

RESHAPING URBANIZATION IN RWANDA

Economic and Spatial Trends and Proposals

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Note 1: Urbanization and the Evolution of Rwanda's Urban Landscape

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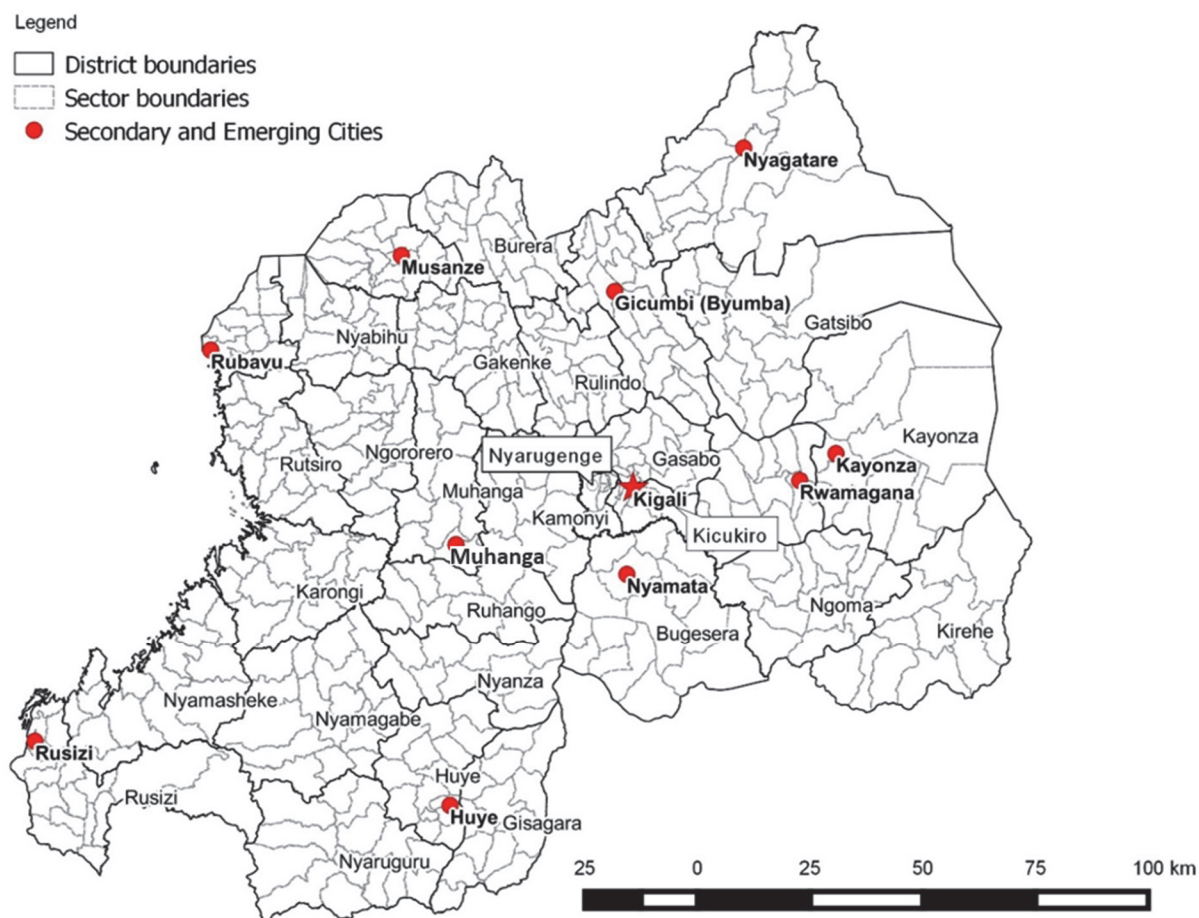
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Figure 1. Rwanda administrative district boundaries, showing the location of Kigali, Secondary Cities and other towns of focus



Cover Note

Reshaping Urbanization in Rwanda: Economic and Spatial Trends and Proposals is a product of Advisory Services and Analytics (ASA), jointly provided by the Poverty and Equity Global Practice and the Social, Urban, Rural and Resilience Global Practice at the World Bank. The objective of this report is to inform the Government's policies and strategies on urbanization as a driver of economic development, job creation, and poverty reduction through the following four stand-alone but closely related notes.

- Note 1: Urbanization and the Evolution of Rwanda's Urban Landscape
- Note 2: Internal Migration in Rwanda
- Note 3: Urbanization, Job Creation, and Poverty Reduction in Rwanda
- Note 4: Profiling Secondary Cities in Rwanda—Dynamics and Opportunities

Note 1 examines Rwanda's urbanization process since 2002 by analyzing satellite images and other sources. The changes in urban population and built-up areas are discussed together with the characteristics of the urban system and urban form and—in view of the key policy and legal framework guiding Rwanda's urbanization process—the spatial economy of cities and production and dimensions of density and connectivity. Note 2 analyzes internal migration patterns of Rwandan households, mainly based on the last two household surveys, and discusses the main drivers of migration. Note 3 explores whether and to what extent urbanization—in the sense of increased density and enhanced connectivity—has resulted in job creation and poverty reduction in Rwanda. Note 4 provides a detailed analysis of the core secondary cities of the country, discussing their expansion in terms of urban area and population, economic profiles and potential, access to services, and urban development plans.

1 Understanding the Dynamics of Rwanda's Urban Transition

1.1. Introduction

This Note presents and analyses the core features and trends of Rwanda's urbanization process. In the first part, it lays out the overall trends in Rwanda's levels of urbanization and the primary trends in urban expansion of Rwanda's key cities, and presents central legal and institutional elements that influence and inform the dynamics of urbanization. Second, it analyses the characteristics and spatial economy of the urban system. Third, it provides an analysis of key characteristics of connectivity of the urban system, domestically and with perspectives to regional connectivity. Last, the Note lays out a set of policy implications.

1.2. Urbanization and urban growth

In order to fully understand the dynamics of Rwanda's urban transition, it is important to disaggregate the general concept of 'urbanization' into three related but distinct processes: urbanization, urban growth, and urban expansion. **Urbanization** refers to change from rural to urban ways of living characterized by predominance of economic activities other than agriculture. **Urban growth** refers to an increase in the absolute number of people living in urban areas. **Urban expansion** concerns the physical enlargement of built-up urban areas.¹

In Rwanda, it has been difficult to track urban population trends due to changes in the definition of 'urban' areas between the 2002 and 2012 censuses (see Box 1). For the 2002 Census, 15 cities were delineated and all settlements within these catchment areas were considered urban, even those that previously would have been classified as rural. The 2012 Census defined urban-rural status based on the smallest administrative entity: the village. Villages with a significant built-up area with infrastructure (e.g. schools, electricity, banks, markets, etc.) were considered urban. As a result of this change in definition, the two census figures cannot be compared directly to evaluate urban population trends.

To understand basic urban population trends, a simple approach to settlement classification based on population size and density can be useful. Classifying settlements based upon the presence or absence of infrastructure can obscure identification of de facto settlement patterns, such as the emergence of large, densely populated areas on the edges of formally planned areas that are lacking infrastructure but are nonetheless functionally part of the broader urban landscape.

In contexts of rapid demographic change, a spatial-demographic approach to classifying settlements is a useful tool for planning, particularly when complemented by a separate suite of indicators of urban development that capture changes in the physical and socioeconomic characteristics of settlements. In such spatial-demographic terms, settlements are commonly classified as urban if they contain a **minimum of 5,000 persons living at a minimum density of 1,000 persons per kilometer (km).**

¹ These three metrics do not necessarily coincide and distinguishing among them is important. For example, urban growth can take place even with the urbanization rate unchanged if both the urban and rural population increase at the same pace. And urban growth can happen without urban expansion, if urban population increases only in the already built-up areas. Similarly, urban expansion can happen with the urbanization rate unchanged if urban population in inner-city decreases while rural population grows at the same pace with the urban population.

Box 1. Urban Definitions in Rwanda

The National Land Use Master Plan (NLUMP) defines “urban” and “built-up” areas from a land use planning perspective which considers spatial, population, density, administrative, size and zoning aspects. It defines an urban area as a built-up agglomeration which exceeds 20 km² and has a population of more than 10,000 inhabitants, resulting in a population density of more than 500 persons/km².

On the other hand, Law N°10/2012 of 02/05/2012 “Governing Urban Planning and Building in Rwanda” defines three categories of urban settlements according to population size. It categorizes urban areas into (1) a **city** with at least 200,000 inhabitants; (2) a **municipality** with at least 30,000 but less than 200,000 inhabitants; and (3) an **agglomeration** with at least 10,000 inhabitants but less than 30,000 inhabitants.

In addition, the Urban Planning Code (UPC) of 2015 has defined a hierarchy of settlements as follows: The **Capital City (Kigali)** is the national urban center whose functions, services and facilities have national and international influence and impact; a **Secondary City** is a sub-national urban center comprised of an urban area within a Secondary City district, whose functions, services and facilities impact or influence the district—and beyond its borders; a **District Town** is the main urban area within a district other than a Secondary City district, and which provides central urban functions, public facilities and services for a catchment area of the whole district; and a **Trading Center** is an additional center to the main urban center of a district, and serves as a hub of socio-economic opportunities within a predominantly rural setting.

Finally, the **2012 General Population and Housing Census** defined an urban area based on the smallest administrative entity, the village (Umudugudu). To qualify as urban, a village has to fulfil two main criteria of possessing: (1) an **important built up area** and (2) **important infrastructure** (education facilities, electricity and water, markets, banks and other financial institutions). According to the 2012 Census Atlas, 10 Districts have an urban area with one directly shared administrative boundary (the lowest level being the sector), while the remaining 20 Districts have more than one and up to four urban areas which do not have common administrative boundaries (the smallest being the one village in the whole sector).

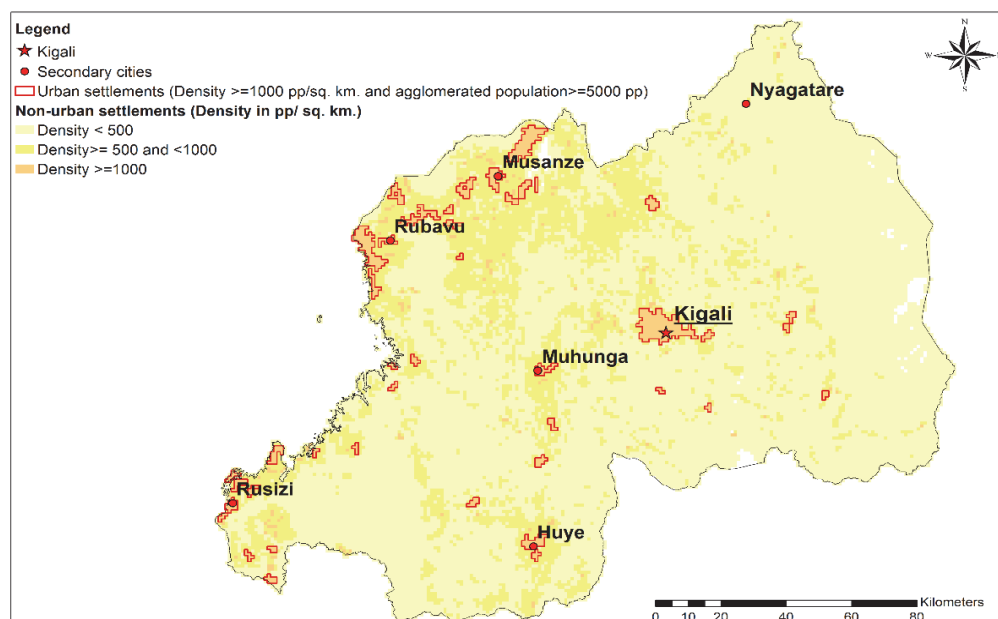
Applying this experimental definition to an analysis of geocoded population data indicates that Rwanda’s urban population growth was just under 2 million people—or 132 percent—from 1.49 million to 3.46 million between 2002 and 2015,² at an average rate of 6.7 percent per annum, while the level of urbanization increased from 15.8 percent to 26.5 percent over the same period. These estimates are based on analysis of data from the WorldPop project and a methodology that classifies settlements by breaking the national territory into 1km² grid cells as opposed to villages or sectors, which have variable areas (see Figures 2 and 3).³

² Representing intervals for data availability at WorldPop and reflects the simultaneous period for census data available in Rwanda.

³ The 2015 WorldPop datasets for Rwanda was used as the population map. The spatial distributions of population were estimated by applying a machine-learning method to the Census data, land-cover imageries, and other various types of datasets. For the details in the methodology, see <http://www.worldpop.org.uk/data/summary/?doi=10.5258/SOTON/WP00223>

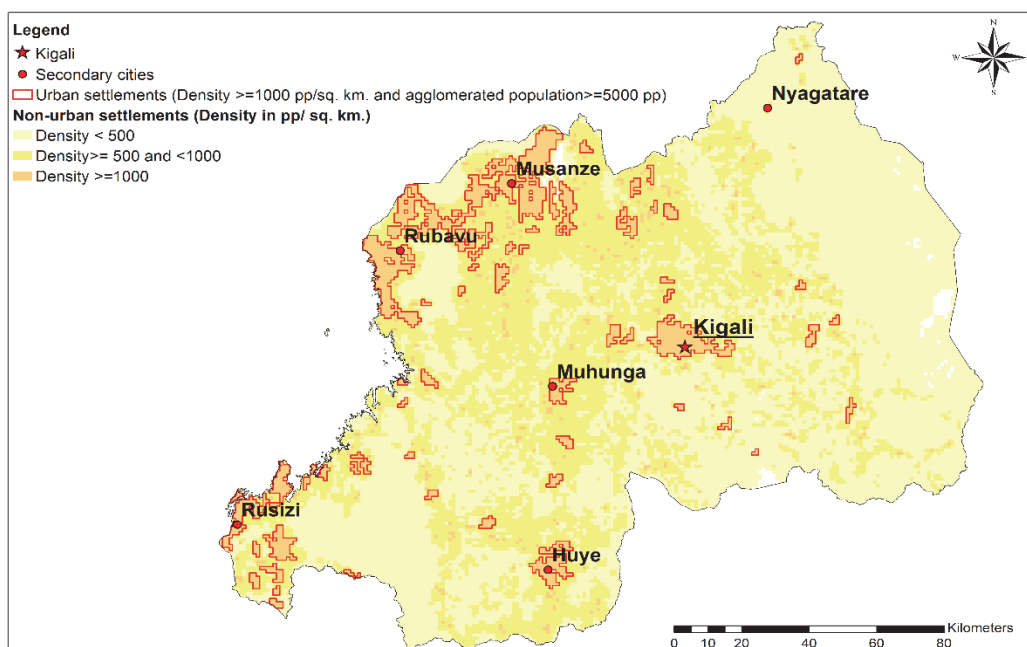
From a strictly spatial-demographic point of view, therefore, it is crucial to recognize that Rwanda has clearly experienced significant and rapid increases in both the absolute size (urban growth) and the proportion of the population (urbanization) living in identifiably 'urban' areas over the past decade.

Figure 2. Settlements of 5,000 or more persons and minimum density of 1,000 persons per km², 2002



Source: Authors' analysis of WorldPop data

Figure 3. Settlements of 5,000 or more persons and minimum density of 1,000 persons per km², 2015



Source: Authors' analysis of WorldPop data

These dynamics are manifested in different ways across the national territory. To begin with, rural population growth in the three districts that constitute the Kigali City area (Gasabo, Kicukiro, and Nyarugenge) has outpaced urban population growth, indicating that growth is occurring in low density settlements on the periphery of the main urban core. Kigali's urban population has also grown slowly compared to some secondary towns, and especially in comparison made to Rubavu-Nyabihu-Musanze corridor.

By contrast, many adjacent districts outside of Kigali City have lower rates of overall population growth but significantly higher rates of urban population growth according to the urban definition outlined above. For example, according to analysis of WorldPop data, Kamonyi District grew at roughly 2.3 percent per annum between 2002 and 2015, but the 'urban' population grew by over 28 percent per annum over the same period—a fact evident from the emergence of the 'urban' (or indeed suburban) settlements directly west of Kigali in Figure 3 above.

Similarly, Rusizi District grew at an annual rate of 2.3 percent during this period, but the 'urban' population of the district grew at around 7 percent per annum, while Nyabihu District saw per annum urban growth of nearly 10 percent during the same period.

Other demographic trends will continue to drive moderate to high rates of urban growth and urbanization. Rwanda has experienced impressive decline in both infant mortality and fertility, steadily pushing the country towards a demographic regime of low birth and infant mortality as opposed to high birth and infant mortality, as Table 1 demonstrates.

Table 1 highlights key trends by converting the data into index numbers with 2005 set as the base year. It is notable that infant mortality rates (IMR)⁴ have fallen much more rapidly in the past decade than fertility, indicating accelerated population growth. Rather unusually, urban fertility rates reversed trend and actually increased between 2010 and 2015. In other words, more people are being born in urban areas than rural ones, possibly due to a more youthful age structure in urban areas (DHS 2016, pg. 63). This trend indicates that urban populations will continue to grow more quickly than rural populations even in the absence of any rural migration.

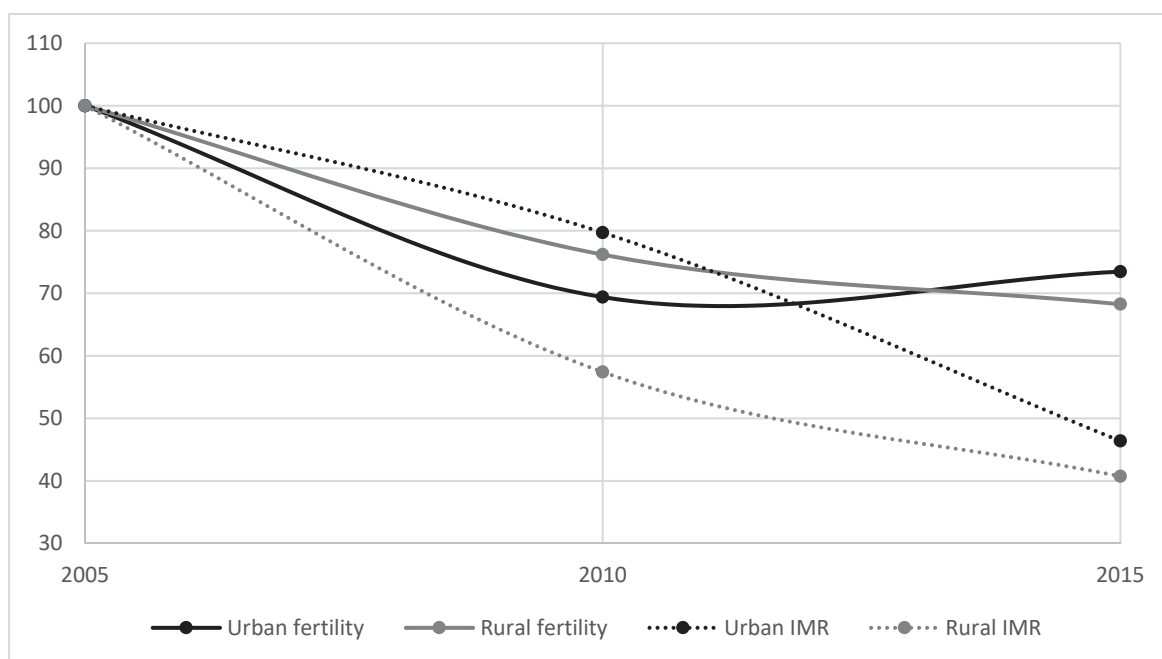
Table 1. Fertility and infant mortality rates by residence

Fertility/mortality rate	2005	2010	2015
Total fertility rate urban (births per woman)	4.9	3.4	3.6
Total fertility rate rural (births per woman)	6.3	4.8	4.3
Infant mortality rate urban	69	55	32
Infant mortality rate rural	108	62	44

Source: Demographic and Health Surveys (DHS) 2005, 2010 and 2015

⁴ Number of deaths of children under one year of age per 1,000 live

Figure 4. Fertility and infant mortality trends by residence (2005=100)



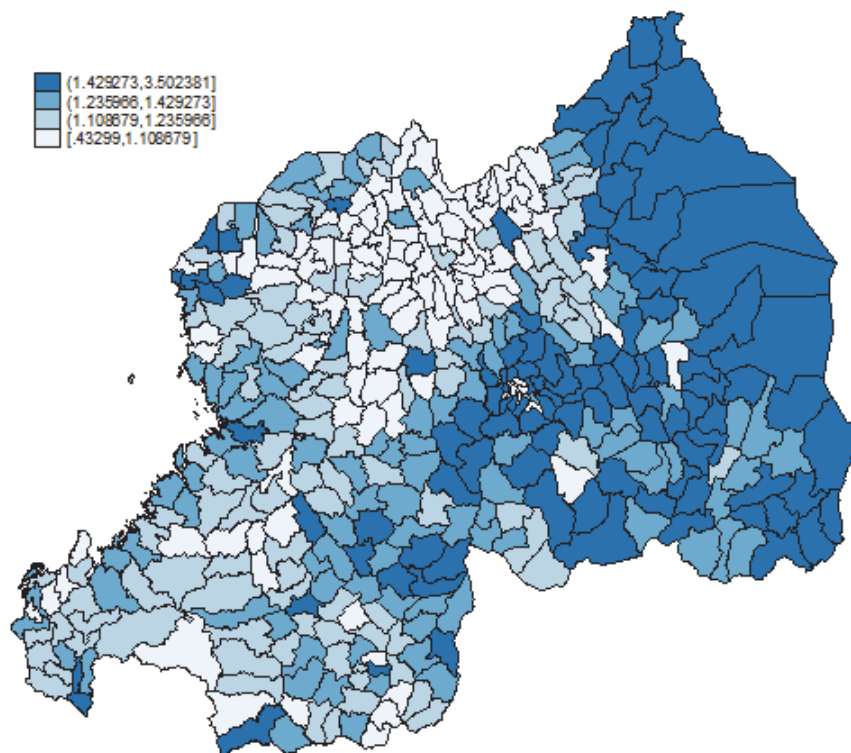
Source: Demographic and Health Surveys 2005, 2010 and 2015

The geography of population growth and densification is also influenced by demographic factors. Figure 5 illustrates the relative increase in population density by sector between 2002 and 2012, while Figure 6 shows total fertility rates by district in 2015. Strong population growth in the Eastern Province is mirrored by high fertility rates in this region, with similar patterns in parts of the Western and Southern provinces implying that population growth in these provinces are driven by a natural increase in population.

By contrast, fertility rates are comparatively lower in the peripheral and suburban zones of Kigali, suggesting that in-migration may play a relatively larger role in explaining population growth in this region (refer also to Note 2 for further perspectives on this trend in rural-urban migration).

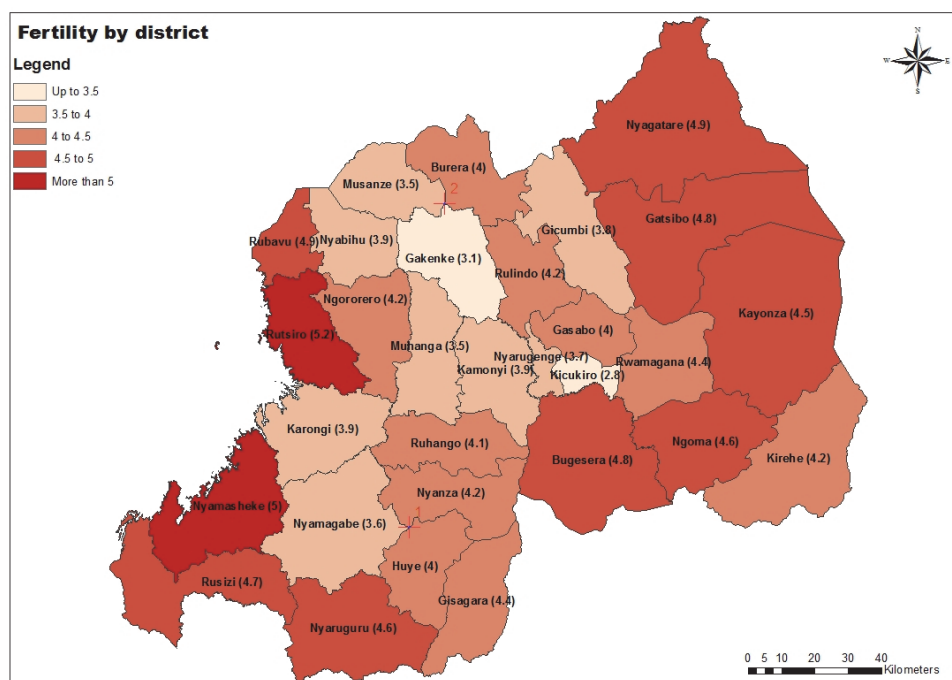
In conclusion, for the discussion of an urban definition and to what extent it is a useful measure to capture Rwanda's urbanization, this Note proposes an alternative urban definition be considered to better capture the real trends and reflect the reality of density of settlements in the country, avoiding an under-estimation of the urbanization rate. Not having a precise definition that reflects the reality of density and urbanization may create an impediment to gathering accurate information to inform policy decisions and prioritization of investments.

Figure 5. Factor increase in population density by sector, 2002-2012



Source: World Bank analysis of Census data 2002 and 2012

Figure 6. Total fertility rate by district in 2015



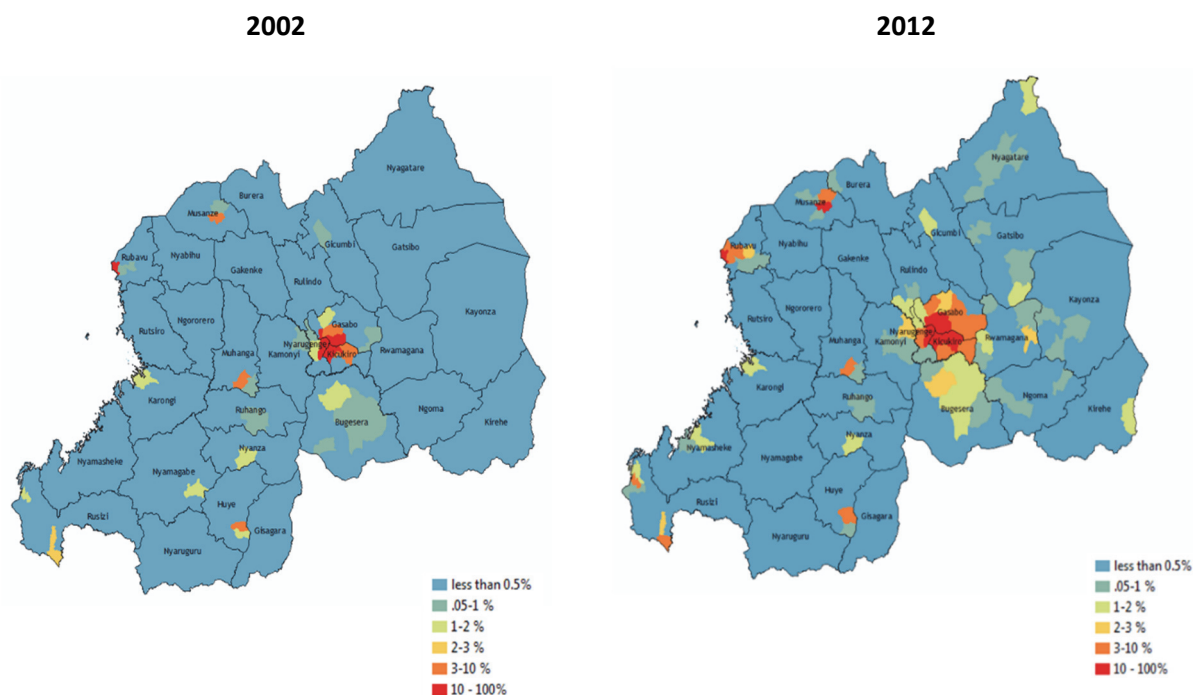
Source: Demographic and Health Survey 2015

1.3. Urban expansion

Population growth in urban areas has been accompanied by rapid expansion of built-up areas, particularly in the periphery and fringe zones of Kigali. Using satellite imagery, it is possible to evaluate changes in the amount of 'built-up' land in Rwanda — i.e. land covered by man-made, impervious surfaces such as roofs, roads, and other infrastructure. This is a good proxy for urban expansion. At the national level, the built-up area increased from 83 km² to 167 km².

A comparison of the maps in Figure 7 shows that the periphery and fringe zones of Kigali have experienced the most extensive expansion, with significant growth of built-up areas in the core city districts of Nyarugenge, Kicukiro and Gasabo. In neighboring Rulindo, Kamonyi, and Rwamagana, there have also been noticeable increases in built-up areas. Similarly, there has been extensive but modest expansion south of Kigali in Bugesera. While this is indicative of an urban expansion trend, some of these areas will still be predominantly rural in nature in terms of settlement pattern and economic activities, with relatively low-density settlement and dominated by agriculture-based economies.

Figure 7. Built-up area at sector level in 2002 and 2012



Source: World Bank analysis of satellite imagery

The expansion of built-up areas immediately surrounding Kigali City is indicative of an underlying trend of a rapidly growing city spilling over its designated boundaries. As Figure 7 also shows, there is still a significant amount of undeveloped land in Kigali City—with only the red sectors being built-up by more than 10 percent. In fact, 273,000 residents in Kigali City are classified as rural according to the 2012 census. Moreover, with a total population of around 1.2 million and a total land area of 730 km², the overall density

of Kigali City is only 1,644 people per km² compared with 9,430 in Kampala or around 6,500 in Addis Ababa (a city with a designated capital territory of 527 km² and a population of almost 3.5 million).⁵

It appears, then, not to be a shortage of land that is driving expansion into neighboring districts, but rather other factors, including the higher price of land in Kigali and stricter building codes leading to difficulty in obtaining permits and high construction cost. These factors have driven developments on the periphery of the city, despite government's introduction of one-stop centers to facilitate the permitting process and clarify construction procedures. Further, evidence from interviews conducted during the fieldwork indicates that these peripheral and increasingly suburban developments are also in demand for low to middle income families who made a comparative choice to relocate to these areas beyond the city limits (in places like Runda in Kamonyi district, Muyumbu in Rwamagana district and Nyamata town).

Continued growth of this nature is likely to present challenges in terms of the cost of servicing new settlements (especially roads and water) and pressure on transport links to Kigali where the majority of Kigali peripheral residents work. There is evidence that this phenomenon is being replicated to some extent in secondary cities, as observed in Rubavu and Muhanga.

In the secondary cities, there is a general trend toward decreased densities, though from a lower starting point. There is also a similar trend towards sprawl, based on the satellite imagery, as secondary cities have expanded their built-up area by an average of 10.1 percent a year.⁶ In contrast, population increased by an average of 3.6 percent a year between the two censuses (2002 and 2012), although it is impossible to be precise about changes in urban population between censuses due to changes in the urban definition (as explained above in Section 1.1)⁷.

2. Rwanda's Urban System—Institutional Framework and Trends in Development

2.1. Urbanization policy and key planning framework

Rwanda's urban system needs to be viewed within the context of an emerging policy framework that has evolved in a concentrated time period beginning in the early 2000s.

In 2000, **Rwanda Vision 2020** acknowledged the need to develop urban infrastructure in view of a targeted increase in urban population from 12 percent in the year 2000 to 30 percent by 2020. This was subsequently revised up to 35 percent in the 2012 version of Vision 2020 (Republic of Rwanda 2000).

In 2005 a UN-HABITAT/UNDP-supported programme was introduced to support the Ministry of Infrastructure in the development of a national urbanization policy. The joint UN-Government of Rwanda agreement to establish this noted that *"currently there are no policies in Rwanda guiding the urban development and planning sector."*

Even as recently as 2005, there was therefore *"minimum or no control of the dynamic urban growth, and a lack of urban planning and management tools"* (ibid). The UN-supported proposal was both to develop

⁵ Topographical nature of Kigali also contributes to the low density by constraining habitable area.

⁶ The span of years over which this expansion occurred vary for each of the cities due to data limitations, but all expansion took place in the period between 2000 and 2015 (Feasibility Studies of urban infrastructure were conducted by MININFRA for each of the secondary cities in 2015).

⁷ For detailed discussion of the trends of each city, please refer Note 4.

a National Urban Policy (including urban planning and construction standards) and provide institutional capacity-building for national and local institutions in charge of the urban sector.

The first **Economic Development and Poverty Reduction Strategy (EDPRS 1)** was released in 2007. This did not have any sustained or specific urban focus, but **EDPRS 2**, which set out development strategy from 2013-2018, treated urbanization as a 'standalone sector', being one of the five priorities under the first of the four overarching strategic thematic aims ('Economic transformation'). This priority is to *"Transform the economic geography of Rwanda by facilitating urbanization and promoting secondary cities."*

EDPRS 2 goes on to specify that *"Six Secondary Cities will be developed as poles of growth and centers of non-agricultural economic activities. This will require investment in specific hard and soft infrastructure and strategic economic projects that will trigger growth of these cities and enhance linkages to other towns and rural areas."* (EDPRS2 p. xi). The six selected cities are Rubavu, Musanze, Huye, Rusizi, Nyagatare, and Muhanga.

The National Urban Policy supported by the UN-habitat first appeared under the title **National Urban Housing Policy** in 2008, though its scope extended far beyond housing. This policy proposed the establishment of the Rwanda Urban Development Bureau.

What resulted was the creation of the Kigali One Stop Center, which was opened in 2010 with the purposes of: ensuring respect for safety standards in the construction sector; developing and reviewing key area detailed physical plans; ensuring quick service delivery, mostly in building permit issuance; and monitoring and advising districts' land bureaus for efficient service delivery. In 2014, District One Stop Centers were set up across the country.

In the years that followed the publication of the National Urban Housing Policy, it was superseded by two separate policies. The **National Housing Policy**, adopted in March 2015, covers the role of various actors delivering housing to a range of income groups. The **National Urbanization Policy (NUP)** was adopted in December 2015, organized around the four pillars of:

1. Coordination (enhancement of institutional capacity to manage urban development in a coordinated manner at all levels)
2. Densification (how to integrate urban planning to achieve resource-efficient and compact growth)
3. Conviviality (how to support the quality of life in urban settlements)
4. Economic growth (facilitating employment creation and off-farm productivity for local subsistence and regional competitiveness)

In addition, the **Rwanda Spatial Development Framework (2016)** builds on the NUP with an analysis of existing urban areas and focus on the specialization, spatial coordination and linkages between urban areas, including the secondary cities. As such it aims to "orient the implementation of the NUP", identifying the gaps between the real and desired spatial development situations.

Other relevant policy and strategic documents include:

1. **Government Programme for 2010-2017**, which prioritizes implementation of the National Land Use Master Plan and district land use master plans;
2. **Rwanda Green Growth Strategy** (2011), which includes a focus on high density construction and appropriate zoning;
3. **National Roadmap for Green Secondary Cities Development**, which provides tangible, simple actions at central and local levels that could be used to kick-start green growth within Rwanda's secondary cities;

4. **A practical guide to the Government of Rwanda** for planning the six secondary cities; and
5. **Urbanization and Rural Settlement Sector Strategic Plan** (2013-2018), which outlines the overarching goals and objectives concerning urban development (including affordable housing and capacity development).

The implication of this strategic prioritization of urban development has been reflected in both investment priorities and in legislative and policy development, as evidenced below. Furthermore, the priority and selection of six specific cities has been critical for the Government's orientation. However, the strategic choices should be informed by consistent data analysis and based on the observed trends of changes. In the following, the note lays out correlation between the formal framework for urban development and the observed trends in over the last ten years.

2.2. Urban planning and regulatory legislation

In accordance with the stronger orientation toward urbanization and spatial development in its national development plans and policies, the Government of Rwanda (GoR) has undertaken several initiatives to strengthen and develop the legal and institutional framework governing urban development. The trends of Rwanda's urbanization, urban growth and urban expansion influence and affect urban planning practices and the implementation of land policy, and vice versa. In the following, a set of key laws and policies are presented, with reflections on the applicability of these laws in their current form, as well as their potential positive and or negative impact on the urbanization process, in particular in Kigali.

Law N°10/2012 of 02/05/2012 Governing Urban Planning and Building in Rwanda is the overarching legal reference for planning. Its implementation orders regulate local development based on clear procedures for development management and technical implementation details. These ministerial implementation orders establish a planning hierarchy and the relationship between various key planning documents.

Most significant is the **Ministerial Order Determining Urban Planning and Building Regulations**, which provides the principles to be followed when planning for urban development. It has three Annexes which include the **Urban Planning Code (UPC)**, providing technical detail to be followed in urban plan elaboration, and the **Building Code** which provides technical detail for construction and a list of related faults and sanctions.

In 2011, the Government of Rwanda adopted the **National Land Use and Development Master Plan (NLUMP)** which provides general directives for sustainable land use development and guiding principles for the socio-economic development, infrastructure, environment and land administration. The plan is intended neither to supersede nor compete with the various strategic (national/local) plans being prepared by sector ministries. Its main functions are to provide a coordination framework for the production and implementation of District Development Plans. Based on its provisions, detailed **District Land Use and Development Plans** were developed in 2014-15.

The roles and responsibilities of the City of Kigali and the three districts of which it is composed had already been legally codified under the **Kigali City Law** (Law No 10, 2006). This law specified that the city's government is responsible for preparing a master plan for the city; coordinating the activities specified in the strategic plans of the three districts that comprise Kigali City; coordinating the developmental activities of the three districts, and following up the implementation of national policy in these districts. However, in 2015, the role of Local Urban Development Plan was attributed to the District by a ministerial order.⁸

⁸ Prime Minister's order n°104/03 of 06/05/2015 determining procedures for formulation, approval, publication and

In 2013, Kigali city moved from a conceptual master plan to detailed physical plans comprising land use categories and zoning regulations. Currently, all 27 districts outside the City of Kigali have adopted Local Urban Development Plans, some with detailed physical plans covering a small portion of urban planning area, and others on final stages.

The system of zoning in Rwanda, and the fact that it is being undertaken largely after the completion of the Land Tenure Regularization (LTR) programme can pose a number of challenges for inclusive urbanization, as outlined below.

Zoning is often undertaken without any clear legally-rooted principles for the practice. Most land is now theoretically under individual ownership after the implementation of the LTR, and the fact that zoning is being done after this process means that it can depend on the luck of the landholder as to whether the zoning regulations applied to their plot suit their needs and capacities.

Zoning thus essentially can have the power to withdraw land ownership rights. There are indications that this could have been a problem in Kigali, both in terms of creating uncertainty among investors and insecurity among existing urban dwellers. It may also be of particular concern in other urbanizing areas to which master planning and zoning are applied. This is because in these other areas, most people work in agriculture and live in informal housing, but most zoning regulations applied in the context of master planning will be for formal urban developed plots. In sum, zoning regulations as stipulated in the legal framework can in some cases function as a deterrent to inclusive and efficient urban development.

Urban areas that are under new local plans subsequently become subject to zoning requirements as well as to new forms of property taxation that come with urban status. Both of these factors generate incentives to develop property just outside of the formal urban area.

In Kigali - where stricter zoning standards were adopted earlier than the other cities - there are also reasons to believe that zoning has constrained both population densification and the growth of some economic activity (informal sector). This is because the disconnect between zoning and existing land use can require substantial resettlement and redevelopment (as per some of the upgrading of settlements in Kigali), and in some cases increases the risk of pushing the marginalized population out of the urban core. This is due, in part, to that fact that the adopted zoning standards limit both residential settlement and commercial activity through building regulations, minimum plot sizes and maximum plot coverage ratios. This is likely to lead some investors, as well as economic activity more generally, to areas where zoning has not yet been completed and/or planning codes are less rigidly enforced.

The UPC states that “an area characterized by functional weaknesses and structural problems and/or economic underutilization of land may be designated as an urban renewal area” (UPC, p. 32). This is likely to result in rezoning, which may be subject to some of the problems noted above. In such cases, the UPC states that “it shall be demonstrated that the newly proposed zoning is suitable for the area and for the community”, but the policy is less explicit as to how this will be demonstrated or in what way the public will be involved. Existing buildings may be formalized in the context of urban renewal areas, but only if they conform to a series of conditions regarding minimum standards, building material, etc., to which the majority of existing urban dwellings are unlikely to conform.

Another issue arises from the fact that many residential leases are typically for a limited number of years (often around 20-25 years), and the process of extending leases is not yet fully developed or clarified. The government has the right to change the category (and concomitantly, lease conditions) of a particular plot

of land which could, de facto, result in expropriation. Also, districts have the theoretical option not to extend leases which can increase the level of predictability for land holders.

As seen above, this is evident in some of the districts surrounding Kigali where rapid urbanization and urban expansion are occurring. Not only typical informal (i.e. slum-like) settlements but also high-value, low-density development on the urban periphery can use land inefficiently and unsustainably, in contradiction to spatial development strategies.

Box 2. Zoning and densification

Interest in densification has intensified in Rwanda in recent years, and it forms the second pillar of the National Urbanization Policy discussed below. The Urban Planning Code is central to realizing this densification pillar. However, despite significant population growth in the city as a whole, parts of Kigali have not witnessed significant increases in density (partly because of the expropriation and redevelopment of dense unplanned settlements in lieu of larger plot sizes in regularized zones), but also due to stringent planning and zoning regulations which restrict development in the city core. Much of the zoning for Kigali's three districts stipulates medium or low-density development at odds with the majority of existing housing.

A comparison of existing residential land use in Gasabo District with proposed land use (enshrined in zoning regulations) illustrates the point:

Comparison of planned and actual residential land use in Gasabo

Land use	Area (ha)	% of residential area
Existing residential land use		
TOTAL	3,110	100%
Single Family Residential	908	29.2%
Low Rise Residential	2,187	70.3%
Medium Rise Residential	15	0.5%
Planned residential land use		
TOTAL	7,401	100%
Single Family Residential	4,594	62.1%
Low Rise Residential	1,797	24.3%
Medium Rise Residential	955	12.9%
High Rise Residential	55	0.7%

This comparison shows that much of the planned residential part of Gasabo is zoned for single family residential use (R1)—almost two thirds, which is more than twice the existing proportion, and five times as much area in real terms as is currently used for such housing. The zoning rules for single family residential use, however, involve minimum plot sizes of 600 m² and maximum plot coverage of 40 percent. In contrast, over 70 percent of existing housing is in the 'low rise residential' (R2) category (which includes informal settlements), while only 24 percent of

Box 2. Zoning and densification

residential areas are zoned as R2 (which allows minimum plot sizes of 90 m² and coverage of 60%) in the Gasabo area plan.

For the vast majority of the population, conforming to R1 regulations is not possible and is likely to inhibit development in those areas. To the extent that the zoning is being followed, it is also promoting relatively low densities across much of the district. The expectation that medium-rise residential development (R3) will also occupy 13 percent of residential land (up from 0.5% currently) is also problematic and unrealistic, given that minimum plot sizes for such developments are 750 m².

The secondary cities are all significantly less dense than Kigali, averaging around half of the density of the capital, with the important exception of Nyagatare which is very sparsely populated (only 305 per km²). Nevertheless, most of these cities are still dense in particular areas. In some cases, if residences were to conform to the code, it might actually decrease density (as has happened at certain times in Kigali) if much residential zoning is for R1 rather than R2, as discussed above. More generally, 'off-core residential' areas are required to have lower plot coverage than 'urban core' and 'urban sub-center' residential areas. This, along with the tendency to allocate large amounts of land for R1-type housing development, fits with typical suburban development patterns which may not be suitable for the Rwandan context.⁹

Further analysis of the composition of individual land ownership, expropriation and investment in new land would be required to extrapolate the impact of the policy's guiding principles. But on the basis of observed trends, it is obvious that, for practical purposes and in order to address the particular needs of the urban context in Rwanda, a more flexible application of the formal land use regime will be needed.

Efforts to attract investment by providing serviced land with infrastructure, which is very expensive, can cause government to pay low levels of compensation to people for land expropriated for projects outlined in Master Plans. Because the costs of servicing the land cannot easily be brought down, compensation payments can come under pressure in the effort to keep serviced land prices low.

There is some anecdotal evidence of under-compensation in Kigali, along with evidence that the city government has had to 'fix' the price of land at times, effectively subsidizing it to make it more appealing to investors. Secondary cities may be more vulnerable to this, given that attracting investment into these contexts is likely to be even more challenging. The new 2015 Expropriation Law may help to limit such practices of under-compensation, although as highlighted in Note 4, the impact of the application of the new law still requires further analysis since the law may still pose risks for under-compensation.

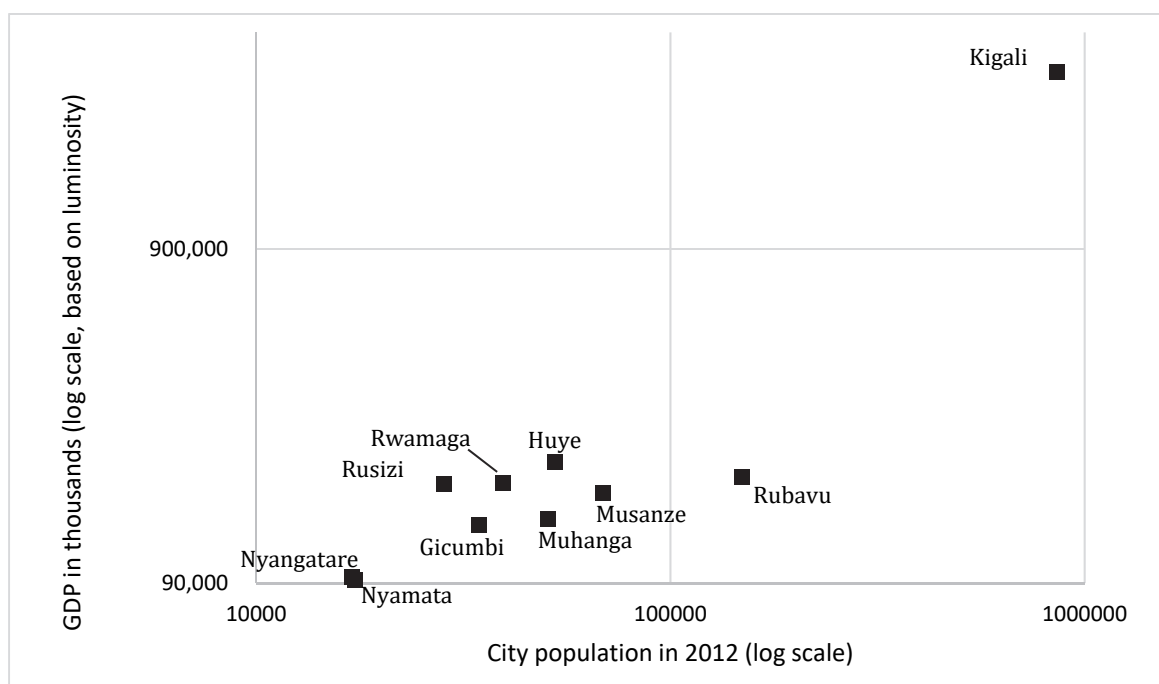
⁹ The spatial development trends of the secondary cities is further discussed in Note 4.

2.3. The Urban System

The Primacy of Kigali

Rwanda has a highly concentrated urban system with Kigali at its core. As Figure 8 clearly shows, Rwanda's urban system is dominated by Kigali, both demographically and economically. Using the standard measure of primacy, the percentage of population of the four largest urban units contained in the largest settlement, Kigali has a primacy rate of 76 percent. Given the size of Rwanda and the scale of difference between Kigali, which accounts for 50 percent of the country's entire urban population, and other cities in the country, this dominance will persist even as the secondary cities and other towns grow.

Figure 8. City population and GDP estimated from luminosity of night-time lights, 2012



Source: Census 2012; GDP estimates based on night-time lights data from NOAA

However, the same is not true for urban expansion with respect to increases in the proportion of land that is 'built-up', which continues to be primarily in Kigali and the districts immediately surrounding it, as well as in Eastern Province to some extent.

Infrastructure data shows the extent of investment in Kigali relative to the rest of the country. According to the census, in Kigali City: 73 percent of households use electricity, compared with 9-15 percent on average in other provinces; 89 percent of households have access to improved water sources; and 28 percent of households have members who have access to the internet, which is at least seven times more than any other household. Around 7 percent of households in Kigali have vehicles, seven times more than the nationwide average of 1 percent. However, 66 percent of the population continue to live in dwellings characterized as unplanned.

Such sustained ongoing investment in infrastructure in Kigali reflects the emphasis placed on the capital city in national development strategies as a regional hub for East/Central Africa, as well as the intense focus on Kigali in early efforts towards planned urban development in Rwanda.

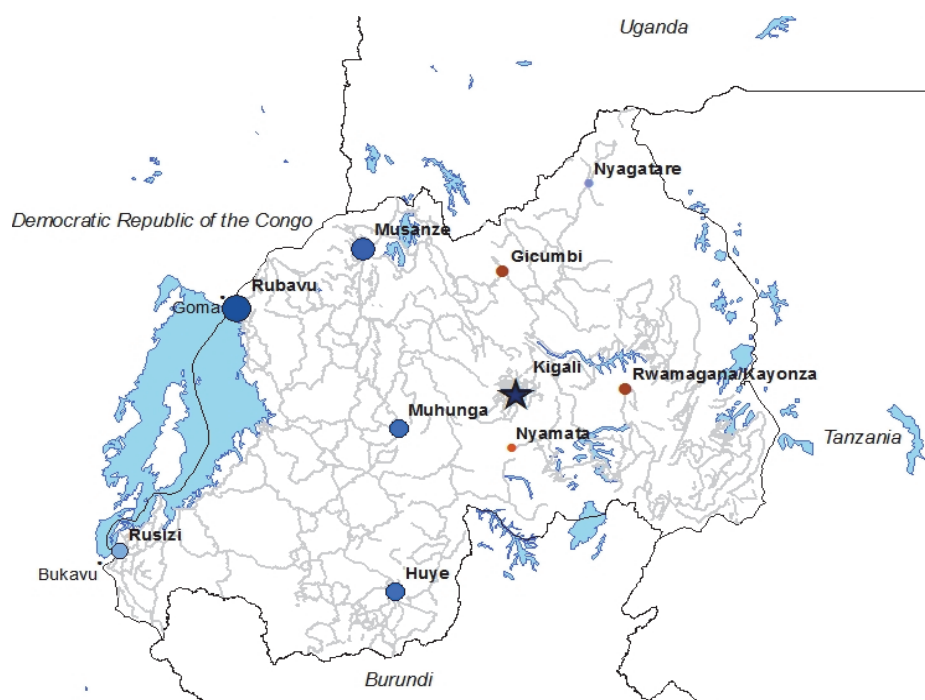
Rolling out zoning and other regulatory frameworks across Kigali in advance of any other urban areas may, however, limit the scope of economic activity in the city itself as some investors move to the places with more lenient planning codes. At the same time, it appears to be driving urbanization in the districts immediately surrounding the city but are not part of the Kigali Master Plan (and its associated zoning regulations), and which offer easy access to land and economic opportunities linked to the city.

2.4. Secondary cities and other cities of focus

While Kigali has always been and will remain Rwanda's principal city and a key national asset, there are reasons to believe that urban development and economic activities are starting to deconcentrate away from the city. As Figure 9 demonstrates, outside of Kigali, the urban population is clustered in six officially designated secondary cities—the already-mentioned Muhanga, Rubavu, Rusizi, Nyagatare, Huye, and Musanze—and a handful of other towns spread across the national territory.

The most significant concentration is the urban corridor emerging between Rubavu-Musanze, and Muhanga-Huye, which together account for half of the urban population outside Kigali, according to the 2012 census. The three districts along the Musanze-Rubavu corridor (Musanze, Nyabihu, and Rubavu) account for one-third of urban population outside Kigali, while the Muhanga-Huye corridor (Muhanga, Ruhango, Nyanza and Huye districts) accounts for another 18 percent. The remaining urban population is mainly concentrated along the national Bugesera road towards Burundi, the road linking Kigali to Rwamagana and Kayonza, and the urban centers of Rusizi and Nyagatare.

Figure 9. Rwanda's urban system: The capital, secondary cities, and other towns of focus



Figures 2 and 3 in Section 1.1 above showed developing urban clusters in different parts of the country. In the northwest, the distance between the secondary cities of Musanze and Rubavu is only approximately 50 km, and the sectors along the national road that connects both cities have experienced rapid urbanization since the early 2000s. This could be developed as an urban cluster focused on tourism and trade with the neighboring city of Goma in East DRC.

The southwest is densely populated throughout, and certain sectors (Bugarama) have urbanized fast from a low base. This urban cluster could be developed as a trade and services hub serving the cities of Bukavu and Uvira in DRC and Bujumbura in Burundi. Gicumbi town is close to the Ugandan border at Gatuna, and is close to Kigali as well.

Rubavu and Rusizi both form part of much larger contiguous transnational urban areas with cities on the other side of the border in DR Congo. Rubavu merges with Goma to form an agglomeration of well over one million people, while the city of Bukavu across the river from Rusizi is home to around 800,000. Both of these transnational agglomerations are vibrant areas of cross-border trade and have the potential to grow rapidly to the benefit of both countries.

The National Urbanization Policy aims to create a ‘functional network of development poles’ which can ‘cost-effectively provide socio-economic opportunities to all’. The way in which the cities are characterized as economic growth poles in the NUP is as follows:

- Huye as the city of ‘Education, Knowledge and Cultural History’
- Rubavu as the city of ‘International Gateway City and Tourism’
- Musanze as the city of ‘Eco-friendly mountain tourism and industry’
- Nyagatare as the city of ‘Cattle and dairy region/commercial hub of Eastern Region’
- Rusizi as the city of ‘Cross-border trade and transportation logistics, Nyungwe Forest’
- Muhanga as the city of ‘Hydropower and mining center; creative economy; pottery and fashion’

The Rwanda Spatial Development Framework (SPF) provides a more detailed typology of urban settlements, classifying four of the secondary cities as ‘intermediate urban centers’ (Rubavu, Musanze, Rusizi and Huye), while Muhanga and Nyagatare are classed as ‘medium-sized towns’ with a significantly smaller number of core urban functions/amenities.

Between them, the six secondary cities account for just 21 percent of the total urban population. Other towns of focus, which have the potential to grow quickly due to factors such as location, are on average smaller, accounting for 5 percent of the total urban population. This leaves 24 percent of the urban population resident in small settlements of fewer than approximately 15,000 people.

The growth rates of these settlements are far from uniform and reflect significant underlying differences between cities. As Table 2 shows, the various cities in Rwanda’s urban system are growing at substantially different rates, with the older and more established cities, such as Huye, growing more slowly in comparison to new settlements like Nyagatare and Nyamata.

With an average annual growth rate of 3.3 percent, the six secondary cities are growing at a slower rate than the official national urbanization rate of 4.1 percent, which reflects the rate of urbanization in Kigali of 4.2 percent. Meanwhile the three towns of focus¹⁰ grew at 5.3 percent, albeit from a lower starting base.

¹⁰ Nyamata, Gicumbi, Rwamagana/Kayanza

Table 2. Rwanda's urban system

Urban center	Population	Share of total urban population	Growth rate 2002-2012
Kigali	859,332	49%	4.2
Rubavu	149,209	9%	3.7
Musanze	68,930	4%	3.3
Huye	52,768	3%	1.9
Muhanga	50,608	3%	2.1
Rwamagana-Kayonza	39,491	2%	5.6
Gicumbi (Byumba)	34,544	2%	4.1
Rusizi	28,488	2%	1.1
Nyagatare	17,274	1%	7.9
Nyamata	17,076	1%	6.3
Other centers	419,964	24%	N/A
Total urban population	1,737,684	100%	4.1

Source: Census 2012; Note: Secondary cities in bold

If this trend continues it will have implications for the NUP, since each of the secondary cities is growing at a slower rate than is necessary to meet projected targets made in the NUP (Table 3). Secondly, if current growth trends continue, then other towns such as Gicumbi and Rwamagana/Kayonza will soon overtake more established cities like Huye, at least in terms of size—and potentially in economic importance. The relative potential of the secondary and other growing cities are explored in more detail in Note 4.

Table 3. Comparison of projected and target urban populations in secondary cities, 2020

City	2020 projected	2020 target	Difference	Current rate	Target rate
Huye	61,343	103,654	69%	1.9	8.8
Muhanga	59,762	111,901	87%	2.1	10.4
Musanze	132,358	236,638	79%	3.3	11.1
Nyagatare	87,233	181,600	108%	7.9	18.3
Rubavu	199,538	421,124	111%	3.7	13.9
Rusizi	69,044	137,315	99%	1.1	10.2

Source: Census 2012, National Roadmap for Green Secondary City Development; Authors' projections

3. Rwanda's Spatial Economy

As countries develop and urbanize from a low base, economic activity tends to concentrate in areas that are favored by market forces, usually areas with a certain urban density or specific comparative advantages.¹¹ In the early stages of development, increased concentration of economic production in so-called leading areas is usually associated with increased spatial disparities in living standards, as incomes and access to basic services improve faster in the leading than in the economically lagging areas.

¹¹ See the World Bank (2009) *World Development Report: Reshaping Economic Geography*.

At higher levels of development, living standards and socio-economic indicators tend to converge across space, while economic density typically stays highly concentrated in a number of economically leading locations. Typically, essential household consumption is the first to converge across space, followed by access to basic public services. Disparities in wages and income are the last to converge.

3.1. Economic activity in Kigali

Rwanda's economic activity is concentrated in Kigali. Though there are no subnational accounts in Rwanda, proxy indicators highlight the importance of the capital city in national production.

The three districts of Kigali, which represent 11 percent of the population and less than three percent of Rwanda's total land area, account for 39 percent of all non-farm wage-employment in the country and more than 50 percent of all formal private sector firms (and employment in those firms). Nightlights-based estimation of district-level GDP estimates that Kigali accounted for 40 percent of total GDP in 2012.¹²

To further illustrate Kigali's importance, firms in Kigali accounted for 92 percent of total turnover in the first three quarters of 2015. This number is however biased upwards given that many firms are headquartered in Kigali even though their operations are elsewhere and because these data only concern registered firms (and exclude informal non-farm activity and subsistence agriculture).

Industrialization in Rwanda, however, is still low even by regional standards. A small industrial area was developed in Kigali from the 1970s, but industrialization remained nascent partly due to the expense of importing materials to a landlocked, natural resource-poor country. Industry has fallen as a share of GDP from 25 percent in 1990 to 14 percent in 2014, while agriculture has remained at 33 percent and services have increased from 42 percent to 53 percent.¹³

Consequently, a large proportion of Kigali's workforce are employed either in service sectors or in the informal economy, though the strict regulatory regime renders the latter a difficult option for many. The increasing difficulty of operating in the informal economy in Kigali may partly account for the relative dispersal of economic activity over time, discussed below.

A 2001 study indicated that in areas outside the Central Business District (CBD), up to 94 percent of businesses were unregistered. Since this time there has been a concerted formalization drive, as well as efforts to further develop the city's formal economy. This includes relocation of the existing industrial area at Gikondo to the Special Economic Zone on the eastern outskirts of the city. Significant efforts have been put in place to provide infrastructure in this area. Other major projects include the Kigali Convention Center, which is aimed at bringing business tourism to the city, and the planned Bugesera Airport and accompanying enterprise zone.¹⁴

¹² In recent years, the intensity of nightlights as measured from space has increasingly been used to estimate economic activity. The use of nightlights as a proxy for economic activity rests on the assumption that as almost all consumption and investment activities in the evening or night require lighting, the intensity of nightlights can be used as a proxy for the intensity of economic activity. See Bundervoet, Maiyo, and Sanghi (2015) for details in the methodology. They show that the nightlight approach works in Sub-Saharan Africa, and that the trend of annual GDP and the nightlight-based GDP has been similar over the past 20 years in Rwanda.

¹³ World Bank, World Development Indicators

¹⁴ While the proposed location lies outside the administrative boundaries of Kigali, it would have a large impact on the city. The Master Plan has been drafted with the position of the new airport in mind. The existing airport is considered too close to the expanding city center, constraining its capacity in the face of increasing tourism and economic activity. The idea of an accompanying enterprise zone is to facilitate Rwanda's aspirations to be the IT and

3.2. A gradual deconcentration

Kigali remains Rwanda's economic center, and accordingly, there is a strong focus on Kigali's role as a business hub in the Vision 2020 and the EDPRS. There are indications, however, that economic activity is gradually deconcentrating away from Kigali. Thus, while Kigali's output still exceeds that of the six secondary cities and three other important towns¹⁵ combined, it has not been increasing as fast as most of them.

This pattern holds for nearly all proxy indicators of economic production. Between 2002 and 2012, Kigali's share of total non-farm wage employment dropped from 50 percent to 39 percent, and the share of Kigali in total GDP (using the nightlights-based estimation) declined from 50 percent to 40 percent.

Using nightlights again as a proxy for non-agricultural GDP, we see that, for example, settlements such as Rwamagana-Kayanza grew by ten times as much and Musanze by six times as much over the period 2003-2013. Using data from the Establishment Censuses, non-farm establishments in Kigali accounted for 21 percent of all establishments in 2014, down from 23 percent in 2011, while Kigali accounted for 28 percent of employment in both 2011 and 2014.

Economic activity is not only dispersing away from Kigali, but also apparently from the secondary cities. Evidence from the Establishment Census shows that just 21 percent of new firms and 27 percent of new non-farm jobs between 2011 and 2014 were created in Kigali. Despite this, just 11 percent of these firms and jobs were created in the secondary cities and 3 percent in the additional three towns. This means that around two-thirds (65 percent) of new non-agricultural firms and 59 percent of non-farm jobs were created outside of the recognized main urban centers.

Much of this dispersal is of informal economic activity, however, with formal economic activity still remaining more concentrated in Kigali. Of formal firms in the Establishment Census, 53 percent are located in Kigali, while 56 percent of new non-farm firms created between 2011 and 2014 were also located there, indicating a slight increase in concentration. In addition, 16 percent were located in secondary cities and 3 percent in the emerging towns, leaving 25 percent located elsewhere.

Outside of Kigali, the largest concentration of economic activity is in the Rubavu-Musanze corridor. Of the 106,073 formal private-sector jobs accounted for by firms in the 2014 Establishment Census, 57,260 (54 percent) are located in Kigali, with the three districts of Rubavu, Nyabihu, and Musanze accounting for 7,388 (7 percent). When jobs in the informal sector are also considered, the share rises to 11 percent.

Figures on informal employment are inevitably difficult to verify, but the high concentration of formal firms and jobs in Kigali may obscure the economic vibrancy of some other urban areas, which is captured in the increased dispersal of economic activity evidenced by the nightlights-based estimated of district GDPs.

Nonetheless, at present, other urban areas are far too small to generate significant agglomeration economies. Consequently, economic activity is dispersed across the national territory. Together, the remaining four secondary cities account for 5 percent (5,357) of formal jobs, while the three other towns account for less than 3 percent (2,724), with 33 percent dispersed across the rest of the country. For the foreseeable future, Kigali will remain the engine of new job creation in the region. It is not evident from the basis of existing data that all of the six selected secondary cities are economically viable as alternative

logistics hub for the East and Central Africa regions. The development of this project has been plagued with ongoing problems of funding and administration over the past decade, but anticipation of it and the activities associated with it may partly explain the visible increase in built-up area within Bugesera District, which is not yet matched by population increase and densification in the area.

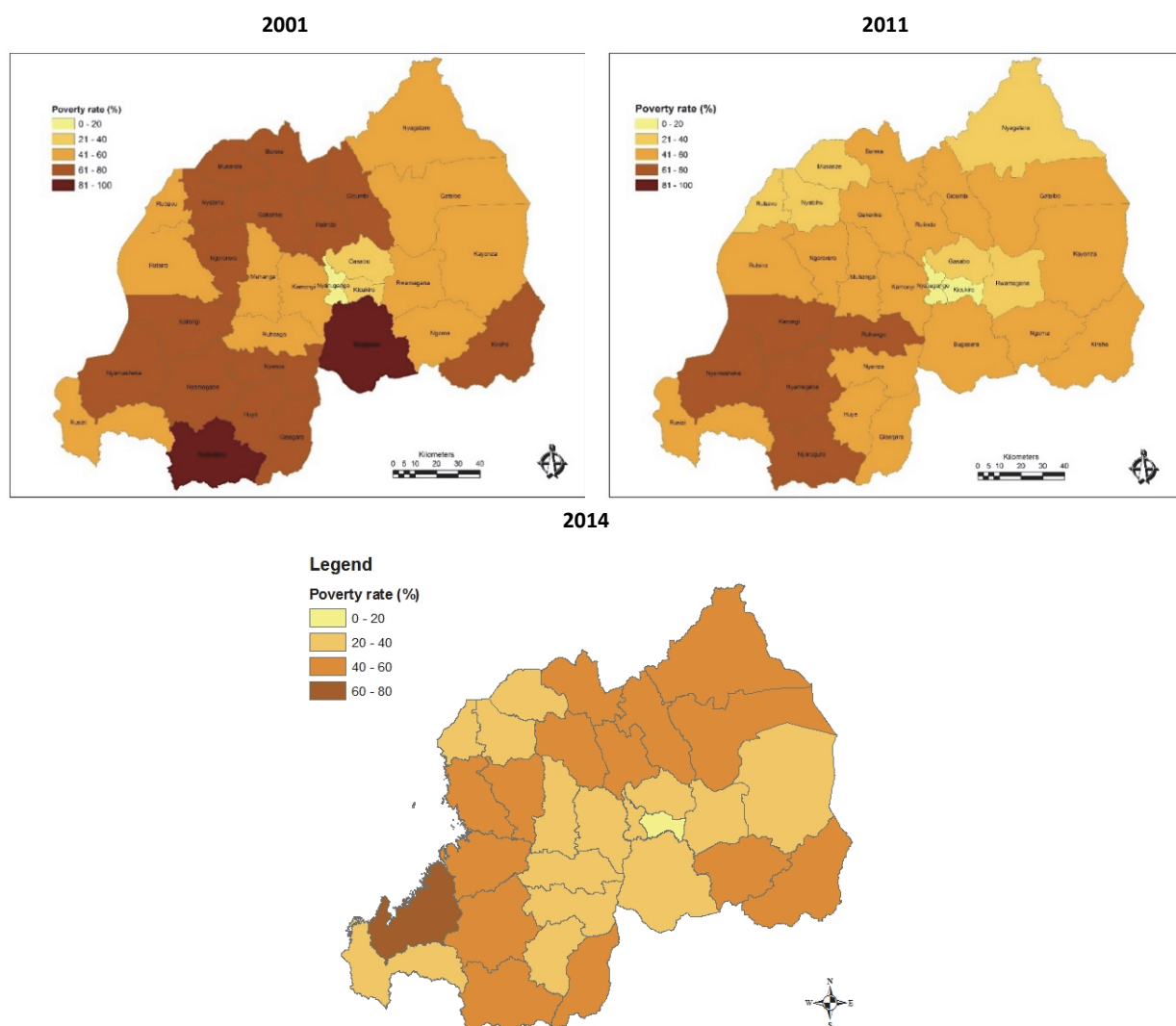
¹⁵ Nyamata, Gicumbi, Rwamagana/Kayanza.

centers for economic growth and large-scale job creation. Note 4 further explores the potential and implications for spatial prioritization of parts of the urban economic system, including recommendations of regulatory and investment prioritization.

3.3. Spatial convergence in living standards

In line with economic activity, living standards have also tended to converge since the early 2000s, though disparities remain large for certain indicators. Figure 10 shows that spatial disparities in poverty rates have decreased between 2001 and 2014, though the difference between urban and rural areas remains high: in 2014, the rural poverty rate was, at 44 percent, more than twice as high as the urban rate of 16 percent.

Figure 10. Poverty rates by district, Rwanda, 2001-2011



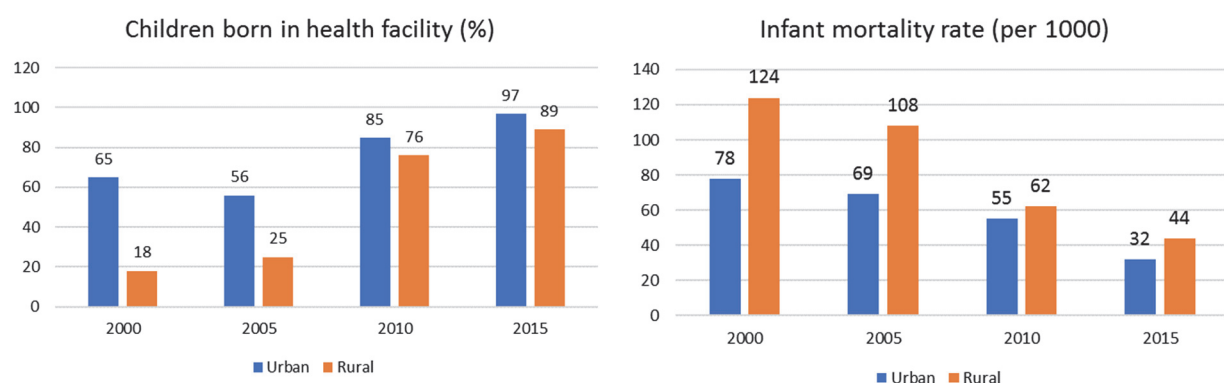
Source: EICV 2001, 2011, and 2014.

Non-monetary indicators of well-being that reflect access to public services have converged fastest. At the turn of the century, only 18 percent of rural births (compared to 65 percent of urban ones) took place in

a health facility. By 2010, 76 percent of rural births took place in a health facility, still lower than the urban share but nevertheless a strong convergence (Figure 11). Infant mortality was 60 percent higher in rural than in urban areas in 2000, but the gap narrowed to 12 percent in 2010.

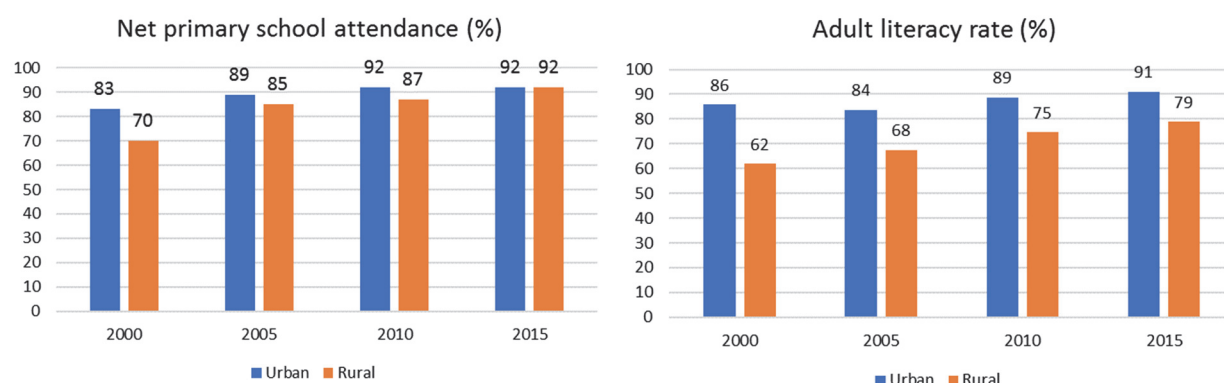
Education indicators display a similar pattern, with literacy rates and primary school attendance in rural areas progressively catching up with urban ones (Figure 12). Not all indicators have converged: rural-urban disparities in fertility, stunting, and secondary school attendance, for instance, have persisted or marginally widened.

Figure 11. Births in health facilities and infant mortality in urban and rural areas, 2000-2010



Source: DHS, 2000; 2005; 2008; 2010.

Figure 12. Primary school attendance and adult literacy



Source: DHS, 2000; 2005; 2010

The convergence in non-monetary dimensions of well-being reflects the increasingly effective delivery of basic services throughout the country. Basic health and education facilities are distributed equitably across space, with only some parts of the Eastern Province lagging somewhat behind (The province is, however, the least densely populated province, which explains, in part, why it has comparatively fewer facilities).

Access to secondary schooling, however, remains unequally distributed across space and economic circumstances (net enrollment in secondary school is 19 percent for rural and 39 percent for urban areas,

and is four times higher in the highest quintile than in the lowest). A main challenge is now to both increase overall enrollment in secondary school and make it more spatially neutral. This will also be required to achieve a stronger convergence in economic outcomes across Rwanda's geographical units, and across rural and urban areas.

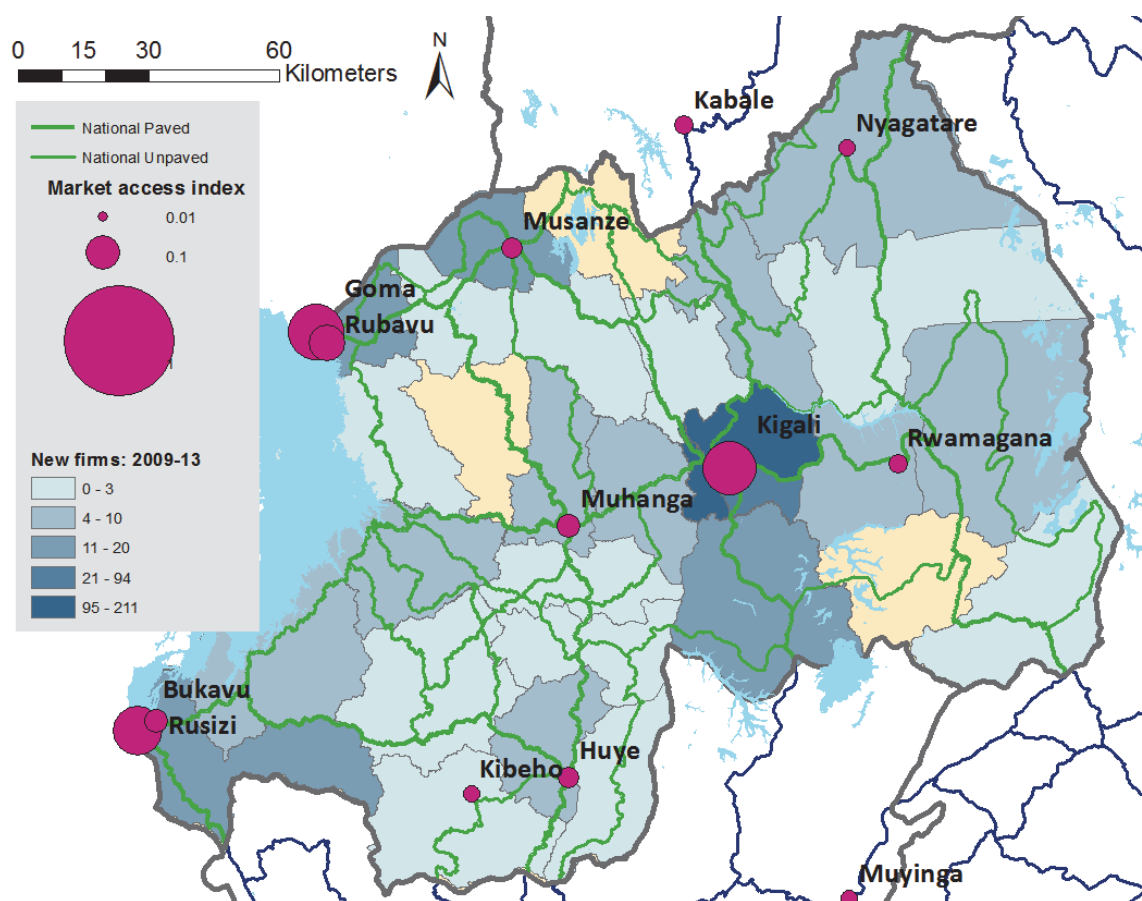
4. Connectivity

4.1. Connectivity and economic activity

Access to markets is vital for firms and transport connectivity is an important determinant of firm productivity. With limited connectivity, firms are likely to be faced with a significant challenge to improve their competitiveness in the regional or global market.

Transport connectivity is particularly important for firms to decide where to locate. Because of better connectivity and thus lower transport costs, firms are often concentrated along highways. Similarly, in Rwanda more firms have been established where market access is high, which is why many economic activities are concentrated in Kigali as seen in the previous section. As Figure 13 shows, in addition to Kigali, two of the districts with the highest number of new firms are Rubavu and Rusizi with good access to markets in Democratic Republic of Congo (DRC).

Figure 13. Market access index and new firm establishment



Source: World Bank, 2016c.

Kigali's good market access and agglomeration economies may raise concerns that the capital city will become more congested in the future. As the city grows with more firms and people attracted, the demand for urban transportation will likely increase rapidly, especially together with accelerated motorization. To ensure efficient mobility of people and goods within the city, urban transport infrastructure and services need to be improved further.

The current road network in Kigali is extensive, but the quality of the network still compares unfavorably to other African cities. For instance, paved road density in Kigali is about 0.2 km per sq. km; much less than Accra with 2.8 km, Lagos with 1.7 km, and Kampala with 0.5 km. The vast majority of Kigali roads remain unpaved. Significant resources, totaling approximately one-fourth of the road maintenance fund, are allocated to rehabilitate and maintain urban roads in Kigali. But more resources may be needed depending on the pace of future urbanization.

To meet the increasing demand for urban transport services, early planning and development of mass transit systems are also required, and the City of Kigali has indeed conducted a study on Bus Rapid Transit (BRT). Despite the limited capacity of the urban road network in Kigali, there are a significant number of buses operating in the city. According to data from Africa Infrastructure Country Diagnostic (AICD), about 20 large buses and 2,000 minibuses currently operate in Kigali. Assuming a minibus capacity of one quarter that of a large bus, the bus fleet size relative to the city population is about 700 buses per one million people, which is already relatively high by global standards. The bus fleet size in highly bus-dependent cities, such as Stockholm and Guangzhou, is about 1,000. The supply of bus services in Kigali is already at the same level as Accra or Singapore.

Transport is one of the areas in which Rwanda is hoping to build its regional comparative advantage and it forms a key emphasis of both the EDPRS II and the Kigali City Master Plan 2013. There are proposals for various new national roads. At the regional level, a new rail line from Kigali to Tanzania is planned, as is the building of a new international airport and an enterprise zone at Bugesera (Nyamata), south of the city itself.

4.2. Domestic connectivity

Rwanda has a well-established road network comprising about 30,000 km of classified and unclassified roads. The classified network includes about 14,400 km of roads, which consist of 2,749 km of National Roads, and 3,848 km and about 7,800 km of District Class 1 and 2 Roads, respectively (see Figure 14 below). Road density is above the regional average though a higher percentage of roads are in poor condition (see Figure 15). This is in part due to the difficult nature of the terrain which causes frequent flooding in many areas.

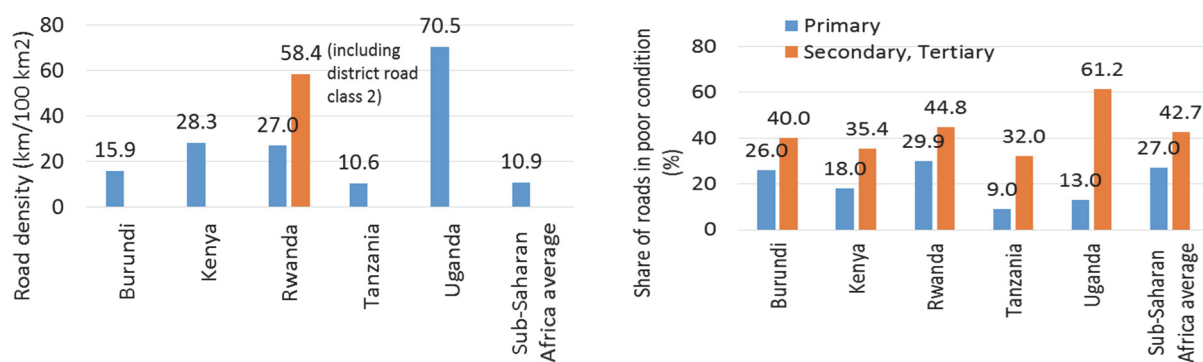
Rwanda's Rural Access Index (RAI) is at the same level today as it was in 2006—at 51 percent. As one of the traditional global indicators in the transport sector, RAI measures the share of the rural population with access to an all-season road within approximately two-kilometer walking distance. In Rwanda, according to the RAI analysis, about 8.2 million people, or about 72 percent of the total population, live in rural areas, of which about 4.3 million people are still unconnected to a road network in good condition.

Figure 14. Road network, Rwanda



Source: Rwanda Transport Development Agency.

Figure 15. Road density (km/100km²) and share of roads in poor condition, Rwanda

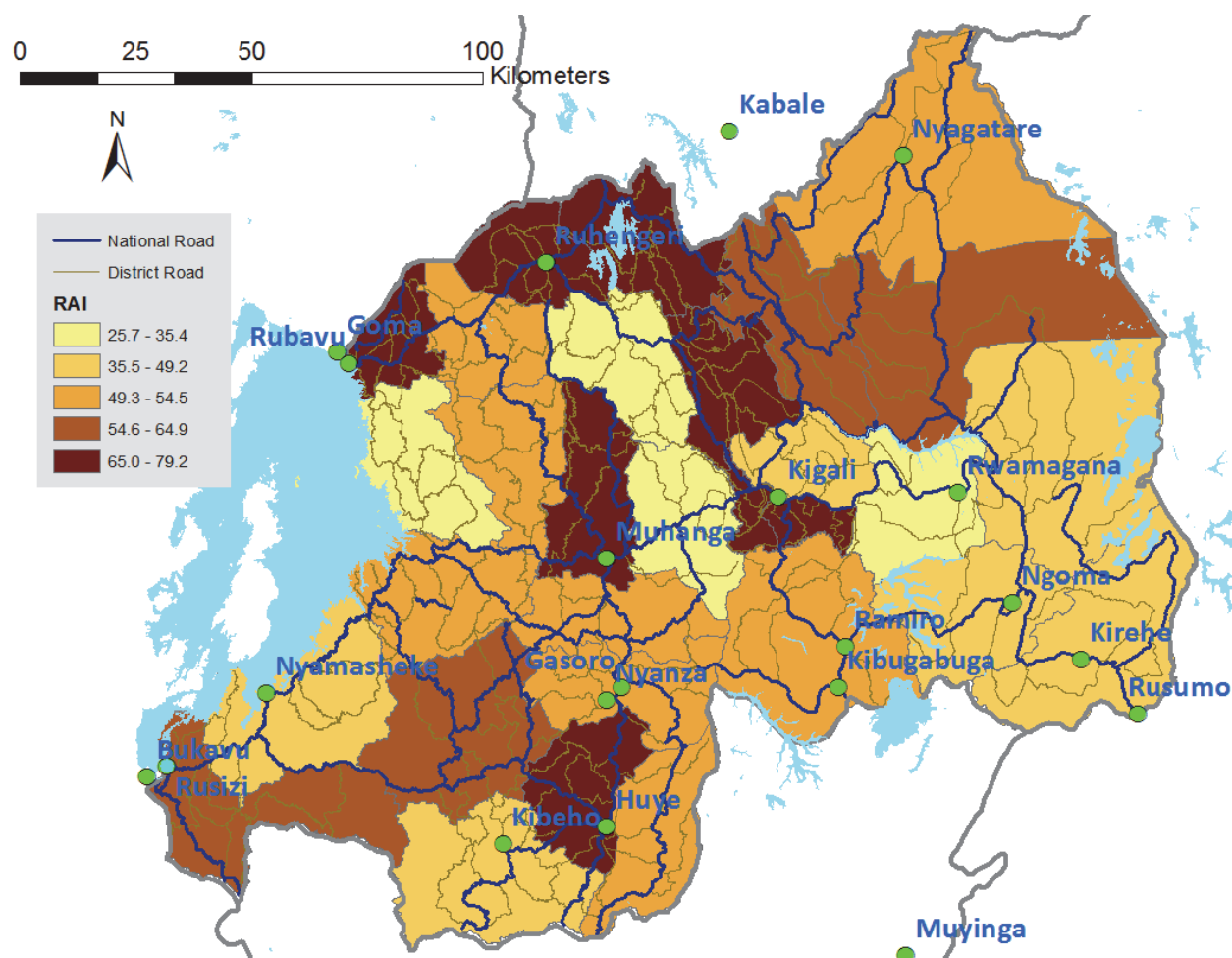


Sources: Africa Infrastructure Country Diagnostic (AICD); World Bank (2016b); RTDA 2015; Gwilliam (2011) for other countries.

Note 1: Urbanization and the Evolution of Rwanda's Urban Landscape

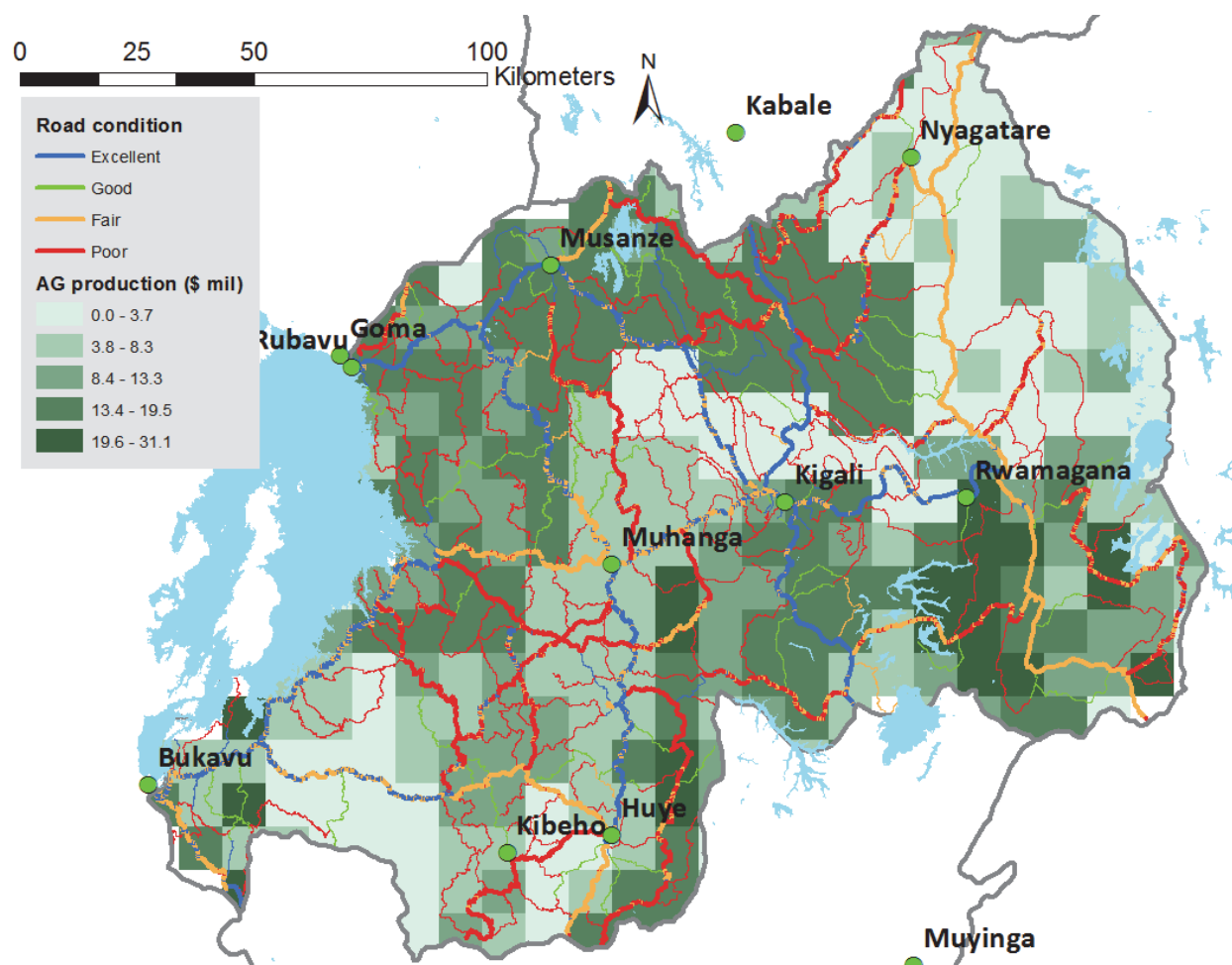
The investment priority is to areas where agricultural production exists but the road conditions remain poor. Rural access seems to be closely related to agricultural production, and Rwanda's agricultural potential is considerable. When the map of rural access is compared to agricultural output, however, it is clear there is unmet demand for access in the productive south-east of the country (i.e. the Southeast has poor access as indicated by the light orange color in Figure 16, but high agricultural productivity as indicated by the dark green in Figure 17).

Figure 16. Rural Access Index (%)



Sources: World Bank 2016b; RTDA 2015; MapSPAM.

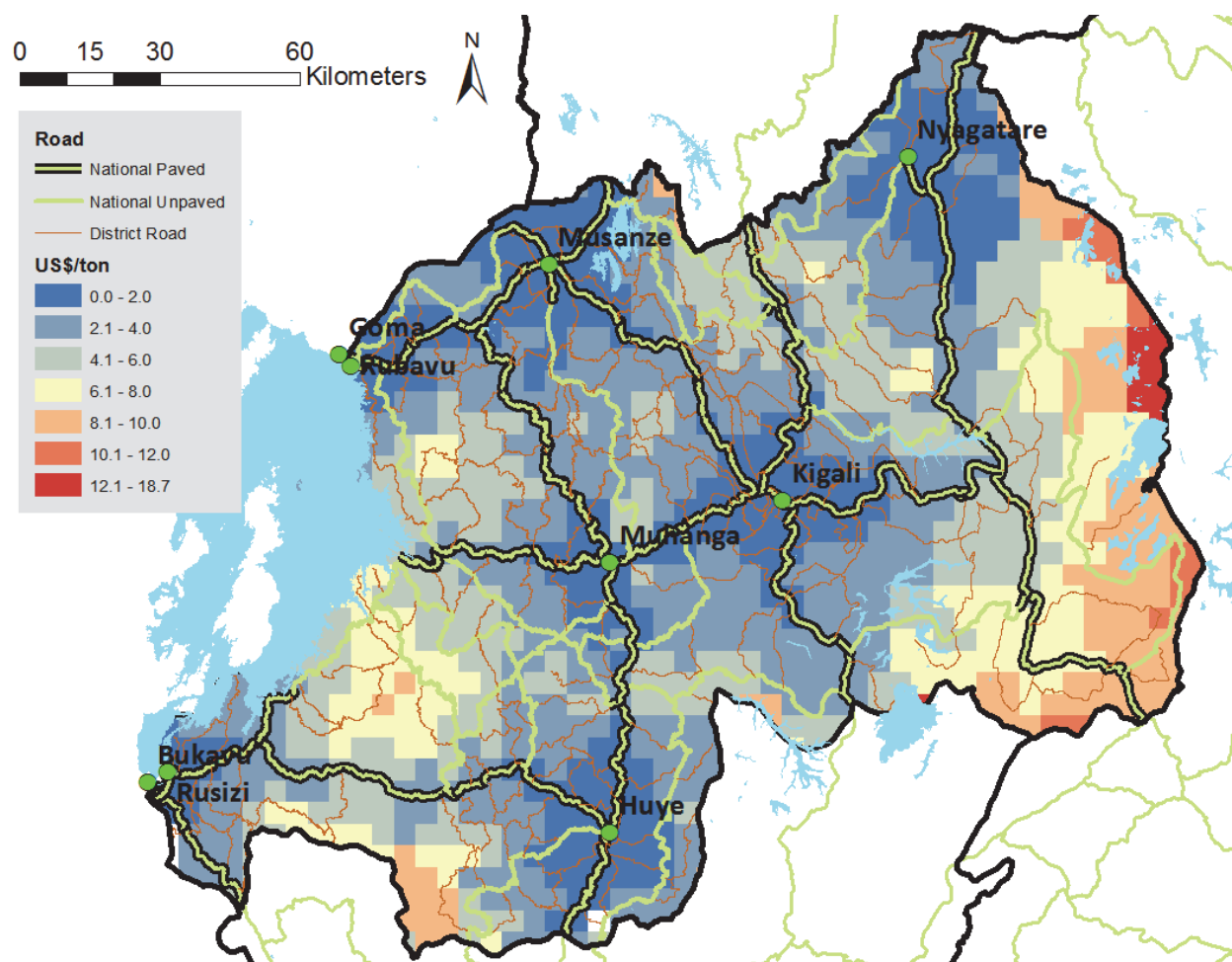
Figure 17. Agricultural output (US\$ million)



Source: World Bank 2016c.

Domestic connectivity, when measured by transport costs per ton, is relatively good by regional standards but varies within the country. As Figure 18 illustrates, transport costs are lowest in and around Kigali and the secondary cities. The three other towns have slightly higher costs per ton and this may reflect both the road conditions and fewer transport firms in these cities.

Figure 18. Transport costs to major cities (US\$/ton)

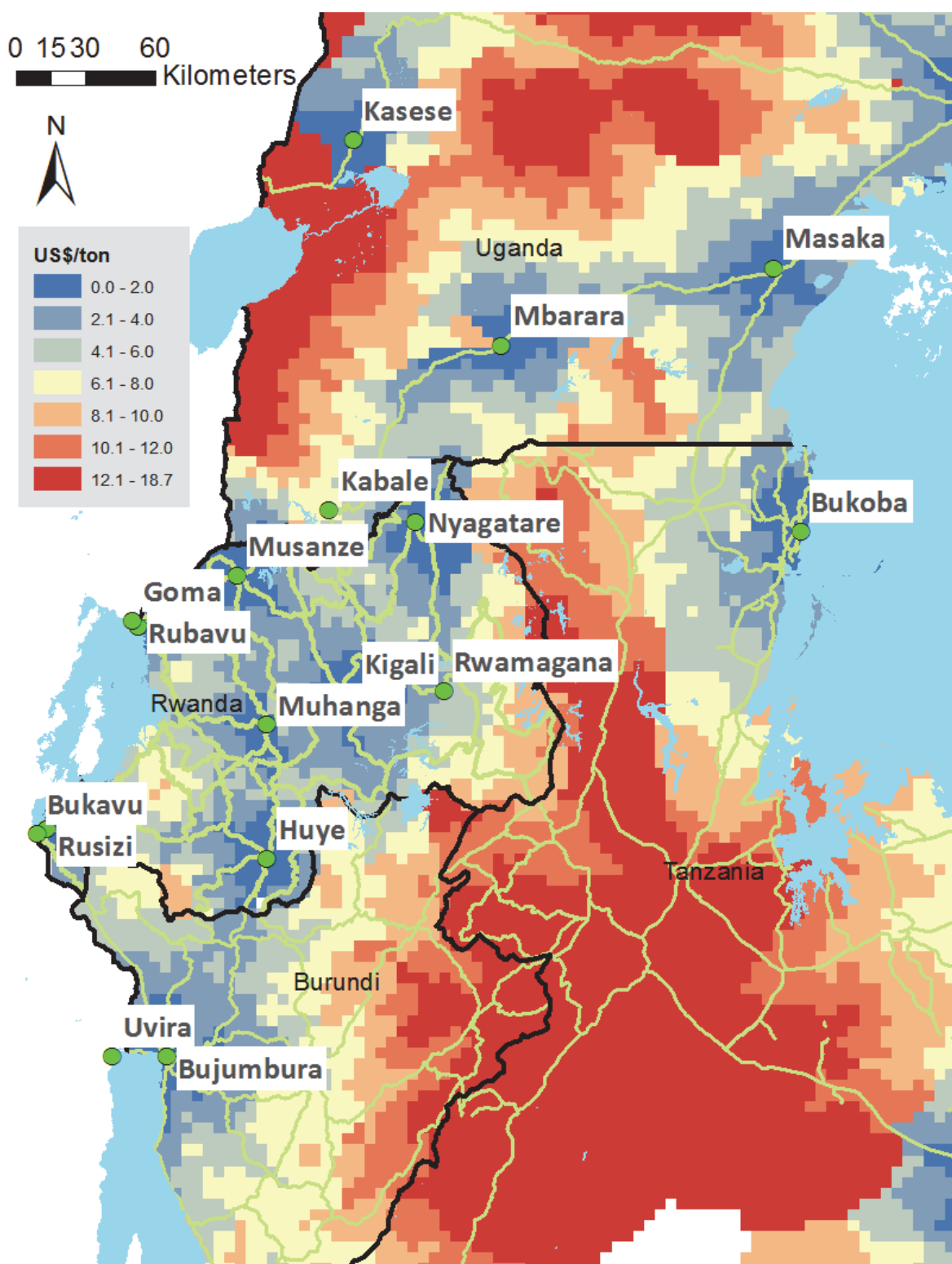


Source: World Bank 2016c.

4.3. Regional connectivity

Regional connectivity is a much greater challenge than domestic connectivity. To assess regional road connectivity, transport costs to a large city are computed with the neighboring countries included (Figure 19). Again, the minimum road transport costs are calculated based on road user costs and border crossing costs. This analysis is only focused on road transportation, however, and improving connectivity of other transport modes, such as aviation, is equally important from the regional connectivity point of view.

Figure 19. Regional connectivity (US\$/ton)



Source: World Bank 2016c.

Access to ports is crucial for Rwanda. Dar es Salaam is about 1,500 km from Kigali, with a transport cost estimated at US\$96.1 per ton, and a journey time of 19 to 20 hours. This is a significant constraint to the whole economy and compares unfavorably with other major cities in the region. For instance, the transport costs from Mwanza and Kigoma to Dar es Salaam are estimated at US\$68.1 and US\$85.5 per ton, respectively. The cost from Bujumbura is US\$93.3 per ton, slightly lower than that from Kigali.¹⁶

When focused on a narrower area around the country, some Rwandan cities located close to the borders are relatively well-connected to neighboring countries, such as DRC, Burundi and Uganda. As seen above, Goma and Bukavu are adjoining cities to Rubavu and Rusizi. The estimated transport cost from Rusizi to Bujumbura in Burundi is US\$10.3 per ton, much less expensive than the cost of connecting to Kigali. The cost from Huye to Bujumbura is also similar to the cost to Kigali. By the same token, Nyagatare can be better connected to Mbarara or Kabale in Uganda than Kigali. The distances are shorter and the transport costs are lower. These indicate potential economic benefits from forming regional agglomerations across borders with neighboring countries.

However, it remains challenging to create potential agglomeration economies with more distant cities in neighboring countries. The relative connectivity, considering both time and costs, is still stronger to Kigali. For instance, Musanze and Rubavu are better connected to Kigali than to Ugandan cities. The distance from Rubavu to Kabale is 14 percent longer than that to Kigali, and the transport cost to Kabale is 38 percent higher than that to Kigali. To promote possible regional agglomeration economies, both infrastructure and institutional arrangements, such as border crossing procedures and trade regulations, need to be improved. The poor condition of roads in Uganda is one issue adding more transport costs. Border crossing costs and times may be able to be reduced further. The literature indicates that both aspects are important for efficient trade.

Connectivity to Tanzania is much more limited. Despite its straight-line proximity, Bukoba, a port city situated on Lake Victoria, is far from Rwandan cities. This is partly because of a large forest reserve area between the two countries and partly because of the poor condition of the non-primary road network in Tanzania. As a result, the required road distance from Kigali to Bukoba is nearly 400 km, and the transport cost of US\$26.8 per ton compares poorly with other regional connections (c.f., US\$30.2 per ton to Kampala and US\$31.8 per ton to Mwanza, Tanzania, both of which are more than 500 km away from Kigali). Moreover, significant efforts would likely be required to improve connectivity to Tanzania on the Tanzanian side of the border.

4.4. Implications for connective infrastructure

Rwanda has a relatively well-established road network that is fairly sufficient to cover the vast majority of the population. However, the quality of roads, especially, feeder roads, remains a matter of concern. More than half of the non-primary road network is in poor condition. It is essential to address rural access in order to reduce poverty, which is particularly high in rural areas. Many farmers do not have good access to the road network, let alone access to domestic or global markets. This should be a priority in the road sector development.

Prioritization is a must in road investment. Based on the current road condition, about US\$1 billion would likely be needed to rehabilitate all the existing road network that is currently in poor condition. The Government of Rwanda has been making significant efforts toward improving the road network in recent years, but available resources are limited. Therefore, strategic prioritization is needed, possibly focusing

¹⁶ This analysis is from the World Bank (2016c) background paper produced for this section.

on poverty and agricultural growth potential. There is clear correlation between rural accessibility and agricultural production.

Regional connectivity is also a crucial constraint to economic development in Rwanda. Evidence indicates that Kigali is the only city that has high accessibility to markets in the region. The two border cities, Rubavu and Rusizi, may have potential, but intercity connectivity remains generally low in other cities. To stimulate business development, further improvements are needed in both regional road infrastructure and border crossings. Currently, connectivity to Tanzania is particularly limited. There is a risk that Kigali's city congestion would be accelerated without any effective mitigation measures, as firms would likely be located at Kigali, given its high market accessibility as well as agglomeration economies.

To ensure sustainable efficiency in the transport sector, more financial resources may need to be mobilized, along with the reinforcement of institutional arrangements, such as road financing and planning mechanisms. This will help to not only meet the road infrastructure needs in rural areas but also address emerging urban transport issues in Kigali.

5. Conclusions and Perspectives

Urbanization in Rwanda was analyzed here by disaggregating the general concept of 'urbanization' into three related but distinct processes: urbanization (the increase in the proportion of the national population living in urban areas), urban growth (the increase in the absolute number of people living in urban areas), and urban expansion (the physical enlargement of built-up areas).

Urbanization is high on the agenda of Rwanda's economic development and poverty reduction strategy. and in that sense, Rwanda is at the forefront of managing its spatial challenges and exploring opportunities for optimal efficiencies in its land use and urban expansion. The Government's pioneering vision embraced urbanization as a strategic agenda, establishing dedicated urban management institutions and adopting strategies, laws, and policies aimed to manage and facilitate harmonious urban development.

Second, Rwanda's urbanization process comes relatively late and fast, and may be at a much higher level than previously anticipated. This Note highlights the need for clear and consistent definitions of urban areas in Rwanda, facilitating accurate, comparable assessments that better reflect the observed reality. There is a need for the Government to revisit and likely redefine current definitions of urban areas, adopting a spatial-demographic approach that captures settlements' physical and socioeconomic characteristics.

Third, Rwanda's urbanization process and pace are changing, demonstrating that Rwanda is urbanizing rapidly. The proportion of Rwanda's population living in urban areas increased from 16 percent to 27 percent from 2002 to 2015, an average urbanization rate of 6.7 percent per annum. The national urban population grew by nearly two million people, from 1.49 million to 3.46 million, or by roughly 132 percent. In relative terms, Kigali City's urban population grew more slowly than a number of secondary cities and the emerging Rubavu-Musanze urban corridor. The significant urban population growth took place in districts on Kigali City's periphery, with the urban population of the neighboring Kamonyi District growing at over 28 percent per annum between 2002 and 2015.

However, despite relatively fast growth in the rate of urbanization, the levels of urbanization are still behind the Government's Vision 2020 Plan targets. As part of revising Vision 2020 and the EPRS3, the Government will need to take into account the challenges of using the urbanization rate as a development target, and to clarify the target urbanization levels in its statistical categorization.

Fourth, with urban population growth, several of Rwanda's cities are undergoing rapid expansion as a result of land prices and restricting regulations, pushing middle income, investors and poor families to move outward from the core urban centers. Urban population growth has been accompanied by rapid expansion of built-up areas, particularly in the periphery and fringe zones of the Kigali area, with growth of built-up areas in the core city districts (Nyarugenge, Kicukiro and Gasabo) and, at what appear to be lower densities in neighboring Rulindo, Kamonyi, and Rwamagana districts. Existing planning and zoning frameworks may be constraining both population densification and economic activity in already developed areas of Kigali City. Most secondary cities and the other towns are also expanding rapidly, also at low densities. This implies that Government may need to revisit existing planning and zoning guidelines in order to synchronize these with current development as well as applying new tools to allow for a more flexible and participatory use of zoning and planning regulations, to reflect the living standard and housing conditions of the majority of the population.

Fifth, in addition to the continuous dominance of Kigali as Rwanda's population and urban economic center, new corridors, in particular the Rubavu—Musanze corridor, have seen rapid urban development and increased population growth. The most significant concentrations are in the urban corridors of Rubavu-Musanze and Muhanga-Huye, which together account for half of the urban population outside Kigali. The Rubavu-Musanze corridor is emerging as an important urban region, with the three districts along the corridor (Musanze, Nyabihu, and Rubavu) accounting for one-third of urban population outside Kigali, and 7 percent of total national formal private-sector employment. The growth of other secondary towns and urban areas is uneven, with some towns seeing reduction in population and others growing fast, demonstrating also the uneven economic endowment and locational advantage of each of these cities. Note 4 provides specific recommendations on the details of this conclusion, but the pre-eminent and overarching perspective of this analysis is to encourage Government to seek a differentiated approach to the six pre-selected secondary cities and to consider other towns as well as part of a medium-term strategy for public investment and spatial development.

In that sense, while there is some evidence for deconcentration of economic activities, most of the secondary cities and other towns remain too small to generate agglomeration economies, with less than 5 percent of the formal jobs available in these towns. Between 2002 and 2012, Kigali's share of national non-farm wage employment dropped from 50 percent to 39 percent, and the share of Kigali in total GDP declined from 50 percent to 40 percent. Formal economic activity nonetheless remains largely located in Kigali, which is likely to continue in its primary role as a result of scale (agglomeration) economies, its access to markets, and its role as the seat of national government and international connector. Public investment in infrastructure and services should be directed to where endogenous forces are driving growth, as this will tend to result in better returns on investment. Further analysis of each of the secondary cities and other towns is presented in Note 4.

Furthermore, recent trends in the urban expansion of Kigali may pose a challenge to its long-term efficiency as a growth driver. The economic potential of the city and its region is possibly being impeded by the current planning and regulatory regime, which may warrant review, as large-scale investments such as Kigali's new airport are setting the pace for the future form for Kigali. In particular, the management of Kigali's land market and the effective but also pragmatic use of zoning regulations will be required, and will likely also require further analysis.

Sixth, there is a correlation between urbanization and improvements in living standards, including in secondary towns, though these improvements have also been observed in most rural areas, albeit to a lesser degree. Further analysis on the correlation between urbanization, job creation and poverty reduction is presented in Note 3.

Finally, Rwanda's cities are relatively better connected than their peer cities in the region. Yet the level of connectivity, to regional markets and even within Rwanda, still represents obstacles for cities to fully deliver on their potential. New firm creation, in particular, is closely linked to market access, and transport connectivity is an important determinant of firm productivity. Kigali has the highest market access in the country, followed by the border cities of Rubavu and Rusizi. In general, though, urban areas outside of Kigali are poorly connected to markets and will require infrastructural investment.

References

- Bundervoet, Tom, Laban Maiyo, and Apurva Sanghi (2015). "Bright Lights, Big Cities : Measuring National and Subnational Economic Growth in Africa from Outer Space, with an Application to Kenya and Rwanda." Policy Research Working Paper No. 7461. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/22883> License: CC BY 3.0 IGO.
- IMC Worldwide (2015). "Developing Rwandan Secondary Cities as Model Green Cities with Green Economic Opportunities." Kigali, IMC.
- MapSPAM (2017). Spatial Production Allocation Model (SPAM). <http://mapspam.info/>.
- Ministry of Infrastructure (May 2008), Rwamagana Conceptual Masterplan, Kigali, MININFRA.
- Ministry of Infrastructure (May 2011), Etude Du Plan Local D'aménagement et D'urbanisme de la Ville de Muhanga, Kigali, MININFRA.
- Ministry of Infrastructure (2011), Gicumbe Local Urban Development Plan, Kigali, MININFRA.
- Ministry of Infrastructure (2011), Huye City Local Urban Development Plan 2011-2020 , Kigali, MININFRA.
- Ministry of Infrastructure (2011), National Land Use and Development Masterplan, Kigali, MININFRA.
- Ministry of Infrastructure (2011), Nyamata Urban Development Plan, Kigali, MININFRA.
- Ministry of Infrastructure (2012), Law N°10/2012 of 02/05/2012 Governing Urban Planning and Building in Rwanda, Kigali, MININFRA.
- Ministry of Infrastructure (2013) District Development Plans 2013/14—2017/18 for Bugesera, Gicumbe, Huye, Kayonza, Muhanga, Musanza, Nyagatare, Rubavu, Rusizi, and Rwamagana districts, Kigali, MININFRA.
- Ministry of Infrastructure (2015) Ministerial Order N° 04/Cab.M/015 of 18/05/2015 determining urban planning and building regulations, Kigali, MININFRA.
- Ministry of Infrastructure (2015), Detailed Physical Plan for Rusizi Secondary City, Kigali, MININFRA.
- Ministry of Infrastructure (2015), National Informal Settlement Upgrading Strategy, Kigali, MININFRA.
- Ministry of Infrastructure (2015), National Spatial Development Framework (SDF), Kigali, MININFRA.
- Ministry of Infrastructure (2015), Rwanda Urban Planning Code (UPC), Kigali, MININFRA.
- Ministry of Infrastructure (2015), Rwanda Urban Planning Framework, Kigali, MININFRA.
- Ministry of Infrastructure (2015), Rwanda Report to Habitat III, Kigali, MININFRA.
- Ministry of Infrastructure (MININFRA) (2016) Rwanda Urban Development Programme; Feasibility Studies and Preliminary Designs for Infrastructure: Huye, Muhanga, Musanza, Nyagatare, Rubavu and Rusizi, Kigali, MININFRA.
- Ministry of Infrastructure: National Housing Policy. March 2015, Kigali,
- Ministry of Local Government: 2012, P.O Box 3445 Kigali, National Strategy for Community Development and Local Economy Development 2013-2018, Kigali, Republic of Rwanda
- Ministry of Trade and Commerce (MINECOM) (2014), Strategy for Development of Industrial Parks, Kigali,

MINECOM.

NISR (National Institute of Statistics of Rwanda) and MINICOFIN (Ministry of Finance and Economic Planning) (Various years). Integrated Household Living Conditions Survey (EICV). Kigali, NSIR.

NISR (National Institute of Statistics of Rwanda) and MINICOFIN (Ministry of Finance and Economic Planning) (Various years). Demographic and Health Survey (DHS). Kigali, NSIR.

NISR (National Institute of Statistics of Rwanda) and MINICOFIN (Ministry of Finance and Economic Planning). (2012). *Fourth Rwanda Population and Housing Census. Thematic Report: Measurement and Mapping of Non-Monetary Poverty.*

NISR (National Institute of Statistics of Rwanda) and MINICOFIN (Ministry of Finance and Economic Planning) (Various years). Establishment Census. Kigali, NSIR.

NISR (2014). Fourth Population and Housing Census Thematic report: Migration and spatial mobility. Rwanda: NISR.

Republic of Rwanda (Various years). Demographic and Health Survey. Government of Republic of Rwanda.

Republic of Rwanda (2016). National Roadmap for Green Secondary Cities Development. Government of Republic of Rwanda.

Republic of Rwanda (2000), Vision 2020, Kigali, Government of Republic of Rwanda.

Republic of Rwanda (2012), Vision 2020 (Revised 2012), Kigali, Government of Republic of Rwanda.

Republic of Rwanda (May 2013). Economic Development and Poverty Reduction Strategy 2 (EDPRS 2) 2013-2018, Kigali: Government of Republic of Rwanda.

Republic of Rwanda (September 2007). Economic Development and Poverty Reduction Strategy 1 (EDPRS 1) (2008-2012), Kigali: Government of Republic of Rwanda.

Rwanda Transport Development Agency (RTDA) (2015). Road Condition Report 2014/15 and Feeder Roads Policy and Strategy. Kigali, RTDA.

University of Southampton (Various years). WorldPop database. <http://www.worldpop.org.uk/data/>.

World Bank (2008a). *World Development Report 2009: Reshaping Economic Geography*. Washington DC: The World Bank.

World Bank (2008b). "Africa Infrastructure Country Diagnostic (AICD), Roads in Sub-Saharan Africa." Washington, DC: World Bank.

World Bank (2009) *World Development Report: Reshaping Economic Geography*. Washington, DC: World Bank.

World Bank (2015a). *Rwanda Poverty Assessment*. Washington, DC: World Bank.

World Bank (2015b). *Rwanda: Employment and Job Study*. Washington, DC: World Bank.

World Bank (2016a). *Rwanda: Firm Growth and Job Creation Study*. Washington, DC: World Bank.

World Bank (2016b). *Measuring Rural Access: Using New Technologies*. Washington, DC: World Bank.

World Bank (2016c). "Rwanda: Transport Connectivity and Growth Potential." Kigali, World Bank.

