2</sup>), and by a further 67.4 km<sup>2</sup> between 2011 and 2017 (from 118.8 to 186.2 km<sup>2</sup>) – figure below.

This rapid growth of Gaborone city has not only resulted in urban sprawl characterised by low densities but has also made it difficult for provision of urban level services such as sanitation, resulting in low performances in the related indicators (see infrastructure dimension under section 4.2.2.2). In addition, this urban expansion has consistently expanded into other land uses, particularly surrounding agricultural areas, with likely negative impacts on food security.

***Gaborone, a Sprawling City***

1. Urbanized land here represents areas where the built-up density in every 1 Km<sup>2</sup> circle of a given point/built up pixel is equal to, or greater than 25% - i.e. within every 1 Km<sup>2</sup> circle, at least 25% of the land is built up. For more information, refer to urban extent approach to city definition at [https://unhabitat.org/wp-content/uploads/2019/05/Training-Indicator-11.3.1-Module\\_D.pdf](https://unhabitat.org/wp-content/uploads/2019/05/Training-Indicator-11.3.1-Module_D.pdf) (pp 30 - 36)



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## Chapter 3: Conclusions and recommendations

The application of the CPI in Gaborone reveals prevailing conditions using about 58 indicators, which constitute invaluable data to planners, policy makers and any stakeholders involved in decision-making, both for Gaborone City Council and the national government. In general, different trends were observed with the city performing well in some dimensions and poorly in others.

Overall, Gaborone has moderately weak prosperity that needs to be strengthened, with large discrepancies among the six dimensions of Urban Prosperity and therefore an unbalanced urban development process, probably due to institutional and structural weaknesses. Quality of Life and Equity & Social Inclusion are moderately solid for basic CPI; however, it is important to strengthen these dimensions as they are

moderately weak for extended CPI. On the other hand, there is need to rethink policies on infrastructure, environmental sustainability and urban governance. To effectively manage the urbanisation process and bring change in all sectors, there is need to develop a National Urban Policy to harness opportunities created by cities. In addition, the implementation of the National Spatial Plan of 2019 will be critical in ensuring stronger national, regional and international connections; improved spatial governance; access and mobility; human and social development; sustainable environment and diversified economy. Furthermore, there is need to develop local monitoring with national reporting systems, including governance mechanisms of data production, use, and dissemination. There is an urgent need to establish the national urban observatory.





The key findings and recommendations under each dimension are as follows:



### 3.1 Productivity

The productivity dimension has low average value due to weak economic agglomeration as evidenced by low economic density and specialisation. This can be attributed to low industrialisation and low production of goods and services. There is need to strengthen implementation of the Economic Diversification Strategy which aims to develop other sectors apart from the primary sectors so that they can contribute to the GDP.

Gaborone relies on minerals extraction especially diamonds, which may not be sustainable in the long run. In order to create more employment opportunities, it is important to diversify economic activities. For example, Gaborone's strategic location and importance in the SADC region can be leveraged to create economic activities beyond the mining sector. Furthermore, it is home to most higher education facilities and has a youthful population which can be leveraged through innovation centres such as Botswana Innovation Hub and Botswana Institute of Technology, Research and Innovation (BITRI). Investments in ICT and innovation will place Gaborone as an ICT hub in Africa like Nairobi, Kenya. Gaborone enjoys relatively good safety and security and political stability that provide a conducive environment for attracting foreign investments. Furthermore, the implementation of Special Economic Zones (SEZ) present a unique opportunity for economic specialization and economic agglomeration. Two (2) zones have been identified in Gaborone (Fairgrounds and Sir Seretse Khama International Airport) and are expected to promote economic diversification and Foreign Direct Investment.



### 3.2 Infrastructure Development

Infrastructure is crucial for the development, functioning and prosperity of cities. It provides the underlying foundation for cities to thrive. Physical infrastructure such as road network, power and communication facilities all enhance urban mobility, which is essential for economic growth and poverty reduction. Good infrastructure is vital in making firms more productive and competitive internationally and critical to the ability of countries and cities to reap the benefits of globalisation as it is central to the behind the border agenda, enhances the investment climate in of the city, improves the productivity of workers, and contributes to the overall attractiveness of the city (Fay & Morrison, 2006). Historically, cities and countries that have invested in their physical, social, ICT, policy and regulation infrastructure have achieved high and rapid levels of development. The fact that Gaborone performs poorly on this dimension is a major impediment to prosperity for the city and Botswana.

A productive city is a city that is highly connected whether physically or virtually. Gaborone has both low street connectivity and poor internet access, which is a deterrent to increased productivity and economic growth. Given that Gaborone is a relatively small city, improving internet access can open the city to wide opportunities for investment both locally and internationally. This will hugely contribute to making Gaborone a smart city, with associated benefits such as high employment opportunities for the youthful population, improvement of efficiency in production and trading (e-commerce), and increased connectivity. The quality of service measures that are being developed by the Botswana

Communications Regulatory Authority (BOCRA) which include download speeds and network availability are anticipated to improve connectivity and broadband speed.

There is need to review the housing policy and programmes, so that they can address the complexities of urbanisation in general, and deal with key housing deprivations (overcrowding, sanitation, non-durable structures) in particular. The implementation of the Low-Income Housing and the Participatory Slum Upgrading Programmes should be intensified. For lasting impact, there is an urgent need for efficient consumption of land through high densities, infill and mixed-use residential developments. Although the results indicate that urban mobility is solid, it is important to introduce a mass transit system and dedicated bus lanes to improve efficiency and reliability of the transport system and reduce air pollution. The implementation of the Botswana Integrated Transport Project should be expedited.

This project implemented in partnership with the World Bank improves the efficiency of the transport system in the city as well as inter-regional transport through provision of technical support and construction of critical infrastructure. Several projects to improve road network by replacing traffic circles with inter changes and installation of centralised robots for automated traffic control are ongoing under this initiative. Furthermore, there is need to review urban planning standards to improve street connectivity and develop better plans in newly developed areas.



### 3.3 Quality of Life

A prosperous city creates opportunities for all citizens to enjoy enhanced quality of life, which in turn make them healthier and productive. While the quality of life dimension is relatively well-performing compared to the other dimensions, it is not commensurate with the country's level of development. For example, compared to countries with similar level of development such as Mauritius and Thailand, Botswana is not doing well in terms of survival of her children and their mothers. There is need to rethink interventions and strategies to improve maternal and child health including South-to-South learning.

Although literacy rate is very solid, access to Early Childhood Education and net enrolment in higher education is very low. The low ECE rate is mainly attributed to unaffordability of the programme as it is mainly offered by private institutions. To increase access to early childhood education, there is need to increase the number of public institutions that offer the programme. In addition, net enrolment in higher education needs to be improved.

Safety and security significantly contribute to a city's economy including promotion of a 24-hour economy. The introduction of the safer city concept whereby the city is under 24-hour surveillance through cameras could assist in containing theft incidences. There is need to ensure that safety considerations are integrated from planning stage through implementation of the safer cities programme. Furthermore, the review and implementation of the economic empowerment and poverty eradication

strategies are also important prerequisites of improved urban safety.

There is also need to improve health systems and increase health personnel in Gaborone. This could be done through introduction of investments in attractive and competitive remuneration packages to attract and retain physicians to the city as the poor level of physician density is attributed to their relocation to other areas, particularly outside the country, in pursuit of better opportunities. It is also recommended that public libraries be increased to promote the culture of reading and hence contribute to the vision of a knowledge-based society. In addition, there is need to improve connectivity and permeability of the city's urban space to promote safe pedestrian movement and reduce traffic congestion.



### 3.4 Equity and Social Inclusion

A prosperous city ensures that the wealth it generates benefits all residents. While Gaborone is well performing in the equity and social inclusion dimension, the city also has high income inequalities as evidence by high Gini coefficient (0.67). This calls for robust implementation of policies and programmes geared towards poverty eradication and equal distribution of wealth.

There is need to consider reviewing the economic empowerment and poverty eradication strategies to better target initiatives that can result in bankable projects. It may be prudent for welfare improvements programmes to go beyond or shift focus from rural areas to urban areas such as Gaborone. It is also necessary to achieve gender equality in the local government, perhaps through affirmative action to improve women's

participation. There is also poor land use mix, suggesting that the city does not balance well its systems and functions through complementary uses and activities. It is recommended to conduct a review of the Urban Development Standards to improve not only land use mix but also street connectivity.



### 3.5. Environmental Sustainability

A prosperous city is one that advances its development agenda while protecting the environment. While Gaborone is a relatively green city, which can be associated with its development pattern, the city records very high levels of PM<sub>2.5</sub> concentration at 20.4 ug/m<sup>3</sup>, with potential serious health consequences for its residents. The main pollutants include construction industries and open burning. DWMPC is still working on the revision of the current Ambient Air Quality Standard (BOS498:2012) with BOBS so that it conforms to WHO standards. Meanwhile, WHO standard is used to verify compliance.

To improve solid waste management, there is need to reinforce implementation of policies on the recycling of waste. Sorting at source should be encouraged. The block 3 sorting pilot project is a step in the right direction. The project involves waste separation at source and sorting at the two (2) drop off at centres. This waste is then collected by recycling companies. This concept will be rolled out to the rest of the city. It is however important to inculcate the culture of segregation of waste right from household, office, industry and institution levels. The City should not only introduce reclamation of waste but also offer community incentives for recycling and intensify public education on waste management. The Integrated



Waste Management Policy that is being formulated is expected to improve waste management in the city.

To improve the share of sustainable energy, there is need to strengthen implementation of the Renewable Energy Strategy. It is also recommended that the initial capital cost of installing solar panels be subsidised in the same way as electricity connections.



### 3.6 Urban Governance & Legislation

Prosperity cannot be achieved in a city without adequate urban governance and legislation. This ranges from policies promoting sustainable urbanisation and own revenue generation to inclusion of citizens in decision making processes. Despite Botswana being recognized as a leading democracy in Africa, voter apathy, limited access to public information and civic participation in the city's development including in the planning and budgeting processes constrains effective engagement and participation. Communication and feedback channels should be improved so that the public can contribute meaningfully to their development. The inclusion of non-conventional public participation channels like social media will go a long way in improving public participation, particularly by the youth. Increased internet connectivity will significantly improve public participation.

There is also need for improved revenue streams by local authorities to ensure financial independence. The finalisation and implementation of the decentralization policy is anticipated to result in more autonomy of the local authorities. Moreover, the ease of doing business should be improved by reducing the number of days to start a business, implementation of e-government and one stop shops. The implementation and monitoring of

the newly adopted interventions to improve the ease of doing business like the introduction of the online registration by Companies and Intellectual Property Authority (CIPA) should be strengthened.

The current urban growth trends in Gaborone encourages both urban sprawl and disintegrated land use activities. This impedes efficient provision of services to residents and requires more infrastructure development to connect different parts of the city. The ongoing discussions on the development of a national urban policy needs to consider more compact development which also encourages mixed land use development. Furthermore, the implementation of the Gaborone Development Plan should be strengthened.

This plan advocates for spatial transformation through intensification and redevelopment of underutilised properties, rezoning to permit a wider range of housing types and greater mixing of compatible land uses and concentration of higher density development along major circulation axes (Government of Botswana, 2008).

***The current urban growth trends in Gaborone encourages both urban sprawl and disintegrated land use activities. This impedes efficient provision of services to residents and requires more infrastructure development to connect different parts of the city.***

In summary, the increasing number of urban dwellers in Botswana provides a great opportunity to achieve sustainable economic growth and development. This is however dependent on access to relevant, timely, accurate and disaggregated data to inform the design and implementation of programmes and policies that maximise the dispersed energies and potential of urban centres for the common good of all. As such, data generated through the application of the CPI for Gaborone city is invaluable to planners, policy makers and everyone involved in decision-making, both at national and local Governments. It will enable the city authorities as well as local and national stakeholders to gauge their performance and formulate inter-sectoral policy interventions.

However, the availability of data that is aligned to CPI indicators is a huge challenge. It may be necessary to include all CPI indicators in the National Monitoring and Evaluation System (NMES) for continuous monitoring. In addition, there is need to streamline data collection tools to CPI requirements and develop a data sharing strategy on urban indicators. In the

interim, the CPI reports will need to be regularly updated, while modalities on the establishment of the National Urban Observatory are being finalised.

These developments require a clear institutional and regulatory framework that will promote data sharing across sectors. Implementation of the National Spatial plan in terms of harmonisation of administrative boundaries will contribute tremendously to collection of data on uniform areas of jurisdiction.

Furthermore, although the pilot project has helped improve the capacity in terms of generating city-level data in Gaborone, there is need to reinforce capacitation and skills transfer through additional capacity building activities. It is also paramount to set up a research and/or data unit within the Council that is in-charge of collecting relevant data and generating evidence to help in decision-making in Gaborone. Finally, the implementation of these recommendations requires dedicated budget that needs to be provided for by the relevant authorities.

***Access to relevant, timely, accurate and disaggregated data to inform the design and implementation of programmes and policies is paramount in maximizing the dispersed energies and potential of urban centres.***

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# ANNEXES

## Annex 1: SDG 11 Indicators Update

Table 9: SDG 11 Indicators Update

INDICATOR		Gaborone	Francistown	Cities/ Towns	Urban Villages	Rural Areas	National
1.4.1 Proportion of households with access to basic services (water, sanitation, hygiene, electricity, clean fuels, mobility, waste collection, healthcare, education, broadband internet)	Water	95.5	98.3	96.5	98.2	91.0	95.0
	Sanitation	84.7	79.7	84.3	72.5	40.8	64.9
	Electricity	87.1	80.2	81.6	79.1	34.6	65.5
	Waste collection	98.7	92.5	96.6	48.3	22.1	50.9
	Broadband	0.26	0.26				
11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	Durable floor material	96.6	98.4	97.5	96.5	71.3	88.1
	Durable wall materials	94.5	93.2	93.7	92.9	63.5	83.0
	Durable roof materials	96.3	98.4	95.5	98.9	98.0	97.8
	Durable structures	93.8	93.2	91.7	92.5	61.4	81.6
	Sufficient living area	93.1	92.4	92.2	86.0	82.4	86.3
	One shelter deprivation	5.7	5.7	6.1	9.3		8.1
	Two shelter deprivation	4.6	3.5	0.1	0.3		6.0
	Slum households	10.3	9.2	10.4	16.4		14.1
11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities		43.4					
11.3.1 Ratio of land consumption rate to population growth rate		1.88	1.19				
11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities		66.5	74.3				-

## Annex 2: Steering Committee And Local Project Team

Table 10: SDG11 Steering Committee, Technical Working Group and Local Project team Members

NO.	NAMES	ORGANIZATION	NO.	NAMES	ORGANIZATION
1.	Dikagiso .B. Mokotedi	Ministry of Infrastructure and Housing Development	25.	Kesaobaka M. Moreeng	Gaborone City Council
2.	Bareng C. Malatsi	Ministry of Infrastructure and Housing Development	26.	Lebuile Israel	Gaborone City Council
3.	Duke Masilo	Ministry of Local Government and Rural Development	27.	Kaelo. K. Masara	Gaborone City Council
4.	Dr. Burton Mguni	Statistics Botswana	28.	Zibisani Siwawa	Water Utilities Corporation
5.	Lesego Chalashika	Ministry of Finance and Economic Development	29.	Ada Mabongo	Botswana Police Service
6.	Segomotso S. Maroba	Department of Housing	30.	Katlego Pearl Khudu	Department of Local Governance and Development Planning
7.	Gaokgakala Rabalone	Department of Housing	31.	Pelaelo M. Tsayang	Department of Local Governance and Development Planning
8.	Grace Mphetlang	Statistics Botswana	32.	William Mphala	Department of Local Governance and Development Planning
9.	Tapologo .B. Baakile	Statistics Botswana	33.	Bonolo Basebi	Department Of Housing
10.	Amutshilani Setoboli	Department Of Housing	34.	Kelebogile Basima	Department of Housing
11.	Maipelo O. Phale	Botswana Council of Non-Governmental Organization	35.	Kabelo Mpatane	Department of Lands, Water & Sanitation
12.	Dr. Morvyn Nyakudya	Ba Isago University	36.	Kentse Raphukula	Ministry of Finance and Economic Development
13.	G. Motlhagodi	Ba Isago University	37.	Patrick Seitiso	Ministry of Finance and Economic Development
14.	Ditshupo Gaobotse	Statistics Botswana	38.	Ditiro M. Sesinyi	Gaborone City Council
15.	Emmanuel Otukile	Statistics Botswana	39.	Tshimologo Douglas Motsumi	Department of Surveys and Mapping
16.	Boago Ian Mashadi	Statistics Botswana	40.	Dr Godfrey Simoonga	District Health Management Team
17.	Boikhutso E. Tumisang	Department of Town and Country Planning	41.	Donatien Beguy	UN-Habitat
18.	Mpho Kuaho	Department of Town and Country Planning	42.	Robert Ndugwa	UN-Habitat
19.	Tshwaragano Mothibi	Department of Town and Country Planning	43.	Thomas Chiramba	UN-Habitat
20.	Aone Phiri	Department of Town and Country Planning	44.	Dennis Mwaniki	UN-Habitat
21.	Chipo Bose	Department of Town and Country Planning	45.	Daniel Githira	UN-Habitat
22.	Tirafalo Jongilizwe	City Of Francistown Council	46.	Julius Majale	UN-Habitat
23.	Gabobofane Mbwe	City Of Francistown Council	47.	Leandre Foster Ngogang Wandji	ECA
24.	Unami N. Moanga	City Of Francistown Council	48.	Thomas Sinmegn	ECA
			49.	Khogali Khogali	ECA

## Annex 3: The CPI Summary For Gaborone

Table 11: A summary of Gaborone City Prosperity Index

CITY PROSPERITY INDEX	BASIC CPI RATING	PROSPERITY SCALE	EXTENDED CPI RATING	PROSPERITY SCALE
	53.38	Moderately weak	45.07	Weak
<b>Productivity Sub Index (P)</b>	<b>48.39</b>	<b>Weak</b>	<b>49.05</b>	<b>Weak</b>
Economic Growth (EG)	77.69	Solid	51.79	Moderately weak
Economic Agglomeration (EA)	1.17	Very weak	27.34	Very weak
Employment (E)	65.78	Moderately solid	68.01	Moderately solid
<b>Infrastructure Development Sub Index (ID)</b>	<b>54.18</b>	<b>Moderately weak</b>	<b>42.77</b>	<b>Weak</b>
Housing Infrastructure (HI)	78.59	Solid	75.13	Solid
Social Infrastructure (SI)	32.25	Very weak	17.29	Very weak
ICT Sub Index (ICT)	50.30	Moderately weak	26.57	Very weak
Urban Mobility (UM)	82.85	Very solid	67.97	Moderately solid
Street Connectivity (SC)	26.88	Very weak	26.88	Very weak
<b>Quality of Life Sub Index (QOL)</b>	<b>58.88</b>	<b>Moderately weak</b>	<b>53.47</b>	<b>Moderately weak</b>
Health Sub Index (H)	39.14	Very weak	41.80	Weak
Education Sub Index (E)	80.80	Very solid	46.64	Weak
Safety and Security (SS)	55.40	Moderately weak	42.21	Weak
Public Space (PS)	60.20	Moderately solid	83.25	Very solid
<b>Equity and Social Inclusion Sub Index (ESI)</b>	<b>65.32</b>	<b>Moderately solid</b>	<b>51.13</b>	<b>Moderately weak</b>
Economic Equity (EE)	22.52	Very weak	22.52	Very weak
Social Inclusion (SI)	74.43	Solid	74.43	Solid
Gender Inclusion (GI)	99.00	Very solid	77.13	Solid
Urban Diversity (UD)		Very weak	30.43	Very weak
<b>Environmental Sustainability Sub Index (ES)</b>	<b>61.85</b>	<b>Moderately solid</b>	<b>33.13</b>	<b>Very weak</b>
Air Quality	25.00	Very weak	16.67	Very weak
Waste Management (WM)	98.70	Very solid	49.59	Weak
<b>Urban Governance and Legislation Sub Index (UGL)</b>	<b>37.08</b>	<b>Very weak</b>	<b>44.11</b>	<b>Weak</b>
Participation (P)	43.00	Weak	31.50	Very weak
Municipal Finance and institutional Capacity	30.91	Very weak	63.50	Moderately solid
Governance of Urbanization (GU)	37.33	Very weak	37.33	Very weak



## Annex 4: Definition of terms

<b>City product per capita</b>	The City Product Per Capita is the sum of the gross value added (wages plus business surplus plus taxes less imports), or the total final demand (consumption plus investment plus exports), relative to the city's total population. The City Product Per Capita is calculated as the sum of the products of the national Gross Domestic Product (GDP) of each economic sector (primary, industrial and service) and the city's share of that sector's total employment, divided by total city population
<b>Economic specialization</b>	Refers to the agglomeration effects resulting from the clustering of industrial activities giving rise to an "industrial climate". It is usually as a way to gain greater degrees of productivity efficiency and take advantage of increasing returns of scale.
<b>Economic agglomeration</b>	This is the clustering of industries which results in efficiency due to reduction of costs of production and economies of scale.
<b>Improved housing</b>	Proportion of households living in a durable housing unit, i.e. built on a non-hazardous location, and has a permanent structure adequate enough to protect its inhabitants from extreme climatic conditions such as rain, heat, cold, humidity.
<b>Sufficient living area</b>	Proportion of households with three or fewer people sharing a room. A room is defined as a space in a housing unit or other living quarters enclosed by walls reaching the floor to the ceiling or roof covering, or to a height of at least two meters, of an area large enough to hold a bed for an adult, that is at least four square meters.
<b>Physicians density</b>	Number of physicians per 1,000 people, relative to the total city population.
<b>Street intersection density</b>	Number of street intersections per one square kilometer of urban area.
<b>Street density</b>	Number of kilometers of urban streets per square kilometer of land
<b>Women in local workforce</b>	The share of women in the labor force is the share of female workers in the non- agricultural sector expressed as a percentage of total employment of the city (African Health Observatory, 2008).
<b>Land use mix</b>	Diversity of land use per square kilometer, within a city or urban area.
<b>PM 2.5</b>	Annual mean concentration of particulate matter of less than 2.5 microns (PM2.5) in cities. PM 2.5 is used because of its greater health impacts. The estimates represent the average annual exposure level of the average urban resident to outdoor particulate matter.





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