

Future Proofing Cities

Uganda - Secondary Cities



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Cities Alliance
Cities Without Slums



Foreword

It is a great pleasure to introduce these Future-Proofing Cities Studies, covering cities in Ethiopia, Ghana, Mozambique and Uganda. These studies, form an integral part of the Future Cities Africa (FCA) Programme that the Cities Alliance has undertaken over the past two years, with financial support of DFID. These studies covered nine cities that were carefully selected to represent metropolitan cities, secondary cities, regional capitals and cities within growth corridors. Together, they exemplify the challenges of contemporary rapid urban growth, and the opportunities and promise that African cities can and must hold for the future of the continent.

While demonstrating important differences between the cities, there is a common thread that is well understood by national governments and city managers alike: a combination of enabling national policies, strong institutions, well-resourced and accountable local governments, and informed and engaged citizens are essential for local and national prosperity. On the African continent it is precisely these type of cities, in every country, that will have to be empowered to contribute to the successful implementation of Agenda 2030, and grapple with the consequences of climate change. However, time is very short, as the majority of urban growth is determined more by facts on the ground than by effective policy-making.

I would like to thank Jamie Simpson, Erika Puspa and the entire FCA team for their outstanding work in completing a complex work programme against demanding deadlines, our colleagues at Arup International Development for the high quality of these studies, and Simon Ratcliffe and his colleagues at DFID (UK) for their constant support and encouragement.

William Cobbett

Cities Alliance Director

Uganda – Secondary Cities is part of the Future Cities Africa (FCA) initiative in partnership with Cities Alliance and the UK Department for International Development (DFID).

FCA is a partnership initiative launched by Cities Alliance and DFID to support cities in Ghana, Ethiopia, Uganda and Mozambique as they transform themselves into resilient, inclusive centres of economic growth.

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African governments are counting on urbanisation to lift their nations out of poverty.



Figure 1. Market in Arua

Introduction

▶ The majority of Africa’s population will shift from rural to urban in the next thirty years. Future Cities Africa aims to help cities achieve inclusive economic growth, manage demographic change, and address environmental risks.

Africa is going through an economic boom and cities are at the centre of this pathway to economic prosperity. Two key features are set to alter Africa’s future: a youthful population and urbanisation. Combined, these features are defining the boom in trade and industry and will push modernisation and increase connectivity across the continent (KPMG, 2012).

Africa’s cities are emerging as centres of entrepreneurship, innovation, creativity and invention. Africa is now the fastest-growing region in the world in terms of mobile telephone and internet access. It is anticipated that mobile data usage will increase twenty times between 2013 and 2019 (Ericsson, 2014). Africa is also the final inhabited continent on the planet to urbanise.

Globally, future city growth will be almost exclusively in Africa and Asia, representing over 90% of the world’s urban population growth (WEF, 2015). In its recent report *Future of African Cities: Poles of Prosperity or Slums of Despair* (2015), The Brenthurst Foundation indicates that by mid-2030 half of all Africans will live in cities. They suggest that three main drivers of African urbanisation are fuelling these historic changes in the continent: natural population growth, rural-urban migration, and large-scale dynamics such as connectivity, technology and globalisation (Brenthurst Foundation, 2015). Linked to these drivers of growth, greenhouse gas emissions in the region are expected to grow rapidly, primarily through increased fossil fuel use, and agricultural expansion (Hogarth et al, 2015).

“The emerging future of cities largely depends on the way we plan and manage urbanisation, and the way we leverage this transformative process to ‘provide the setting, the underlying base and also the momentum for global change”

*Joan Clos
Executive Director UN-Habitat*

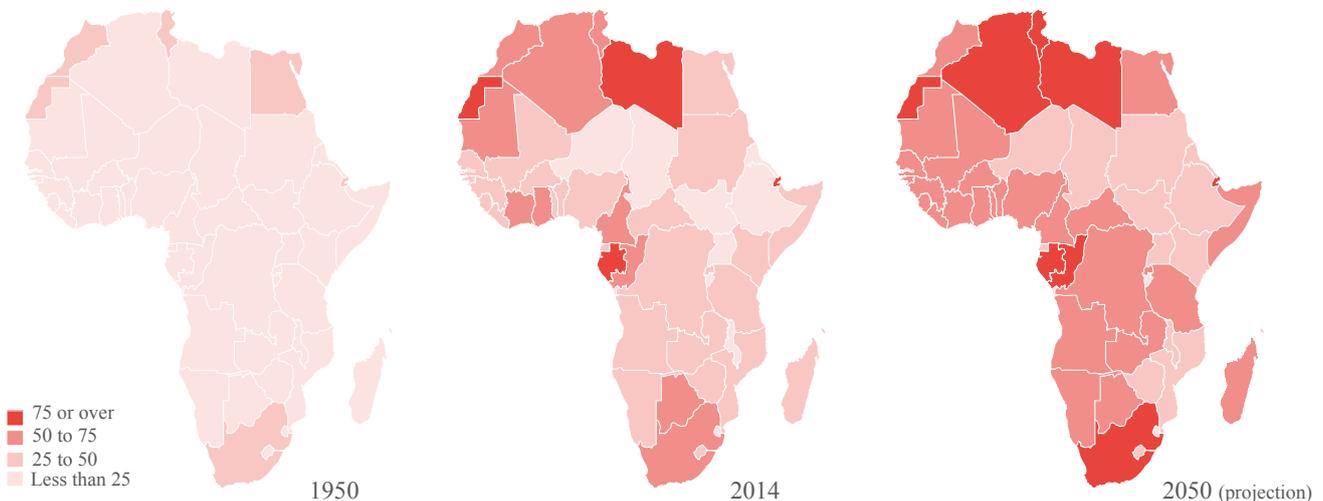


Figure 2. Percentage of the population residing in urban areas
Based on World Urbanization Prospects, The 2014 Revision. UN 2015

African city megatrends

Development megatrends impacting African cities can be viewed as opportunities or risks depending on a city's context.



Figure 3: African city megatrends - highlighting Ugandan megatrends based on Z-punkt, n.d. & Arup Cities Alive, 2014

“The current wave of urban growth in Africa is occurring faster and on a larger scale than anything the world has yet witnessed, and therefore poses the greatest challenge yet for urban and national policy-makers.”

Brenthurst Foundation, 2015

The challenge facing African cities is to provide their citizens with equal economic opportunities while transitioning to a low carbon economy, using limited resources efficiently, and managing rapid urban and population growth. African cities also need to manage the impacts of a youthful population. In Uganda, for example, the majority population is younger than 15. This leads African leaders to question whether their demographic profile is an economic godsend or ticking time-bomb (World Bank, 2012).

For African cities to be successful they should adopt integrated and holistic urban planning practices that consider not only inclusive economic development and low-carbon development pathways but also the environmental and social impacts of growth to promote liveable cities. Cities need to plan for growth that is future-proofed for our changing climate, the challenges of scarce natural resources, and underlying geophysical risks.

This report relates to urbanisation as it is currently happening in Uganda. It captures the present situation of cities and also the government’s planned urbanisation strategy.

The report discusses how Uganda plans to transition from a nation with one of the lowest urban populations in the world, at 15.8% to 60% urban by 2040 (NPA, 2007). The rate of urbanisation in Uganda has been very high – 7.74% in recent times. The majority of this urban growth will take place in the small-medium sized secondary cities (NPA, 2007). This report will also discuss the influence the urbanisation strategy is having on the regional development of the country. To discuss these messages, Future Cities Africa has selected two cities, Arua and Jinja, to indicate the current urbanisation trends and to highlight key challenges these cities may face in the future.

This report relates to secondary cities in Uganda and represents one of four reports prepared for Future Cities Africa. Each report covers a specific country, its national urbanisation strategy and its specific regional planning typology. The other three reports include: regional cities in Ethiopia, metropolitan cities in Ghana, and urban growth corridors in Mozambique.



Figure 4. Kampala taxi park
Credits: Babak Fakhmzadeh / Flickr

Approach

▶ Future Cities Africa seeks to support cities in Africa to become future-proofed for climate, environment and natural resource challenges, so that they are inclusive and resilient, and have growing economies. It will help make cities work for the urban poor. It will conduct an in depth feasibility and scoping study and develop innovative tools to enable rapidly growing African cities to realise their potential as centres of growth and job creation; and use research and evidence to develop targeted urban action plans.

Future Cities Africa Business Case and Intervention Summary (DFID, 2014)

Future Cities Africa is working with Sub-Saharan (SSA) cities to future-proof them for the range of social, economic, and environmental risks they are exposed to now and will be exposed to in the future. As discussed above, African cities are experiencing rapid population growth and urbanisation alongside a range of severe environmental shocks and stresses. City governments in Africa tend to have limited institutional capacity, over-stretched financial and human resources, and limited data to guide decision-making. Future Cities Africa has identified three key drivers (see Figure 5) that are shaping African cities: achieving inclusive economic growth, managing demographic change, and addressing local risks associated with climate change, natural resources, and geophysical risks.

Arup was asked to prepare Future-Proofing City Studies for nine cities in four countries: Mekele and Dire Dawa (Ethiopia); Accra and Tema (Ghana); Tete, Nampula, and Nacala (Mozambique); and Jinja and Arua (Uganda).

City Governments are trying to...

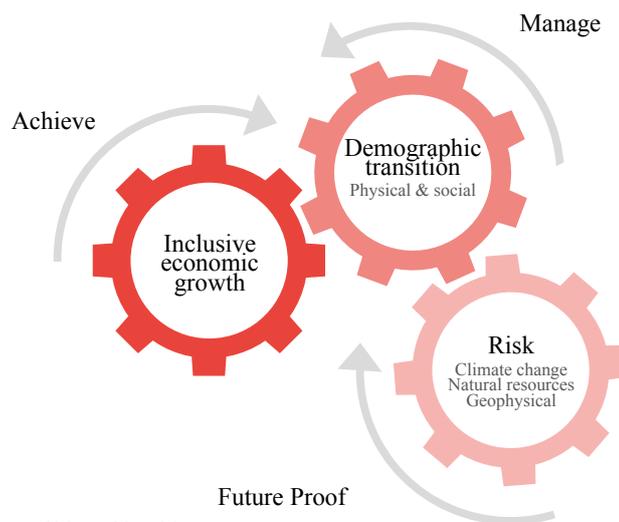


Figure 5: Future Cities Africa drivers

These studies are part of an in-depth feasibility and scoping phase to develop diagnostic tools to enable these cities to realise their growth potential and begin to guide this growth toward a more resilient and inclusive future. We hope that these city studies will help practitioners in local municipalities, national administrations, and international

organisations better understand the specific challenges each city is facing.

Two tools are used as part of our data analysis to help us dig-deeper into the capacity to act and risks in the cities - the Cities Alliance Normative Framework and the Arup Environmental Risk Framework.

Normative Framework

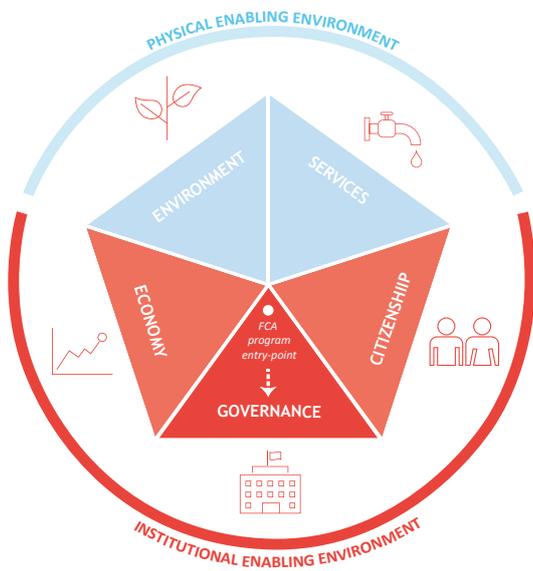


Figure 6: Normative Framework

The Normative Framework describes the physical and institutional environment which can support cities to achieve inclusive economic growth, to manage demographic change and to future-proof against environmental risks. The Framework helps: identify relevant data sources, facilitate discussions and build understanding of the factors that African cities need to ‘get right’ to achieve inclusive growth, manage demographic change, and address future risk. The Framework is a tool to assess the physical and institutional enabling environment within African cities, and provides an evidence base for future planning, investment and decision-making. As part of this work, the Framework mapped the available information for each city and to provide an holistic understanding of each city’s assets according to the five dimensions of the Framework.

Urban ER

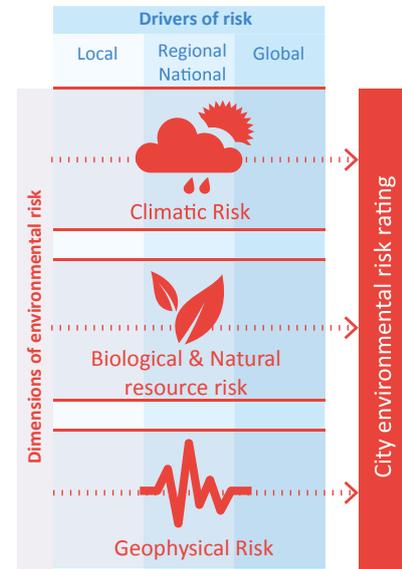


Figure 7: Urban ER Framework

Arup has developed an Urban Environmental Risk Framework (Urban ER) in order to help cities to understand and address the critical environmental challenges which shape urban wellbeing. The Framework identifies three dimensions of environmental risk for African cities: climatic, biological and natural resource and geophysical hazards. A current risk rating is provided through an understanding of existing threats. A future risk rating is provided based on the drivers of risk at three scales: local (such as loss of local biodiversity), regional (such as poor regional planning policy), and global (such as climate change). Though understanding the drivers of environmental risk, we can help city governments, advisors and stakeholders understand how local urban development pathways can create or compound risk. Urban ER can also help cities evaluate their capacity to act at different levels in order to mitigate current risk, and collaborate with others on a local, regional and global level to achieve a more resilient future.

Uganda

▶ Uganda has been undergoing rapid urbanisation for a number of years and has a strong and growing economy. Kampala was the dominant city for many years, but secondary cities are now growing rapidly too. National government sees urbanisation as the key to development processes – with five regional and five strategic cities identified.



of Ugandans
live in urban areas

The Republic of Uganda is a landlocked country in East Africa bordered by Kenya to the east, South Sudan to the north, the Democratic Republic of Congo to the west, and Tanzania and Rwanda to the south. It has a population of 35 million that has been rapidly growing over the last ten years (UBOS, 2014). With a history stretching back over 2,000 years – indigenous hunter-gathers mixed with Bantu-speaking populations’ migrating from west and central parts of Africa into southern parts of Uganda. In mid-1890 the area came under the rule of the British until independence in 1962. Since then there have been intermittent governments, military coups and conflicts including a

long civil war against the Lord’s Resistance Army (LRA). Today, the country is emerging as a strong and growing economy, having already started the process of economic diversification and with a goal to become a middle income country by 2020 (NPA, 2007).

Uganda’s population has been growing at an average of 3.03% between 2002 and 2014, and from the 1990s to early 2000s has had an average economic growth rate of 7% (World Bank, 2015). The working population in 2012 was 13.9 million. This grew one million over three years between 2009 and 2012. The proportion of the poor has decreased by 4.8% to a total of

19.7% between 2009 and 2012; and income inequality also reduced in the same time period (UBOS, 2015). Per capita income is now at \$703, putting the country closer to middle income status, however in the most recent year’s economic growth has been slightly less at 4.5% in 2013/14. Uganda however is still in the low human development category, with a Human Development Index ranking of 164 out of 188 countries. However, from 1980 to 2014, Uganda’s HDI increased 69.4% during which time life expectancy at birth increased by 9.3 years, mean years of schooling increased by 3.6 years and expected years of schooling increased by 5.8 years (UNDP, 2015).



Figure 8: View of Kampala
Credit: Gilles Bassiere/Flickr

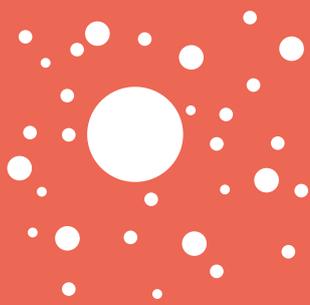
Uganda at a glance

Economic growth

5.5%

Economic growth has been high at 5.5% between 2010/11 and 2013/14, the highest in recent years being 9.7% in 2010/11.

Urban centres



There are **202** urban centres varying from Kampala with 1.5m people to many Town Councils with less than 5,000 persons. The median size of urban centres is 24,000 people.

Proportion of urban population for Kampala



Kampala is the primary city, but decentralisation is reducing its importance.

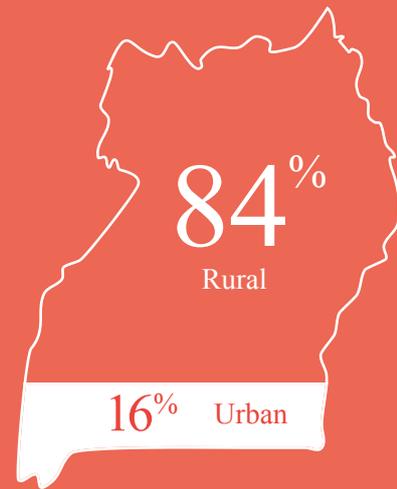
Urban population growth

Over the past 12 years, an average of

300,000

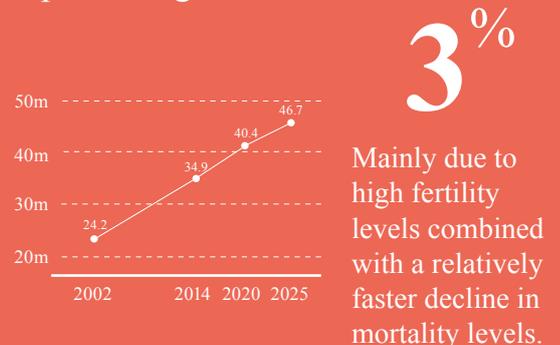
extra people living in Uganda's urban areas every year.

Low urban population

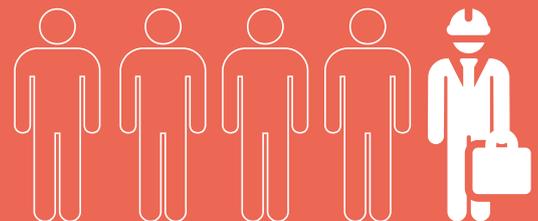


Only 16% are currently living in urban areas, but the rate of urbanisation is high at 5.74%.

Population growth rate



High youth unemployment



78% youth unemployment (2012/13), however urban unemployment has declined from 29% in 2009/10 to 24.6% in 2010/11.

Urbanisation has played a key part of this development process, helping the country to increase the overall level of productivity in the economy. There has been a shift away from low productive subsistence agriculture to jobs in cities (World Bank, 2015), however in 2012/13 72% of the population still worked in the agriculture sector (UBOS, 2015). While living standards and welfare outcomes have improved faster in cities, although transport infrastructure has become overwhelmed in the capital and other cities with future plans appearing to favour car-based travel. While the economy has

grown, this has come at a cost to the environment. Economic growth has led to significant environmental degradation across the country including damage to wetlands, soil erosion, deforestation, water and air pollution, and loss of biodiversity.

Climate change is set to impact a number of sectors in Uganda, given the potential increase in extreme rainfall events and likely increase of 2°C by 2030 (USAID, 2013). For the water sector, projections are for a much greater level of demand and some reduction in supply. This is likely to create serious water shortage in most months (Baastel, 2015a).

For food crops, there is great divergence in predicted production levels but most crops will have a reduction in total national production under most scenarios to 2050. Importantly, climate induced yield losses could be in the order of 50-75% for coffee, which currently contributes about 18% of total exports. This could lead to a loss of about \$1,235m in 2050, and \$1,850m for the 75% scenario. The threat of floods and droughts also creates the potential for serious losses from cash and food crops; for reference the 2008 drought caused a loss of \$47 m (Baastel, 2015b).

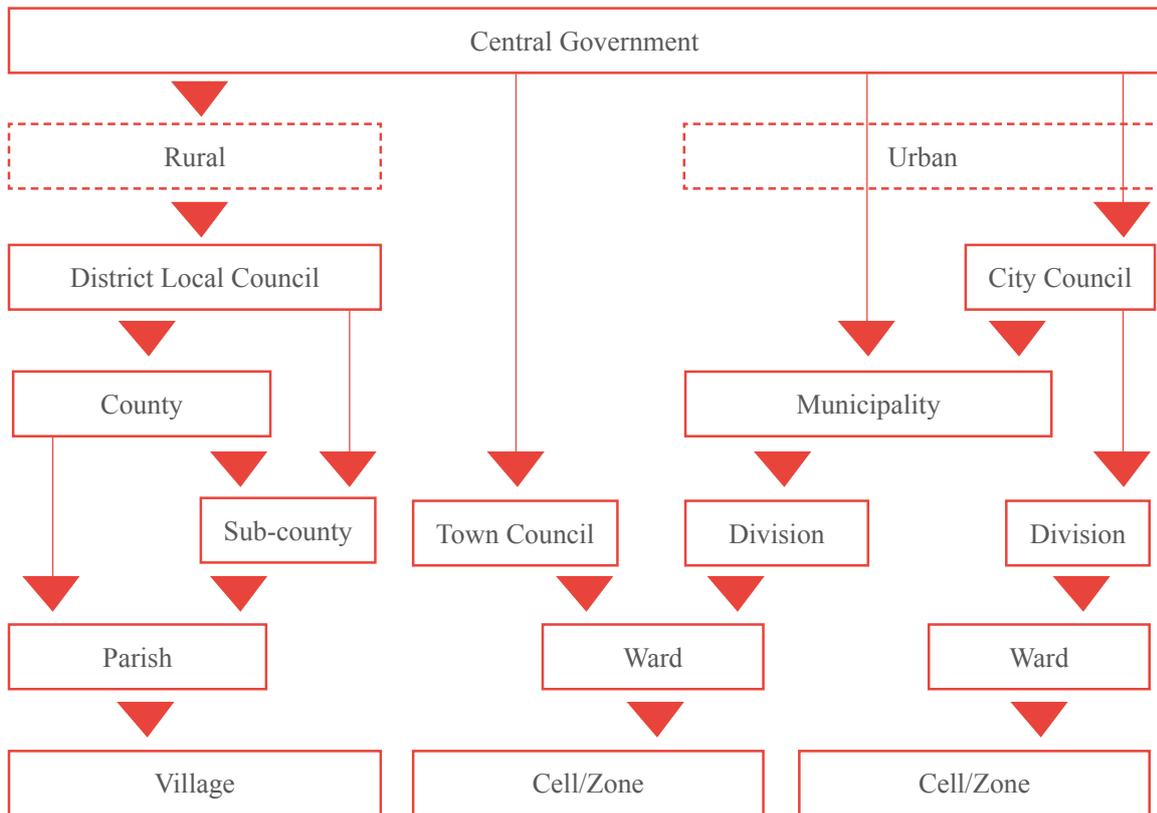


Figure 10: Local governance structure

For energy, climate change is likely to reduce biomass availability and possibly decrease hydropower potential from reduction in precipitation. Predictions suggest a 26% loss by 2050, which would challenge even current energy expansion programmes (Baastel, 2015c). Finally for infrastructure, a potential doubling of extreme events every 25 years would result in damages of around \$77-467m by 2025 (Baastel, 2015d).

As part of its vision to become a middle income country by 2020, Uganda's 'Vision 2040' states specific goals of reaching lower

middle income by 2017, the middle income category by 2032 and attaining the target of \$9500 in 2040 (NPA, 2007). This document identifies national economic opportunities that include "oil and gas, tourism, materials, ICT business, abundant labour force, geographical location and trade, water resources, industrialisation, and agriculture among others..." The strategy also identifies that achieving this goal will depend on the country's capacity to strengthen the following: "infrastructure (energy, transport, water, oil and gas, and ICT); Science, Technology, Engineering and Innovation

(STEI); land use and management; urbanisation; human resource; and peace, security and defence." Despite development in the formal sectors, the Uganda Bureau of Statistics (UBOS) indicates that the informal sector is not only large, but is the fastest growing sector in Uganda, currently accounting for some 43% of the total economy. Street trading and markets account for 44% of employment in Uganda's informal economy (University of Westminster, 2016)



Figure 11: Panoramic view of Kampala
Credit: Ronal Woan

Among its strategic plans, the government views urbanisation as a key driver to the development process. It has a growth model based on Asian examples, including the need for integrated physical planning, land use optimisation and investment in commercial and industrial zones, however there is no clear definition of an ‘urban area’ in Uganda. As part of this, Uganda Vision 2040 identifies five regional and five strategic cities as key to national urban growth. The strategic cities each have a sector focus, including oil, industry, tourism and mining. Alongside this are plans to review the government service delivery system, accelerate industrialisation and a planned urbanisation policy.

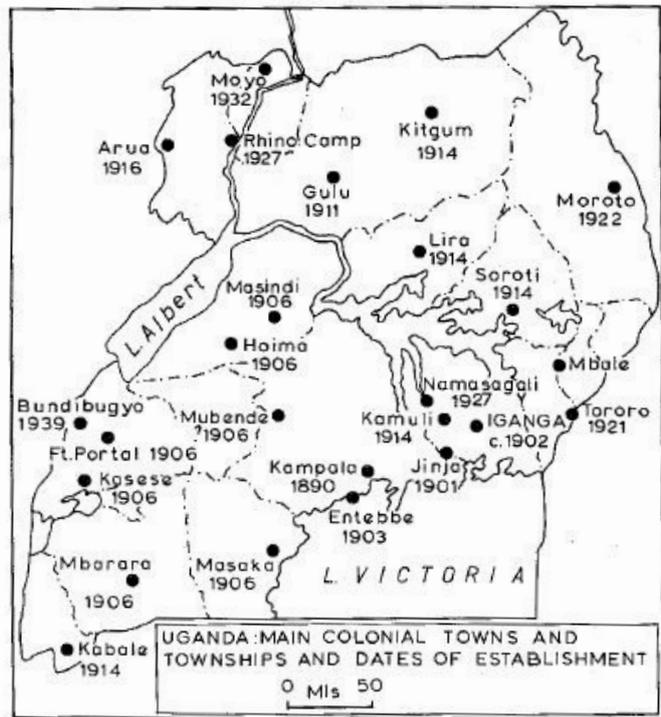


Figure 12: Uganda’s colonial urban system
Source: Bakwesegha, 1974

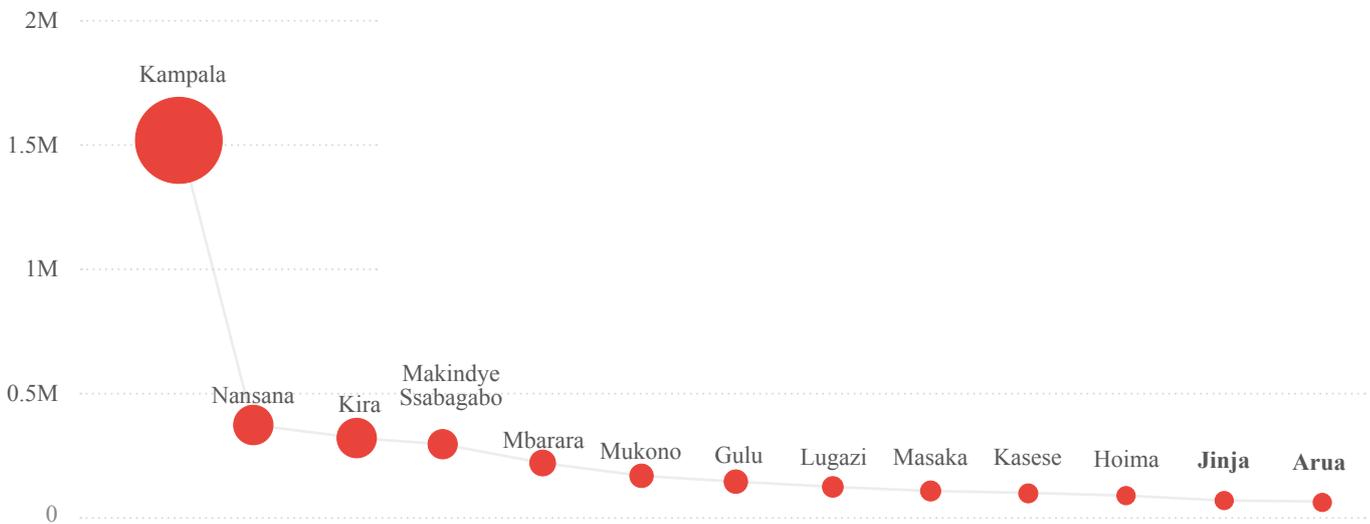


Figure 13: Relative population of cities in Uganda
Based on data from citypopulation.de

Secondary Cities

- ▶ As part of the ‘Uganda Vision 2040’, five regional and five strategic cities have been identified. These are intended to attract investment away from the capital, providing general services to a large catchment area (regional) or a functional specialty for national economic development (strategic).



Figure 14: View of Jinja
Credit: Ihertgo / Flickr

Uganda has been rapidly urbanising in recent years, at a rate of almost 6%. While Kampala remains by far the largest city, its dominance is reducing. Having seen an increase in built-up area of more than ten times between 2005 and 2010, Uganda’s population of urban dwellers is predicted to increase from 6 million to 30 million in the next few decades (World Bank, 2015). While urbanisation is associated with economic growth for the country and an overall increase in living standards and welfare for many people, these rates of urbanisation pose many challenges for Uganda.

Unfortunately most migrants settle for activities that are not highly productive, and the level of youth unemployment is high (78% in 2012) (NPA, 2015). As infrastructure in main cities like Kampala has become stretched, there is intense congestion and housing shortages. 60% of Kampala’s residents live in slums and services particularly education and healthcare are stretched, as well as the provision of electricity and piped water (World Bank, 2015).

Uganda’s urban hierarchy is dominated by Kampala, and is a good example of a primate city to secondary cities urban system.

Secondary cities growing

Kampala has had the highest rates of growth and in 1991 was home to 41% of the total urban population. But this has decreased to 25% (2014) as secondary cities are booming – in large part due to rural-urban migration.

Rapid economic growth

The country’s economic growth has averaged 5.5% over the last 5 years – driven by regional exports and an expanding services sector.

Sprawl and slums

Rapid urban growth has outpaced planning and service provision, resulting in large slum areas and overwhelmed transport systems in the capital and elsewhere.

Key areas of economic development

The strategic cities represent the focus for national economic development: oil, industry, tourism and mining.

The urban system was first established during British rule and has continued until today. Under British rule urban centres were developed to act as “modernising agents” within the periphery of Uganda and whose primary functions were administrative and commercial – largely for the benefits of the colonial administration (Bakwesegha, 1974). These centres were essentially designed to serve the interests of non-indigenous groups (Europeans and Indians) who lived within the centres with indigenous populations forced to live on the periphery (Bakwesegha, 1974).

The urban hierarchy has remained the same in the years since independence and the existing urban system still reflects the huge disparity between Kampala and the next largest city. Uganda is 15.8% urban. 4.3% live in Kampala alone but the majority of urbanites

(10.6%) live in centres of less than 200,000 people. As Uganda strives to achieve 60%, these small-medium sized secondary cities will grow in importance (NPA, 2007).

Uganda’s secondary cities are referred to as municipalities within the current government administrative structure, although this may change soon with both Arua and Jinja moving for city status. Municipalities have the power to make local policy, regulate the delivery of services; formulate development plans based on locally determined priorities; receive, raise, manage and allocate revenue through approval and execution of own budgets; alter or create new boundaries; and finally to appoint statutory commissions, boards and committees for personnel, land, procurement and accountability (Government of Uganda, 1997).

A secondary city...

...is largely determined by population, size, function, and economic status.

Commonly, secondary cities are geographically defined urban jurisdictions or centres performing vital governance, logistical, and production functions at a sub-national or sub-metropolitan region level within a system of cities in a country. In some cases, their role and functions may expand to a geographic region or the global realm. The population of secondary cities range between 10-50% of a country’s largest

city, although some can be smaller than this. They will likely constitute a sub-national or sub-metropolitan second-tier level of government, acting as centres for public administration and delivery of education, knowledge, health, community, and security services; an industrial centre or development growth pole; a new national capital; or a large city making up a cluster of smaller cities in a large metropolitan region (Roberts et al, 2014).

After studying the national urban hierarchy the Government of Uganda issued Vision 2040 which identifies specific urban centres as Regional or Strategic after their role in the overall urban system. Regional Cities are urban centres that provide general services to a large catchment area. The government has designated five 'Regional Cities' namely: Kampala, Gulu, Mbale, Mbarara and Arua. Arua serves as a hub for the West Nile Region, Southern Sudan and Democratic Republic of Congo (DRC); the city is a transport and communications node with future prospects of a railway link to the DRC and Southern Sudan, an upgraded international airport, and fibre optic network. Vision 2040 also lists five 'Strategic Cities'; Hoima (oil), Nakasongola (Industrial), Fort Portal (Tourism), Moroto (Mining) and Jinja (Industrial).

Strategic Cities are cities identified to have a functional specialty of national economic importance, such as Jinja, a Strategic City set to develop as an industrial as well as tourism city.

Both Regional and Strategic cities in Uganda are secondary cities in relation to the functional urban hierarchy with the primate city of Kampala. Secondary cities will each play an important role as catalysts for growth, facilitating local production, transportation, transformation, or transfer of goods, people, trade, information, and services between systems of cities (Robert et al, 2014).

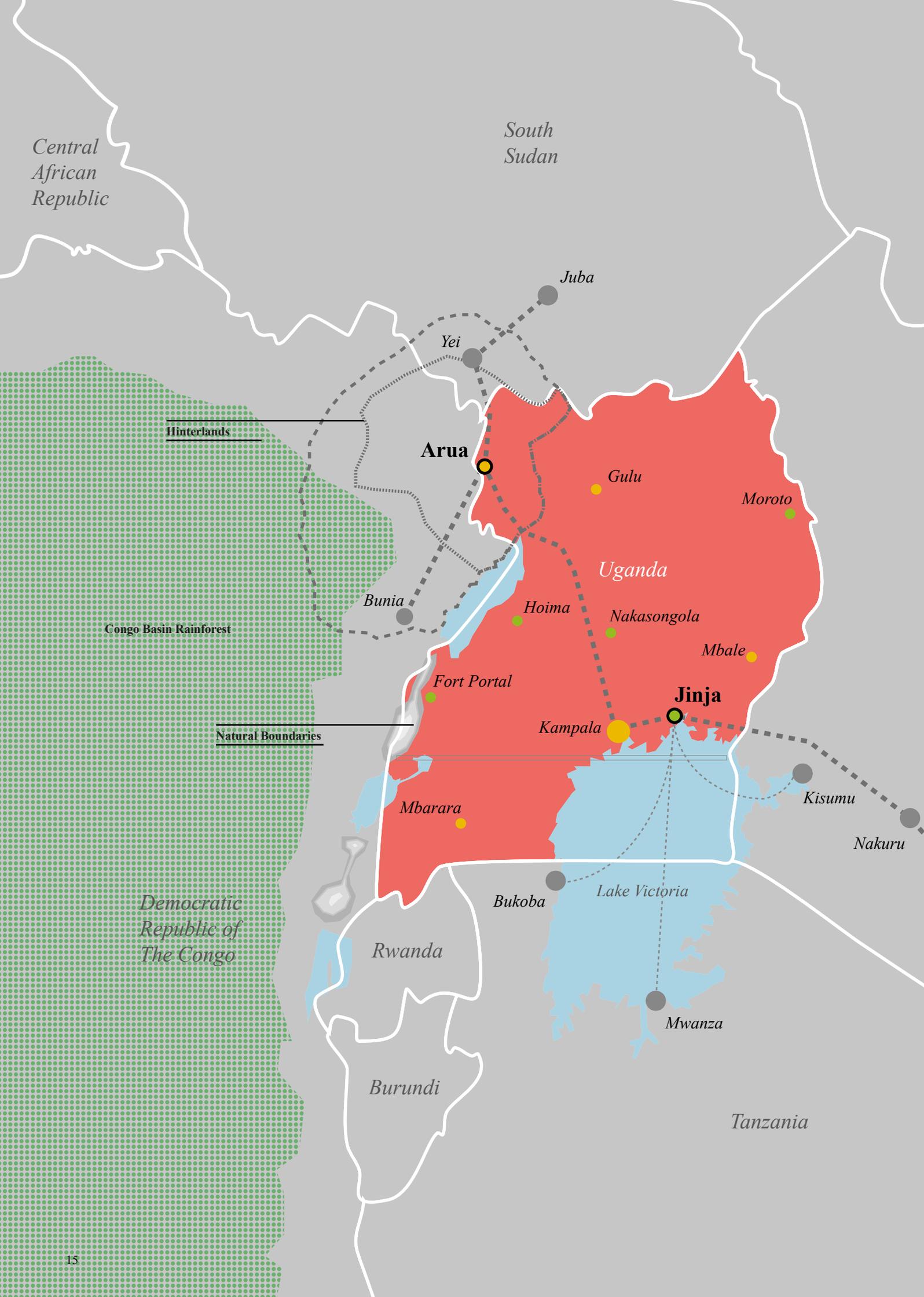
This report focuses on one Regional and one Strategic city from Uganda Vision 2040 - Arua and Jinja as identified by Cities Alliance.

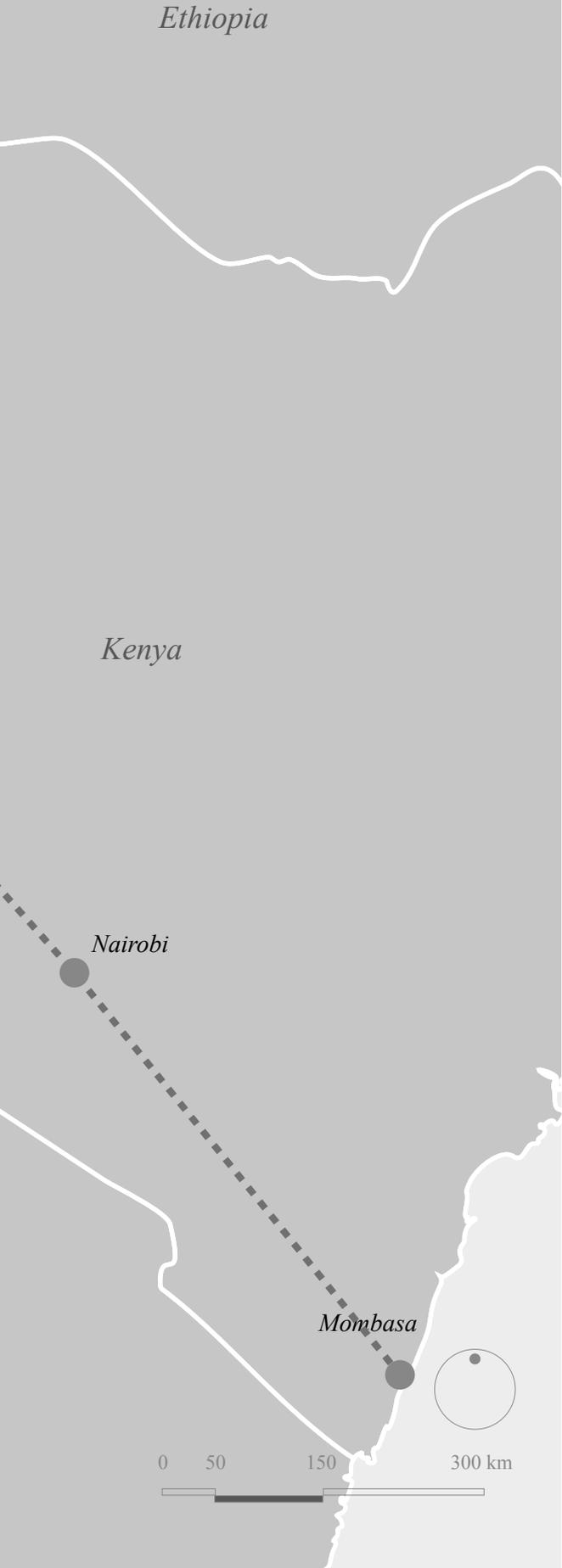
Cities with large catchment areas

Regional cities in Uganda have large catchment areas, or hinterlands. For example, Arua serves North West Uganda (West Nile Region), South Sudan and Eastern Democratic Republic of Congo (DRC).



Figure 15: Street in Arua
Credits: Dentalsafariafrica.blogspot.co.uk





Arua

Arua is a ‘regional city’ that is in many ways a frontier city, strategically located between the Democratic Republic of Congo 15km away and South Sudan 75km away. The city is currently quite small at 62,000 inhabitants but is estimated to grow to 380,000, a significant amount of growth in the coming years. The city’s economy is currently based on commerce, informal cottage industry, urban agriculture and hospitality.

Jinja

Jinja is a strategic industrial city, with a night-time population of 72,000 that rises hugely to 400,000 in the daytime. While much smaller than Kampala, it is still the second largest city in the country and has been established for over 100 years. Its economy is based primarily on tourism and industry and is strategic as an ‘anchor city’ within the Entebbe to Jinja growth corridor, as well as being part of the Greater Kampala Metropolitan Area (GKMA) and part of the GKMA Development Framework 2020.

Figure 16: Map of Uganda

Arua

▶ Arua is a relatively small city located strategically for trade with South Sudan and the Democratic Republic of Congo. Recent rapid growth has resulted in stretched urban services. Connection to the national electricity grid in 2018 will enable its economy to significantly grow.

Arua is a secondary city in northwest Uganda, the largest in the West Nile Region and 480km north of the capital, Kampala. The city was established by the colonial administration in 1916 as a prison camp. The name Arua is derived from the local name “Aru” meaning prison. The town is 15km east of Congo and 75km south of the world’s youngest country – South Sudan. As such, it is a frontier town, dominated by cross-border trade and an important hub for non-governmental organisations serving in the region.

Despite this strategic location, Arua is still a relatively small city of 10.5km² with a population

of 63,000. It has recently grown rapidly in population at a rate of 5.6% between 1991 and 2002, and 3% between 2002 and 2014. As a consequence, the city has a high population density of 6000 persons per km² – a population density roughly equivalent to Tokyo, Japan (Tokyo Metropolitan Government, 2015). It has been estimated that taking into account both the urban and peri-urban areas surrounding the municipality, there are 500,000 people living there (Cities Alliance, 2015a). The city is served by an airport that has regular flights to South Sudan and the Democratic Republic of Congo, the south-north Vurra-Arua-Koboko-Oraba Road

and was connected to the national railway in 1964 but this line is currently defunct.

The city has a multicultural population with large ethnic diversity and a high proportion of young people. The town’s relative stability within the region has led to regular waves of refugees, leading to the diverse ethnic population and enabling trade to flourish with a vast hinterland stretching well into DRC and South Sudan. Unfortunately however unemployment is also high especially in the youth, and 50% of the population are under 15 (Cities Alliance, 2015a).

93%

of city budget comes from central government



Figure 17: Arua
Credits: Dentalsafariafrica.blogspot.co.uk

Arua in numbers



Figure 18: Arua infographic

Arua has a large informal economy with most formal employment in trade and business (49.6% for the district). As such, it is dependent on commerce, the informal cottage industry, urban agriculture and hospitality. The municipal government receives almost all of its revenue from central government (93%). Given this lack of resource, there is also a lack of many basic services although there has been significant improvement recently, such as in the presence of tarmac roads. In slums or low income areas in the city, 75% of roads are now maintained although access to regular potable water is low at only 18%, with connection to solid waste services is only 33% and 10.5% with an electricity connection (MLHUD, 2014).

Arua is strategically located and poised for international trade. If Congo and South Sudan stabilise, the city may become a hub for tourism and industry. Currently there is little industry as the city has lacked consistent energy until two years ago. However with connection to the national electricity network planned for 2018, there is significant opportunity for industrial growth to occur in the city in coming years. A key part of this transition will be ensuring the large number of unemployed youth find employment. Arua has strong mechanisms of participation which should continue in this process.

International trade

Despite its size and current low level of industrial development, Arua has great opportunities for international trade. Investment will be required in basic services and ensuring youth unemployment is tackled.



Figure 19: British American Tobacco Factory
Credit: IPS News Agency/Flickr

Centralised government

Arua is still a small urban centre, receiving the vast majority of its city budget from central government. Currently there are relatively few municipal employees and the city is growing rapidly with urban sprawl occurring. Especially given plans to expand the city boundary to include some of the surrounding sub-counties, strategic planning and environmental regulation will be required.

Arua is identified in national development plans as a key ‘regional city’. It is clear that the city has potential to become this, with national and international trade and tourism opportunities and increasing transportation including an upgrade of its airport to international standards.

The city still faces a number of challenges including being surrounded by informal development and unregulated urban sprawl, vulnerable water sources and deforestation (Cities Alliance, 2015a). Arua has developed a ‘Five-Year Development Plan’ for 2015-2020 to address these challenges.

The main aim of Arua’s Development Plan is to “increase and strengthen the quality of

human resources, increase the amount of social infrastructure and improve the quality of existing public infrastructure and facilitate availability and access to critical production inputs (Arua Municipal Council, n.d.). While it is too early to assess its implementation, the plan certainly addresses some of the key barriers facing Arua fulfilling its role as a strategic regional city in the country.



Figure 20: Street in Arua

What is shaping the city?

A frontier town with international connectivity

The growth of Arua is due to its strategic location – a frontier city and gateway to the predominantly forested region of northern DRC – Province Orientale, and the newly independent South Sudan. Both these regions have been locations of recent political, social and economic instability. Northern DRC is a vast and inaccessible territory – features taken advantage of by militia groups that regularly commit atrocities against the local populations creating refugee crises. The peace deal and recent independence of South Sudan has opened up a large amount of trade, as there was suddenly an increase in demand for a wide array of consumer goods.

The demand for market products is being met in large part by a complex network of informal trading based in Arua, capitalising on the lucrative and untapped markets of South Sudan and Congo. The porous borders between these countries has led to a large and illegal trade due to challenges of enforcement. In a piece of unpublished research carried out at the London School of Economics in 2008, the total informal trade with the DRC (imports and exports) was estimated at \$91.7 million in 2008. Informal and formal exports to South Sudan grew enormously between 2005 and 2010, from \$9.1 million in 2005 to \$929.9 million in 2008.

The rapid growth in trade was the result of increased consumption, a construction boom in the post-conflict South Sudan and a lack of local production capacity (World Bank, 2011). Unfortunately, recent instability in South Sudan has led to a decline in trade between the two countries. The Bank of Uganda forecast that the conflict in South Sudan will affect Uganda's overall economic growth. The Bank estimates that the conflict has resulted in a decline of 31% of formal trade between 2015 and 2016 (URN, 2016). Arua's strategic location and position as a trade hub is strategically important for the Ugandan economy as a whole and its role in the national urban system will continue to define its future development.



Figure 21: Market in Arua

Governance of a large area

With under 10% of city budget coming from local revenue, the local government employs a relatively low number of staff compared to the municipal population.

Specifically there is only one urban planner for the city of Arua and one environmental planner for the entire West Nile region covering an area of 14,070 km². Meanwhile the urban area is growing haphazardly and it is a challenge for city authorities to enforce planning and environmental laws. The municipal area is only officially 10 km², but there are many

residents from surrounding areas and even neighbouring countries who are acquiring land and utilising municipal services in Arua. Our estimates suggest this area may be as large as 60 km².

There have been good efforts in recent years to reduce infectious diseases, keep the streets clean and provide basic services. But while local revenue collection is lacking, haphazard growth continues and extra pressure is put on city services from people coming from outside, these tasks prove difficult to fund.

The Municipality is currently negotiating the increase of its administrative area to include the heavily populated peri-urban areas surrounding Arua. Increasing the population of the municipality by over 400,000 as estimates suggest will mean greater funding from central government but also an increase in responsibility to provide services.



Figure 22: Market stalls in Arua

Infrastructure provision

There has been an improvement in the provision of infrastructure such as roads in recent years. However because the city is servicing a large unaccounted for population with limited funds, the municipality is stretched. There are still 25% roads yet unmaintained. In slums, which house 8.3% of the population, access to potable water is low (18%), solid waste connection to water services are poor (33%). The World Bank recently funded the development of a waste composting centre, however when our team visited the site in

February 2016 it was reported that there were no buyers for the compost locally and that compost was given away to those that could afford the transport to collect the product.

Electricity provision in the city is low (10.5%). For the city overall there is still a deficit of consistent energy, which is a barrier to industries locating there. Three years ago the city was connected to a small northern-grid. This electricity has spurred a small increase in manufacturing in the city. In 2018, Arua is planned to be

connected to the national electricity grid which will significantly change the investment landscape for the city, making it far more attractive for industry. The existing health and educational facilities in Arua are stretched, in part because every day Arua receives between 200 to 250 people, most from DRC and South Sudan, accessing medical services and schools (TheEastAfrican, 2015).



Figure 23: Street in Arua

Key Themes



Citizenship

<p>Diverse ethnic makeup</p> <p>The ethnic makeup of the city is quite diverse, having received an influx of migrants from South Sudan and the DRC, especially during conflicts in the 1990s.</p>	<p>Unemployment</p> <p>Arua has a high proportion of unemployed youth – an ‘idle society’ with men with many wives, not working.</p>	<p>Citizen participation</p> <p>Participation is good where local government engages the community through ‘barazaas’ to identify issues that are then communicated back; the whole community is invited.</p>
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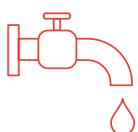
Economy

<p>Unemployment</p> <p>Arua faces the challenge that approximately 50% of the population is under 15 years, and youth unemployment is high. However this is a potential future employment base.</p>	<p>Energy</p> <p>There is currently little industry as the city has lacked consistent energy until 2 years ago. The connection to the national electricity grid in 2018 will open up significant economic growth potential.</p>	<p>Trade and tourism hub</p> <p>There are strong trade opportunities as Congo and South Sudan stabilise. Industry and tourism are also set to increase.</p>
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Governance

<p>High reliance on central government</p> <p>Arua has the challenge that over 90% of its revenues come from the national government and it has weak mechanisms for local revenue collection.</p>	<p>City boundary expansion</p> <p>The city is trying to expand its boundary so that the sub-counties are part of the greater town, as well as becoming a city, and formalising some of the informal sector, e.g. including informal settlements in plans.</p>	<p>Low municipal capacity</p> <p>There are relatively few municipal employees for the total population.</p>
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Services

<p>Recent transport improvements</p> <p>The city has seen a positive change recently – there were no tarmac roads 3 years ago.</p>	<p>Public health infrastructure upgrades</p> <p>Arua is still weak in health and sanitation, solid waste management, their sewerage system and water drainage however. Unfortunately there is inadequate financing for infrastructure.</p>	<p>Migrant pressure</p> <p>The influx of migrants has put extra pressure on city services.</p>
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Environment

<p>Informal settlements</p> <p>The town is surrounded by informal development and there is unregulated urban sprawl which provides a challenge for environmental protection.</p>	<p>Vulnerable water sources</p> <p>The local Enyau River is running dry – forcing the city to look for alternative water sources. They are looking to groundwater but currently have no strategy for managing this.</p>	<p>Deforestation</p> <p>Much of the poor population use wood fuel for energy which is leading to deforestation locally. Barifa Forest provides ecosystem services to Arua. Arua is deciding whether to trade the services for commercial development (Nile Eco-City)</p>
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Arua

**To Dem. Rep. of Congo
15 km.**
Arua is the gateway & trade
hub for the vast province
orientale in eastern DRC.

River Enyau

Drinking water supply for Arua. Decreasing rainfall in upstream catchment areas & poor water management along River Enyau is threatening the water supply for Arua. The city is looking for alternative sources including boreholes & a costly connection to the distant River Nile.

Prison

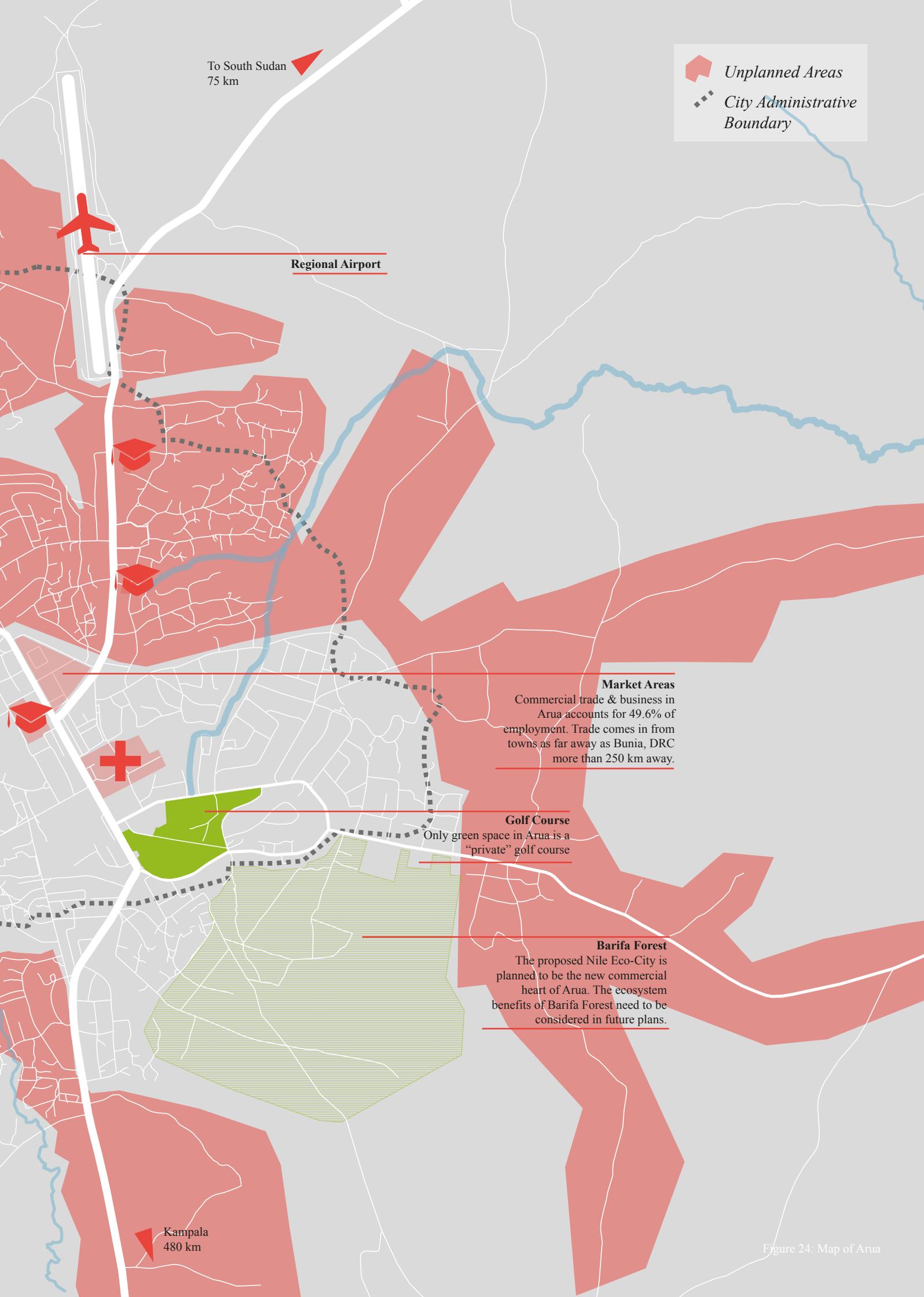
Arua was established in 1916 as the location for a prison. Arua means "in prison".

Edif Cathedral and School

Unplanned Areas

Refugees + rural - urban migration has resulted in extensive sprawl and a patchwork of urban & rural housing typologies. Refugees have occupied planned industrial areas in Oli River District within Arua Municipality.





To South Sudan
75 km

 *Unplanned Areas*
 *City Administrative Boundary*

Regional Airport

Market Areas
Commercial trade & business in Arua accounts for 49.6% of employment. Trade comes in from towns as far away as Bunia, DRC more than 250 km away.

Golf Course
Only green space in Arua is a "private" golf course

Barifa Forest
The proposed Nile Eco-City is planned to be the new commercial heart of Arua. The ecosystem benefits of Barifa Forest need to be considered in future plans.

Kampala
480 km

Figure 24: Map of Arua

Summary of environmental risks

▶ Arua’s main threats are extreme temperature and risks associated with this – increased disease, drought and water depletion.

Climate change will exacerbate Arua’s already hot climate and make rainfall less predictable. As the city is already exploring new water sources, and the urban area sprawls, the availability of water will become a key risk. Plans are underway to consider future alternate sources (World Bank, 2012b) but a moderate risk remains.

Other threats include increased disease transmission with increased temperatures, water contamination from poor solid waste management, soil degradation and loss of forests. The disease threat is compounded by refugee influx and consumption of contaminated water sources, but both of these risks should decrease with improved services. The loss and degradation of natural resources from a growing and spreading population will have to be managed and given environmental protection.

Three dimensions of environmental risk



Climatic risk

The impact of climatic events on urban populations, infrastructure and economies



Geophysical risk

The impact of geophysical events on urban populations, infrastructure and economies



Biological and natural resource risk

The impact of scarce or degraded natural resources on urban populations and economies

Types of threat or hazard, with current and estimated future risk rating

<p> Extreme temperature</p> <p>Arua is in a very hot area of the country with temperatures predicted to increase. Across the country, the frequency of hot days has already increased - as a result malaria spreading into new areas of the country (Uganda National Climate Change Policy, 2012).</p>	<p> Storm</p> <p>Hailstorms and lightening are low risk. Arua District HRV Profile states destructive cases of hailstorm & lightening with lives of humans and animals lost as well as property damage, however risk level in the city is low.</p>	<p> Wildfire</p> <p>Wild bush fires in the dry season are a current threat (Arua District State of the Env't Report, 2007). In other cases, houses are burned due to community misunderstandings and conflicts but also low-medium risk (Arua District HRV Profile).</p>	<p> Drought</p> <p>Given the high temperatures and rainfall in the region, this is a consistent moderate risk. Droughts are also on the rise across the country generally (Uganda National Climate Change Policy, 2012) and August and September will get drier with climate change (CDKN, 2014).</p>	<p> Flood</p> <p>Flood risk in the city is low (Arua District HRV Profile); slums also suffer from flooding (AcTogether 2010).</p>
<p> Earthquake</p> <p>Arua is in an earthquake risk zone (African Conservation Centre) and there have been minor quakes in the region, e.g. 4.5 magnitude on June 29 2015 (earthquake-track.com). UN-OCHA show Arua in a 'Degree VII' zone (20% probability of a very strong earthquake in 50 years) (UN-OCHA, 2007).</p>				
<p> Air quality degradation</p> <p>Widespread bush burning is causing air pollution (Arua RCRA).</p>	<p> Contamination or depletion of fresh water</p> <p>Currently minor risk of both water depletion from river running dry and water contamination (RCRA); also evidence of residents dumping septic waste into pits overnight - likely to cause groundwater pollution (World Bank, 2012b).</p>	<p> Crop disease, infestation or failure</p> <p>Drought caused agricultural growth to drop in 2004-5 and 2005-6 (Uganda National Climate Change Policy, 2012) - more of a rural issue but will affect the city.</p>	<p> Disease or failure of livestock systems</p> <p>For the District, diseases and poor feeding are problems for cattle rearing (Arua District State of the Environment Report, 2007) - more of a rural issue but will affect the city.</p>	<p> Fuel scarcity</p> <p>For the District, the vast majority rely on wood fuel for cooking (Arua District HRV Profile); likely less of an issue in the city but still a risk.</p>
<p> Soil contamination and erosion</p> <p>Soil degradation (mostly erosion) is a significant issue (Arua District State of the Environment Report, 2007).</p>	<p> Mineral depletion</p> <p>Gold has been discovered in Arua (Daily Monitor, 2012) but no current evidence of extraction.</p>	<p> Raw materials degradation or scarcity</p> <p>Widespread deforestation currently going on (Arua District HRV Profile).</p>	<p> Loss of biodiversity</p> <p>Lack of good evidence but reduction of urban green space and forests in the surrounds make this a risk.</p>	<p> Vector-borne disease</p> <p>Human disease/Epidemics rated 'high risk' in Arua HRV Profile.</p>
<p> Water-borne disease</p> <p>Human disease/Epidemics rated 'high risk' in Arua HRV Profile.</p>	<p> Air-borne disease</p> <p>Human disease/Epidemics rated 'high risk' in Arua HRV Profile.</p>		<p>Legend</p> <p>Current risk Estimated future risk</p> <p> Low </p> <p> Medium </p> <p> High </p>	

Future challenges

- ▶ A very high proportion of unemployed youth could become a challenge unless adequate employment is created; meanwhile adequate green space and water provision for the growing urban area need consideration.



Figure 25 Landfill in Arua

Blue and green resources

Water and vegetation are critical natural resources for Arua – one of the driest areas of the country. The urban area itself has very little green space, with only 22.1ha, or under 2% of the current city administrative area as green space. The existing green space within the city consists of a private 18-hole golf course built in 1950's. The golf course is still currently in use but a portion appears to have been informally appropriated by citizens for recreational purposes and also for grazing of cattle. One kilometre from the city centre on the southern outskirts of the city is Barifa Forest, a natural primary forest 220ha in size. The forest was designated for protection before independence in 1948 but may soon be developed

as the proposed Nile Eco-City, a satellite city to Arua Municipality. According to the new plan, about 650 hectares will be developed into a bustling city called Nile Eco-City (Skyscrapercity, 2013). To replace the forest area lost to development the municipality is planning to allocating land 30km south to an area on the DRC border for a new forest. While developing the existing Barifa Forest may provide some immediate economic and employment opportunities, this area currently provides a host of environmental benefits, such as improved air quality and biodiversity. A full ecosystem services assessment should be carried out to understand the ecosystem services that will be lost.

Climate change is altering the regional rainfall patterns near Arua and particularly in critical river catchment areas feeding the city. The River Enyau is the primary source of water for the city. Today during the dry season it is common for the river to run dry forcing the city to look for alternative water sources. Currently five boreholes supplement the city's water supply but there is no detailed understanding of the size of the underground water aquifer beneath the city and no long-term strategy for managing this water resources sustainably. The aquifer should be studied to determine the sustainable yield and therefore the optimal quantity that can be safely extracted.

Youth unemployment

Approximately 50% of the population in Arua is under 15 years. Arua's high percentage of youth is due to high natural population growth rates in the 1990s (5.6% between 1991 and 2002) and rural-urban migration. Unemployment among the youth is very high. Out of 205 people who were randomly interviewed in Arua district during the general elections, 86% identified unemployment as their primary concern (NewVision, 2015). According to the Uganda Bureau of Statistics, the share of unemployed youth (18-30 years) nationally stands at 64% (University of Westminster, 2016) though this may likely be higher in Arua which has received many refugees in the last decade.

The large unemployed youth population is also an economic bonus if adequate employment can be created to utilise this resource. The youth represents the potential workforce of the future and could benefit Arua's trade and industrial

growth. However, there is still a lack of skilled labour at present which NGO's and faith-based institutions are trying to address. Unless this unemployment challenge is tackled, it could lead to increased social problems that are already being observed, such as a culture of an 'idle society' of young men, not working.

As the future workforce of Arua, efforts should be made to tap into the entrepreneurial spirit of the youth population, which combined with Arua's strategic location as a trade hub has holds huge opportunity for success.

Expansion of the city and provision of services

With increased trade and the movement of people into the city, as well as the possible expansion of the city boundary, the city will need to provide services across a much larger area and number of people. Currently the city encompasses an area of 10.2 km² with a population of 62,000 people. While no plan

currently exists for the proposed new city boundaries our discussions with municipal authorities indicate that the city could potentially grow by six times, to approximately 60 sq. km and including a population of approximately 500,000 people. With central government transfers to municipalities tied to night-time population, this increase in administrative boundaries will mean an increase in central government transfers to the city, currently amounting to 90% of municipal revenue (Byabagambi, 2016).

Presently, the city is not able to meet the infrastructure needs and provide basic services to the population. In Arua, 11,452 households are in slums, only 0.1% of households are connected to electricity supply and just under 0.2% have access to regular potable water (University of Westminster, 2016). While these low figures are partly due to the recent arrival of electricity to the city, the transient nature of many migrants means that city services could constantly face being overwhelmed.



Figure 26: Arua street scenes

Jinja

▶ Jinja is a relatively old city that recently lost some of its industries to Kampala. Good transport connections and a large source of skilled labour position the city well for growth.



80% of residents are living in poverty

Jinja, in eastern Uganda, is set at the source of the River Nile along the tranquil northern shores of Lake Victoria. Today the city is the second largest in Uganda, is also the second largest economy in Uganda and attracts a large number of visitors for its beautiful surroundings, colonial architecture and availability of adventure tourism activities such as white water rafting in the Nile.

Historically, a small fishing village existed prior to the location of an administration centre in the area 115 years ago in 1901. The centre was strategically located at the source of the Nile and benefited from ample fresh water, fishing, and productive agricultural areas in the hinterland. With the railway connection to Mombasa complete in 1928 and the construction of Owen Falls hydropower station in 1954, Jinja began to grow quickly into an urban centre of significant importance.

Located 81 kilometres due east of Kampala, the city has an urban area of 28 km² and a resident population of 73,000 (Cities Alliance, 2015b). According to the 2014 Census, the urban centre itself has not had great population growth in recent years (0.2% from 2002 to 2014) (UBOS, 2014). Likewise its population density is still relatively low, at 2,600 persons per km² (MLHUD, 2014) – equivalent to Brussels, Belgium (Demographia, 2016). The population of the municipality oscillates between 100,000 and 400,000 persons every day however as people commute into the city to work and go to school. Jinja is served by the Uganda Railway and is also a port for Lake Victoria ferries; it also has an airport which is currently small with national and regional flights.

Infrastructure

Jinja has significant infrastructure already, a large source of skilled labour and good transport connections. These conditions position the urban centre well for renewed industrial growth, but environmental concerns should be addressed before significant negative impact from development occurs.



Figure 27: Jinja
Credits: Dentalsafariafrica.blogspot.co.uk

Jinja in numbers

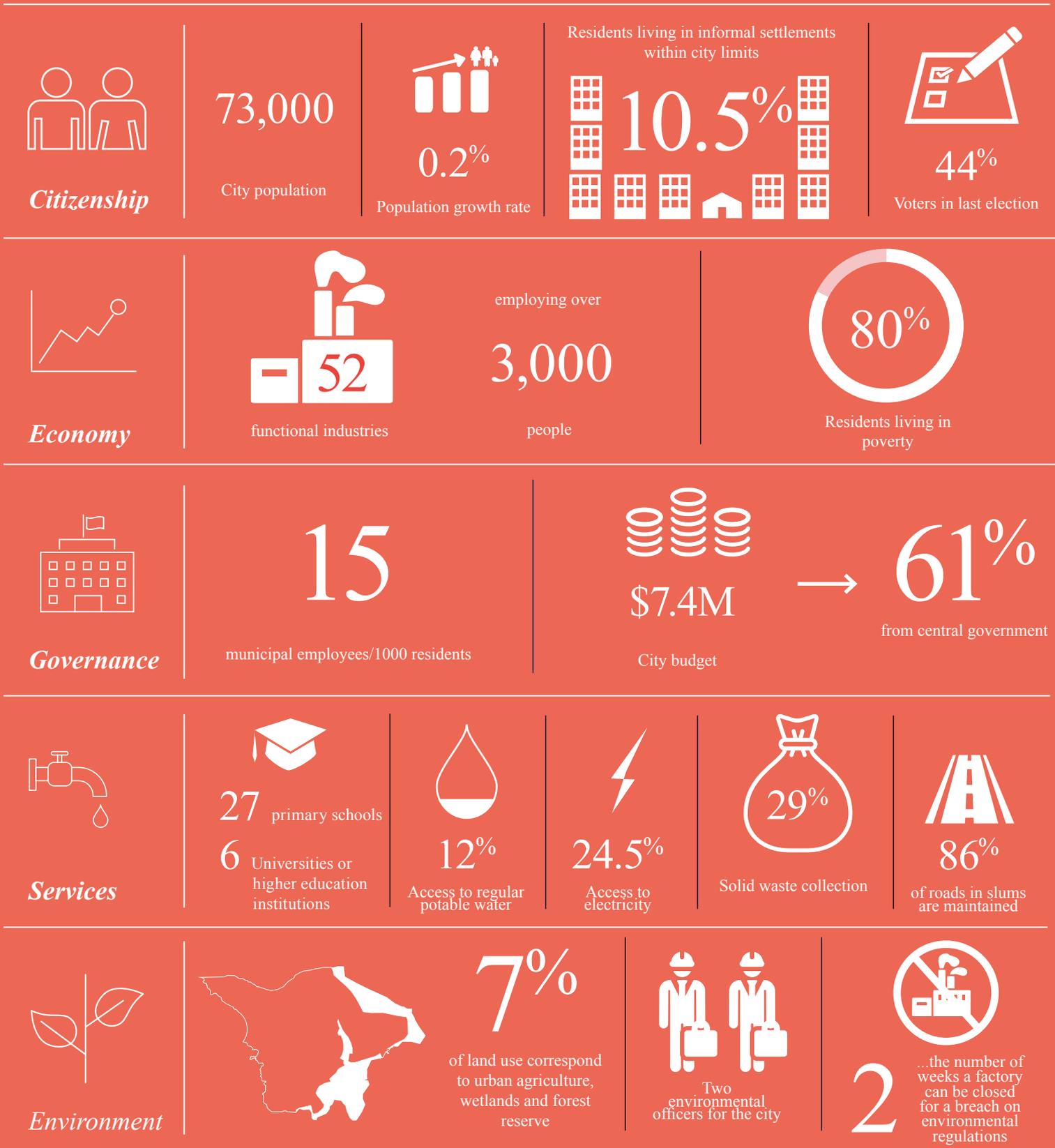


Figure 28: Jinja Infographic

Jinja has a large informal sector that employs a significant proportion of employed persons in the municipality (Cities Alliance, 2015b). Like other cities in Uganda, Jinja receives a large proportion (61%) of its operating budget from central government. The level of this support is calculated according to the overall night-time population of each city. Due to the expanding peri-urban population and daily influx of rural to urban migrants, Jinja Municipal Council (JMC) struggles to provide services to the population. For instance in the city's slums and poor areas, access to potable water is only 12%, to solid waste services 29% and sewerage only 4.3%, and 24.5% have an electricity connection (MLHUD, 2014). Despite this, JMC is making great strides to raise its own funds (39%) within a total overall operating budget of \$7.5m/year (JMC, 2016).

Uganda Vision 2040 recognises the strategic potential of Jinja particularly as an industrial hub. It is located on a strategic road and rail link connecting Kampala (80km) with the port city of Mombasa, Kenya (1,065km). Plans are underway to improve the rail line with a spur to Jinja. Jinja is also an in-land port on Lake Victoria providing connections to other cities within the Lake Victoria Region and is an 'anchor city' within the Greater Kampala Metropolitan Area stretching from Entebbe in the west to Jinja in the east. The city therefore enjoys good transport links to major urban centres as well as bordering countries.

Existing services

Jinja's history means that the town has significant infrastructural investment already. It also has readily available energy and a large number of higher education facilities, and therefore skilled labour. The town has done a good job of increasing its local revenue collection, but certain services such as sewerage and solid waste management are overstretched.

Figure 29: Nile rapids
Credit: Sunisa Kanchanasua / Flickr



Growth of industry

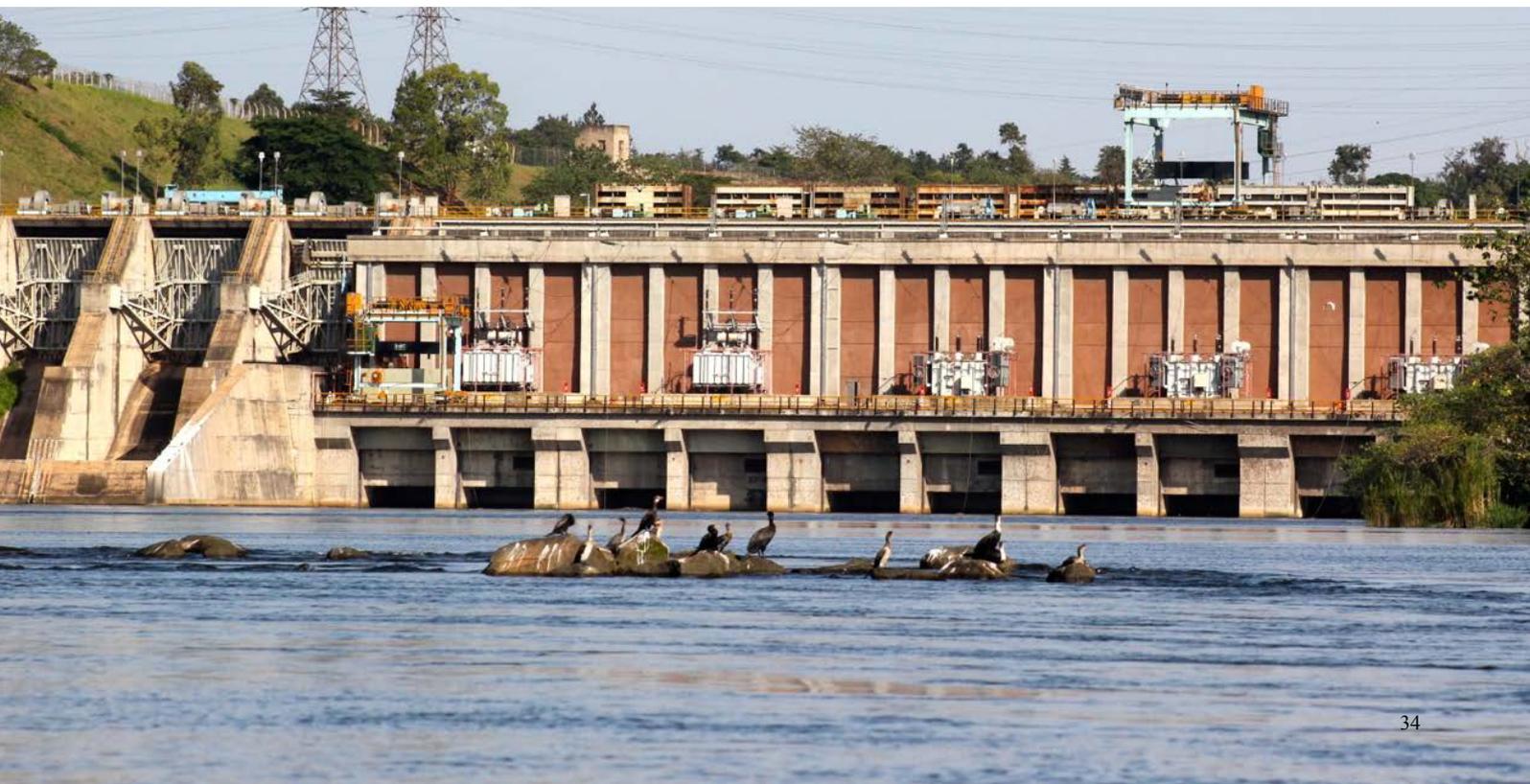
The growth of industry has had negative environmental impact and currently the city lacks capacity to tackle these issues in full. A recent Structural Plan for the city gives good detail of future development plans, but greater community involvement will help to ensure balanced growth going forward. This will be especially critical in planning for peri-urban areas where the majority of informal settlements are.

Jinja's history of energy and industrial developments means that the municipality has significant infrastructural investment already. It has readily available energy and skilled labour, with a large number of higher education establishments. Economic opportunities exist around ecotourism, cultural heritage and the revival of the industrial base and waterfront development. Historically, industries were given preferential power tariffs in Jinja which encouraged them to locate in the city. In recent times the removal of energy subsidies has resulted in industries leaving the centre in favour of proximity to the larger market of Kampala. However Jinja is still home to many industries such as a sugar factory, brewery, steel factory, textile factory, tanneries and a palm oil factory.

Jinja is identified in national development plans as a strategic city for industry. The city's 'Five

Year Development Plan' for 2010-2014 identified "excellence in tourism, commerce and industry" in its vision statement (JMC, 2011). Given the city's strategic location and latent infrastructure availability, there is clear potential for industrial development. The municipality has done a good job of increasing local revenue collection. Anecdotally it appears the city is able to raise 40% of its revenue from local resources such as through paid car parking and market trading charges. But as mentioned certain services such as sewerage and solid waste management are overstretched. Furthermore, there are signs the city residents are becoming tired of planning and consultation as well as lack of municipal capacity to implement these plans. Faced with growing peri-urban areas and a daily influx of people, there is both an opportunity and challenge to address tax revenue in these informal peripheral areas of the city.

Figure 30: Owell Fall dam
Credit: Nagarjun Kandukuru / Flickr



What is shaping the city?

Infrastructure service provision

Jinja is a well-planned city built using a grid-system and has enjoyed enviable infrastructure from early on in its development. Since the construction of the Owen Falls (now Nalubaale) hydropower station built across the Nile in 1954, the city has enjoyed a constant and inexpensive supply of power. Industry was encouraged to locate to Jinja taking advantage of abundant supplies of power and water.

A decision in the 1990's to remove subsidised power tariffs enjoyed by industrial manufacturers in Jinja, industry began to shift. The key change in strategic advantage meant that there was no longer an incentive for manufacturing or industrial business to remain in Jinja. Shortly after this decision to remove subsidies on power, small and middle-sized businesses began to shift 80km west to Kampala in order to be closer to the large metropolitan area.

The city now has enviable infrastructure: three hydropower plants, two international hospitals and many higher education institutions. The city also has higher than average road coverage (86%). However the roads that do exist

within the city have deteriorated and sanitation and waste management have become key areas of concerns for Jinja Municipal Council.

Jinja's privileged infrastructure supply is a key strength however much of its infrastructure is now aging and demands increased operations and maintenance budgets to revitalise its systems.



Figure 31: Wastewater treatment in Jinja

A well connected city

Given its close proximity to Kampala, its road, rail, port and air connections to the Lake Victoria Region and Kenya, and its connection to the transnational fibre-optic network – Jinja is well connected both within Uganda and internationally. A planned new standard gauge railway (SGR) connecting Jinja with Mombasa

has been proposed and plans are well underway for its construction. The new line, financed primarily by China’s Exim Bank will carry passengers and cargo. Rail connectivity in particular will open significant new export trade capacity via Kenya to the global market, and improve its regional and international connectivity making the city an even more attractive place for business.

Jinja is also connected via a road, port and air connections. The lake port and air connections are not regularly used, however the road network is in good condition and has been recently upgraded. Its strategic location and connectivity will continue to shape the future of the city.



Figure 32: Jinja street scene
Credit: ihertgo / Flickr

Human resources

Within Jinja there are a particularly large number of higher education institutions including campuses of national universities, a Civil Service College, many vocational or business institutes, three military colleges, and schools of nursing and health sciences. This suggests the availability of a highly-skilled workforce will be available to supply the local growth in industry, the service sector and tourism. The council reported that a high proportion of municipal employees have a post-secondary education (90%) and relative to other secondary cities in Uganda such as Arua, Jinja has greater local government capacity with 15 municipal employees per 1000

people (versus 10). Despite the relative performance, the city only has 1 urban planner and a trainee urban planner and 2 environmental planners. Jinja's ready access to a local pool of talent is a key asset that could shape the city's future growth.

Urban edge conditions

Jinja is surrounded by clusters of growing informal settlements on the edge of the city. In discussions with the Municipal Council authorities the city experiences a significant difference in day-time versus night-time population due to this large peri-urban population living on its doorstep. It is reported that each day the population of Jinja swells from 73,000 to 440,000, therefore

upwards of 360,000 or 82% of people commute into the city centre.

Currently municipalities in Uganda receive financial transfers linked to the night-time population of city. In Jinja this equates to transfers that cover only 18% of the population and insufficient to provide services to the full population that takes advantage of Jinja's services. The municipality is working hard to generate its own-source funds to plug the shortfall in financing. A review of the municipal boundaries currently in discussion may also help to address the gap in finance for service provisions. A municipal finance review may help Jinja receive the assistance it needs from the national government to provide services within the city.



Figure 33: Street in Jinja

Key Themes



Citizenship

<p>Lack of social capital The city is reported to have a lack of social capital and confidence in local institutions.</p>	<p>Lack of citizen participation Involvement of the community in planning is largely missing – currently there is minimal consultation.</p>	
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Economy

<p>De-industrialisation In recent years, following energy subsidies lifting, some industries have relocated to Kampala. There has also been little investment in the manufacturing and service sector leading to a growing informal sector.</p>	<p>Barriers to economic growth Barriers to economic growth for the city include limited access to land and the abolition of the preferential energy tariff.</p>	<p>Economic opportunities Opportunities exist around ecotourism, cultural heritage, revival of the industrial base and waterfront development. The city has a good stock of existing infrastructure that can enable industrial expansion and now needs institutional capacity and incentives to attract investment.</p>
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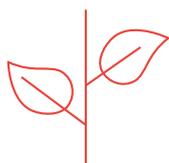
Governance

<p>Planning fatigue There is a gap between the city's 5 and 10 year development plan which remains unimplemented. This has led to some 'planning fatigue'. Furthermore the city has a challenge of inadequate revenue for this plan implementation.</p>	<p>Low capacity There has been some recent strengthening of capacity in many areas by USMID, however the environmental capacity of staff and their enforcement powers are still particularly weak.</p>	<p>Challenges with peri-urban areas Jinja has a significant challenge in dealing with its peri-urban areas that are mainly informal settlements and have a total population of 440,000 compared to 73,000 in the municipality. On the one hand the city is not receiving tax revenue from this population that use city services, on the other were it to extend its boundaries it would have to provide further services there.</p>
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Services

<p>Surplus energy Jinja has energy readily available in the formal city, has strong transport connections and is a hub of higher education.</p>	<p>Rural-urban migration impacts An influx of people from rural areas has overwhelmed urban infrastructure, specifically sewerage and solid waste management.</p>	<p>Health and social services The city is also overstretched in health and social services, and large areas of land are now being used as dumping grounds, with only 40% collected by the municipality.</p>
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Environment

<p>Informal settlements The town is surrounded by informal development and there is unregulated urban sprawl which provides a challenge for environmental protection.</p>	<p>Degraded wetlands Wetlands in Jinja are being degraded due to encroaching industrial development.</p>	<p>Pollution Increasing water and air pollution from industries such as tanneries.</p>
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Jinja

To Bujagali Falls Hydropower Station 8km

Steel Mill

Regional Airport

Kiira Hydropower Station

Nalubaale Hydropower Station

Starting in 1954 with the construction of Nalubaale Hydro Power Dam, hydropower in Jinja now generates 620 MW off the river Nile.

Breweries

Textile Industry

Informal Settlements

82% of the wider Jinja population live in informal settlements surrounding Jinja Municipality

Universities

Jinja is a higher education hub with 6 universities located in the town centre.

Kampala 84km

Source of the Nile



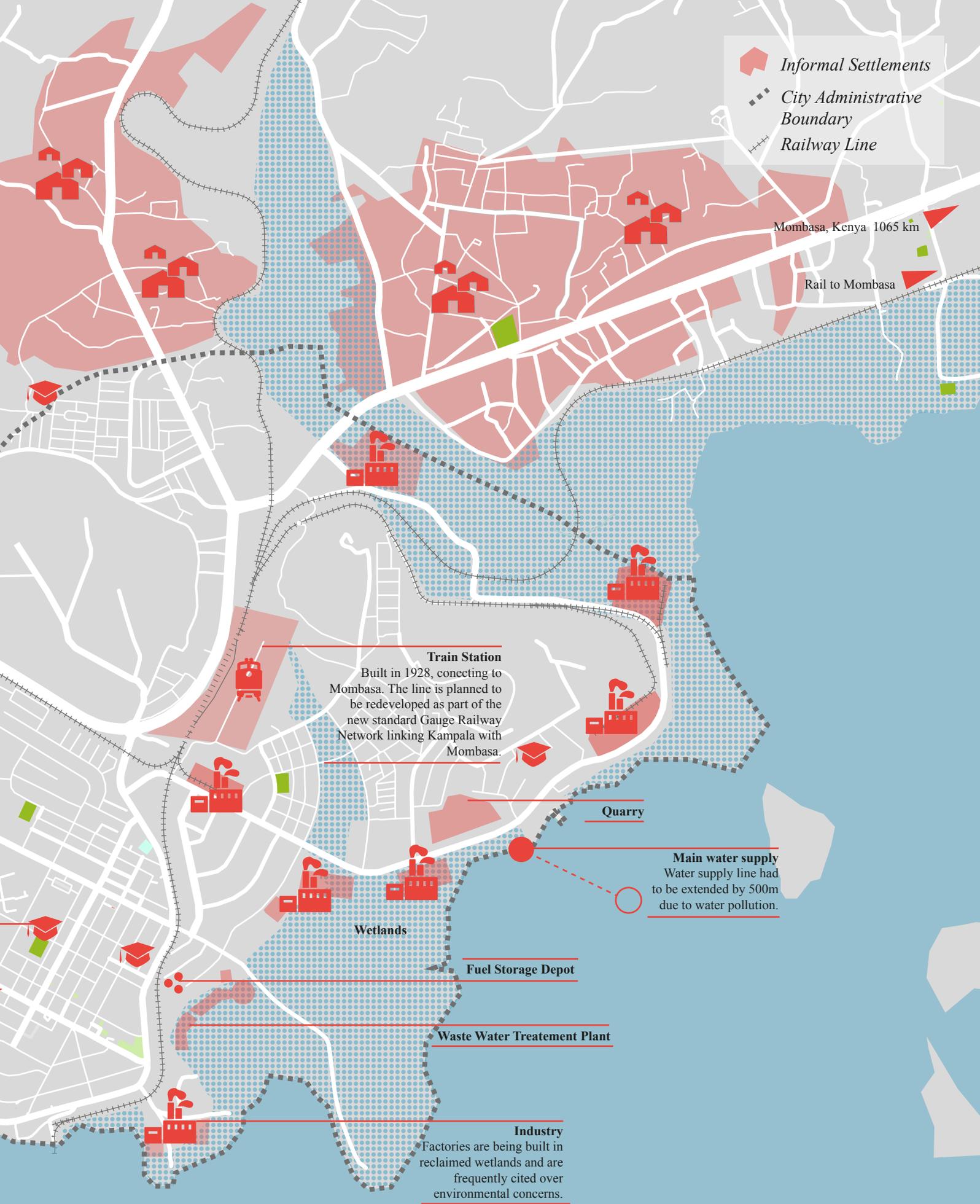


Figure 34: Map of Jinja

Summary of environmental risks

Jinja’s main threats are air quality degradation and contamination of freshwater sources. This is due to the city’s proximity to a range of natural ecosystems, and growing industrial risks.

Industry is already contributing to environmental degradation in the city through industrial emissions, effluent from industries such as tanneries and harmful land use practices on riversides and lakeshores. Combined with poor sewerage and solid waste management, the likely future growth in industry will therefore make this a critical risk for the city in future.

The growth of the city and its population will also put increased demand on natural resources such as Lake Victoria fish stocks, and soil fertility. Wetland degradation and encroachment is likely also to become a significant threat as the city expands. These threats may be mitigated by strong environmental protection and management that allows Jinja’s abundant natural resources to benefit economic development and wellbeing.

Three dimensions of environmental risk



Climatic risk

The impact of climatic events on urban populations, infrastructure and economies



Geophysical risk

The impact of geophysical events on urban populations, infrastructure and economies



Biological and natural resource risk

The impact of scarce or degraded natural resources on urban populations and economies

Types of threat or hazard, with current and estimated future risk rating

<p> Extreme temperature</p> <p>Jinja has a much more moderate climate (than Arua) - no real risks of extreme temperature despite national increase of hot days (Uganda National Climate Change Policy, 2012).</p>	<p> Storm</p> <p>Storms occur in the area (Jinja RCRA), and Uganda has high lightning risk. Storms have been more frequent in eastern Africa in the last 30-60 years (CDKN, 2014).</p>	<p> Wildfire</p> <p>Outbreaks have been recorded in the city (RCRA).</p>	<p> Drought</p> <p>The District has experienced prolonged droughts in recent years (Jinja District State of the Environment Report, 2005).</p>	<p> Flood</p> <p>There is little evidence for flood impact in the city, but it is in an area of major storms (African Conservation Centre, 2004) and the region is expected to have more intense wet seasons in coming years (CDKN, 2014). The flooding hazard is high in this region (World Bank, 2011).</p>
<p> Earthquake</p> <p>Jinja is in an earthquake risk zone (African Conservation Centre). There has been earthquakes in the region around Kampala/Lake Victoria and in 1990 a destructive earthquake of 5.0 at Lake Victoria near Kampala that destroyed semi-permanent buildings (Nyago, 2012).</p>				
<p> Air quality degradation</p> <p>Air pollution identified as a significant environmental risk (Jinja RCRA).</p>	<p> Contamination or depletion of fresh water</p> <p>Wastewater from processing of animal products is discharged directly into the drainage channels and sewer line (SotER for Jinja District 2005). Water front is at serious risk of being degraded through silting and encroachment (JMC Final Structure Plan Report, 2009).</p>	<p> Crop disease, infestation or failure</p> <p>No or little risk (at least within the city) - and the most ravaging crop diseases such as coffee wilt and cassava mosaic now diminished to less harmful levels (State of the Environment Report for Jinja District, 2005).</p>	<p> Disease or failure of livestock systems</p> <p>No or little risk (at least within the city).</p>	<p> Fuel scarcity</p> <p>The vast majority rely charcoal and firewood for cooking (JMC Final Structure Plan, 2009). Charcoal comes from the neighbouring districts of Kamuli, Mukono and Mayuge, and there is declining forest cover and wood fuel reserves (State of the Environment Report for Jinja District, 2005).</p>
<p> Soil contamination and erosion</p> <p>Soil erosion is a major issue in the municipality (JMC Final Structure Plan Report 2009). Also excavation of murrum and aggregate stones on the hills of the municipality (State of the Environment Report for Jinja District, 2005).</p>	<p> Mineral depletion</p> <p>No risk.</p>	<p> Raw materials degradation or scarcity</p> <p>Reported incidences of forest degradation - of the 47Ha Kimaka Forest Reserve deforestation, and pollution in other smaller forests (JMC Final Structure Plan Report, 2009).</p>	<p> Loss of biodiversity</p> <p>Rate of change not known for the district in 2005 (State of the Env. Report for Jinja 2005) but reduction of urban green space and forests in the surrounds make this a risk. Aquatic biodiversity in Lake Victoria under pressure from introduction of foreign species (JMC Final Structure Plan Report, 2009).</p>	<p> Vector-borne disease</p> <p>Malaria is the leading cause of morbidity in the district (State of the Environment Report for Jinja District, 2005).</p>
<p> Water-borne disease</p> <p>Diarrhoea accounts for 21% of disease burden in the district (State of the Environment Report for Jinja District, 2005).</p>	<p> Air-borne disease</p> <p>Colds, influenza etc cover 12.1% of the disease burden for the district (State of the Environment Report for Jinja District, 2005).</p>	<p> Degradation or depletion of fisheries</p> <p>Continued risk (albeit of Nile and Lake Victoria fisheries) from illegal fishing gears and high demand from fish processing factories (Jinja District State of the Environment Report, 2005).</p>	<p>Legend</p> <p>Current risk Estimated future risk</p> <p> Low </p> <p> Medium </p> <p> High </p>	

Future challenges

▶ Industrial growth is likely to exacerbate current environmental risks to local water sources and air quality. Potential expansion of the city’s boundaries will require integration peri-urban informal settlements into development plans.

City boundaries – to expand or not

Jinja has only one urban planner, two environmental planners and limited financial resources, there is a challenge of staff and services to keep up with both planned and unplanned urban growth. Due to high levels of rural to urban migration Jinja has many informal settlements in its periphery and living outside the municipal boundaries means that the city cannot collect revenue from most of this population.

Jinja is currently considering how to expand its boundaries to become a City within Uganda. On onehand, city expansion is a challenge as it means the city will become responsible for providing services to a much larger population, and a population that is occupied in the informal economy and living in informal settlements on the edge of the city who do not directly contribute revenue to municipal council through taxes. If the boundaries are expanded, Jinja will need more personnel to collect revenue. The municipality also anticipates difficulties in collecting revenue from the informal sector which makes up the majority of the economy in peri-urban areas.

Where and how to re-draw new administrative boundaries in the face of rapid urban growth presents a significant challenge for city authorities in terms of managing small municipal budgets and negotiating the provision of adequate services in secondary cities. An expansion of the boundaries in Jinja would enable the city to respond to this challenge more successfully and comprehensively by having the full extent of the challenge within one entity would make any response easier.



Figure 35: Downtown Jinja view
Credit: YawJoshua27 - Google

Environmental trade-offs

Within Uganda, Jinja is an industrial city. Already significant industries have located there taking advantage of its connectivity and available resources. These industries benefit not only the city but the nation. Currently industrial land is being developed adjacent to environmentally sensitive wetlands and lakeshores – in many cases encroaching on the national standard of 100m setback from the lakeshore.

Jinja is located on the shores of Lake Victoria, at the source of the Nile and with abundant wetlands and freshwater ecosystems.

Unfortunately the proximity of industries to water bodies, ineffective environmental controls and pollution from certain industries such as tanneries is leading to degradation of ecosystems and water pollution. It is clear that local environmental and economic trade-offs are being made for the sake of strategic national economic priorities. While economic growth is important to bringing the city out of poverty, care should be taken to safeguard valuable environmental services from long-term damage or even destruction.

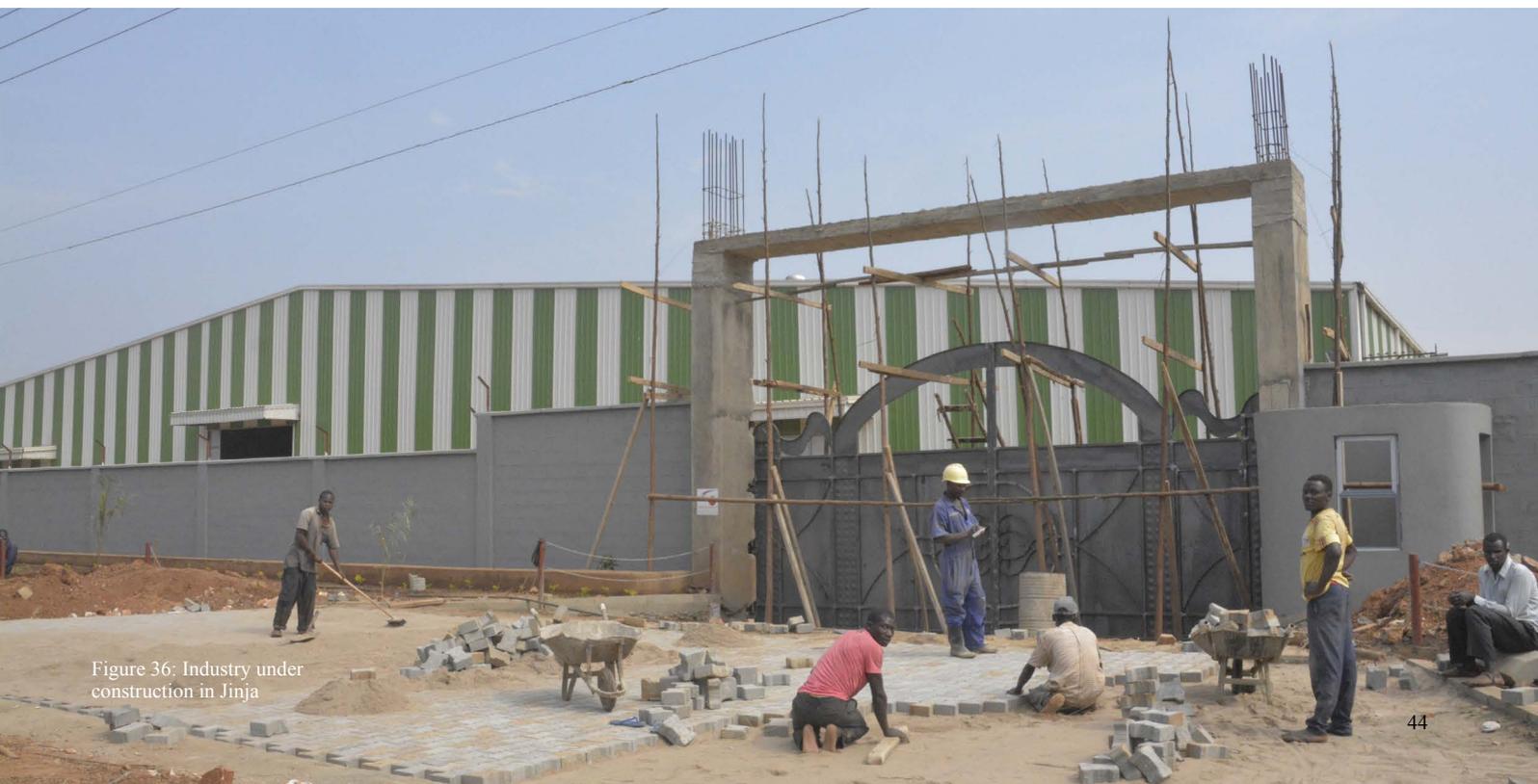


Figure 36: Industry under construction in Jinja

Final Thoughts

▶ Uganda's secondary cities are already rapidly growing, putting pressure on basic services. Growing transport connections and energy provision will allow significant economic growth. Common challenges are likely to be managing growth beyond the formal city perimeter and environmental trade-offs with industrial development.

Governance and city boundaries

Secondary cities in Uganda are expanding rapidly and are struggling to keep up with the pace of growth. The clear majority of this growth is unplanned and unregulated and in many cases is also occurring outside the jurisdiction of the municipal councils.

A key challenge for secondary cities is urban planning and management when much of the demand for city services comes from populations living beyond their man-made jurisdictional boundaries.

At present many secondary cities struggle with service provision partly due to financial constraints. The majority of revenues come from central government transfers linked to night-time population statistics. Local revenue collection is also hampered by limited human resource and capacity. Yet these secondary cities receive high numbers of daily migrants from peri-urban areas – 88% in Arua and 82% in Jinja. These peri-urban areas are often home to informal settlements and unregulated growth. With plans for city expansion into these informal areas, there is a key

challenge to provide services to this large population and also an opportunity for the city to increase its tax base and increase revenue collections. Secondary cities should expand their boundaries well beyond the area that they deem is absolutely necessary and to also prepare and implement a masterplan to ensure that future urban growth is regulated. Procedures to regularly update the city masterplan should be in place. The regular update should not demand extensive human or financial resources, but should be designed as a practical tool to be used by the city.



Figure 37: Arua peri-urban area
Credit: jose-mi / Google

Environment and Industry

In these urban areas that are experiencing rapid growth, industry has sometimes brought economic development at the expense of local resources. For example in Jinja, tanneries located along the lakeshore are frequently cited for breaching environmental regulations through illegal effluent discharge, while in Arua water security and managing limited water resources are a key issue for the city going forward and any industry that decides to locate there.

Municipalities are showing signs of progress, for example Jinja's tanneries are often cited and being held to account over the "bad smells" and water pollution that they cause. The challenge for the cities will be the strength of regulations, the environmental officers' jurisdiction, and managing decisions by central government that contradict national guidance, such as the location of factories in wetland areas. Cities should identify the true planning area that needs to be considered when planning the city, which in some cases can extend beyond administrative jurisdictions.

For example, this planning area should consider the environmental assets and resources within a city and how these function as an ecosystem and the various services that these valuable areas provide to the city – for free. By understanding and planning the entire city, we can better understand where trade-offs can occur between environmental protection and industrial development. Moving away from an ad-hoc system of exceptions towards providing clear certainty on where development can and cannot occur will ultimately attract more investment.

Figure 38: Lake Victoria shore, Jinja
Credit: raymondpilot / Google

Infrastructure in secondary cities

To achieve goals set in Vision 2040, secondary cities will need to improve their infrastructure including utilities and transport infrastructure (road and rail) to connect with their hinterlands and enhance regional trade links.

The heritage from Uganda's colonial history has led to unequal infrastructure provision between the primary city (Kampala) and secondary cities. While Kampala is rapidly developing, urban centres that started for administrative and commercial purposes primarily for non-indigenous populations now have a significant infrastructure gap or what limited infrastructure does exist is typically aging. Jinja for example being over 100 years old has both overstretched and aging sewerage and solid waste systems

that were designed for a much smaller population. Infrastructure in both Arua and Jinja has not been well managed or maintained and there are limited plans to expand the system, except in cases where donor funding has been provided to prepare plans.

As a critical driver for urban growth, access to energy has shaped the growth of both Jinja and Arua. In the early 1900's Jinja benefited from access to hydroelectricity generated on the River Nile and enjoyed a privileged tariff rate that promoted industrial development. Arua's development, on the other hand, has been held back from lack of ready access to energy. Less than 1% of households in informal settlements in Arua are connected to electricity supply (University of Westminster, 2016). However, 2018 will mark a tipping point when the city will be connected to the national

grid enabling the expansion of industry and commerce. Evidently city-specific energy provision needs to match future growth plans depending on the level of industrial growth, population change and other factors.

Both Jinja and Arua are set to expand physically and receive extra pressure on city services from rural-urban migrants in the coming years. Both cities shall find new ways to provide reliable basic services to facilitate local production, transport, transfer of goods, people, trade, and information services. Cities also have the challenge of improving the coordination of public investment with decisions related to the location of both people and businesses; and enhance urban planning with the aim of providing common knowledge to guide and coordinate public and private investment (World Bank, 2015).

Figure 39: Jinja railway bridge
Credit: Veigo



Low carbon development

Uganda currently has one of the lowest levels of urbanisation in the world (16%) but one of the highest urbanisation rates (5.4%), planning to transition to 60% urban by 2040. With a strong GDP growth of 5.5%, much of this change is happening in secondary cities where construction is booming and light industries are growing. The country’s economic growth has previously centred on agricultural products such as coffee, fruits and vegetables, flowers, tobacco and tea. The industrial sector is now growing in areas such as construction materials and cement, the manufacturing sector is growing and there is a potential oil boom. There is therefore, an opportunity to invest in low-carbon development as this transition occurs.

An Overseas Development Institute (ODI) study analysed economic

and environmental factors in sub-Saharan Africa, and identified twenty long-term cross-sector initiatives that can promote low-carbon development in sub-Saharan African countries (Hogarth et al, 2015). Some of these initiatives have higher applicability to Ethiopia, as indicated in Figure 40. A full list of these initiatives are included in Appendix B.

For Uganda’s secondary cities, opportunities for low-carbon development exist in removing fossil fuel subsidies for consumption, continuing to drive growth in light manufacturing and investing in energy efficient processes in heavy industry. Uganda still has significant subsidies for fossil fuels and light manufacturing and heavy industry are both likely growth areas, making these key opportunities. Given the high charcoal use in cities and serious issues with deforestation,

formalising the charcoal industry and promoting efficient household cooking stoves will also generate benefits for economic development and reduced carbon emissions.

The most impactful opportunities however are likely to be in generating on-grid electricity from renewables, shifting to a low-carbon automobile fleet, implementing higher density multi-use urban plans and mass transport for these cities. Currently many secondary cities have critical energy needs limiting industrial growth. Further while car ownership is low, the number of vehicles being imported into the country is high and emissions tests are currently lacking. Given the country’s rapid urbanisation and growth of informal settlements, investing in higher density multi-use plans and mass transport will be critical opportunities for future cities low-carbon development.

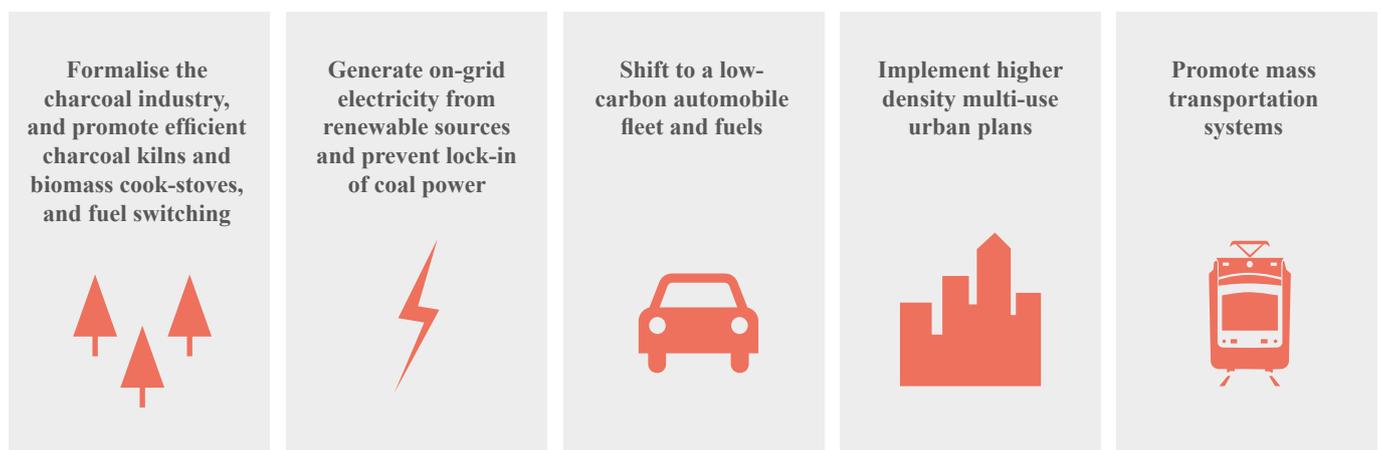


Figure 40: Key initiatives for low-carbon development along regional cities in Uganda

Appendix

A. Information mapping

We followed a subjective process to assess the information that was immediately available for each city. Information was supplied by Cities Alliance and Future Cities Africa teams. Arup carried out a global information scan to identify whether any gaps could be readily filled with open-source information. We applied a rating to this information according to quality and availability of data or information on each sub-dimension within the revised normative framework.

Overall there is a considerable amount of information available in order to evaluate the performance of Arua and Jinja in each area of the Normative Framework. Information is especially strong within the Governance dimension.

There appears to be a lack of information around Ecosystem Services and greater information is required regarding what is generated by the local economy (Outputs) and how institutional and governance factors influence the economy (Institutional environment).

	Arua	Jinja	Overall
<i>Citizenship</i>			
Participation	■	■	■
Social capital	■	■	■
Community awareness and preparedness	■	■	■
Civil rights and justice	■	■	■
<i>Economy</i>			
Human capital	■	■	■
Institutional environment	■	■	■
External macro environment	■	■	■
Industry	■	■	■
Outputs	■	■	■
<i>Governance</i>			
Enabling environment	■	■	■
Municipal finance	■	■	■
Representation and accountability	■	■	■
Municipal capacity	■	■	■
Risk management	■	■	■
Planning	■	■	■
<i>Services</i>			
Social services	■	■	■
Basic services	■	■	■
Economic services	■	■	■
Emergency services	■	■	■
<i>Environment</i>			
Protective ecosystem services	■	■	■
Regulating ecosystem services	■	■	■
Natural resources	■	■	■
Cultural ecosystem services	■	■	■

Legend

- High A substantial amount of information that is sufficiently detailed enough to use in further analysis work.
- Moderate An average amount of information of adequate detail. Information may require interpretation for further analysis work. Additional research is suggested.
- Low A limited amount of information, or information of low quality or partially available information. More research is recommended.
- No data No data was initially supplied by Cities Alliance or Future Cities Africa team. A reasonable amount of time was spent looking for additional open-source information and none was readily available for the city.

B. Low-carbon development initiatives mapping

Building on the in-depth sector analysis, ODI identified 20 long-term cross-sector transitions (or initiatives) that can be undertaken to promote low-carbon development in Sub-Saharan Africa (SSA). To rank and score these initiatives, they developed a preliminary methodology using a set of four criteria: (1) the level of GHG emissions that they could avoid; (2) the risk of lock-in that they could avert; (3) their contribution to increased productivity; and (4) their contribution to poverty reduction. These initiatives were scored as having high, medium or low potential in promoting low-carbon development. Based on research carried out for this report we have provided a qualitative comparative score based on country specific knowledge.

Legend
Potential for supporting low-carbon economic development

- High
- Medium
- Low

Cross-sector transitions / initiatives	SSA	Ugnd.	Why is it relevant in Uganda?	What is the opportunity in Uganda?
<i>Agriculture</i>				
Reduce demand for agricultural land by intensifying production and reducing post-harvest waste	High	Low	While the majority of agriculture occurs in rural areas, secondary cities especially source their food supply from surrounding hinterlands and therefore influence and are influenced by these processes. Urban sprawl is also putting pressure on the ecosystems in these hinterlands. For example 7% of Jinja municipality is urban agriculture, wetlands and forest reserve and much of the hinterlands is for agriculture.	Intensifying agricultural production elsewhere allows densification of urban and peri-urban areas with benefits of economic efficiency, as well as reducing the demands on peri-urban land use. Fluid land markets and regional land use planning will help manage this process. In Uganda only 18% of land is registered and titled so improving land tenure will also help.
Reduce emissions from livestock	Medium	Low	As above, livestock husbandry is low in cities but the demand for meat consumption has a direct effect.	Nationally there are plans to commercialise agriculture but evidence suggests there is a market development gap - thus a potential opportunity for technologies and approaches to reduce emissions. Moreover, meat demand in cities is likely to increase with economic development.
Diffuse climate-smart agriculture practices	Medium	Low	While the majority of agriculture occurs in rural areas, secondary cities especially source their food supply from surrounding hinterlands, and some urban agriculture occurs including a new resource and training centre in Kampala.	While mostly applicable to large-scale agriculture, some benefits will come from climate-smart urban agriculture.
<i>Forestry</i>				
Integrate rural land-use planning	High	Low	Not applicable to secondary cities.	N/A
Capture the value of forests' ecosystems services	Medium	Medium	There is significant deforestation in the hinterlands of many Ugandan cities. Key factors for deforestation include harvesting firewood for charcoal and urban sprawl. In Arua, 220 ha of natural primary forest called Barifa Forest is threatened by a proposed eco-city, although land has been proposed to be allocated for new forest nearby.	Currently there is little valuation of forest ecosystem services in and around urban areas in Uganda. Examples like Nakivubo swamp in Kampala show the value of capturing these values, to help articulate urban land trade-offs.
<i>Energy</i>				
Formalise the charcoal industry, and promote efficient charcoal kilns and biomass cook-stoves, and fuel switching	Medium	High	A majority of the urban households in both cities reviewed for this report rely on wood fuel and charcoal for household cooking.	Switching to more efficient and reliable sources of energy will reduce environmental damage, especially deforestation in urban hinterlands.
Generate on-grid electricity from renewable sources and prevent lock-in of coal power	High	High	Both secondary cities have critical energy needs - Arua limiting industrial growth up to this point and energy subsidies spurring previous industrial development.	Uganda has already constructed two large biomass plants linked to sugar production and manufacturing, that supply excess energy back to the grid. Construction has also just started on the largest solar plant in Africa. The country has vast potential for solar, hydropower, geothermal and wind energy, and given increasing energy demands, there is an opportunity for investment in renewables.

Promote electricity access from off-grid and mini-grid systems in rural areas			Very important for rural development, but not applicable to secondary cities.	N/A
<i>Transport</i>				
Remove fossil fuel subsidies for consumption			Uganda has significant subsidies for fossil fuels, although figures could only be found for exploration and investment.	A reform of tax measures for investment in oil and gas exploration and production occurred in 2014/15 - given the growing industry, it appears there may be benefits for removal of any consumption subsidies.
Shift to a low-carbon automobile fleet and fuels			Uganda has low car ownership rate, with the poor in Kampala doing 50% of their trips by walking. Exact number of vehicles is unknown but estimated at between 800,000 and 1,000,000 vehicles including motorcycles. However emissions from vehicles are high and the level of vehicle inspection is still low.	The number of vehicles on Ugandan roads has increased 100% (by 500,000) between 1991 and 2011 and is set to continue. Ensuring these vehicles are low-emission will have a significant contribution.
Implement higher density multi-use urban plans			A majority of urban households live in dense and poorly serviced informal settlements both in and around secondary cities. Urbanisation and population growth is still occurring rapidly, and national policy sees urban centres as drivers of economic growth.	The density of secondary cities like Jinja still low, while they struggle with urban sprawl and unclear municipal boundaries. Effective urban planning will help maximise provision of basic services, revenue collection and implement low-carbon transport designs.
Promote mass transportation systems			Urbanisation and population growth is occurring rapidly, and national policy sees urban centres as drivers of economic growth. The majority of urban residents use locally run shared taxis and in major cities private vehicles are already overwhelming road systems (e.g. Kampala).	An increase in per capita income will be accompanied by an increasing demand for cars, so planning mass transportation systems now for secondary cities (that are not yet facing the challenges of Kampala with regard to road congestion) will enable these cities to manage transportation demand effectively and in a low-carbon way.
<i>Extractives</i>				
Strengthen the use of energy efficient processes and technologies in the extractives sector			Mining has decreased from being a significant contributor to the national economy to only 0.5% in 2010. However there is mining for cobalt, gold, copper, iron ore and other industrial products and certain areas have greater future potential for the extractives industry e.g. around Moroto.	Given the high energy use in mining activities, these measures will have significant contribution to carbon emissions.
Switch to lower carbon fuel sources and renewable energy in the extractives sector			Mining has decreased from being a significant contributor to the national economy to only 0.5% in 2010. However there is mining for cobalt, gold, copper, iron ore and other industrial products and certain areas have greater future potential for the extractives industry e.g. around Moroto.	"Given the high energy use in mining activities, these measures will have significant contribution to carbon emissions. There is great potential for renewable energy sources in Uganda including solar, wind and hydropower."
Remove and avoid subsidies for fossil fuel production			Uganda has had significant subsidies for fossil fuel production, estimated at \$380 million in 2013 and \$400 million in 2015.	After recent oil discoveries, the Ugandan government has made efforts to reduce tax breaks in the form of subsidies for fossil fuel production. This has been partially successful however as some tax breaks have been reformed while others entrenched - there seems an opportunity for further removal of production subsidies.
<i>Construction</i>				
Reduce emissions from construction materials and methods			Secondary cities such as Arua have seen a construction boom, and nationally the construction industry is growing strong.	With the growth of construction in rapidly growing Ugandan cities, this is an area of opportunity. Furthermore influencing some of the large construction projects going on in growing cities can derive a disproportionately large benefit. Evidence suggests that considering embodied carbon in the construction process would greatly add to sustainable construction.
Reduce emissions from buildings operations			With increasing incomes across Uganda, energy consumption in buildings is projected to be higher.	National level criteria on low-emission operations that guide local building codes could be implemented. There is likely great opportunity given the lack of implementation of building codes at present.
<i>Manufacturing</i>				
Increase use of energy efficient processes and technologies and clean energy in heavy manufacturing			Industrialisation is picking up in secondary cities such as Arua and Jinja, as is the oil and gas sector nationally.	Heavy manufacturing is driven by a few multinational organisations for industries such as oil and gas, or steel production. The impact of implementing energy efficient processes can be high considering implementation does not involve many actors in this sector.
Drive growth in light manufacturing			Industrialisation is picking up in secondary cities such as Arua and Jinja, and Uganda has a significant leather industry.	Light manufacturing, while being a low-emission option, can be a significant contributor to inclusive growth for the primarily agriculture-reliant economy.
Develop low-carbon products			Industrialisation is picking up in secondary cities such as Arua and Jinja.	There appears little directive towards low-carbon products at present, but given that industrialisation is in its infancy in the country, there is an opportunity to direct production towards low-carbon products.

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Icons

Cristina Torres, Clockwise, Mister pixel, United Unknown from The Noun Project

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