



Fig. 1: City of Kigali

Rwanda **KIGALI**

2021 Exploring Urban Resilience Pathways



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About the report and the collection

Exploring Urban Resilience Pathways

This report is part of a collection wishing to provide a global overview about different cities' experience in resilience, and how this is evolving. The series is titled "Exploring Urban Resilience Pathways" and each report is prepared by one student of the Int. Msc. City Resilience Design and Management (URNet-UIC Barcelona) during the first semester, as a learning outcome of the acquired analytical skills -to find, understand, organize and communicate different perspectives, approaches and models of urban resilience implementation in a determined city.

The aim of each report is thus offering an easy-to-read overview, about how adaptive capacities have been evolving in a selected city, as set of mechanisms to respond through governance, plans, projects or community-led initiatives to overlapping shocks and stresses within its recent history. Nowadays current City Resilience Strategies – launched and supported by the Rockefeller 100RC program – are included within these analyses, representing the ultimate trend of understanding and implementing city resilience.

What is interesting to learn from this series of reports, is that each of them critically discusses how cities managed adaptive responses to different treats in the past, and how the concept of resilience entered city agenda, discourses and plans, making explicit what (and if) resilience brought to city policies and practices. Thus, the relationship between past and present adaptive capacities, between resilience and sustainability, and between city resilience and community resilience are critically discussed.

Although the scope of these reports is ambitious, and the analysis leading to each report results complex, the presentation has been designed in order to be easy to read and accessible to the general public. Each report of this collection maintains a standard structure, facilitating the reading and the reports and cities comparison. Hope this initiative contributes to spread the understanding about how resilience is framed and implemented in many cities across the globe.

KIGALI **Rwanda**

Summary

The City of Kigali is not only the capital of Rwanda, it is also home to half of the country's urban population. Spanning between Mt. Kigali, Mt. Jali and the marshlands around the Nyabarongo and its side rivers, the city is naturally exposed to geomorphological hazards. Since Rwanda's Independence in 1962 the city has experienced unprecedented demographic growth and with it rapid unplanned expansion, mainly on the steep hillsides and in flood-prone river basins. Since the turn of the century, the municipal government has been grappling with the challenge of urban planning, especially providing infrastructure for for all. Simultaneously, as the city expands and densifies the effects of climate change pose risks additional to those of geomorphological nature and an increasing number of citizens are exposed to unpredictable shocks and intensifying stresses, such as flooding, landslides and droughts.

The resilience framework introduced in 2014 through the city's participation in the 100 Resilient Cities project, has allowed the city to formulate more integrated answers to the triple challenge of demographic pressure, providing safe infrastructure and urban services for all and coping with the shocks and stresses intensified by the climate crisis. Integrating some key learnings in the revised strategies and plans, the city shifted from an engineering and economy-centred to a more incremental citizen-centred urban planning approach, building adaptive capacity to unpredictable futures, while keeping with its ambition to be the 'Centre of Urban Excellence' in Africa.

The case of Kigali furthermore highlights the role of development aid organisation and networks in local agenda setting. Moreover, the ongoing Covid-19 pandemic emphasises once again the need to leverage grassroots communities of practice for comprehensive resilience.

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LIST OF ABBREVIATIONS

100RC	100 Resilient Cities
CBD	Central Business District
CoK	City of Kigali
DRM	Disaster Risk Management
EDPRS	Economic Development & Poverty Reduction Strategy
GGCRS	Green Growth & Climate Resilience Strategy
GoR	Government of Rwanda
LODA	Local Administrative Entities Development Agency
MIDIMAR	Ministry of Disaster Management and Refugee Affairs
MINECOFIN	Ministry of Finance & Economic Development
MINEMA	Ministry of Emergency Management
MININFRA	Ministry of Infrastructure
MINIRENA	Ministry of Natural Resources
MoE	Ministry of Environment
NDC	Nationally Determined Contributions
NST	National Strategy for Transformation
NUA	New Urban Agenda
NUS	National Urbanisation Strategy
REMA	Rwanda Environment Management Agency
RoR	Republic of Rwanda
RUDP	Rwanda Urban Development Project
SDG	Sustainable Development Goals
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organisation

KIGALI

The City of Kigali (CoK) is both the capital of Rwanda and one of its 5 provinces. With nearly 1,3 million inhabitants it is almost 10 times larger than the second-largest city Rubavu, and houses 50,1% of the country's urban population (REMA, 2017). Located in the central part of the country, the city is of major political, economic, and socio-cultural importance and plays an important role in the articulation of national developmental ambitions (100RC, n.d.).

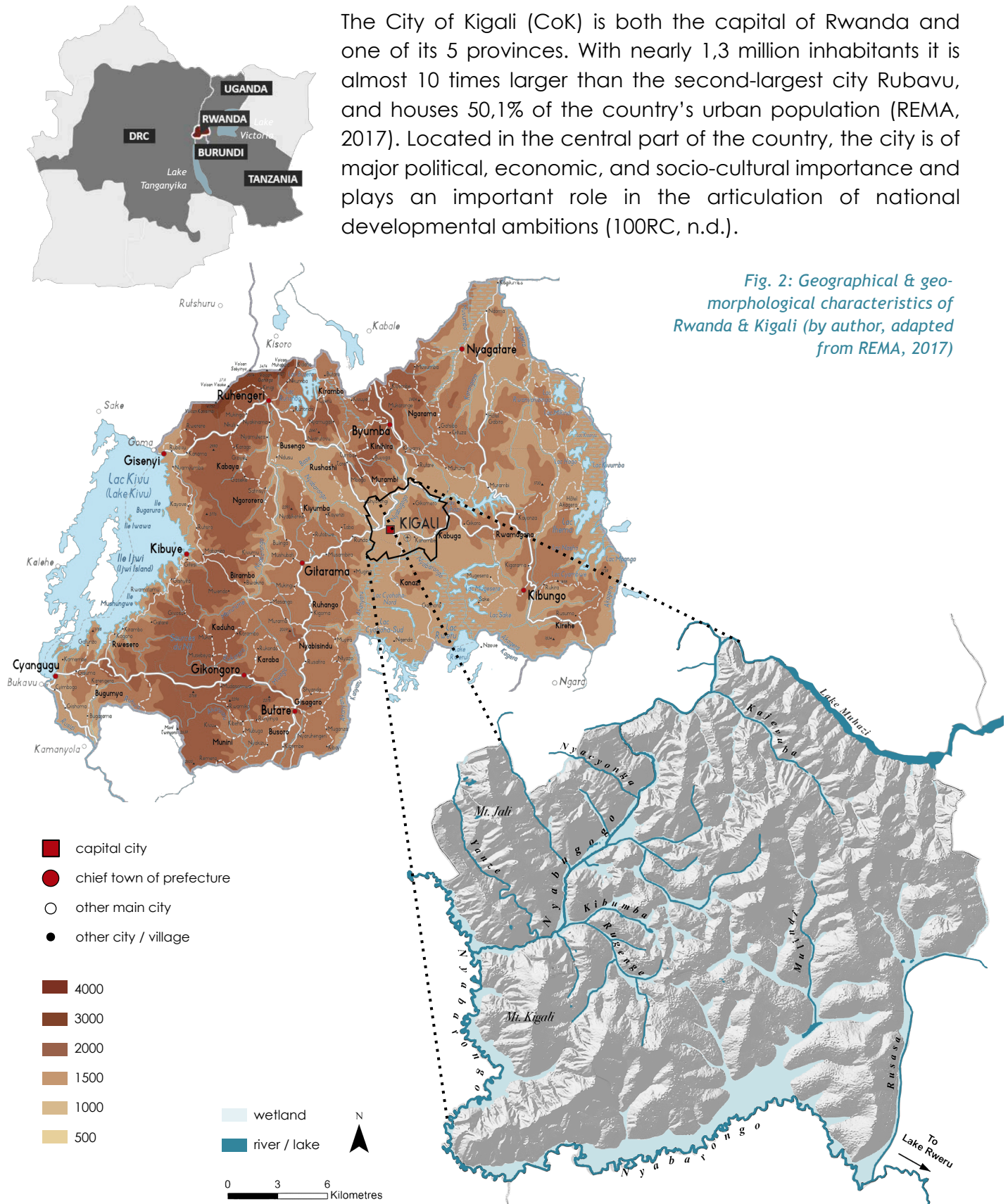


Fig. 2: Geographical & geomorphological characteristics of Rwanda & Kigali (by author, adapted from REMA, 2017)

Kigali City Profile



City size 730 km²



Population
size 1 630 657
growth rate 4%



Gender
male 50.1%
female 49.9%



Age distribution
0-14 33%
15-24 23.2%
25-65 41.8%
65+ 2%



Households
urban 73.8%
rural 26.2%



Land use
urban 16%
rural 84%



Housing type
planned 36.4%
mixed 28.9%
spontaneous 34.7%



Informality
built area 60%
households 70%



Access to services
electricity 78.4%
water 95.0%
sanitation 9.3%
waste collection <50%

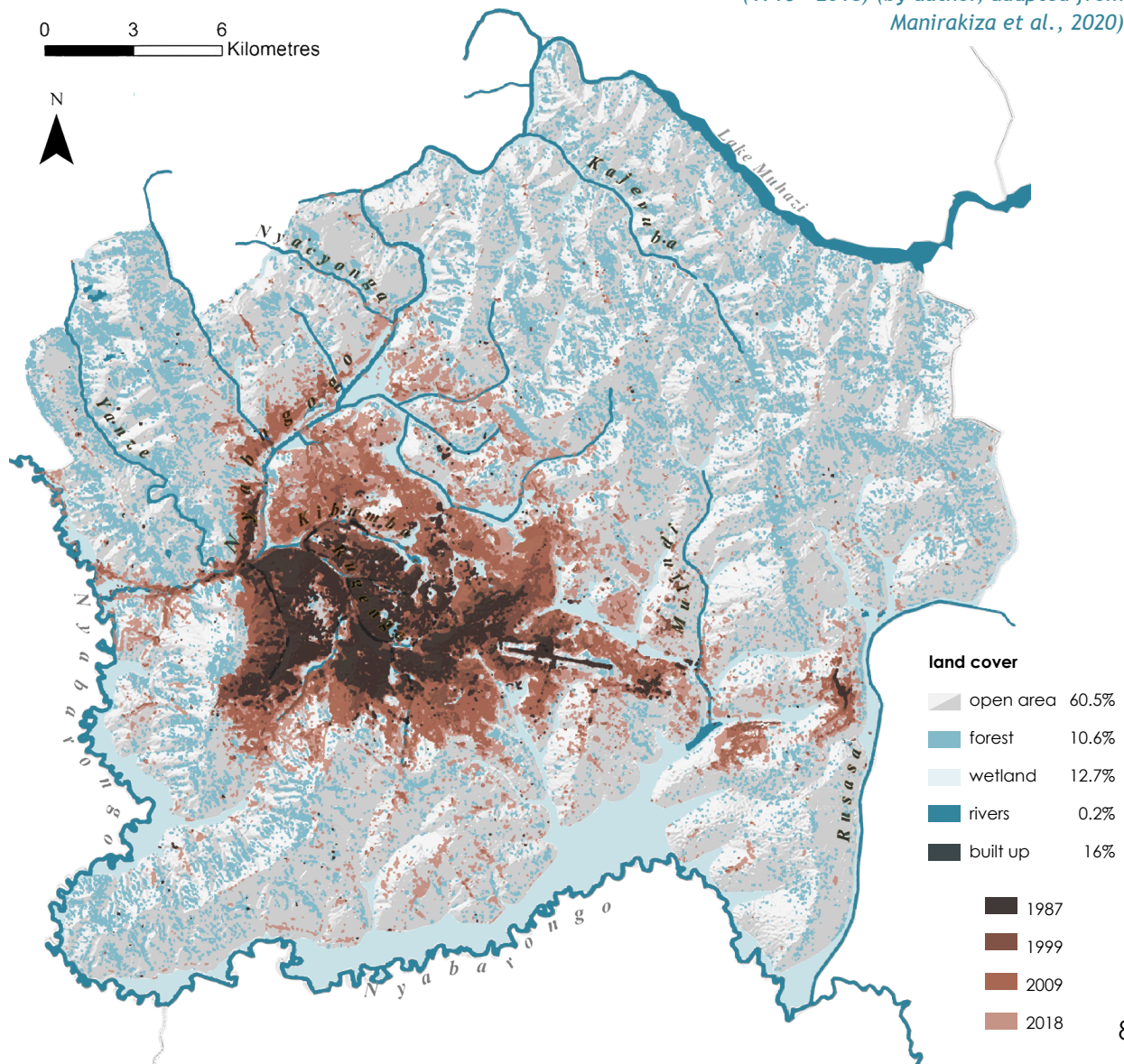


Employment
unemployment 20.75%
in agriculture 67.6%

Spatial context

Located in the Lake Victoria basin (fig. 2), the city's topography and natural hydrological system are crucial factors for urban development. The Nyabarongo River is an important element in the urban water network as it is the main catchment for all other streams in the CoK. The wetlands in the river valleys cover around 12.7% of the city's area (fig. 3) & provide important ecosystem services, hence they are another key part of Kigali's hydrological system. Topographically the city is characterised by hilly landscapes with slopes ranging between 2° in the valleys and 40-45° on hillsides (fig. 2) (Manirakiza et al., 2019). Urbanisation in this area is therefore exposed to geomorphological hazards, namely earthquakes and landslides. Unplanned urbanisation also challenges sustainable and resilient management of the hydrological system in the city, increasing the risk of urban floods.

Fig. 3: Built environment land cover trends (1916 - 2018) (by author, adapted from Manirakiza et al., 2020)



Built environment

The City of Kigali is characterised by the co-existence of luxury dwellings & business neighbourhoods provided with modern infrastructure and low-income settlements with limited or no connection to qualitative & safe urban infrastructure (Manirakiza, 2014). Recent investment in the city has resulted in the expansion of modern infrastructure, the development of the business district and middle- and high-income housing. However, as the city attracts rural residents from other provinces in search for economic opportunities & urban services, informal settlements have been expanding alongside these planned developments (fig. 4). Consequently, over 60% of the built environment today exists of informal housing. This spontaneous growth happens mainly in hazard-prone areas, namely on slopes more susceptible to landslides and on flood-prone wetlands. In addition, these areas are generally poorly connected to existing infrastructure & services such as the road network and sanitation services (Manirakiza et al., 2019). Even though advancements in modernising the infrastructure have been made in the last decades, especially in terms of water and electricity provision, infrastructure cannot keep up with the rate of informal urbanisation and investments have been mainly directed towards improving those areas with a high potential of increasing economic opportunities.

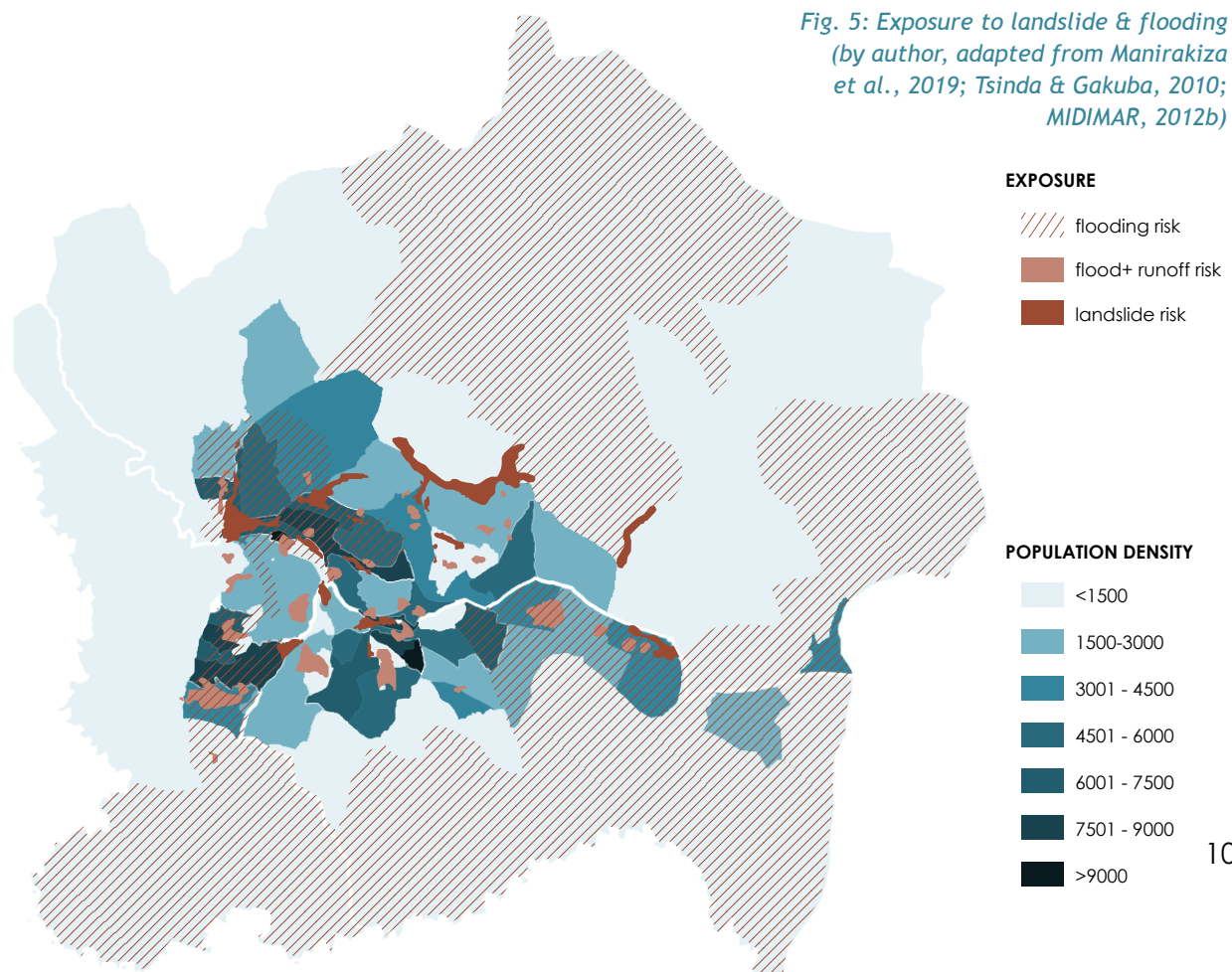


Fig. 4: Aerial view of Nyarugenge Central Business District (Bizimungu, 2019)

In 2012 the city had a population density of 1579.5 people/km² (REMA, 2017). However, densities vary greatly within the administrative boundaries of the city: 73,8% of the residents are urban, meaning that they live on the 16% of the land (fig. 2). Density within the urban parts is not evenly distributed either as 70% of the urban residents live in informal settlements which account for only 60% of the built environment (Manirakiza et al., 2019 & REMA, 2017). So, not only do low-income households generally live in hazard-prone areas and have less access to urban services, they also live in the most densely populated neighbourhoods of the city (fig. 5).

Socio-economic context

In Kigali as in Rwanda, agriculture is the economic base with 67,6% of the active residents employed in the agricultural sector. However, in the urban parts of the city this figure is drastically lower, namely 22,6%. Since 2010 these number have been in decline at the advance of employment opportunities in the industrial and service sector (REMA, 2017). This is mainly the result of Rwanda's actions towards becoming a middle-income country by 2050 (MINECOFIN, 2000) and making Kigali an attractive city for business investment and public-private partnerships. Despite these ambitions still 20,75% of the urban population is unemployed (Manirakiza et al., 2019). In general the poverty rate in the city has been in decline since 2010, however in 2014 still 20,9% of the urban population was living below the poverty line.



PAST DEVELOPMENT PATHWAY

PAST SHOCKS AND STRESSES

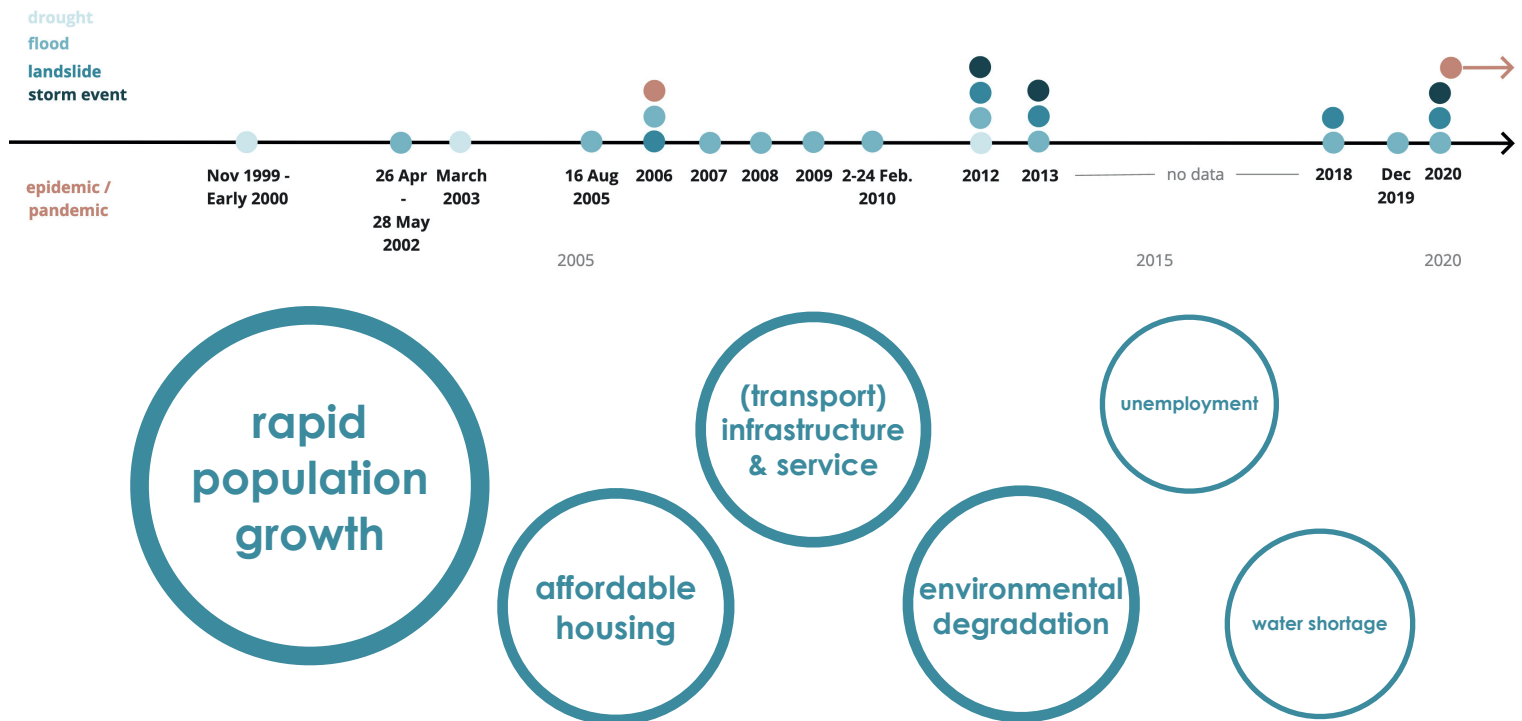


Fig. 6: Timeline of past shocks & identified stresses (by author)

DEVELOPMENT STRATEGY BEFORE RESILIENCE

National ambitions & guiding policies

Following the unrest and violence in the country in the 1990s, the turn of the century marked the beginning of nation-driven transformation across the different dimensions of governance, economy and society (fig. 7). Vision 2020 (fig. 8) is an ambitious developmental intent statement on national level (MINECOFIN, 2000). Following the evaluation of contemporary challenges, such as a fragile economic base, demographic pressure on agriculture and land use, limited institutional capacity and aid dependency, the vision statement presents a threefold ambition for development. Politically, the Rwandan government pledges to develop a capable state showcasing good governance. In terms of economy the objective is to become a middle-income country by moving from subsistence agricultural to a diversified knowledge-based economy and reducing dependency on foreign aid. Lastly, equality, equity and the development of an inclusive Rwandan identity are the main objectives in terms of social development.

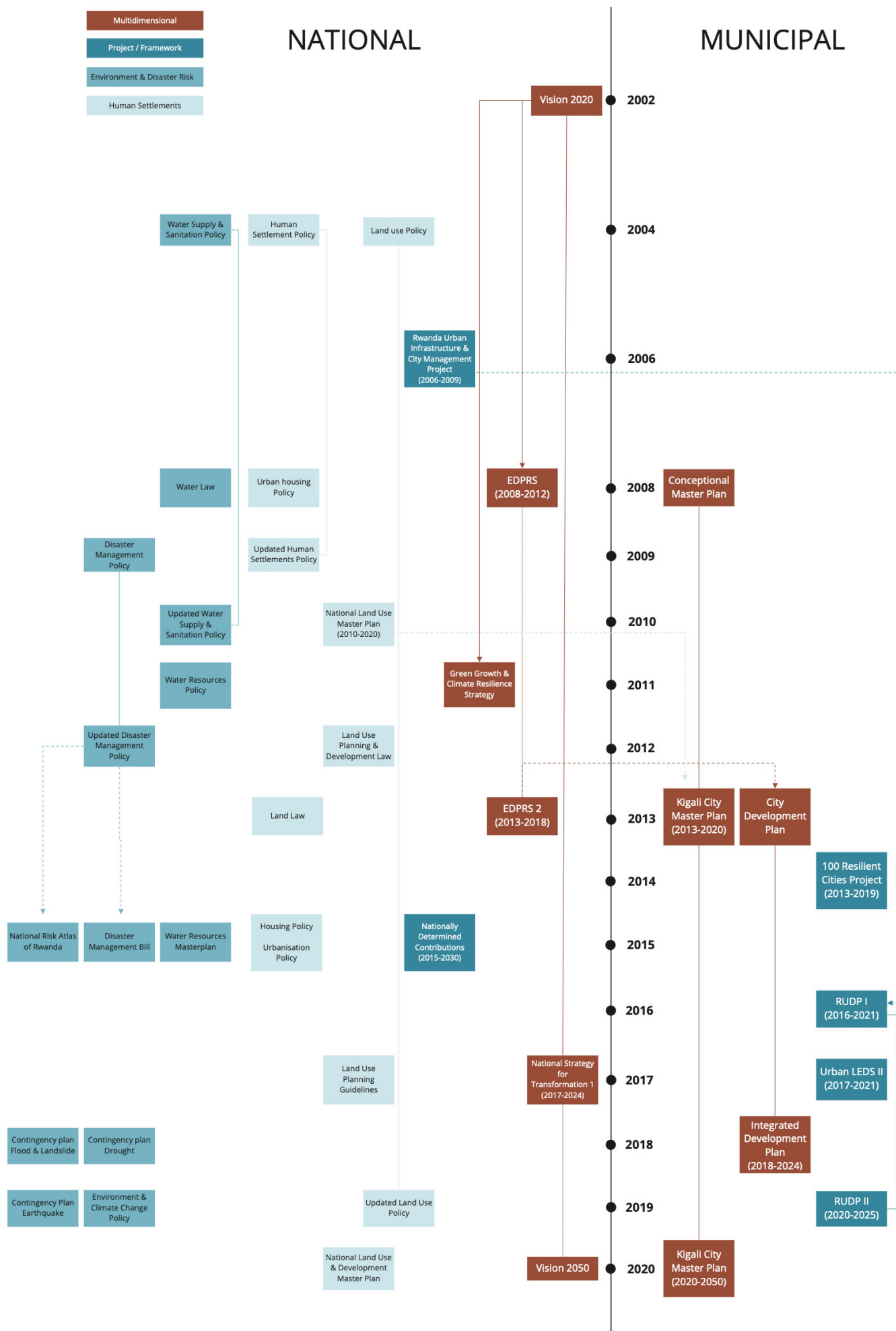


Fig. 7: Timeline of relevant plans, policies, strategies (by author)

The Economic Development & Poverty Reduction Strategy (EDPRS) further defines the economic objectives over a medium term time-scale (MINECOFIN, 2008). In the National Strategy for Transformation (NST 1), progress in this domain was evaluated & the strategy broadened to explicitly include the social and governmental dimensions of Rwanda's development strategy (MINECOFIN, 2017). In the same way the Green Growth & Climate Resilience Strategy (GGCRS) aims at mainstreaming sustainability across the different objectives defined in Vision 2020 (GoR, 2011).

The cross-cutting dimension covering natural resources & the environment (fig. 8) aims at mainstreaming climate resilient development, primarily focussing on reducing the risk of climatic hazards. To this end, the Disaster Management Policy defines the framework for risk assessment & response strategies (MININFRA, 2009). Disaster risk profiles are mapped in the National Risk Atlas which is the guiding document for risk assessment and management (MINEMA, 2015).

The objective of water resource management is to "manage and develop the water resources of Rwanda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations [...]" (MINIRENA, 2011). This sums up the underlying vision on natural resource and water management, reinforcing the cross-cutting dimension in this area.

Fig. 8: Pillars & cross-cutting dimensions of Vision 2020 (by author, adapted from

Vision 2020 Pillars

- 1) Good governance & a capable state
- 2) Human-resource development & a knowledge-based economy
 - Education
 - health & population
- 3) A private sector-led economy
- 4) Infrastructure development
 - Land use management
 - Urban development
 - Transport
 - Communication & ICT
 - Energy
 - Water
 - Waste management
- 5) Productive & market-oriented agriculture
- 6) Regional & international economic integration

Cross-cutting dimensions

- 1) Gender equality
- 2) Protection of environment & sustainable natural resource management
- 3) science & technology, including ICT

Consecutive policies and laws governing land use, land tenure and human settlements have been developed to fulfil the ambition to "make human settlements more secure, salubrious, viable, equitable, sustainable & productive", as laid out in the 2004 Human Settlement and Land Use Policies (MININFRA, 2009). This domain of Vision 2020 has a direct impact on urban development in Kigali.

Government-led urban transformation

The master plans for Kigali (Conceptual Master Plan 2008 & Master Plan 2013) aim at giving shape, in a very literal way, to the social, economic and environmental ambitions expressed on national and urban level (CoK, 2013). The national ambitions are localised through the envisioned transformation of Kigali as Africa's "Centre of Urban Excellence" (CoK, 2013).

Specific key issues the city is facing are laid out in the Kigali Urban Sustainability Framework (USF). Economic sustainability covers "capacity" and "economy", "nature" and "energy & resources" fall under environmental sustainability. The social sustainability dimension covers "housing/communities" and "culture" (fig. 9). These dimension are subsumed within the core value of sustainable development which should promote Kigali's importance as modern, attractive and safe model city on the African continent.



Fig. 9: Kigali City 2013 Urban Sustainability Framework (Kigali City Master Plan, 2014)

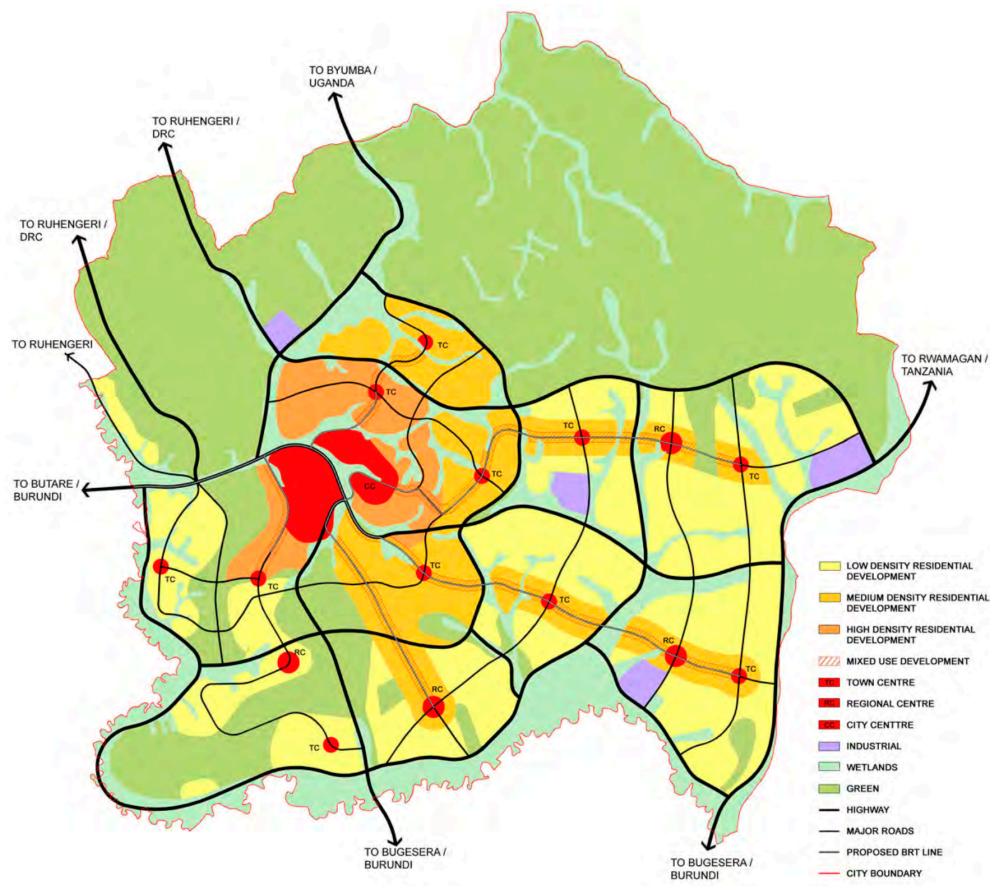


Fig. 10: Radial City Concept for Kigali (CoK, 2013)

Conceptually, the Central Business District (CBD) is the centre of the radial plan (fig. 10). From the CBD transport corridors spread out like tentacles to reach the regional and town centres. These secondary centres are smaller nodes where urban facilities & services as well as job opportunities are concentrated. This supports the objective of developing a compact, vibrant & transit-oriented city (CoK, 2013). The commercial complexes and high-rise buildings in the CBD have been developed in the first phase of implementation as the centre is “the most attractive area of the city in terms of commercial activities” (Bafana, 2016). This again showcases the priorities which are the dominant undercurrent of the KCMP, namely modernisation and economic international appeal.

Emphasis is put on rolling out multiple large-scale infrastructure projects, especially transportation, water and sanitation networks. Improving access to safe and secure water and sanitation services is high up the international development agenda and included in Vision 2020 with the ambition to ensure universal water access by 2020 (MINECOFIN, 2000). However, the effectiveness of the proposed method of expanding the centralised network of piped water and increasing capacity via the construction of a new treatment plant near the CBD, is questionable especially given the identified high risks of landslides and earthquakes.

Lastly, the KCMP proposes remarkable intensification of housing to give answer to the continually rising demographic pressure. The ambition is to bump up the housing density from 120 units along 1km of road to 1200 (CoK, 2013). To this end, stringent zoning & construction regulations are defined in the 2013 KCMP.

Development projects

Additionally to the conducting influence of national strategies, international frameworks, networks & projects inscribed in the international development paradigm direct the city's transformation.

Climate mitigation & adaptation

The Paris Agreement put climate mitigation and adaptation at the heart of national strategies (UNFCCC, n.d.) and therefor, in the case of Rwanda where 50% of the population lives in its capital, at the centre of Kigali's development pathway. The most influential adaptation targets for urban development in Rwanda's NDCs are: securing access to water, sustainable land use management, informal settlements upgrading & high density development, all-weather transportation networks & DRM (RoR, 2020a).

Joining ICLEI Africa's Urban-LEDS II, a European Commission funded project, allows the GoR to access the networks' financial & technical resources and support system to start implementing the ambitions developed in the NDCs, GGCRS & NST (Urban-LEDS, 2018). This project focusses mainly on knowledge aggregation at municipal level through providing technical support and access to a city-to-city learning platform.

Urban infrastructure

Following examples of other developing cities in the Global South¹ and the recommendations of the World Bank for "[c]ities [...] to invest in infrastructure if they are to provide the basic services for economic growth" (Arimah, 2005), infrastructure development in Kigali between 2000 and 2020 targeted mainly those areas which would make the city attractive for business investment. The Urban Infrastructure & City Management Project improved access to paved roads & social infrastructure and featured a pilot project for slum upgrading (World Bank, 2018).

Through the Rwanda Urban Development Project I & II (RUDP) the city received financial aid from the World Bank to upgrade urban infrastructure. While RUDP I focussed on general city-wide infrastructure upgrading, RUDP II targets infrastructure in four unplanned settlements showcasing a pro-poor strategy to infrastructure upgrading (CoK (b), 2019; LODA, n.d.).

Urban resilience

Lastly, the Kigali also participated in the 100 Resilient Cities (100RC) project which introduces the urban resilience perspective to city (re)development. In what follows, the change in urban planning and development approach will be highlighted through the objectives set in the framework of the 100RC project.

¹ e.g. the case of Cape Town, South Africa, by Swilling (2006)

SHIFT TOWARDS RESILIENCE

Urban resilience

The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt and grow no matter what kinds of chronic stresses and acute shocks they experience.

Resilience definition by the Resilient Cities Network (Resilient Cities Network, n.d.)

Localising the Resilient Cities Framework

Resilience as outlined in the Rockefeller Foundation 100RC project initiated in 2013 combines an 'adaptive' perspective, focussing on flexible adjustment to a constantly changing context of shocks and stresses, with a 'transformative' one, aiming to challenge and radically change the pre-existing urban development pathway. Furthermore, the project aimed to stimulate integrated planning both in terms of sectoral integration and multi-stakeholder participation and provided a platform for city-to-city learning (Berkowitz & Kramer, 2018).

Even though to date the 100RC report for the CoK has not been published, a shift in urban development approach is clearly apparent. In adopting the resilience perspective to Kigali, an engineering-oriented perspective on resilience (Davoudi, 2012) seems to prevail, adhering to the adaptive aspects of the 100RC definition. Based on the examination of policy documents, the revised master plan and implementation projects, the city focusses on the reduction of infrastructural vulnerability to geomorphological and climate-related disasters. In this context, the resilience concept adopted stays close to the dominant definitions in disaster risk management (DRM), namely resilience as "the inverse of human vulnerability" (Matyas & Pelling, 2014). As will be discussed in what follows, this tendency can be explained by examining the application of "resilience" in the new wave of policies and strategies such as EDPRS II, NST 1 and Vision 2050, which largely attend to "sustainable urbanisation" as defined by the SDGs and the NUA (Ortega & Malonza, 2020), as well as through the influence of the 100RC program.

Resilient infrastructure and climate sustainability

In the National Risk Atlas of Rwanda (MINEMA, 2015) geomorphological (earthquakes, landslides) and climatic (flooding & drought) disasters were identified for Kigali as most urgent shocks and stresses to be addressed. In dealing with these shocks and stresses, the development of resilient infrastructure and service provision seems to be the primary focus on municipal and national level. In the context of widespread rapid unplanned urbanisation, the provision of resilient transportation, water, sanitation and telecom infrastructure not only reduces vulnerability to the identified shocks and stresses, it also serves the overarching ambitions of achieving “a high quality and standards of life for Rwandans” expressed in Vision 2050 (MINECOFIN, 2020) and its precedents.

“Climate resilience” has been on top of the national agenda since 2011 with the adoption of the GGCRS (RoR, 2011). On national level, this narrative is almost exclusively related to the need for low-carbon and climate resilient infrastructure, thus putting emphasis on climate adaptation and mitigation through infrastructure development, rather than promoting comprehensive resilient (urban) development. With the adoption of the SDGs in 2015 “sustainability” clearly has taken precedence over “resilience” in Rwanda.

The need for resilient infrastructure to climate impacts recurs in all policies, strategies, planning documents as well as in the implementation projects pushed forward by the national government. In the National Urbanisation Strategy (NUS) (MININFRA, 2015), “sustainability and resilient” is the first core principle of policy framework, even though a definition of both “sustainability” and “resilience” is absent. In pillar 3 of the NUS, “conviviality”, “resilience” is linked to disaster risk reduction and the role of safe, inclusive and resilient infrastructure. RUDP I & II (RoR, n.d.) funded by the World Bank, seek to “improve access to sustainable infrastructure and services, and strengthen urban management and resilience in low income areas in the City of Kigali and the 6 Secondary Cities of Rwanda”, thus implementing the DRR and sustainability agenda for the urban poor. This exemplifies how resilience is considered a property of the physical urban system (Elmqvist et al., 2019) in the city’s vision. This, however, makes abstraction of the importance of social capital and human agency in the face of disasters. Social cohesion & networks (between family & friends, people from similar social circles and between the different powers in society) have been proven to limit damage during and aid recovery after the occurrence of a disaster (Aldrich & Meyer, 2015).

Notwithstanding, access to safe and resilient infrastructure is still a key component to alleviate the risk of damage and loss posed by the identified shock and contribute positively to building adaptive capacity of the urban system, even more so in the context of Kigali, where around 60% of the population lives in unplanned settlements. In this respect, the implementation of infrastructure projects in Kigali has been successful in achieving its ambitions. Through the Agatare Upgrading Project, part of RUDP II, all-

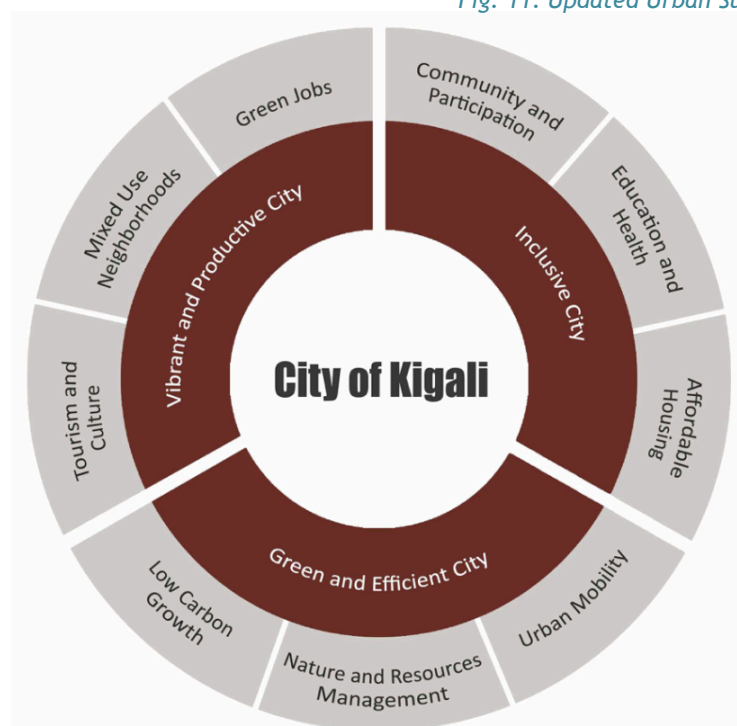
weather roads, street lighting, drainage and pedestrian ways have been constructed to benefit a large portion of residents in the Nyamirambo suburb (Nkurunziza, 2021a). Furthermore, access to safe and clean water has reached 95% of the population in 2019 (Manirakiza, 2019) even though production capacity is still too limited to match up current and projected demand (see Appendix 1 for case study research). Also drainage remains a big challenge (Nkurunziza, 2020b).

Resilience learnings in the revised Master Plan

The revised Urban Sustainability Framework (fig. 11) on which the 2020 master plan is founded clearly marks a maturation of the framework and implicitly includes some of the key learnings from applying a resilience perspective to urban planning. Instead of traditional sectoral dimensions, the updated USF is broken down into 3 integrated visions. Where before “housing” fell under “social sustainability” and covered housing stock and land use, these themes are now included in the cross-sectoral dimensions of “inclusive city” and “vibrant and productive city” respectively, linking them to other transversal priorities in the overarching dimensions.

Rigid zoning regulations, construction standards unattainable for the urban poor, problematic resettlement schemes and unequal access to housing and jobs are major points of criticism in relation to the implementation of 2013 KCMP (Nyiransabimana, 2019; Nikuze et al., 2020; Sabiiti, 2020). These fallacies, are mainly addressed in the 8 founding principles (fig. 12). Incremental densification and flexible zoning (P2 & P5, fig. 12) offer a more accessible approach to development (CoK, 2019a). This also aligns with the notion of general adaptivity in resilient urban planning to deal with unpredictable futures. Additionally, prioritisation and phasing (P4, fig. 12) allow for realignment of the urban development strategy to emerging issues.

Fig. 11: Updated Urban Sustainability Framework (CoK, 2019a)

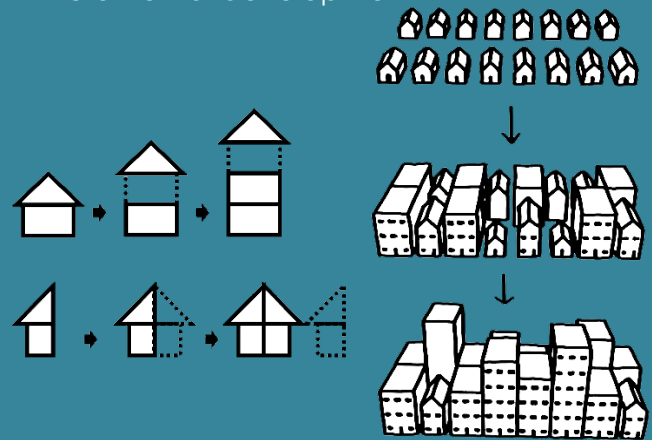


Founding principles of the revised master plan

1 Integration in National and Regional Context



2 Incremental development



3 Facilitating Affordable Housing

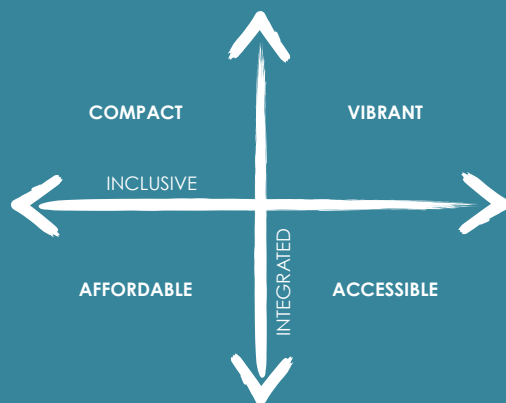


SKAT Model Pilot Project

4 Detailed Phasing aligned to City Development Strategy



5 Mixed Use Approach



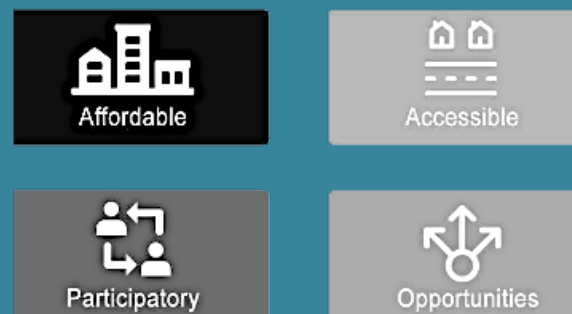
6 Green Growth



7 Sustainable and Resilient Infrastructure



8 Inclusivity and Equity



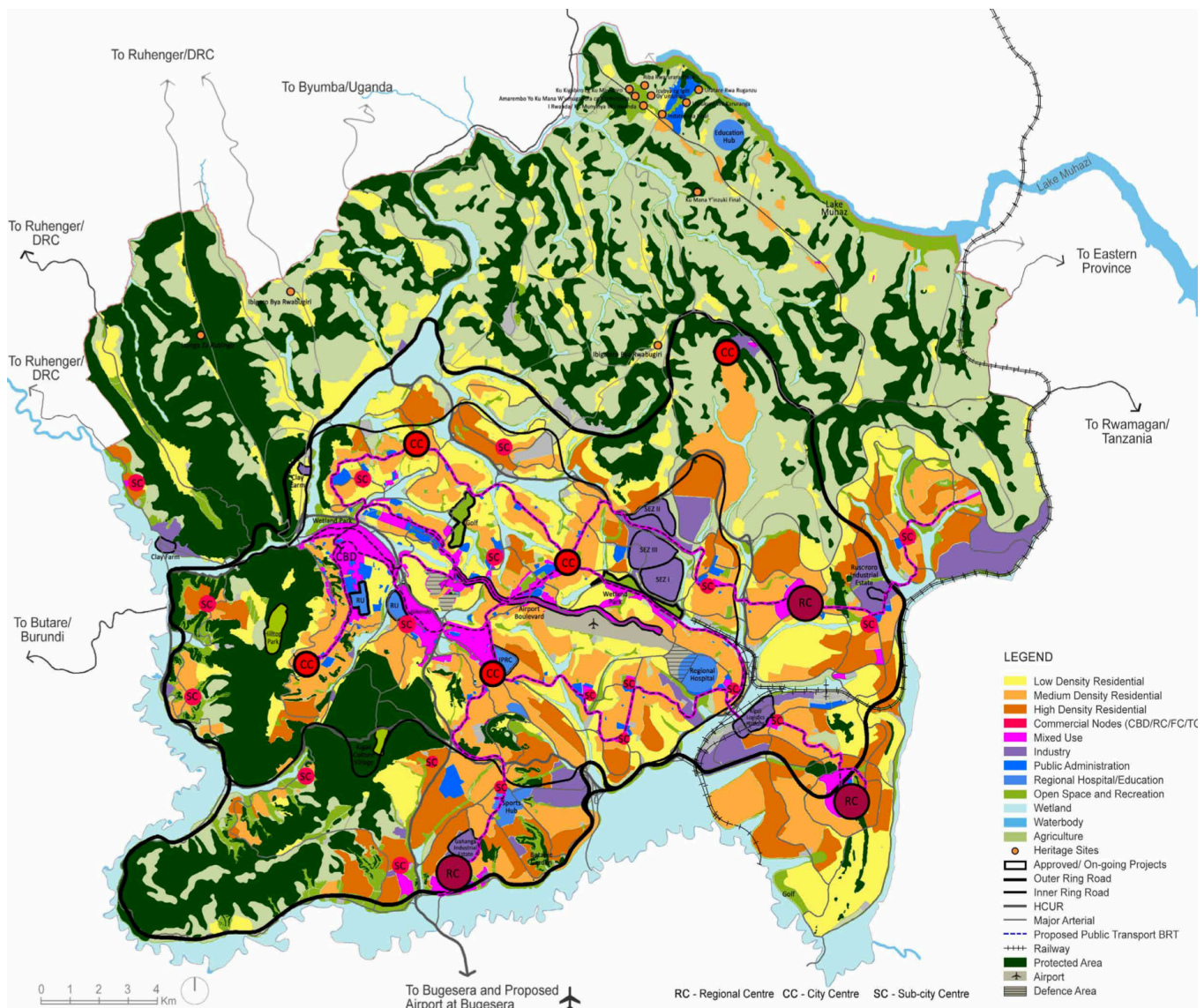


Fig. 13: Proposed Structure Plan 2019-2050 (CoK, 2019a)

The 2020 KCMP concept defines 4 “city centres”, replacing the previous radial concept plan which defined the CBD as sole and unwieldy centre of the city (fig. 13). This spatial decentralisation of urban services together with increased mixed use zones reduces the risk of cascading effects of climatic and geomorphological shocks and stresses throughout the entire city which in turn improves resilience. Moreover, moving away from the CBD as the heart of the city is also of metaphorical importance and embodies the shift from an economic growth-driven to a citizen-centred attitude.

Where the 2013 KCMP failed to localise global urban planning trends, the revised plan is rooted in the specific conditions of the CoK, for example redefining affordable housing for Kigali city-dwellers and embedding phasing and prioritisation to keep up pace with demographic pressure and align external funding with the prioritised development objectives. Nonetheless, the plan also draws on internationally defined development strategies to adhere to the global tendencies of e.g. green growth (CoK, 2019a).

The role of governance

Previously mentioned national policies and strategies, their localisation through the 2020 KCMP and the inclusion of resilience thinking throughout, exemplify an intentional redirection of urban development to take on resilience learnings and offer a more citizen-centred approach. However, on both national and municipal governance level (resp. MININFRA, 2015; CoK, 2019a), it is unclear how these ambitions will translate on the ground and what the implications on governance are.

A top-down approach still prevails in the revised master plan, notwithstanding the fact that different local academics have expressed the need to include existing grassroots communities of practice for successful hazard mitigation (Tsinda & Gakuba, 2010; Manirakiza, 2014). Common top-down urban development practice as in the 2020 KCMP disregards the importance of including multiple forms of knowledge empowerment through awareness and building strong social networks. Indeed, notwithstanding its improvements, the revised, data-infused plan negates to some extent the lived reality in poor neighbourhoods which is overlooked by numbers of km of drainage, percentages of access to paved roads etc. Without transforming also these socio-economic and organisational systems (Meerow, 2015) on the different governance levels, leveraging adaptability in the urban system as a whole cannot come about.

DISCUSSION AND CONCLUSION

“Resilience” first appeared in GGCRS in 2011 where it was used to combine climate adaptation with the recognition of the unpredictability of future disruptive climatic events (GoR, 2011). Correspondingly, “climate resilience” is mostly coupled with low-carbon development. This initial understanding of resilience continues to be the predominant one. Evaluating the evolution of municipal policies and strategies since the start of the program, an engineering-oriented attitude rooted in the idea of “persistence”, dominates the resilience agenda in Kigali. In this sense, the participation of Kigali to the 100RC Program does not mark a profound transformation of policy and practice. Rather it facilitated ways to localise global narratives spearheaded by multilateral organisations and global agreements such as the SDGs, the Paris Agreement and the NUA, into the Rwandan context. The focus on “climate resilience” seems to add some complexity to the still prominent sustainability agenda, challenging its *modus operandi* but not its objectives. Nonetheless, with the release of the 2020 KCMP, the attitude on municipal level has started to shift from an infrastructure-centred approach on resilience to a more citizen-sensitive vision aiming to integrate resilience priorities.

From citizen-centred to citizen-empowered resilience

In the last decade, the need to build and sustain local human capacity and agency, not only through education and access to healthcare but also via knowledge aggregation, empowerment through engagement and the recognition of existing local capacities has been expressed by scholars and citizens (Tsinda & Gakuba, 2010; Baffoe et al., 2020). Moreover, the capacity to self-organise, which originates from strong ties amongst neighbours, local knowledge and activating capacity, generally aids survival and speeds up recovery in the face of hazards (Aldrich & Sawada, 2015). Social capital, invoked by a sense of ownership & belonging, recognition and validity, is not only crucial for specified resilience to known threats but also for building general adaptive capacity.

In Kigali, residents of informal and mixed neighbourhoods share a unique sense of belonging and familiarity amongst neighbours which naturally arises in these neighbourhoods. Especially vulnerable neighbourhood residents consider informal social support systems to be good practices (Baffoe et al., 2020). Eviction and expropriation, tools used for the implementation of the 2013 KCMP through infrastructure projects, disrupt the social dynamics on the ground, trading social resilience, organically build through informal interaction, for resilient infrastructure.

In public policy globally, citizens are often thought of as passive recipients or beneficiaries of top-down actions rather than active stewards of sustainability and resilience. This is no different in the CoK, notwithstanding the formal intention to inform

decision-making through participatory processes. The credibility of this intention is questionable, as no methods or measures to this end are specified. Even more so, in the 2020 KCMP inconsistently a difference is made between “stakeholders” and “beneficiaries”. Without putting too much attention on semantics, this raises the questions: what differentiates “beneficiaries” from “stakeholders” and so, whose interests are really taken into account? This all points to the friction between resilience as framework for policy on one hand and truly governing from a resilience perspective on the other hand (Wagenaar & Wilkinson, 2013).

Development aid & municipal agendas

As discussed in part 2 and 3 of this report, through the participation in projects funded by for example the World Bank or Rockefeller Foundation, the GoR or CoK acquire funds to implement the respective national and municipal development objectives. However, it needs to be clear that these funds are always tied to the specified project and thus to a degree hinder the exploration of innovative co-benefits both across scales and between different objectives or projects (see Appendix 2 for exploration of the challenge posed by aid dependency). Furthermore, this sheds light on an interesting dynamic where donor agencies and organisations define a generic dominant agenda on development to which policy-makers have to adhere to if they are aiming at securing funding, which is a strategy that Rwanda, as many other African countries, uses. Looked at from this point of view, these funding agencies have great responsibility in setting the agenda as well as defining relevant tools, metrics and monitoring systems, which to a certain degree lock the receiving governments into a predetermined pathway.

In the case of Kigali, the SDGs are almost literally the “blueprint for peace and prosperity for people and the planet, now and into the future” (UNDESA, n.d.). However, just ticking the boxes of the SDGs is no guarantee for sustainable, resilient and inclusive futures. These “universal” goals focus on alleviating symptoms by setting benchmarks for desirable outcomes but do not necessarily challenge the root cause of the problem. At their best, they can pave the way to resilient futures, but more often than not, projects justified under the veil of the SDGs fail to dismantle the dominant strategies and paradigms on which actions are founded. So when Kigali received the UN Habitat Scroll of Honour in 2008 for its “many innovations in building a model, modern city” (UN Habitat, n.d.) the city was prematurely appraised for its “innovations” which spoke the language of its main partners, being the World Bank, The African Development Bank etc (“Kigali shines...”, n.d.). Even though the city has taken big steps in improving living conditions for its citizens, critical voices on the other side denounce that “much of the improvements we see in Kigali today are cosmetic and driven by the government’s obsession to portray an image of success rather than to lay the foundations of lasting economic growth” (ROAPE, 2017).

Re-evaluating resilience through the Covid-19 pandemic

“The Covid-19 pandemic has shown that none of us are resilient until all of us are resilient.”

- Dr. Muyawamariya, Minister of Environment, GoR

The ongoing pandemic has already revealed many vulnerabilities and put pressure on human health and development worldwide. However, in Kigali it has also leveraged the power of people self-organising on neighbourhood scale, showcasing innovative new models of cooperation through grassroots communities (van den Berg et al., 2020). Only two weeks after the pandemic was declared by the WHO, these voluntary local actions began to emerge all over the city effectively supporting more than 40 000 vulnerable households affected by the lockdown (J. Habinshuti, personal communication, April 21, 2020). Social media played an important role in mobilising members and aggregating the voluntary donations to a trusted member of the community (Karuhanga, 2020). Moreover, this unexpected shock might spark innovation in ICT and the service sector in Kigali, as with already emerged in early pandemic response, which could aid economic rebound and help the envisioned transition of economic base.

These initiatives emerging from early disaster response exemplify the importance of informal social security nets in poorer neighbourhoods as well as solidarity between classes, which really sparks hope for the future development of the city. The question remains: how to respectfully integrate these innovative grassroots actions with the continued stronghold of the municipal and national government to successfully implement the forward-looking development objectives?

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APPENDIX

Appendix 1

Research on the existing water cycle (collection - use - treatment) for domestic use in Kigali.

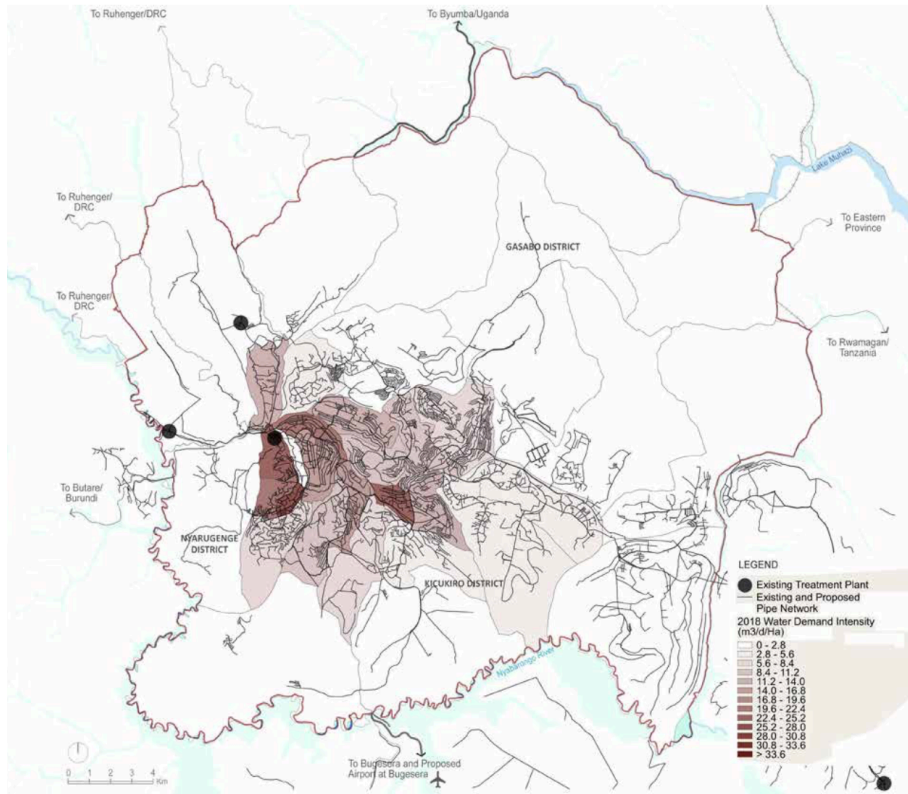
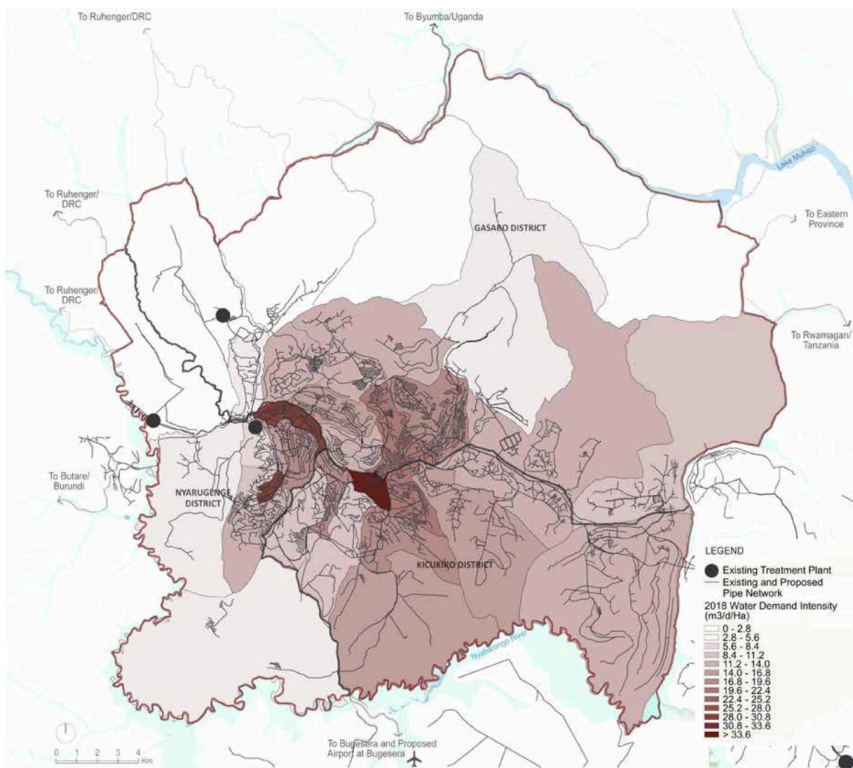


Fig. A: water demand in 2018 (above) & projection for 2050 (below)



Research summary

Projected demographic growth on the one hand & the envisioned transition to lift people out of poverty and grow the middle-income class on the other are likely to increase domestic water use in Kigali (fig. A). Based on current water use profiles per income class (fig. B) it is clear that the transition from low- to middle-income and middle- to high-income comes with an unsustainable increase in domestic water use if water saving measures are not being put in place. Furthermore, the centralised water management system as it exists today increases vulnerability to disruption by hazards and disasters, especially for people living in the margins of the city and/or in under-serviced informal settlements. Households living in informal settlements in wetlands are at risk of both flooding and contamination of soil and water for consumption. Those living on slopes in the margin of the city are at risk of runoff and consequential landslides or gullying as an effect of inadequate drainage infrastructure and soil erosion.

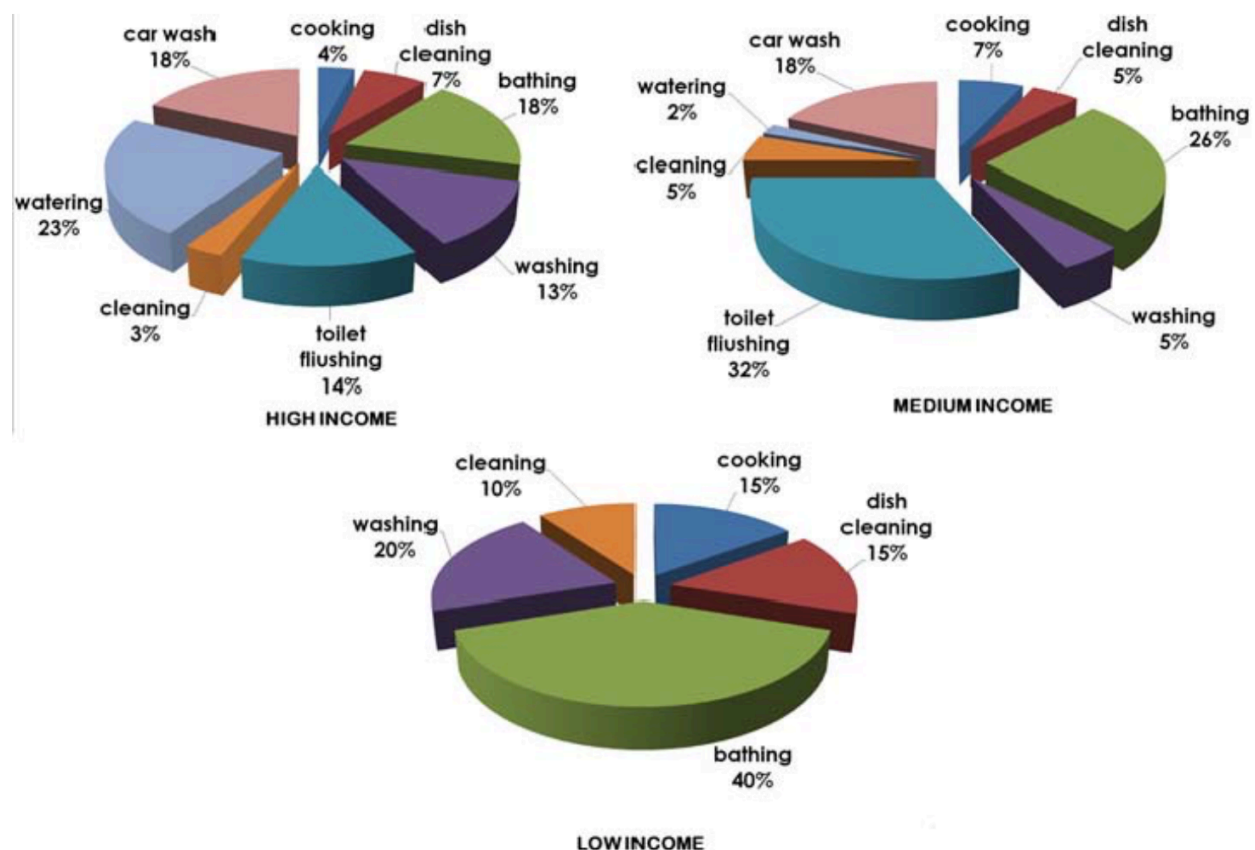


fig. B: water consumption for high-, middle- & low-income households in Kigali (Mbateye et al., 2010)

Furthermore, the current dependence on the natural hydrological water system (groundwater, rivers & basins) as source and the centralised treatment of this water makes adequate and safe water provision precarious. Additionally, is it at odds with environmental sustainability objectives and might the increasing competition for water between agriculture and the urban environment, adversely effecting food availability for urban dwellers.

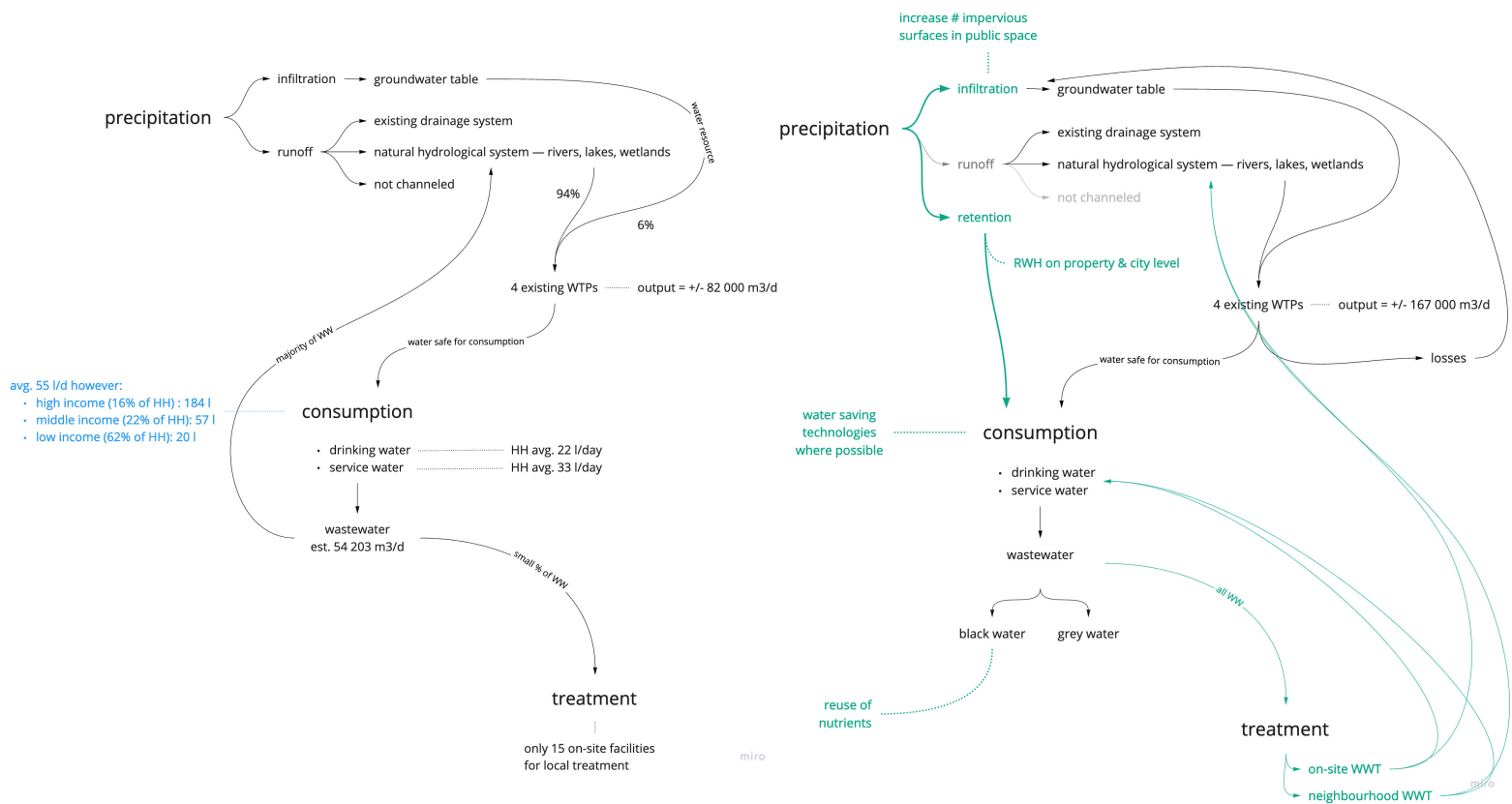
Resilience adaptation

Early adoption of water saving fittings and the promotion of domestic water use reduction through sensibility campaigns for middle- and high-income households, decentralisation of the service provision (distribution and treatment) and diversification of potable water sources, are crucial to develop a sustainable, inclusive and resilient water system.

On city-wide scale, the water cycle (collection - distribution - use - treatment) needs to be redeveloped focussing on diversifying the water sources through investment in local, decentralised rainwater harvesting and decentralising distribution and treatment as to decrease the vulnerability of the distribution network (fig. C).

Necessary actions to be taken by middle- and high-income households and stimulated by the government include: water saving taps and appliances (e.g. compost toilets), rainwater harvesting, water sensibility & water-saving behaviour (fig. D).

fig. C: existing (left) & proposed (right) water cycle for the CoK (by author)



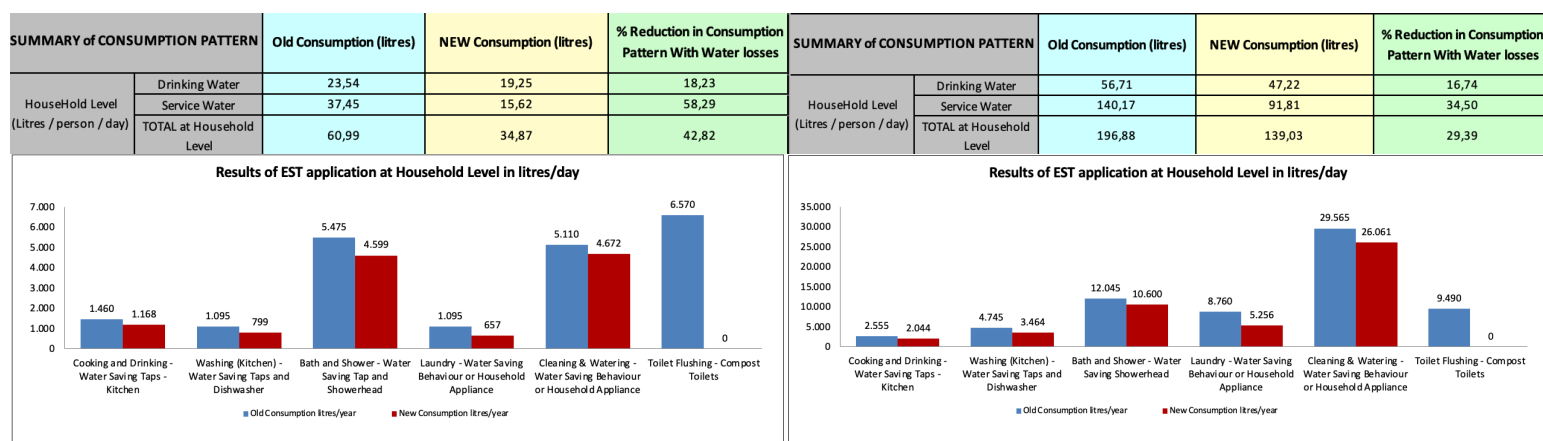


fig. D: possible reductions in water use for middle-income (left) & high-income households using water saving fittings. (by author using WiseWater tool)

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fig. A: Adaptive Cycle mapping government vs. community (adapted from Resilience Earth)



for URBANISATION PRACTICES in relation to SPONTANEOUS DVPT

1. Identify how each paradigm level manifests in your organisation or community. Mark the dominant paradigm with a star icon from the left-hand menu. Identify next steps that could help the organisation or community move one level up. Taking into consideration the leverage points detected in the iceberg framework.

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