





## 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*

Mozambique - Growth Corridors 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.

# Acknowledgements

This report has been developed by Arup in collaboration with Cities Alliance as part of Department for International Development's Future Cities Africa programme. We would like to thank the Future Cities Africa team and the wide range of stakeholders we consulted in Mozambique for making time to contribute to this study. Also, we wish to recognise the valuable guidance and feedback we've received from the Cities Alliance team on our findings and how best to communicate them.

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



Figure 1. Port of Maputo  
Credit: Julien Lagarde / Flickr

# 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. The boom in trade and industry is being defined by two key features that are set to alter Africa’s future: a youthful population and urbanisation. Combined, these features will drive 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).

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*“The emerging future of cities largely depends on the way we plan and manage urbanization, 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*

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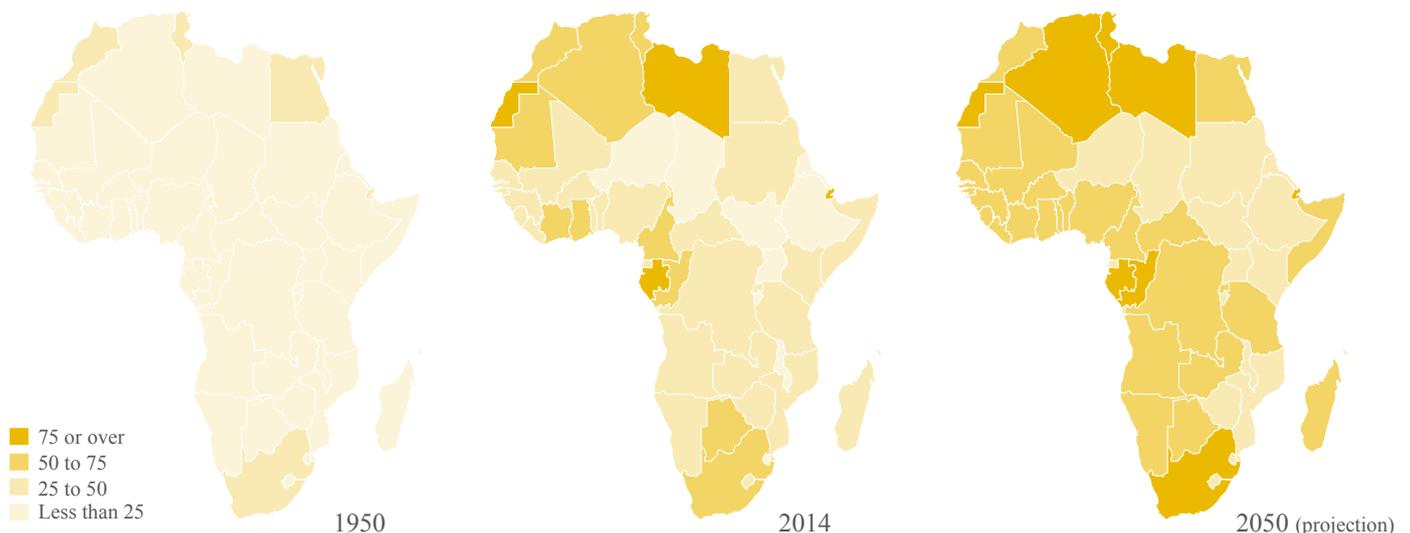


Figure 2. Percentage of the population residing in urban areas.  
Credit: World Urbanization Prospects, The 2014 Revision. UN 2015.

### 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 Mozambican megatrends based on Z-punkt, n.d. & Arup Cities Alive, 2014

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*“The current wave of urban growth in Africa is faster and 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*

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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 Mozambique. It explores the present situation of cities and the government’s planned urbanisation strategy. It also discusses how the country plans to transition to a majority urban population.

Currently, 36% of Mozambique’s population lives in urban areas. This number is increasing in part due to the country’s blistering GDP growth rate – this has been as high as 15.3%, in the first quarter of 2004 (Tradingeconomics, 2016). Roughly 90% of the typical Mozambican city is made up of informal settlements. With projected urban growth rates of 3% each year, cities in Mozambique are becoming denser, particularly in unplanned settlements (Cities Alliance, 2015a).

The report also discusses the impact of the urbanisation strategy on the regional development of the country through the promotion of growth corridors. To discuss this message, Future Cities Africa has selected three cities along the Nacala Corridor - Tete, Nampula, and Nacala - to explore current urbanisation trends and to highlight key challenges these cities may face in the future.

This report relates to urban growth corridors in Mozambique 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 metropolitan cities in Ghana, secondary cities in Uganda, and regional cities in Ethiopia.



Figure 4. New bridge in Tete.  
Credits: zambezitraveller.com

# Approach

► *“FCA 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; 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...

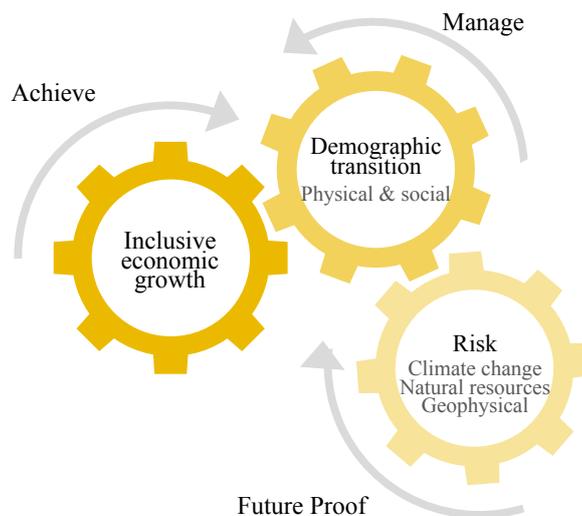


Figure 5: Future Cities Africa drivers

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 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

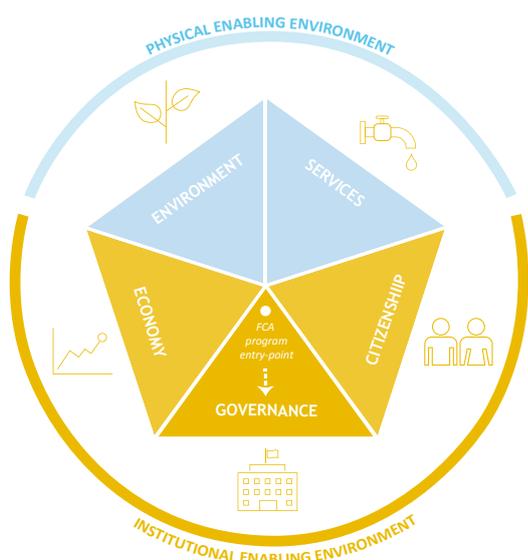


Figure 6: Normative Framework

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

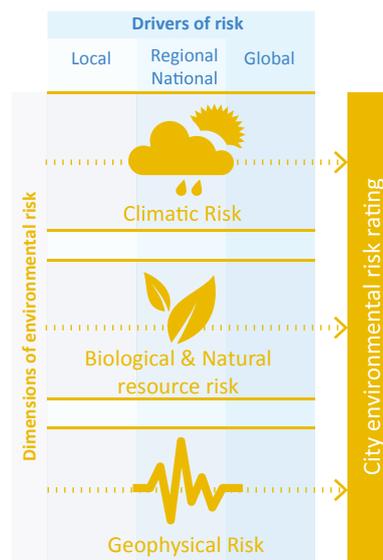


Figure 7: Urban ER framework

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). Through 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.

# Mozambique

► Mozambique's rapid economic growth since 1994 has been accompanied by renewed national focus on economic development policies centred around urban areas.

Mozambique, in Southern Africa, is a young, vibrant and optimistic nation of 24m people with great economic growth potential. The discovery of large deposits of coal and other mineral resources in the country have resulted in substantial foreign investment in mineral ore extraction and processing mineral. The country's location on the Indian Ocean makes it southern Africa's gateway to markets in Asia, the Middle East, and Europe, while its 1,500 km long coastline is dotted with beaches and coral reefs that have made it into a tourist hub (NY Times, 2014). Given its location and low levels of cultivated farming land, Mozambique has vast potential to be a major food producer in Southern Africa, and to play a role in minimising food insecurity for its landlocked neighbours (USAID, 2016).

Mozambique was first settled between the 1st and 5th centuries by Bantu-speaking peoples that migrated from West and Central Africa. The people and culture have been influenced by historical trade routes, bringing Swahili, Omani Arab, Persians, Somali and finally Portuguese influences to the shores to take advantage of valuable natural resources which still supports its economy to this day. Shortly after gaining independence from Portugal in 1975, the country fell into a prolonged civil war which lasted 15 years. Following the peace agreement in 1992 and democratic elections in 1994, the country has seen high levels of economic growth and foreign direct investment. The country's GDP growth has averaged 6.4% between 2000 and 2016 with staggering highs of 15.3% reached in the first quarter of 2004 (Tradingeconomics, 2016) brought about by significant levels of foreign investment.

7 in 10



urban residents live in informal settlements

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## *Sustained economic growth*

On average, Mozambique has seen a **7-8% annual growth** in per capita GDP since first democratic elections

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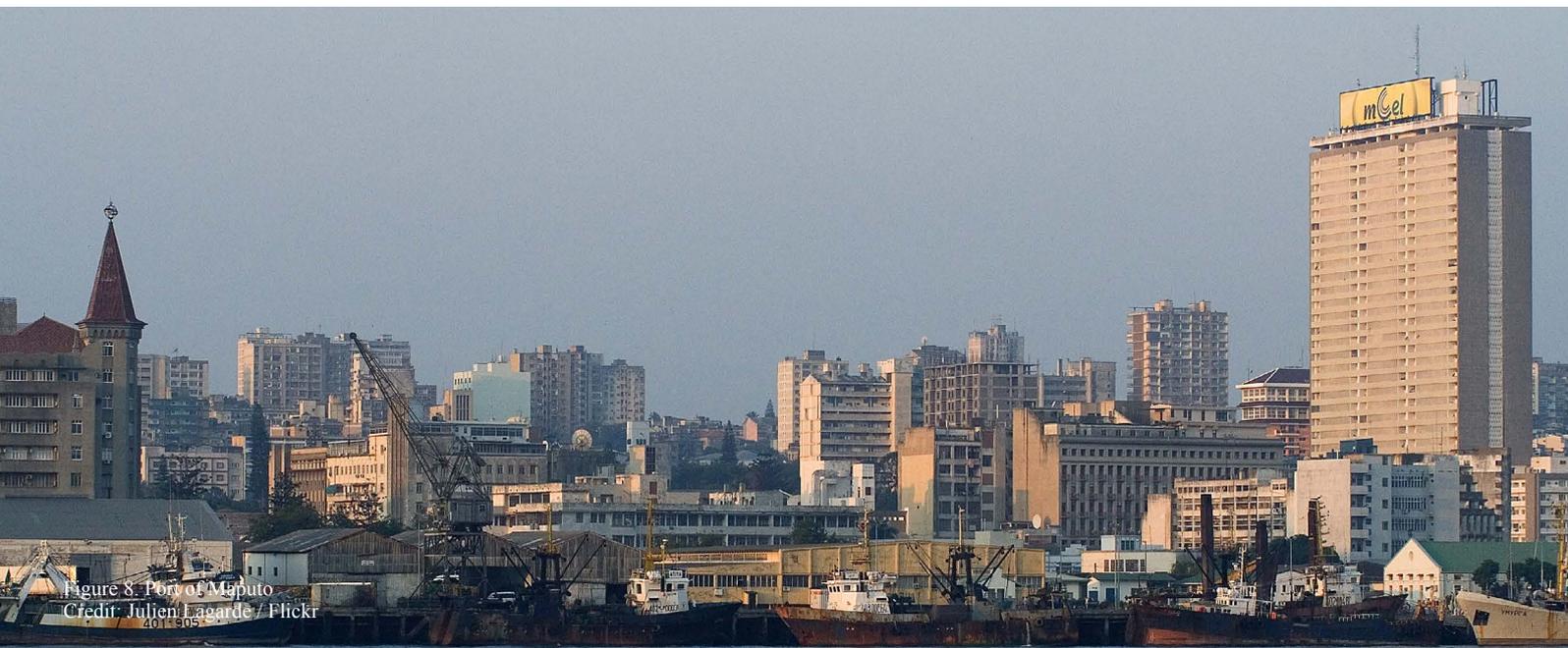


Figure 8. Port of Maputo  
Credit: Julien Lagarde / Flickr  
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## Mozambique at a glance

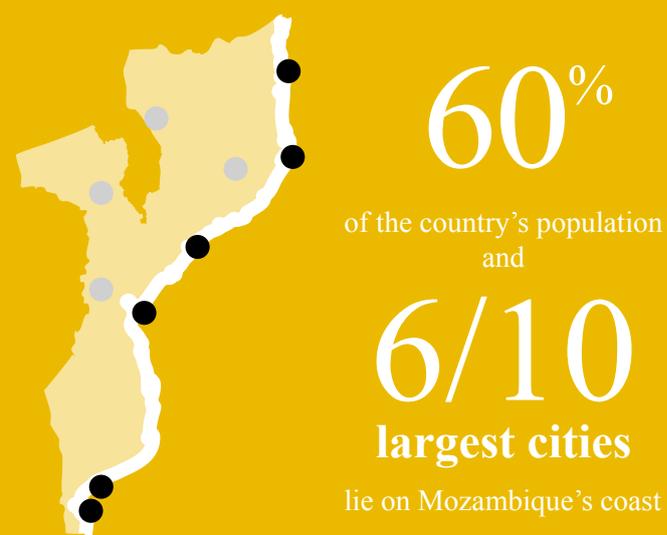
### Poor housing conditions



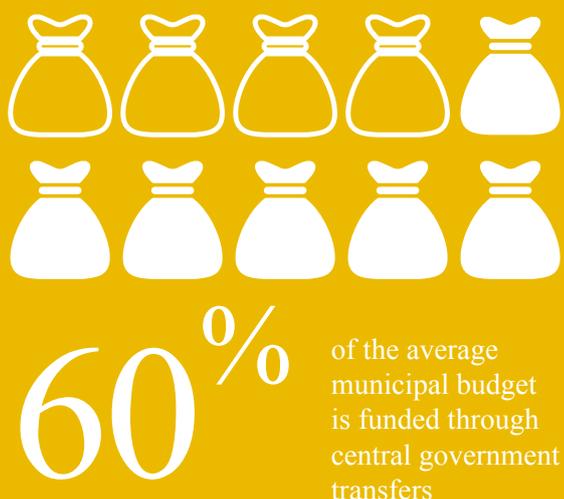
### Low GDP per capita

**\$600** was Mozambique's per capita urban GDP in 2014. Only 13 other countries in the world have lower per capita GDPs

### Vulnerability to sea level rise



### Financial dependence on central government



### Informal economy



Figure 9. Mozambique infographic

Despite its record levels of growth, Mozambique still ranks 180th out of 188 countries and territories on the UN Human Development Index (UNDP, 2016). GDP per capita in 2014 was \$600 – only 13 other countries in the world have lower figures (World Bank, 2016). In urban areas, nearly 70% of the population is below the poverty line (Cities Alliance, 2015a). Specific challenges for the nation include low levels of literacy (56%) and life expectancy (currently 50.3 years), high rates of malnutrition and malaria responsible for 35% of child mortality and 29% of the general population (World Bank, 2016).

With the country rapidly transitioning from being one of the least urbanised countries in Southern Africa in 2005 to currently the fourth most urbanised, city growth will be at the heart of achieving the country’s development plans. Cities in Mozambique have emerged in different contexts. Cities such as Quelimane and Sofala are historic ports and emerged as market towns for trade along the eastern coast of Africa. Similarly, cities like Chimoio and Tete were market towns near major rivers. During Portuguese colonisation, forts were built at strategic, well-connected locations on the coast and the hinterland, which led to the emergence of the administrative centres of Maputo (founded in 1787) and Nampula (founded in 1907) (UCLG, n.d.). Critically, during the civil war, cities located along the strategic road, railway and energy corridors such as Maputo, Quelimane, and Beira

emerged as relatively safe zones and saw a mass migration from worst-affected rural areas (Emerson, 2014). While cities became oases of safety, due to the conflict, they could not provide employment, resources or basic services for the influx of people. This resulted in high concentrations of poverty and informality in urban areas (Cities Alliance, 2015a).

Currently, 36% of Mozambique’s population is urban, spread across 43 municipalities. Only Maputo has a population over one million and 12 other cities have over 100,000 residents. With Maputo and the second largest city, Matola, both in Maputo Province, urban populations are skewed towards the south despite the overall population being concentrated in the north (38.7% of the total population lives in Nampula and Zambezia provinces). In secondary cities in Mozambique, unregulated informal settlements make up roughly 90% of the municipal territory. With a 3% urban growth rate, increasing populations in Mozambican cities are increasing densification of unplanned settlements (Cities Alliance, 2015a).

Urban areas continue to be characterised by an extensive lack of infrastructure and a majority of residents continue to live in poorly-serviced informal settlements. Population growth has been accompanied by a lack of investment in basic infrastructure resulting in poor urban services. Manufacturing-based employment was decimated during the civil

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### *Continuing decentralisation of power*

Since 1998, a national decentralisation policy has enabled the transfer of governance powers to provincial and municipal governments

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### *National policies for urban development*

Through the set-up of special economic zones, industrial free zones and development corridors, Mozambique seeks to spur economic development in cities across the country

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war, and fiscal austerity measures accompanying funding from international organisations during the 1990s has prevented state investment in the manufacturing or services sector. This has resulted in an urban economy also characterised by informality. Nearly 50% of all employment is in the informal sector (Cities Alliance, 2015a).

Within this context, Mozambican cities are increasingly seen as drivers of economic growth for the country. Decentralisation policies have been put in place to allow cities more control over the direction of their economic development. Decentralisation began with municipal elections in 1998. The policies aim to transfer

capacity and governance skills from the central to municipal government, along with the consolidation of operating capacity at the municipal level. The economic growth in cities is led largely by exploitation and processing of natural resources. In the north, this is mainly around minerals and coal, and in the south it is focused on manufacturing aluminium.

Districts are responsible for urban planning, with oversight from central ministries. While municipalities are responsible for social infrastructure service delivery and management, there are few independent revenue sources for these actions.

Nearly 60% of municipal budgets are funded by the centrally-managed Municipal Compensation Fund which constitutes less than 1% of the national income. Evidence gathered in our study suggests that these funds are not sufficient to manage the increased responsibilities that district and municipal governments have to bear. Key powers for implementation of development plans, such as control over land use and titling, are subject to approval from the central ministries and parliament (Cities Alliance, 2015a).

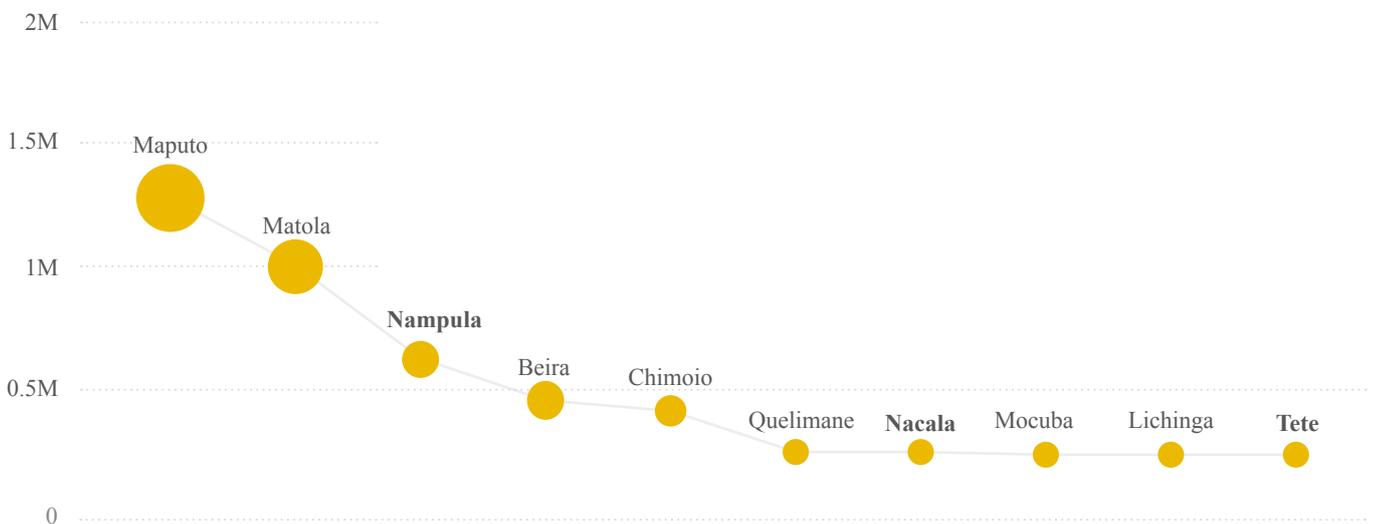


Figure 10: Most populated cities in Mozambique

# Growth Corridors

▶ National policy seeks to set up growth corridors through different parts of the country to achieve economic, human development and regional co-operation goals.

While cities are seen as drivers of economic growth for Mozambique, their development is highly dependent on national policies and programs. Mozambique has looked at a number of policy approaches that reinforce the central government’s importance in spurring economic development, such as the formation of Special Economic Zones and Industrial Free Zones, and Development Corridors. At the same time, different models of planning practice have emerged at the provincial and municipal scales that seek to foster economic development locally.

Growth corridors are economic development initiatives at the regional scale. They seek to spur regional development by connecting economic nodes to each other with transportation and communication infrastructure. When successful, improved connecting infrastructure is able to attract investment in the regions throughout the corridor. This increases linkages between nodes and maximises their economic potential (Galvez Nogales, 2014).

The planning and vision for growth corridors across Mozambique is derived from development strategies prepared

by the national government. The National Development Strategy of 2015 proposes development of corridors across the country to spur development, but does not specify areas or regions where these are to be set up (NDS, 2014). Infrastructure upgrades for the Maputo corridor have been carried out by setting up public-private partnerships (Santos et al, 2015). For the Beira and Nacala corridors, rail infrastructure has been upgraded by mining companies who continue to operate them and setting up use agreements with the national government for running passenger rail lines (The Economist, 2016).

## Evolution of a growth corridor

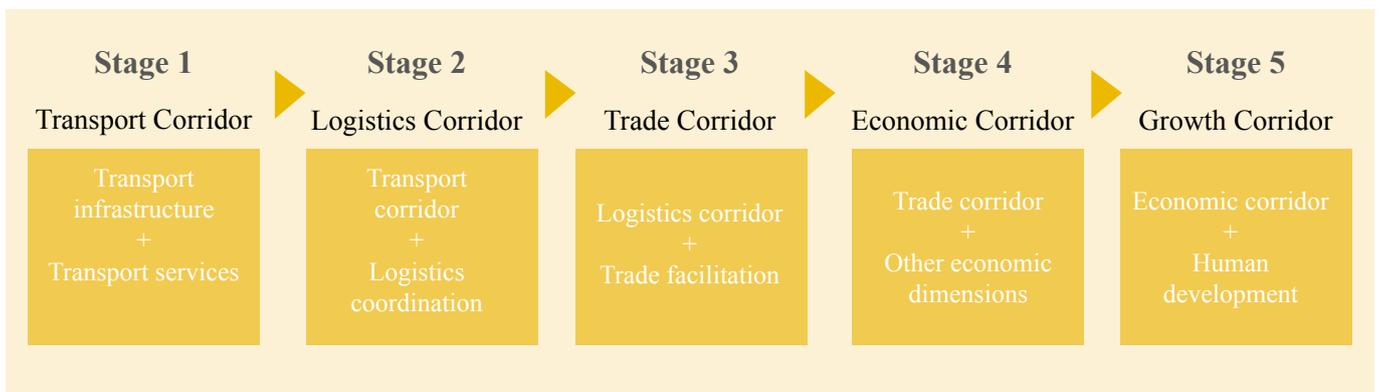


Figure 11: Evolution of a growth corridor

based on Galvez Nogales, 2014

In Mozambique, growth corridors have been a key policy that seeks to achieve different strategic, economic, and social goals (NDS, 2014) which include:

### Improve rural economy

Boost the agriculture and fisheries sector by improving transportation infrastructure between major cities, and slow migration to cities.

### Improve regional cooperation

Mozambique's economic corridors extend towards landlocked neighbouring countries and are supported as Regional Spatial Development Initiatives Programs (RSDIP) within the Southern African Development Community (SADC) framework (Santos et al, 2015).

### Economically integrate the country

Redistribute investment in different regions and foster economic links between them by improving infrastructure connections between major cities. Planned corridors seek to connect industrial centres and port cities to mineral-rich provinces in the hinterland, which also boosts manufacturing.

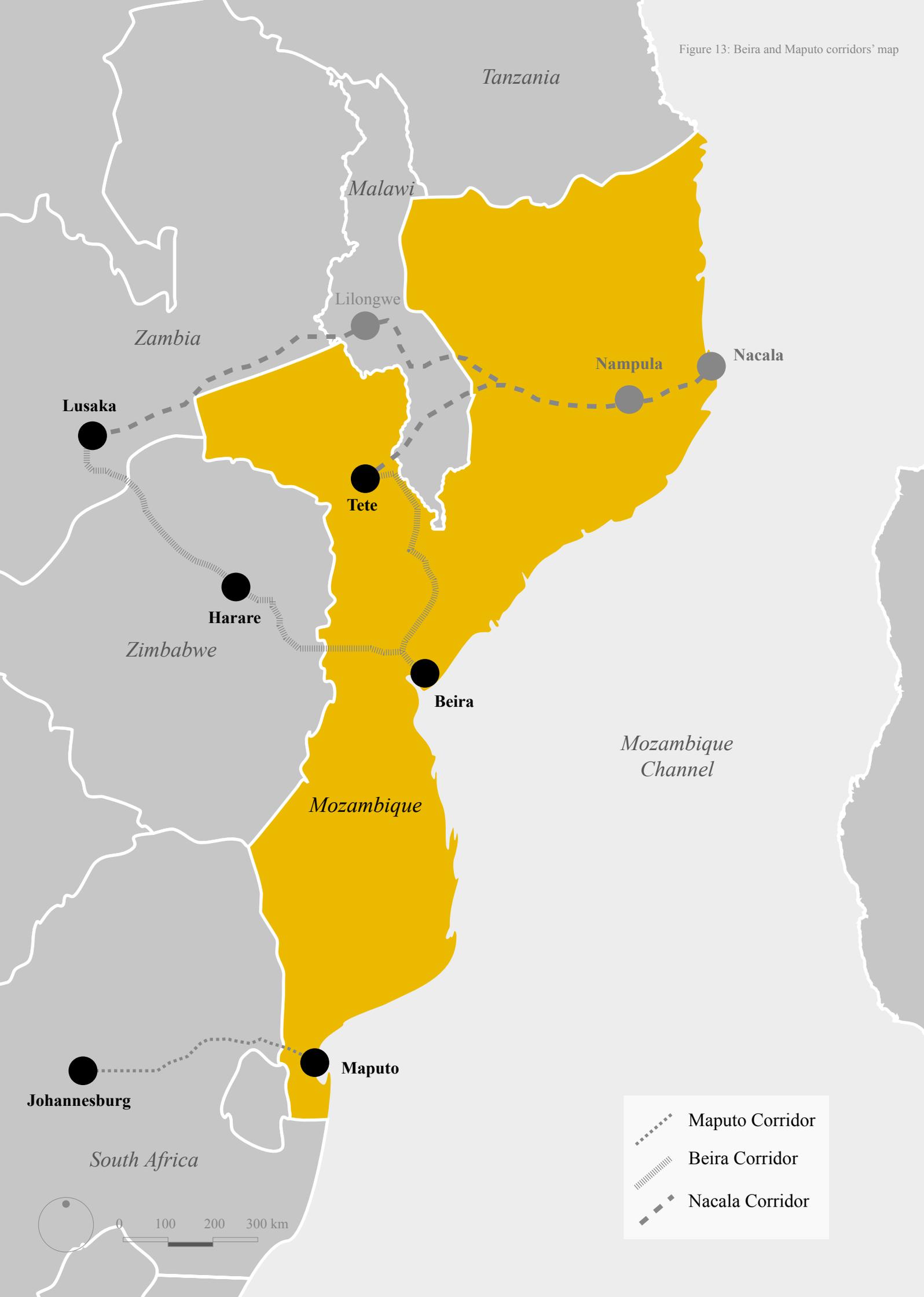
### Address low financial capacity of governance

The development of economic corridors is funded by a mix of funding sources: private investors, public-private partnerships, international development agencies and central government funding.



Figure 12: Train in north Mozambique  
Credit: Nico van der Westhuis/Flickr

Figure 13: Beira and Maputo corridors' map



## *Economic corridors in Mozambique*

- ▶ The development corridor policy has resulted in the establishment of the Maputo, Beira, and Nacala corridors. Of these, the Maputo and Beira corridors are well-established and illustrate the purposes of the development policy:

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### **Beira Corridor**

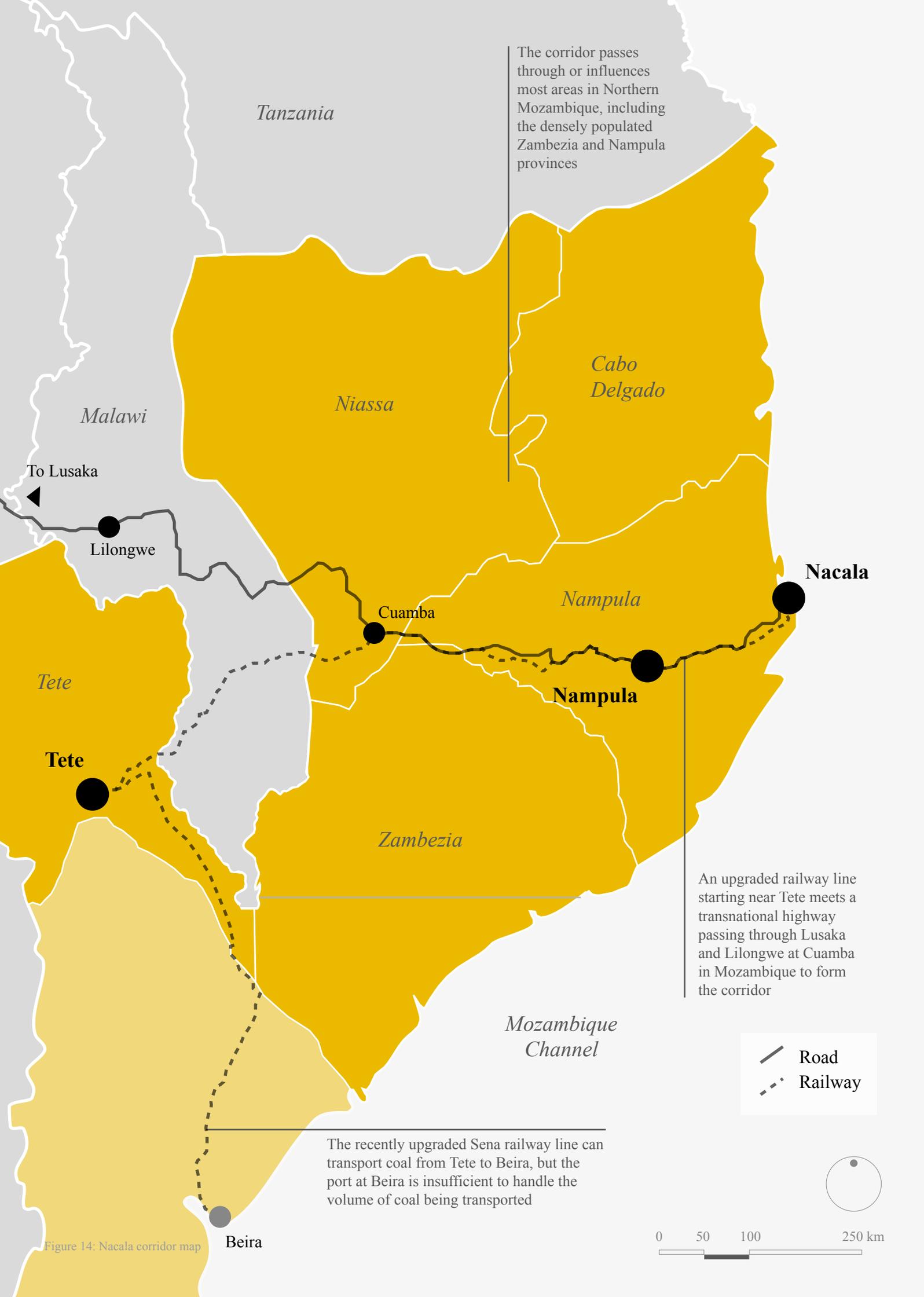
The Beira Corridor links the port city of Beira to landlocked Zimbabwe and Zambia through an upgraded existing railway line, while also connecting to the mineral-rich province of Tete. In 2010, the Beira Agricultural Growth Corridor (BAGC) initiative was launched as a partnership to co-ordinate funding from international development organisations for the formation of a catalytic fund. The fund encourages the growth of responsible commercial agriculture and the development of 10 million hectares of arable land along the corridor (Santos et al, 2015).

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### **Maputo Corridor**

The Maputo Corridor links mining in the eastern provinces of South Africa to the Maputo port that was upgraded in 2003, while providing neighbouring Swaziland with a connection to the sea. This corridor is built around a rail connection and upgraded highway system on the South African and Mozambican sides of the border. Transportation upgrades were carried out through a number of public-private partnerships. The key anchor project for this corridor was a \$1 billion Mozal aluminium smelting plant on the outskirts of Maputo (Santos et al, 2015). Consequently, other private-sector aluminium-based manufacturing has emerged along the corridor (Allafrica.com, 2016a).

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The corridor passes through or influences most areas in Northern Mozambique, including the densely populated Zambezia and Nampula provinces

An upgraded railway line starting near Tete meets a transnational highway passing through Lusaka and Lilongwe at Cuamba in Mozambique to form the corridor

The recently upgraded Sena railway line can transport coal from Tete to Beira, but the port at Beira is insufficient to handle the volume of coal being transported

 Road  
 Railway


Figure 14: Nacala corridor map

## Nacala Corridor

The third planned corridor in Mozambique is the Nacala Corridor, which is the focus of this report. This corridor links the resource-rich Tete province to the port of Nacala, one of the deepest natural ports on the eastern coast of Africa.

A planned upgrade to the Nacala port will render it capable of handling the output from coal mines in Tete, widely thought to have the largest untapped reserve of coal in the world. The corridor is also expected to connect rich agricultural regions in Nampula province to a global market and encourage industrialisation in the city of Nampula. The Nacala corridor will also create connections to the sea for landlocked Malawi, Zambia, and Zimbabwe, fostering regional trade (Santos et al, 2015).

The Nacala Corridor is over 1,000km in length between Tete and Nacala. The development of road, rail and communication infrastructure along this length of the corridor has been spurred by the international demand for coal mined in Tete. Tete is also more suitable than nearby the ports of Beira and Quelimane to handle coal shipping volumes. At the outset, the 17 hour travel time

between Tete and Nacala presents a challenge for other sectors using the corridor for growth. However, the upgrading of infrastructure along the corridor improves access to markets at either end. This enables access to landlocked countries in Southern Africa on the western end and access to global markets via the Nacala Port on the eastern end. Proximity to these markets can help determine the focus of economic development initiatives. For example, agricultural products targeted at markets in Zambia and Zimbabwe can be a better driver of economic growth in Tete than in Nampula province.

Economic corridors have successfully attracted private investment in manufacturing and transportation infrastructure in Mozambique and encouraged growth in regions away from the capital. Cities along the Nacala corridor are harnessing the increased investment in the region through a variety of innovative structures to address governance capacity and basic service provision. These structures establish models of partnerships between the private sector, international development organisations, and central government agencies.

Mozambique's National Development Strategy 2015 envisions that growth corridors provide the impetus for growth outside the major cities by creating special economic zones and industrial parks along corridors that promote the development of industries other than those based on the extraction of mineral resources. Along the Maputo corridor, mineral resource processing industries have already been established, while the Beira corridor has seen investment in agri-business from development organisations and the private sector (Santos et al, 2015). However, for the Nacala corridor to truly be a growth corridor (Galves Nogales, 2014), national policy needs to ensure that economic gains generated by the corridor lead to improvement in human development indicators in the regions through which the corridor passes.

The case studies in this report look at these governance structures in three cities along the Nacala corridor – Tete, Nampula, and Nacala.

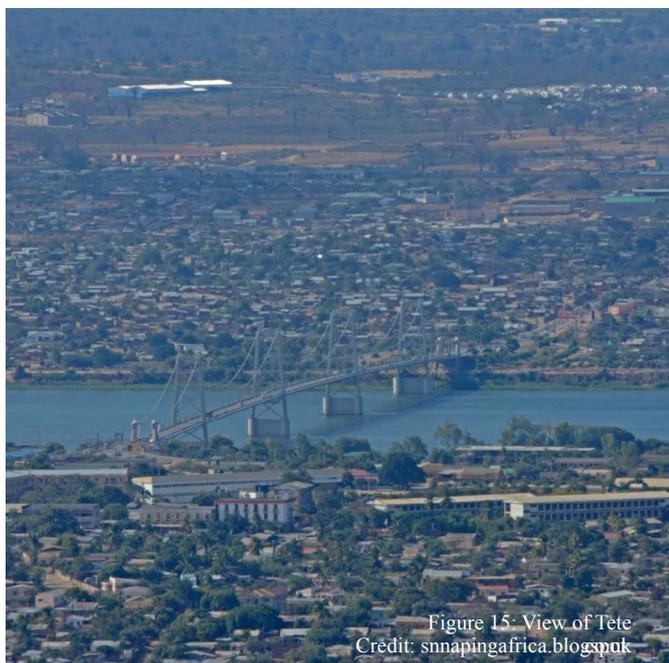
# Tete

▶ The mining boom in Tete has resulted in invisible economic growth and generated high levels of formal employment in the city

Tete City is the capital of the resource-rich Tete province. Located on the banks of the Zambezi River, its population was estimated to be 183,778 in 2011 (Cities Alliance, 2015a). Tete was established as a Swahili trade centre for gold and copper well before the Portuguese colonial era. In the hope of taking over the gold trade, the Portuguese established two settlements on the Zambezi River, one of them at Tete in 1531. By the mid-17th Century Tete had become a market centre for gold, ivory, and copper. In 1761 it was given a Portuguese town charter and became a city of the ‘Overseas Province of Mozambique’ in 1959. Located in one of the hottest parts of Mozambique, Tete is growing rapidly thanks to the abundance of mineral wealth surrounding the city.

The city is located 200km inland from the Mozambican coast, set on a plateau 500m above sea level. The city’s location was chosen because it was the easiest crossing point on the Zambezi River. Today, two bridges cross the Zambezi, linking Malawi and parts of Zambia with Zimbabwe and South Africa, and extending the influence of Tete internationally. The city has an area of 286km<sup>2</sup> with an estimated population density of 640/km<sup>2</sup>, and a population growth of 4.3%. The recent growth of mining and related industries has led to extensive construction and a stimulated local economy. It has also attracted an influx of people, increasing traffic on roads and pressure on urban services.

High levels of informality, poor housing conditions, and poor service delivery challenge overall livability within the city. More than three-quarters of the city lives in informal settlements, and over 70% of its residents live below the poverty line. A large proportion of the population does not have access to water, sanitation or solid waste collection. Only 30.9% have access to potable water inside homes, 48.6% to sanitation and 26% are covered by solid waste collection. Flooding during the 2010 and 2013 monsoon seasons has highlighted the fragility of existing water supply and sanitation systems. These exacerbate the risk of contamination of soil and fresh water, and the occurrence of communicable diseases (Cities Alliance, 2015a).



*Tete in numbers*

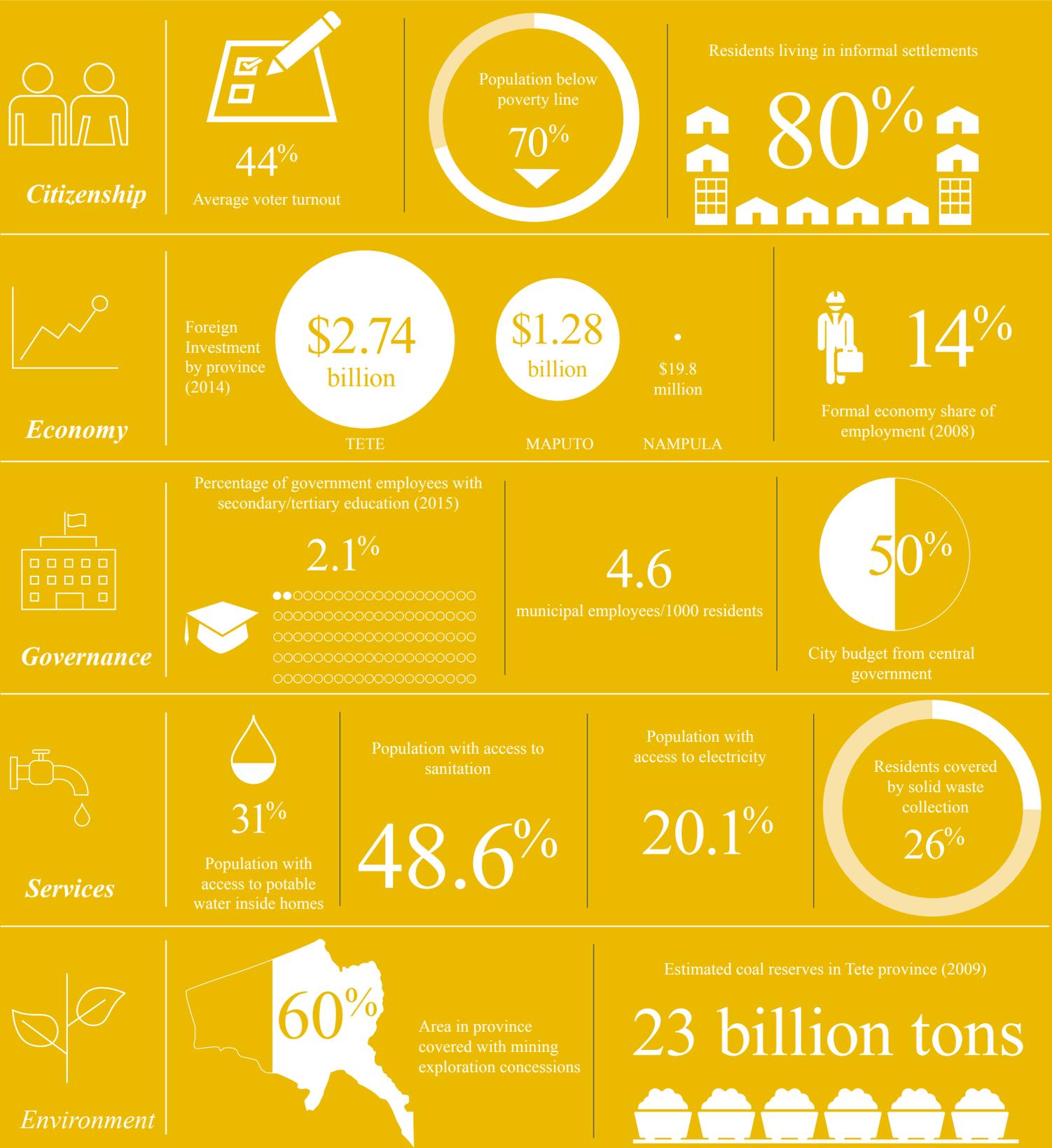


Figure 17: Tete infographic

Tete is strategically located along trading routes connecting Zimbabwe, Malawi and the northern region of Mozambique. These routes were historically recognised by the Swahili and Portuguese traders. Tete is still a key regional transport hub for land, air, and river transport. It has an international airport that runs regular flights to South Africa and Maputo. The city has also become an industrial zone for the extractive industry and an administrative hub for mining in the region. The presence of mining companies and revenues from operations has led to visible economic growth in the city of Tete and a strong sense of optimism for the future of the region. Mining companies have brought technicians and staff to the

city, spurring a construction boom mainly focused on new housing; along with growth in the hospitality and retail sectors. In addition, Tete has also attracted investments in construction, energy, hospitality and infrastructure sectors.

As a city, Tete has seen strong economic and industrial growth while also facing challenges in governance and local service delivery. Construction and mining operations have generated substantial formal employment with spill-over effects in associated industries such as hospitality for residents in the cities of Tete and its neighbouring city, Moatize, which is located 5km to the east. The benefits of this economic growth have not been equal, however. Sudden



Figure 18: Mining activity near Tete  
Credit: Steve Nichols - youtube.com

investment in housing and amenities for mining employees has caused an increase in commodity and house prices in the region.

In managing this growth, city governance is hampered by a lack of technical and financial capacity, as indicated by the low tertiary education rates among city employees (2.1%) and a high reliance on central government transfers for funding (50%). This has meant that while the Tete Provincial Development Plan (2007-11) and Tete Municipality Governance Program (2009-14) have been formulated, they have not yet been adequately implemented. As with other Mozambican cities, planning for urban development occurs at the local level but land

management and financial powers are still concentrated with the national government.

For Tete, being part of the Nacala growth corridor has meant significant regional economic growth, aided by connectivity for mining and other trade. ‘Company towns’ have emerged, particularly in neighbouring Moatize where mining firms have their offices, factories, and accommodation. It has also meant that while some sectors have experienced economic growth, local service provision, such as public health infrastructure for residents is still not fully adequate.



Figure 19. Neighbourhood in Tete  
Credit: Dw.com

## What is shaping the city?

▶ Mining companies have addressed service delivery and infrastructure gaps in Tete, albeit for a small proportion of the city’s residents

### Unequal provision of urban services

The limited coverage of urban infrastructure and low capacity of municipal and provincial governments in Tete has led to mining companies taking over many roles in urban development that are traditionally the city’s responsibility. The larger mining companies are building social infrastructure and housing for their employees or for displaced communities that they have resettled due to their mining operations. Vale and Rio Tinto, two transnational mining companies operating in Tete have built good-quality housing and social infrastructure including educational and healthcare facilities. At the same time, this higher demand for city land generated by new housing, office and administrative spaces has increased living costs in Tete (Cities Alliance, 2015a). However, there is a concern that the benefits of this infrastructure will only flow to a

small minority of residents in Tete and will not be available equally (see Fig. 17).

Recent community protests against the increasing influence of mining (BBC, 2016a; Mining.com, 2012) have prompted active government involvement to mediate the impact of mining. New policies developed in 2012 and 2013 by the central government determine minimum standards of housing for resettled communities and require the involvement of government representatives during resettlement. Taxation laws and new concession contracts at the central level have been amended to direct a larger share of mining revenues towards community development projects in areas directly affected by mining. The central government is also debating the creation of a sovereign wealth fund for harnessing revenue from mining for investing in national development (Macauhub, 2015).

The key role of the private sector in urban development suggests that well-directed mining revenues can help address the lack of technical and financial capacity at the local level, and to help finance infrastructure and service delivery improvements. Government and local communities should recognise their key role, for this collaborative approach to succeed. However, as the mining sector is particularly sensitive to global commodity price fluctuations, current or anticipated future profits from the mining industry are not a reliable source of financing for urban services. The emerging model of urban development driven by investment in mining operations can be considered effective only if is accompanied by a transition to a diversified economy.

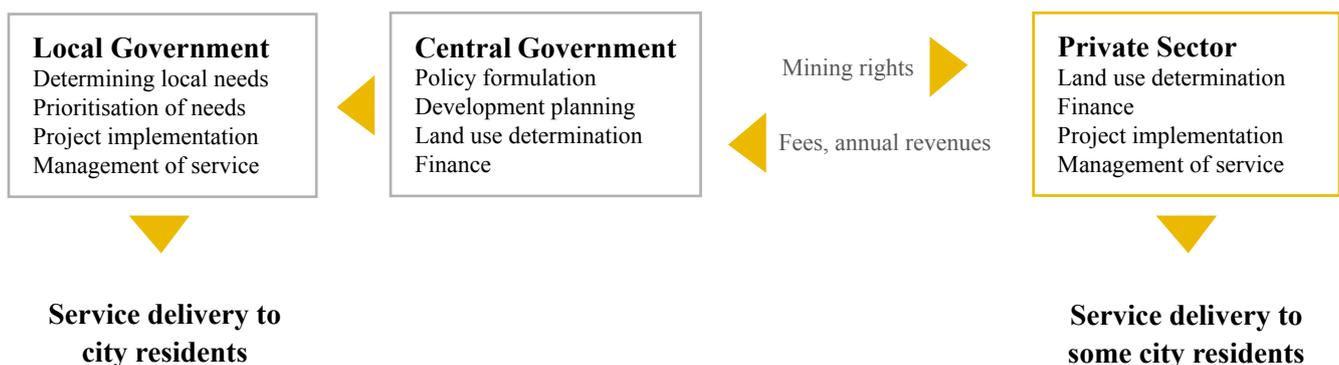


Figure 20: Emerging service delivery model in Tete

### Environmental and social trade-offs for growth

Mining operations themselves present long-term environmental risks in the form of air, water and soil pollution, and near monopolisation of land use in Tete’s hinterland. 60% of the province has been given over as mining concessions to private interests (Human Rights Watch, 2013). Mining concessions are competing for fertile farmland since the richest mineral resource areas are in production agricultural areas near water sources. For example, exploration has revealed the presence of high coal deposits in areas near the Zambezi and Revuboe rivers, which are also highly productive agricultural areas. The mining concessions

do not address the loss of agricultural land in the province and the impact on livelihoods. They also involve displacing and resettling of populations. Open-pit mining operations in Tete are impacting the overall environmental landscape in Tete province and in the city itself.

### Ready supply of energy

Tete has abundant hydro-energy and water supply thanks to its location along the mighty Zambezi River. Although Mozambique is a net exporter of power due to international agreements with South Africa and Zimbabwe, Mozambique itself has a net energy deficit with demands increasing by about 14% each year (82MW). The expansion of the energy sector is one of Mozambique’s greatest economic challenges, given the growing

industrial development across the country (Macau Daily Times, 2015).

Tete’s proximity along the Zambezi River has provided the city with plenty of hydropower. The Cahora Bassa Dam, located further upstream on the Zambezi River produces 2,075MW and is southern Africa’s single largest source of hydro-electric power (Baobabresources, 2016). Plans are being discussed to upgrade this to 3,220MW over next five years (Reuters, 2011). Tete is therefore an excellent location to base mining operations limited only by the lack of transportation infrastructure, which is quickly being addressed. Plans are underway to construct two additional dams near Tete – Lupata and Boroma Dam with combined potential for 626MW at an investment of nearly US\$1.6bn.

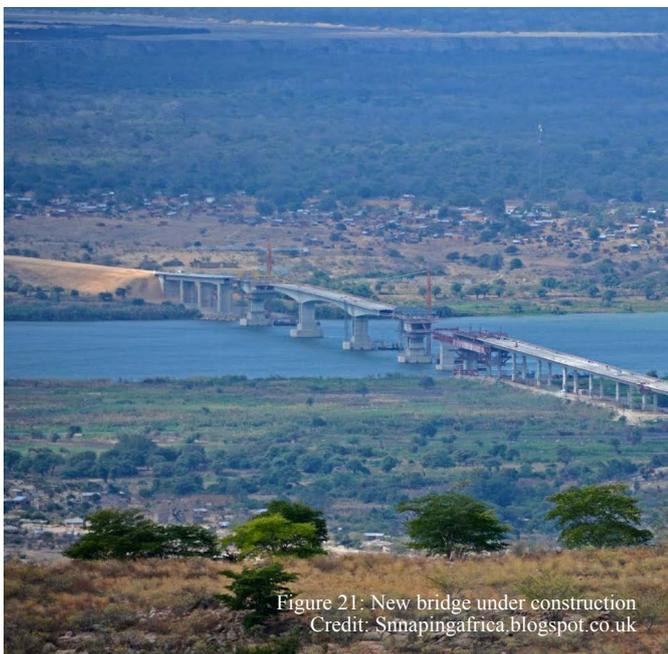


Figure 21: New bridge under construction  
Credit: Smapingafrika.blogspot.co.uk



Figure 22: Cahora Bassa dam.  
Credit: Thorndoncook.com

## Historic levels of foreign direct investment

Thanks in large part to the mineral wealth of Tete, Mozambique is rising up from the devastation of civil war to become home to one of the continent's fastest growing economies. Foreign investment in Tete province dwarfs that of other provinces and is driven mostly by investments in the mining sector (Macauhub, 2015). Tete's status as one of the most mineral rich locations in the country is driving massive foreign interest and investment into the country such as Moatize Mines (\$1,535m investment) and Benga Coal Project, an investment of US\$849m (Embassy of Mozambique, 2012). Additionally, huge deposits of iron ore, vanadium and titanium have

been discovered near Tete with estimated reserves at 750 million tonnes. Mining companies have started investing in the region towards the extraction of these minerals.

Weak transport infrastructure and a government's ruling against using the Zambezi River to barge coal has led international mining companies, such as the Brazil-based Vale and Japanese investment house Mitsui, to finance, construct, operate and manage over 1000km of rail network and port facilities to the ports of Beira and Nacala, in partnership with the government (Allafrica, 2016b; BBC, 2016b; Cities Alliance, 2015a). Vale alone has reportedly invested US\$4.4 billion in rail and port facilities in the corridor (Bloomberg, 2013).



Figure 23: Railway Tete - Nacala under construction  
Credit: Dw.com

## Key Themes



### Citizenship

#### Informality in economy and housing

A large proportion of Tete's residents live in informal settlements along the city's periphery. Most employment is in the informal sector.

#### Low participation in planning

Partly as a result of the planning occurring at the district and provincial level, communication on planning issues between city residents and local government is not sufficient. Citizen groups are active in the city particularly around issues of resettlement, but not formally involved in planning.

#### Resettlement processes

Exploration for coal and other minerals has resulted in the resettlement of many villages in the province. In many cases, villages near agricultural land with high productivity have been moved to less desirable locations, increasing vulnerability for the resettled residents.



### Economy

#### Mining boom

The growth of mining in the last decade has attracted foreign investment to the province, with spill-over effects in the city which serves as the administrative hub for the industry. Formal employment opportunities have increased, along with growth in sectors like construction and hospitality

#### Unequal growth

The benefits of mining-driven economic growth has been unequal. The sudden investment in housing and amenities for mining employees has caused a rise in commodity prices in the region.

#### High agricultural output

The Tete province is well-watered and has a relatively high agricultural output. The city has potential as an agri-business hub.



### Governance

#### Incomplete decentralisation

As with other Mozambican cities, planning for urban development occurs at the local level but land management and financial powers are still concentrated with the national government. Central government transfers constitute over 50% of the municipal budget.

#### Development plans

The Tete Provincial Development Plan (2007-11) and the Tete Municipality Governance Program (2009-14) have been formulated. But low capacity means that the implementation is not adequate.

#### Lack of land management control

Mining concessions are granted by the central government, and may overrule local government planning for the area. Over 60% of Tete province is currently under an exploration concession, or being considered for one.



### Services

#### Poor infrastructure delivery

The city does not have infrastructure or management capacity to provide sufficient services to residents. This is particularly evident in sanitation and housing

#### 'Company towns'

Particularly in Moatize, mining companies have established housing, social amenities and robust physical infrastructure for locals and expatriates working in the mining sector.

#### Public health infrastructure

Public health infrastructure is insufficient to manage epidemics, particularly of water-borne diseases. Climate change models predict the higher prevalence of infectious diseases, which the city does not have adequate capacity to manage.



### Environment

#### Mining operations

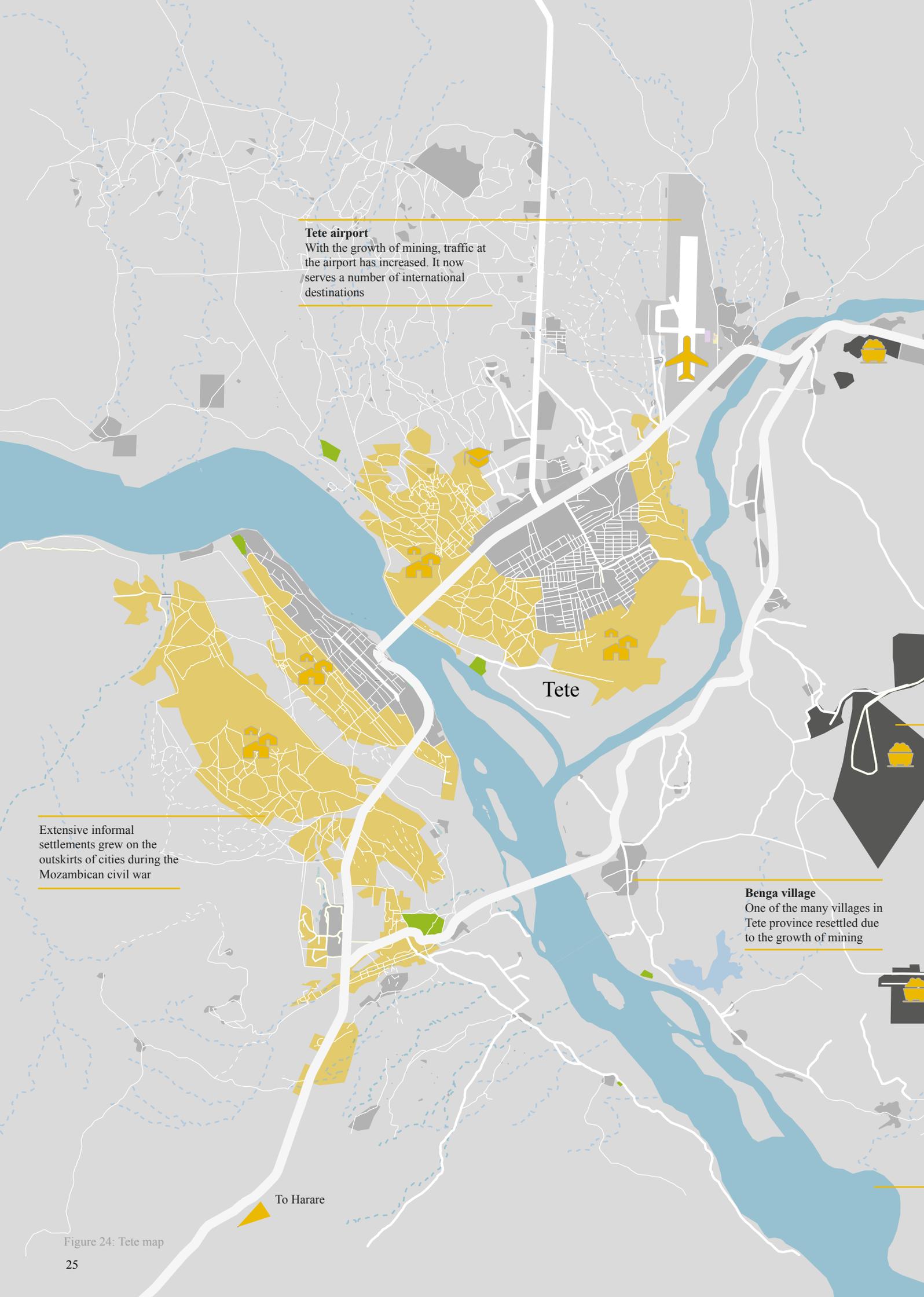
Most mining in the province is open-pit mining which is hazardous for the environment. The proliferation of mining in the province has increased air, water, and soil pollution.

#### The conflict between mining and agricultural uses

Exploration has revealed the presence of high coal deposits in areas near the Zambezi and Revuboe rivers, which are also highly productive agricultural areas. Mining concessions do not address the loss of agricultural land in the province.

#### Reliance on the Zambezi River

The Zambezi is the source of water for agriculture and industry, and the Cahora Bassa dam on the river provides hydro-energy to the province. Reduced water levels in the Zambezi due to climate change are a cause of concern in this context.



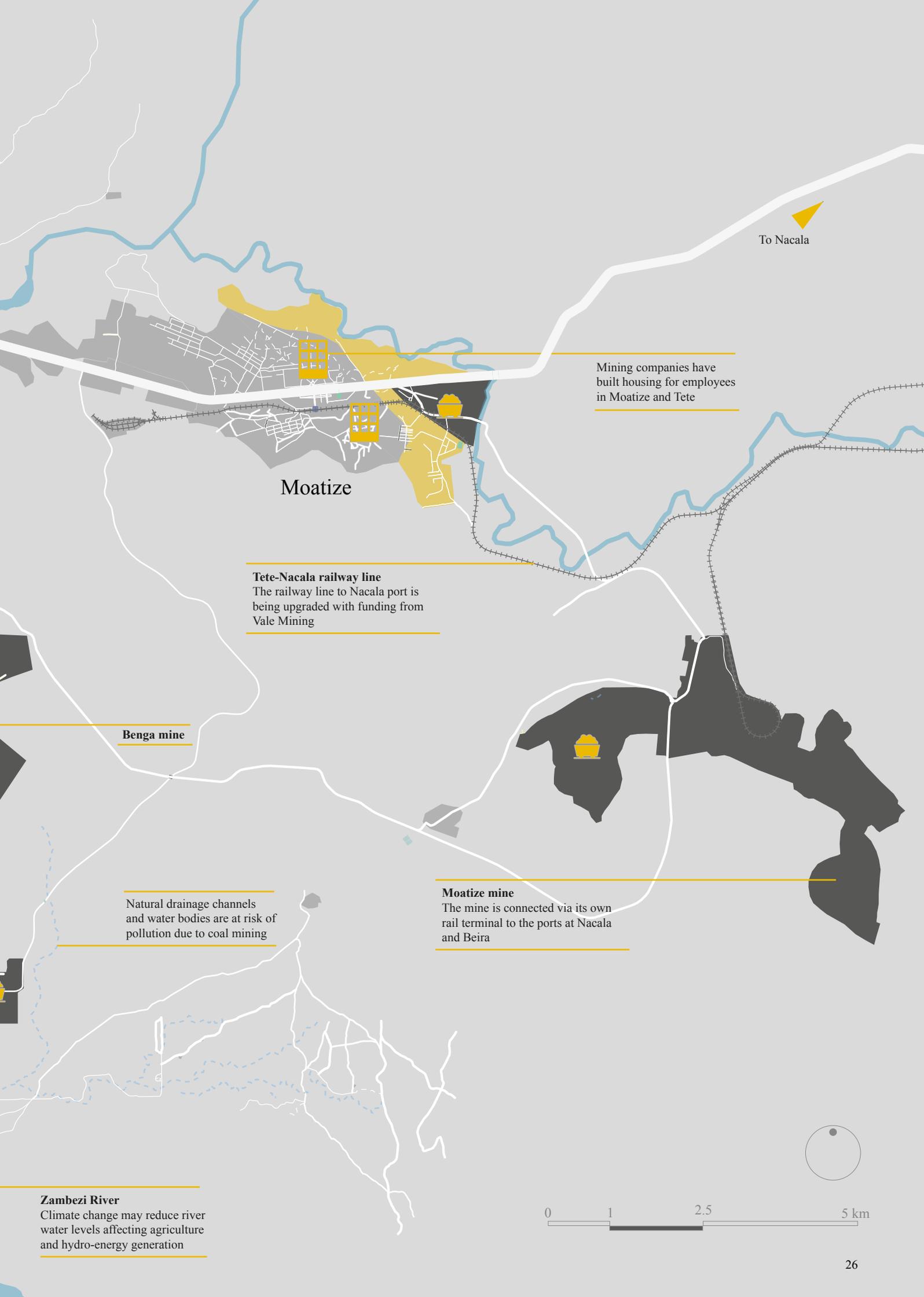
**Tete airport**  
With the growth of mining, traffic at the airport has increased. It now serves a number of international destinations

Extensive informal settlements grew on the outskirts of cities during the Mozambican civil war

**Benga village**  
One of the many villages in Tete province resettled due to the growth of mining

To Harare

Figure 24: Tete map



To Nacala

Mining companies have built housing for employees in Moatize and Tete

### Moatize

**Tete-Nacala railway line**  
The railway line to Nacala port is being upgraded with funding from Vale Mining

### Benga mine

Natural drainage channels and water bodies are at risk of pollution due to coal mining

**Moatize mine**  
The mine is connected via its own rail terminal to the ports at Nacala and Beira

**Zambezi River**  
Climate change may reduce river water levels affecting agriculture and hydro-energy generation

0 1 2.5 5 km

## Summary of environmental risks

► Pollution of land, water, and air due to increased mining over the last decade is a key driver of environmental risk in Tete.

Mining concessions cover nearly 60% of the land area in Tete province. Rich veins of coal have been discovered under fertile agricultural land near the Zambezi and Revuboe Rivers, and have resulted in the displacement of farming communities. Coal mines have also been set up close to the urban centres of Tete and Moatize.

While mining is driving economic growth in Tete, the environmental hazards of open-pit mining are a cause for concern for the region. Like other Mozambican cities, Tete has poor and limited urban infrastructure and a high proportion of residents in informal settlements, which increases their vulnerability to environmental threats and hazards.

### Three dimensions of environmental risk



#### *Climatic risk*

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



#### *Biological & natural resource risk*

The impact of scarcity or degradation of natural resources on urban populations and economies



#### *Geophysical risk*

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

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

<p> <b>Extreme temperature</b></p> <p>Climate change models predict a 2-2.5°C rise in Mozambique. Tete is almost surrounded by coal mines, which may cause localised temperature increases. Poorly constructed housing in informal settlements do not provide protection against extreme temperatures.</p>	<p> <b>Storm</b></p> <p>Tete sees frequent storms during the monsoon season. The lack of effective drainage systems drive increased risk during storms in the city.</p>	<p> <b>Drought</b></p> <p>Tete is in a high desertification risk zone, and the region has seen extended droughts in the last twenty years. Extreme temperature and reduced rainfall due to climate change will increase the frequency of droughts.</p>	<p> <b>Flood</b></p> <p>Flooding along the Zambezi usually occurs in its lower reaches. However, poor drainage infrastructure causes floods in Tete during rainfall. With increased occurrence of extreme rainfall events, the occurrence of floods may increase in the city.</p>	
<p> <b>Air quality degradation</b></p> <p>Open-pit coal mining is the most commonly practised form of extraction near Tete. This type of mining is associated with increased air pollution. With its large reserves of coal and increased mining investment, air quality degradation is bound to be a key risk in the future.</p>	<p> <b>Contamination or depletion of fresh water</b></p> <p>Rich coal veins have been discovered near the Zambezi and Revuboe rivers which are major freshwater sources for the region. Poor capacity to enforce environmental policies has led to increased water pollution from mines.</p>	<p> <b>Crop disease, infestation or failure</b></p> <p>High frequency of droughts have already affected agriculture in the region. Climate change is expected to worsen droughts, leading to increased occurrence of crop failure.</p>		<p> <b>Fuel scarcity</b></p> <p>Like other Mozambican cities, oil and candles are the primary energy source for 55% of households. Increased investment in electricity generation may help reduce dependence on these sources of energy.</p>
<p> <b>Soil contamination and erosion</b></p> <p>With one of the largest coal reserves in the world, mining activity is expected to sustain Tete's economy in the near future. Poor environmental policies and lack of enforcement capacity will worsen soil contamination due to mining.</p>	<p> <b>Mineral depletion</b></p> <p>Tete has one of the largest coal reserves in the world along with significant deposits of other valuable minerals. Mineral depletion is a low risk for the near future.</p>	<p> <b>Raw materials degradation or scarcity</b></p> <p>Land degradation is a common occurrence due to the prevalence of mining concessions through the province.</p>	<p> <b>Vector-borne disease</b></p> <p>Densely packed, poorly serviced housing combined with a poor health infrastructure system increases the risk of vector-borne diseases in Tete.</p>	<p> <b>Water-borne disease</b></p> <p>Poor sewage infrastructure, dense and poorly constructed housing are key drivers of water-borne disease in the city.</p>
<p> <b>Air-borne disease</b></p> <p>The risk of air-borne disease is driven by dense housing conditions and poor health infrastructure.</p>				
<p> <b>Earthquake</b></p> <p>While Tete is in a moderate earthquake risk zone, poorly constructed informal housing increases the risk to human life and property even during relatively low magnitude earthquakes.</p>			<p><b>Legend</b></p> <p>Current risk      Estimated future risk</p> <p> Low </p> <p> Medium </p> <p> High </p>	

## Future challenges

- ▶ Increased rural-urban migration due to two key challenges may be a cause for concern in the context of Tete’s current governance capacity and the extent of informality in housing and the economy

### The future of the Zambezi River

For Tete, in the central region of Mozambique, climate change is projected to result in increased temperatures, a slight increase in rainfall, erratic rainfall patterns, and an overall increase in evaporation rates (weADAPT, 2011). In the future, these changes will lead to reduced water flow in primarily rain-fed rivers, a gradual increase in drought risk and desertification (Fig. 26). For the city, drought and consequent crop failures in the primarily agricultural region around it may increase migration to Tete City, compounding environmental risks.

The Zambezi will experience drier and more prolonged drought

periods, and more extreme floods. Multiple studies cited by the Intergovernmental Panel on Climate Change (IPCC) estimate that rainfall across the Zambezi River Basin will generally decrease by 10-15% over the next 100 years. All Zambezi Basin countries will experience a significant reduction in average annual stream flow. Studies estimate that runoff will decrease by 26–40% by 2050 (International Rivers, 2012). In recent years, the area around the Zambezi River near Tete has experienced frequent floods that caused significant damage to human life, infrastructure, and farms. The frequency of floods on the Zambezi is attributed to unpredictable rainfall patterns caused by climate change (Fant et al, 2015). Flooding

has significant impacts on the region as well. In particular, it affects operations of the Cahora Bassa dam which generates electricity for a substantial portion of Mozambique, and neighbouring countries.

One cause of concern is the over-reliance on the Zambezi River as a water source. It is used for people and industry in Tete, national power production along the existing and planned dams, irrigation for agriculture and small-scale fishing, which are both linked to livelihoods. A reduction in water flow or levels in the Zambezi River could have an impact on energy production and water security and consequently on industrial output.



Figure 25: Zambezi River  
Credit: Jacques Pinette - Flickr

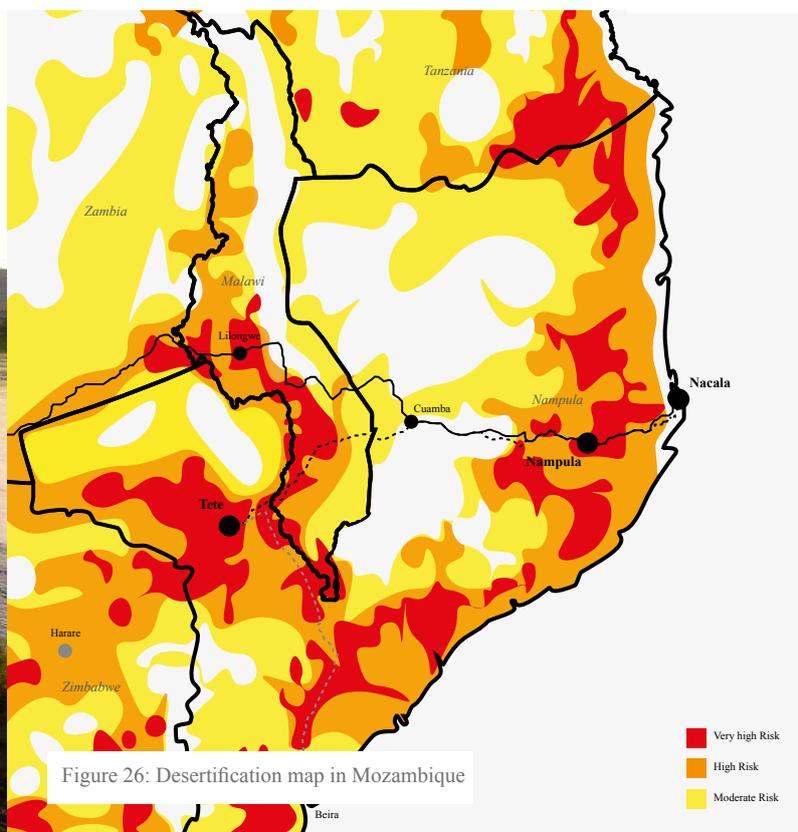


Figure 26: Desertification map in Mozambique

Very high Risk  
High Risk  
Moderate Risk

## Dependency on the mining sector

Since the mid-2000s, mineral exploration and extraction in Tete province have been significant drivers for Mozambique's economic growth. As discussed earlier, due to Tete's location and poor transportation network, mining companies have had to invest in infrastructure to connect Tete with Nacala Port (The Economist, 2016). In spite of these additional costs, generally high commodity prices have made coal mining a profitable venture in Tete (SARW, 2014). More recently, a number of factors have resulted in a global downturn in the mining industry. By 2014, coal prices had declined to

between one-third and half of their 2011 peak (SARW, 2014). Recent local hiring and wage provision laws such as the 2014 Mining Law have increased the total costs involved in extraction, which has further hit the Tete mining industry. These new laws, combined with the high transportation costs and the global downturn in commodity prices, has led a number of mining companies to cut production in existing mines and slow rates of investment in new mines in the province (The Economist, 2016). The mining industry dominates the formal employment sector, either directly in mining operations, or indirectly through construction, transportation and hospitality industries. Besides the direct impact

on formal employment, any city service provisions provided by the mining sector, local community development funds or the national sovereign wealth fund that relies on funding from mining fees and profits are at risk to global fluctuations in commodity prices.



Figure 27: Vale coal mining in Tete  
Credit: mozambiqueminingpost.wordpress.com

### Privatised urban management

Nearly 60% of the province of Tete is covered by land concessions either granted or under process by the national government (Human Rights Watch, 2013). Much of the land is near urban growth centres or fertile agricultural land along the Zambezi and Revuboe rivers. This has led to land disputes in both urban and rural areas. Two of the largest coal mines are located close to the cities of Tete and Moatize (Human Rights Watch, 2013). Any urban planning and development strategies for Tete will need to account for the amount of land under the mining sector's control. At the same time, displaced agricultural communities may increase the rate of migration to Tete due to loss of livelihood.

### The environmental and social cost of mining

Critically for the purposes of the Nacala economic corridor, the province has vast yet largely untapped mineral deposits including gold, iron ore, vanadium, titanium, and uranium (World Bank, 2010). One of the major drivers for the conception of the Nacala corridor is Tete's coal deposits (Reuters, 2016) thought to be the largest unexploited reserve of coal in the world (World Bank, 2010). The type of mining practiced in the region is open-pit mining which is known to have a large impact on air pollution, land degradation, water pollution and carbon emissions. Mitigation of environmental impacts of mining

is a concern particularly as any failures will affect a high number of people (Human Rights Watch, 2013).

The anticipated growth of mining in Tete will have great social impact. As of October 2012, the approved and pending applications for mining concession and exploration licenses covered 60% of the province's total land area (Human Rights Watch, 2013). The anticipated displacement and relocation of communities may result in loss of livelihood, social networks, and community resilience.



Figure 28: Miners at work in Tete  
Credit: Steve Nichols - youtube



Figure 29: Road in Tete province  
Credit: Ismael Mia - Flickr

# Nampula

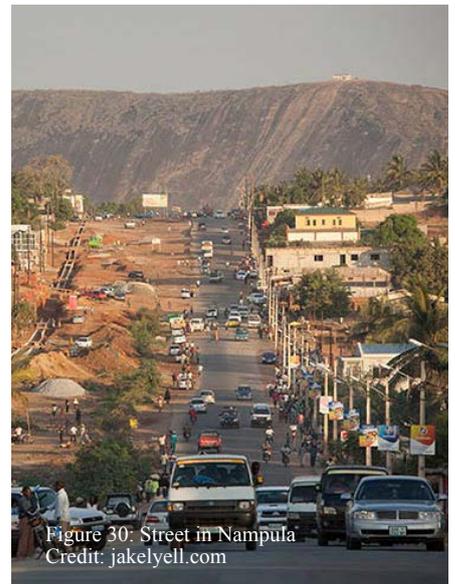
▶ A productive hinterland and strategic location along the corridor make Nampula a viable manufacturing and agri-business hub for Northern Mozambique

The ‘Queen of the North’, Nampula is the capital of Nampula Province, Mozambique’s most populated province. The city, founded in 1907, was originally located on a plateau to serve as a colonial military centre for the entire north of the country. The city grew substantially in the last decades of Portuguese rule as it was a strategic military centre in the fight against the Frente de Libertação de Moçambique (FRELIMO) a national liberation movement (UCLG, n.d.). Now considered the ‘capital’ of northern Mozambique, it has an estimated population of 622,423 in 2015 and covers an area of 404km<sup>2</sup>. Nampula is Mozambique’s third largest city and is a hub for business and manufacturing (World Bank, 2010). This dynamism is partly fuelled by the surrounding well-drained, fertile land that supports the production of various food and cash crops. The city itself is home to several markets, cathedrals, and mosques as well as the National Ethnographic Museum. The city is dense but also features broad avenues. It is set in lush surrounding countryside dotted with ‘inselbergs’ – large masses of smooth volcanic granite.

Nampula is located in the centre of the province, surrounded by plains and rocky outcrops. The city is at the junction point of the railway line that links Nacala Bay to Malawi and also the road axis between

the Zambezia and Cabo Delgado provinces. In addition to these two transport links, a small international airport lies 4km outside the city centre. Nampula’s population has more than doubled within the last two decades and currently has a growth rate of 5.7%. The higher percentage of males in the city suggests that many men have come to the city seeking work. This rapid population growth has put pressure on many city services as well as environmental resources, with 82% of residents living in housing that is unsafe and poorly serviced (Cities Alliance, 2015b).

Similar to other Mozambican cities, municipal governance is hampered by a low municipal budget and lack of technical capacity. The large informal economy makes it difficult to collect sufficient tax revenues to support local governance and service provision. Consequently, the city has a small budget that relies heavily on central government support (Cities Alliance, 2015b). The lack of effective coverage by sanitation systems has led to sewage discharge into rivers and illegal sewer connections that overload the existing network. Periodic health epidemics occur, caused by poor sewage disposal and contaminated drinking water (Cities Alliance, 2015b). Industrial pollution of water sources has also occurred as a result of the informal economy.



## Nampula in numbers



### Citizenship



Annual population growth rate



Residents living in informal settlements



### Economy



Average farm size

1.5  
hectares

80% rural



3.6 million / 4.5 million residents  
live in rural areas



+90%

Employment engaged in  
informal economy

\$604.50

City per capita GDP



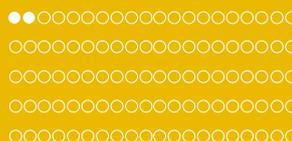
### Governance

2.23

municipal employees/1000 residents

Percentage of government employees with  
secondary/tertiary education (2015)

2%



\$14.6

Municipal expenditure.  
Residents/year



### Services



5.5%

Population with access to potable water inside homes



14%

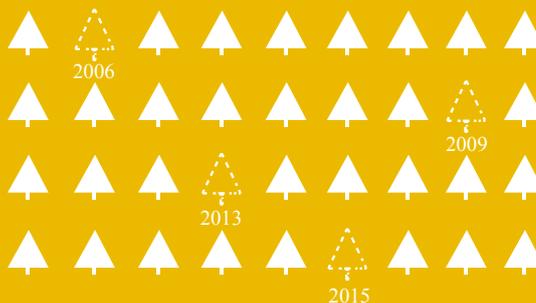
Population with  
access to sanitation



### Environment

137,000

hectares of forest cover lost for  
agricultural purposes every year  
since 2006, representing 3% of  
forest cover in the province a year



At this rate, no  
forest cover by

2035

Figure 32: Nampula infographic

Nampula is strategically positioned to act as a business and administrative hub in Northern Mozambique. The agri-business sector in Nampula has seen increased investment, through international development programmes like Plano Estratégico para Desenvolvimento do Sector Agrário (PEDSA). There is also strong interest from private sector mining and agro-industries too. Other potential growth sectors include tourism, horticulture, biofuels and fishing. The city has a large amount of donor investment into infrastructure such as roads, water and sanitation. In terms of capacity, the city has relatively high literacy and higher education rates compared with the rest of Mozambique. This presents a natural

opportunity for employment in the formal industries to be established in Nampula, especially considering that over 90% of employment is in the informal sector.

Nampula has seen rapid population growth in recent years and has a number of strong economic growth areas, particularly around large agro-industry and mining projects. At the same time, the city has high levels of informal housing and low technical capacity to address service provision challenges. Parastatal agencies that create collaborations between local and central governments and international development agencies are being formed to address the lack of technical and financial capacity in local government. A development co-ordination agency (UCODIN)

has been established to enable local government to better integrate various programs and projects carried out by the other agencies. While these agencies are helping to address key challenges in the city, they also compete with the private sector for skilled labour. This may present a challenge in supplying local workers for formal jobs in the emerging private sector (Cities Alliance, 2015b).

Finally, for Nampula, being part of the Nacala growth corridor is likely to increase mining-related industry. However its location in the middle of this corridor means that the most significant trade and industry investments may take place in Nacala and Tete.



Figure 33: Waste management in Nampula  
Credit: Thomas Stellmack/Flickr



Figure 34: Nampula street vendors  
Credit: Thomas Stellmack/Flickr

## What is shaping the city?

- ▶ Through collaborations with international NGOs, development organisations and central government agencies, Nampula's local governments are able to provide services and development programs to their residents

### Re-emergence of the city as business hub

Owing to its strategic location and as the capital of one of Mozambique's most populated provinces, Nampula is well positioned as a business and administrative hub for a vast hinterland in northern Mozambique. The business community went through difficult times during the civil war between 1977 and 1992 – a period characterised by a lack of investment in industry and high informal employment. The end of the conflict brought structural adjustment policies in the 1990s. In time, investment has returned. Economic development collaboration with international organisations is now leading to strategic investment in opportunity areas such as in the agri-business sector.

### Population change and demographics

Nampula has a history of massive rural to urban migration as a result of conflict. The city's first growth spurt was due to the presence of a military base in the city, which was first established in 1907. Later, after independence in 1975, Nampula was largely abandoned by the military. Rural populations occupied the city, squatting in unplanned peri-urban areas (UCLG, n.d.). The outbreak of civil war dramatically increased migration to Nampula, with many people seeking safety. When the conflict ended, migration continued to increase but this time for economic reasons: most development is occurring in urban areas.

Today, Nampula has a very young population, with half of the population under the age of 15. This is expanding by 5.7% every year. A majority of the population in the city lives in poorly serviced and informal housing on the edge of the city. This demographic dividend can benefit the economic development of the city if urban poverty can be checked and inclusive economic growth is achieved.



Figure 35: Cashew processing in Nampula  
Credit: nextbillion.net



Figure 36: Informal economy in Nampula  
Credit: Magazineindependente.com

### Greater role of parastatals in service delivery

Nampula shows a number of examples of alternative approaches to service delivery and development that have addressed the local capacity and budget challenges. One example is the ProSavana project, run by the central Ministry of Agriculture financed by the Brazilian Cooperation Agency (ABC) and Japan International Cooperation Agency (JICA). The project seeks to spur economic development in Nampula province through investment in education and technology for modernising agricultural practices, improve yields and form new agribusinesses. At municipal and provincial

levels, gaps in service delivery are increasingly addressed through the creation of ‘parastatal’ agencies with support from foreign donors (Fig. 37), such as the Integrated Road Sector Program (PRISE) run by the central government and financed by a number of international agencies including the World Bank, ADB, MCC, DFID, and JICA; and the Water Sector Services and Institutional Support (WASIS) project, financed by investment from international agencies and set up by the National Water Directorate (DNA). These examples show how collaborative models can be instrumental in addressing gaps in technical and financial capacity to deliver services.

The formation of the Nampula Co-ordination Unit for Integrated Development (UCODIN) represents an evolution of this model of service delivery. Created by the Nampula provincial government, UCODIN is an agency that co-ordinates local development and links various development stakeholders including international agencies and municipal governments. Through this model, service delivery and economic development initiatives can share knowledge, best practices for interventions and enhance technical capacity across local government institutions. From the perspective of decentralisation, having a co-ordination agency at the provincial level represents a step forward.

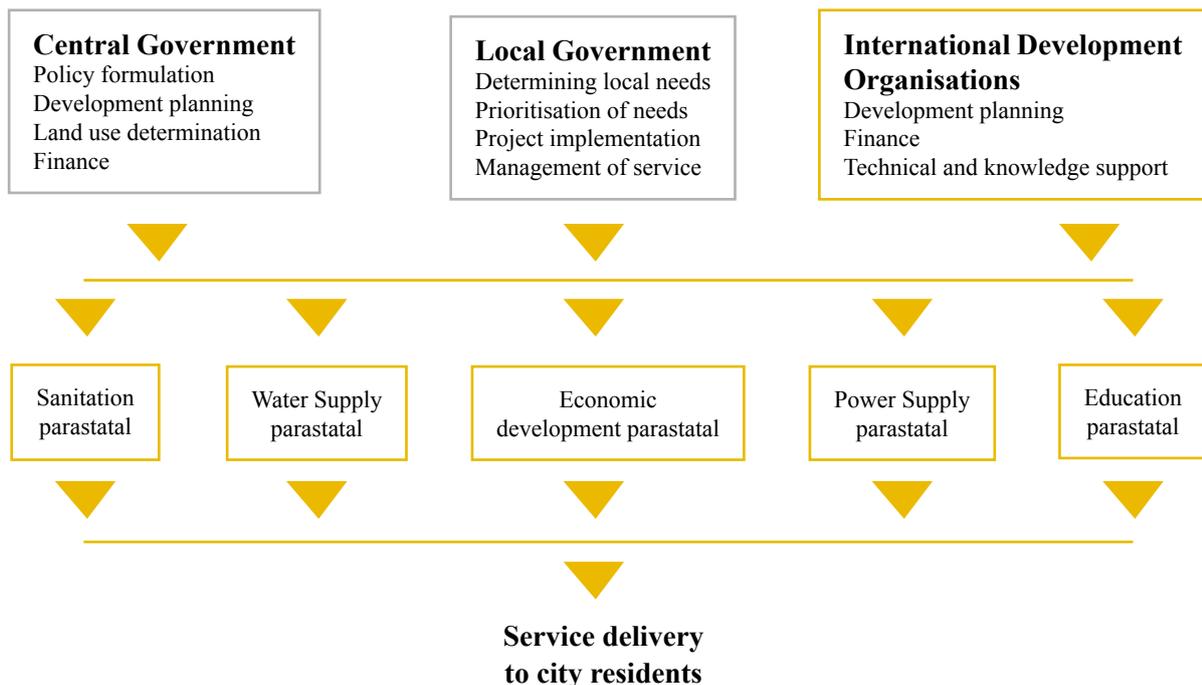


Figure 37: Emerging service delivery model in Nampula

## Key Themes



### Citizenship

#### Informal housing

A majority of the population in the city lives in poorly serviced and informal housing.

#### Literacy and higher education

Compared with the other two cities along the corridor, Nampula has more residents with higher education.

#### Skills mismatch

Economic growth has brought opportunities for formal employment in the city, but there is a skills mismatch for these jobs within city residents. Skills training institutes funded by development organisations are attempting to address this mismatch.



### Economy

#### Informality in economy

The closure of formal industries due to the civil war and the lack of investment in the industrial sector due to structural adjustment policies in the 1990s has led to high informal employment.

#### Business hub

Owing to its strategic location and as the capital of one of Mozambique's most populated provinces, Nampula is well positioned as a business and administrative hub for northern Mozambique.

#### Investment in agri-business

The agri-business sector in Nampula has seen increased investment through programs like PEDSA, PRONER, PAPA involving collaborations with international development organisations.



### Governance

#### Active civil society

Nampula sees high civil society participation in governance. Civil society groups have been driving the movement for participatory budgeting in the city.

#### Presence of parastatals

The lack of technical and financial capacity in local government is being addressed through the formation of parastatal agencies that create collaborations between local and central governments and international development agencies.

#### Formation of UCODIN

The formation of the Nampula development coordination agency (UCODIN) enables local government to better integrate various programs and projects carried out by the parastatal agencies.



### Services

#### Poor service delivery

The city experiences poor service delivery, particularly in sanitation.

#### Presence of donor investment

Through the formation of parastatal agencies like GAPASU, WASIS and NWDP, international organisations have invested in water supply and sanitation upgrades in the city.

#### Capacity building for services infrastructure

The World Bank, USAID's Millennium Challenge Corporation and African Development Bank are funding capacity building programs for local governments.



### Environment

#### Loss of forest cover

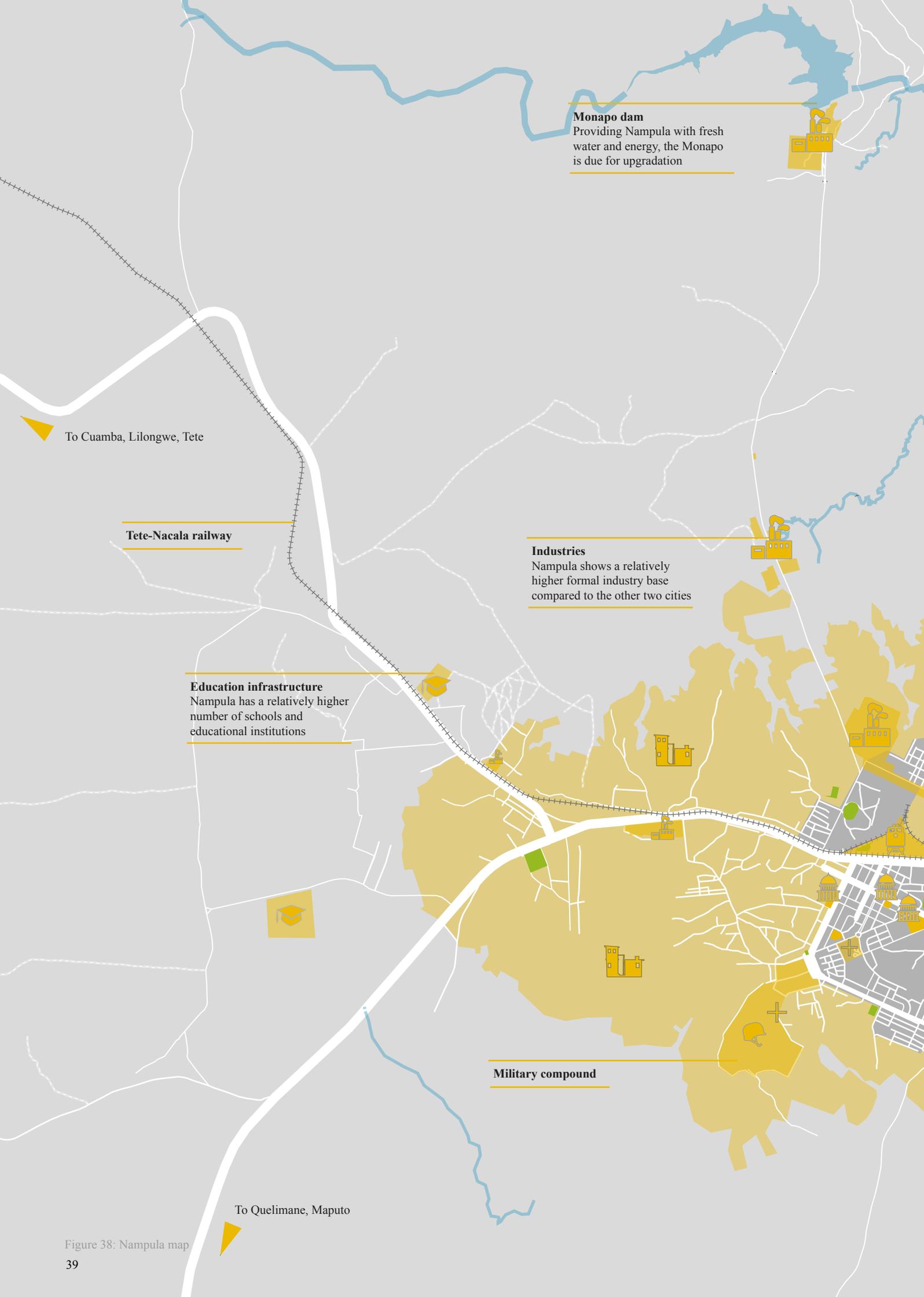
Increasing land coverage under agriculture, fuel, and building use is leading to declining forest cover in the province.

#### Climate change impacts

The province is particularly susceptible to droughts due to climate change.

#### Industrial pollution of water bodies

Formal and informal industries are increasing pollution in water bodies in the province and city.



**Monapo dam**  
 Providing Nampula with fresh water and energy, the Monapo is due for upgradation

To Cuamba, Lilongwe, Tete

**Tete-Nacala railway**

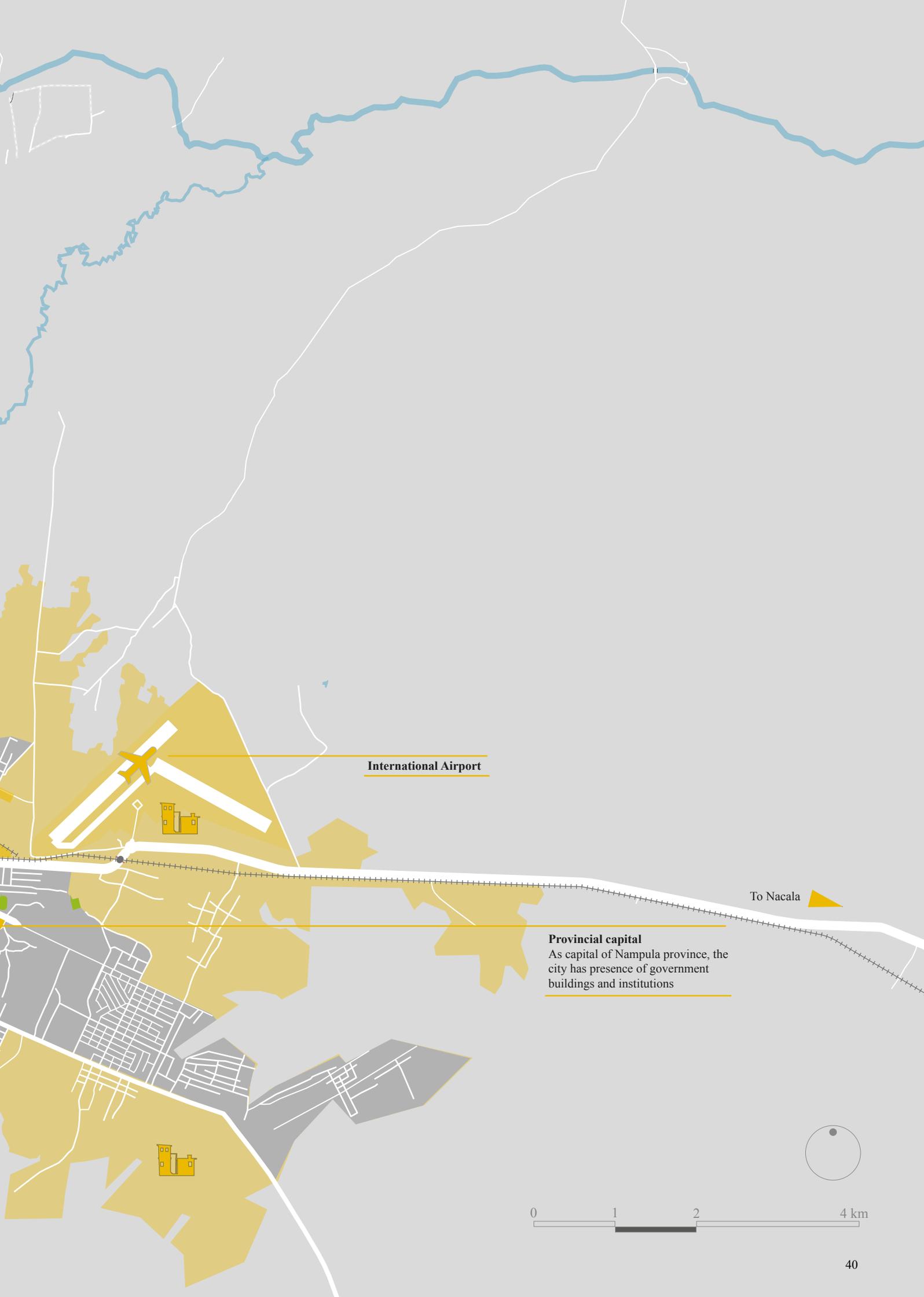
**Industries**  
 Nampula shows a relatively higher formal industry base compared to the other two cities

**Education infrastructure**  
 Nampula has a relatively higher number of schools and educational institutions

**Military compound**

To Quelimane, Maputo

Figure 38: Nampula map  
 39



**International Airport**

To Nacala

**Provincial capital**  
As capital of Nampula province, the city has presence of government buildings and institutions

0 1 2 4 km

## Summary of environmental risks

▶ Drought and desertification is a key concern for Nampula, driven by climate change and high deforestation rates

Nampula province is marked by a high reliance on agriculture, and a key industry in the city of Nampula is agri-business. The occurrence of droughts has increased in recent years, driving increased migration to the city along with increased pressure on its freshwater sources. The province also sees a high rate of deforestation, increasing soil erosion and worsening impact of droughts on the agricultural economy.

Poor civic infrastructure and housing conditions in Nampula are other significant drivers of risk. Increased migration will enhance the pressure on inadequate urban systems, exacerbating risk to a range of environmental threats and hazards.

### Three dimensions of environmental risk



#### *Climatic risk*

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



#### *Biological & natural resource risk*

The impact of scarcity or degradation of natural resources on urban populations and economies



#### *Geophysical risk*

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

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

<p> <b>Extreme temperature</b></p> <p>Climate models predict temperature increases of 2-2.5°C in the semi-arid Nampula province. Poor housing conditions increase the risk to residents from extreme temperature.</p>	<p> <b>Storm</b></p> <p>Nampula sees regular storms during the monsoon. Climate change models predict extreme rainfall patterns, leading to increased strength or frequency of storms.</p>	<p> <b>Wildfire</b></p> <p>Informal housing in the city is poorly constructed, with inflammable materials used in the construction of roofs and walls. Extreme temperatures and higher drought occurrence may increase the possibility of wildfires in the city.</p>	<p> <b>Drought</b></p> <p>Climate change models predict higher occurrence of droughts for Nampula. For a city reliant on rivers for freshwater, increased drought occurrence can severely impact water security.</p>	<p> <b>Flood</b></p> <p>Poor drainage system in the city increases the risk of floods during the monsoons. Inconsistent rainfall due to climate change may increase the chance of extreme rainfall events and increase the risk against floods.</p>
<p> <b>Air quality degradation</b></p> <p>Nampula's fine, dusty soil is prone to erosion and the city already experiences frequent dust storms. Deforestation in the province is expected to increase soil erosion and the frequency of dust storms.</p>	<p> <b>Contamination or depletion of fresh water</b></p> <p>While Nampula has seen upgrades to its freshwater storage systems, the increased frequency of droughts will put pressure on water sources.</p>	<p> <b>Crop disease, infestation or failure</b></p> <p>Crop failures have increased in Nampula province due to droughts. The region is also at high risk of desertification which may reduce the availability of agricultural land in the province. Rural crises will cause increased urban migration.</p>		<p> <b>Fuel scarcity</b></p> <p>Oil, kerosene and paraffin oil are the main energy source for 65% of the city's households. Unlike Nacala and Tete, there are no large energy projects planned near Nampula. The low supply chain diversity is a significant threat as a result.</p>
<p> <b>Soil contamination and erosion</b></p> <p>High rates of deforestation have led to substantial soil erosion in Nampula province. Poor land management and ineffective enforcement of environmental policy are drivers of future risk to soil erosion.</p>	<p> <b>Raw materials degradation or scarcity</b></p> <p>Nampula is one of Mozambique's most populated provinces. The prevalence of subsistence agriculture and high rates of soil erosion will cause land degradation, reducing the availability of land as a resource for its primarily agricultural economy</p>	<p> <b>Loss of biodiversity</b></p> <p>Deforestation in the area surrounding the city of Nampula is a prime driver of biodiversity loss. Poor enforcement of environmental policy may increase the risk of biodiversity loss.</p>	<p> <b>Vector-borne disease</b></p> <p>Dense housing conditions and poor health infrastructure are key drivers of risk to vector-borne diseases.</p>	<p> <b>Water-borne disease</b></p> <p>Poor sewage infrastructure, dense and poorly constructed housing are key drivers of water-borne disease in the city.</p>
<p> <b>Air-borne disease</b></p> <p>The risk of air-borne disease is driven by dense housing conditions and poor health infrastructure.</p>				
<p> <b>Mass movement</b></p> <p>Nampula is in a relatively low earthquake risk zone. The natural flow of water is interrupted by unplanned construction and has led to landslides in the peri-urban areas of Nampula. Poor enforcement of building and planning codes may exacerbate this risk.</p>			<p><b>Legend</b></p> <p>Current risk      Estimated future risk</p> <p> Low </p> <p> Medium </p> <p> High </p>	

## Future challenges

▶ As the business and administrative hub of an agricultural based economy, Nampula relies on regular rainfall to bring economic prosperity to the city

### Reliance on international development

As discussed previously, the city has a number of cases where local capacity and budget constraints have been addressed through collaborative models of service delivery and development. These examples show how alternative models can be instrumental in addressing gaps in technical and financial capacity to deliver services. However, an over-reliance on international development agencies can leave the city vulnerable to sudden changes in funding priorities outside the city's control. Funding from international development agencies seems to flow through to individual projects, which limits the scope for integrated development planning. At the same

time, unexpected changes in the political or financial environment may halt existing programmes that rely on international development organisations. Recently, the suspension of funding from the IMF and other international organisations due to the central government's undeclared debts has halted new programme finance in the country (BBC, 2016c).

### Increased migration due to deforestation

The city's geographic location leaves it susceptible to soil erosion, and loss of tree cover may increase the rate of loss for fertile top soil. Forest cover has been declining in the province at a rate of approximately 1.2% per year. The primary cause of deforestation is

charcoal production and a lack of viable energy alternatives in rural and urban areas. The second cause of deforestation is the conversion of forest land to agricultural use through slash-and-burn methods.

Removing forest cover may increase agricultural production in the short term, but increases the vulnerability of the province and city to extreme weather events such as flooding and landslides during heavy rainfall. With over 80% of the province's residents relying on agriculture, vulnerabilities in rural areas surrounding Nampula can magnify risks in the city. If current deforestation trends continue, it may impact the city through increased rural-urban migration and add more pressure on the limited service capacity of the city.



Figure 39: Commercial Street in Nampula  
Credit: ev.mu

### Climate change bringing drought and extreme weather events

Climate change models predict reduced overall rainfall for the province, while extreme weather events will bring more precipitation. For the province, this will impact the primarily rain-fed agricultural practices in the region. With a rural economy dependent on subsistence farming, a drop in agricultural productivity may lead to increased rural-urban migration. The added population pressure will affect the already poor services in Nampula city.

Nampula relies on its monsoon season for water supply to the city. Reduced rainfall driven by climate change will contribute to water shortages in the city. At the same time, the city's drainage infrastructure does not have the capacity to manage increased rainfall during extreme weather events like storms and hurricanes. Climate change is likely to lead to increased flooding in low-lying areas of the city.

### Unlocking the economic potential of Nampula's hinterland

Over 80% of the working population in Nampula province is employed in agriculture. The dominance of rain-fed, subsistence agriculture on small farms limits the potential for economic development in agriculture. However, the agricultural sector has the potential to drive economic development in Northern Mozambique and Nampula city as the business hub for the province.

The Ministry of Agriculture's Strategic Plan for Agricultural Development has identified key barriers to agricultural development in Mozambique. These are: low access to credit for farmers, low farm productivity levels, lack of market-oriented production and lack of infrastructure to encourage market access. In Northern Mozambique, the Strategic Plan identifies the poor road network

as a key barrier to markets for agricultural products. For these constraints, baseline levels are low, and minor improvements in banking, infrastructure and institutional mechanisms can have significant impacts on economic growth in the agricultural sector (Musoke and Jamac, 2013).

Nampula city is already a hub for agro-businesses in Northern Mozambique. One of the aims of developing the Nacala corridor is to enable access to markets in Southern Africa as well international markets in Asia and Europe through the Nacala Port. An improvement in the secondary road network in the provinces around the corridor could help unlock the economic potential of Nampula's hinterland.



Figure 40: Droughts result in crop failure in Nampula  
Credit: Farmersreviewafrica.com

# Nacala

▶ A modernised port in one of East Africa’s deepest natural ports will help Nacala lead Northern Mozambique’s economic growth



of households have access to piped water

Nacala City is situated on the northern coast of Mozambique and is the one of the deepest natural ports on the east coast of Africa. Also in Nampula province, it is the next largest city after Nampula with a population of 206,449 in 2007 (Cities Alliance, 2015c). Nacala was founded in the 1960s when the Portuguese drained a swamp, across the Nacala Bay from the older city of Nacala-a-Velha. It was developed as a deep water port and industrial, agricultural and exporting centre during the last period of Portuguese rule until the mid-1970s (UN-Habitat, 2010). As the terminal for the Nacala Railway and the Nacala Corridor, the city is a key transport and trade hub for the country and region. Mozambique Island, a UNESCO World Heritage site, lies 53km due south of the city, which, along with numerous pristine beaches along the Nacala coastline, is increasingly attracting tourism to the area.

In addition to its port and rail links, Nacala has an airbase that was recently certified for national and international flights. The city’s population is growing at an annual rate of between 3.7 and 4.5%. Nacala has a relatively strong formal sector, which accounts for 55% of employment. The port is a significant source of employment, and foreign investment in industries is accompanied by training and skill-building institutes. The city has seen a large increase in cargo passing through in recent years, from 1.05m tonnes in 2009 to 2.17m tonnes in 2014. GDP per capita has also increased from \$470 in 2008 to \$620 in 2013, and is predicted to reach \$890 by 2018. For the Special Economic Zone of Nacala (described below), economic and social improvements are expected to well exceed the national average and likely the province (Cities Alliance, 2015c).

However as with other cities on the Nacala corridor, the city faces a number of important challenges associated with poor urban service delivery and infrastructure. 80% of the city’s residents live in informal settlements, although a lower percentage (55%) lives below the poverty line compared with Tete or Nampula (an average 70%). In spite of investments in large water and energy infrastructure projects, coverage rates for these services in Nacala are still low. Only 3% of residents have access to piped water within their houses, and nearly half the population has no access to sanitation. While the solid waste collection is robust within the city centre, in peri-urban areas coverage plummets to 35%. The city is also vulnerable to epidemics due to an under-resourced and insufficient health care system.

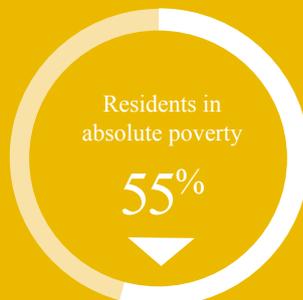


Figure 41: Nacala city  
Credit: Aziz Vasa - youtube

## Nacala in numbers



Projected annual population growth rate



Residents living in informal settlements



1.05 million tons 2.17 million tons



Cargo passing through Nacala



45%

Low proportion of informal employment

\$620 \$820



City per capita GDP



1.78

Municipal employees/1000 residents

Percentage of government employees with secondary/tertiary education (2015)

2%



\$24

Municipal expenditure per resident / year



Access piped water within their house



Solid waste collection within city limits



Solid waste collection in peri-urban areas



55%

Population with access to sanitation



5  
1985 - 1998



11  
1999 - 2012



Number of cyclones

...by the end of the century, this will increase to 75%

50%

of Nacala's land area will be inundated in a 1-in-100 year flood

Nacala is clearly strategically located for business and trade, and the recent establishment of the airport puts the region on the tourist map both domestically and internationally. Compared with more developed Mozambican ports like Maputo and Beira, Nacala has a higher natural capacity to accommodate the shipping of natural resource exports from Tete and Nampula provinces and provide access to sea trade for landlocked Zambia and Malawi. The recent discovery of natural gas deposits along the northern Mozambican coast near Nacala represents another economic opportunity based on natural resource processing and shipping for the city. However, the city's coastal location also means it faces an increasing number of environmental hazards.

The frequency of cyclones is increasing (five between 1985 and 1998 and 11 between 1999 and 2012), as well as the likelihood that 50% of the city's land area will be inundated by a one-in-100 year flood event.

Nacala port is undergoing modernisation and transportation linkages to Tete province are improving. In spite of the construction activity, the port has handled nearly double the cargo in only five years from 2009-2014. The national government has recognised the potential of Nacala port and is investing in transportation infrastructure such as upgrading the Nacala port, development of the Nacala Airport and expanding the capacity of the railway line between Tete and Nacala, passing through Malawi.

Large infrastructure projects such as the upgrade of the Nacala Dam, new electricity generation plants and improvements in distribution networks has occurred in the last 10 years.

In 2007 the government established a Special Economic Zone (SEZ) in Nacala. The SEZ represents the gateway of the Nacala Development Corridor to global markets and attracts considerable private sector investment, with opportunities for all types of industry and technology parks through both fiscal and tax incentives. Nacala's position at the end of the growth corridor, along with the SEZ, are evidently very important for its strategic growth. The improvement of transport connections to the mining industry in Tete will be mutually beneficial for the growth of both cities.



Figure 42: View of Nacala  
Credit: Aziz Vasa - youtube



Figure 43: Nacala International Airport  
Credit: odebrecht.com

## What is shaping the city?

► Special economic zones are addressing service delivery and infrastructure gaps in Nacala, albeit for a small proportion of the city’s residents

### The rise of special economic zones

Nationally, the Nacala port is a key driver for infrastructure and economic development. Capitalising on this opportunity, the central government has created an SEZ covering the districts of Nacala-Porto and Nacala-a-Velha to drive investment in infrastructure, manufacturing, and industry near the port. The national Special Economic Zones Office (GAZEDA) manages the SEZ. The role of this agency is to promote and manage investments in the Nacala SEZ. GAZEDA has a number of policy instruments at its disposal to encourage private investment in the SEZ, including special tax and customs agreements and dispute resolution mechanisms. GAZEDA can coordinate directly

with private investors and international development agencies in the planning and development of infrastructure for the SEZ, and has done this for port and railway infrastructure improvements. As a central government agency, GAZEDA also has direct access to the planning and development ministry and the public works department, with whom it can effectively implement projects on the ground (See Fig. 44).

Financing for SEZ investments in infrastructure comes from private investors as well as international development organisations. Upgrades to the Nacala dam and the city’s water supply system were completed with USAID funding, while upgrades to the electricity system to the city were completed

with funding from the Islamic Development Bank. The Brazilian-based mining company Vale and Japanese investment house Mitsui are carrying out upgrades to the railway line from Moatize near Tete to Nacala-a-Velha SEZ.

Upgrading the port and the formation of the SEZ has increased employment opportunities in the formal sector in Nacala. Between 2010 and 2013, over 5000 new jobs were created in construction, engineering, manufacturing and agro-industry (USAID, 2014). New industrial units are being set up, particularly on highway EN8 which connects the city to Nampula and forms part of the economic corridor enabling the linear growth of the city in a southward direction.

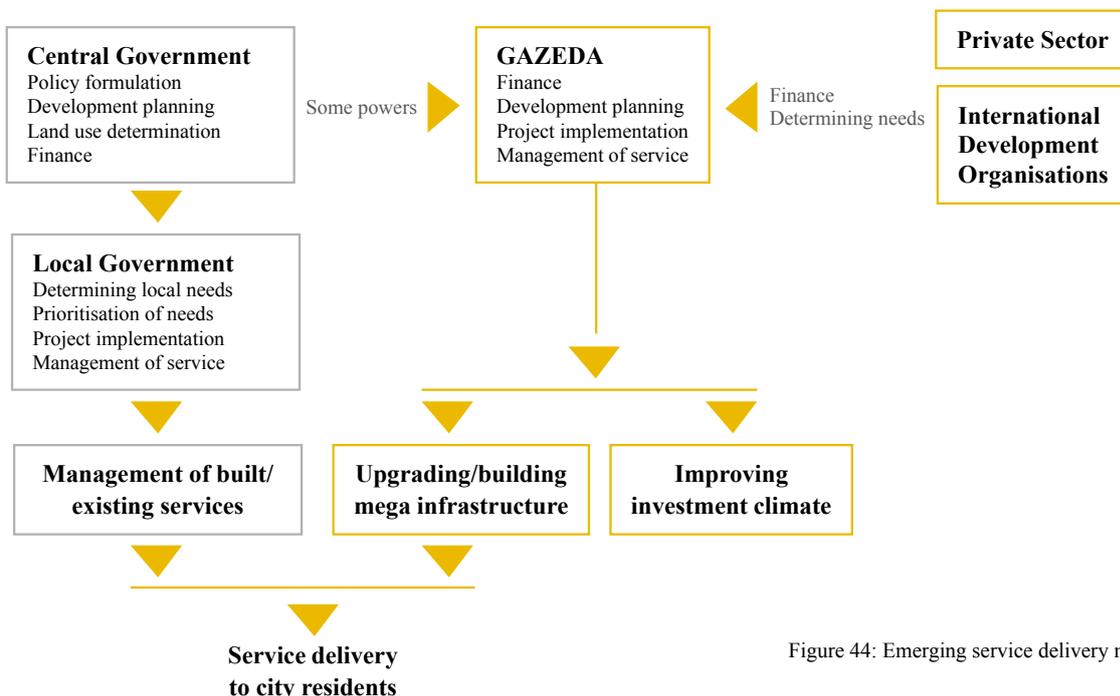


Figure 44: Emerging service delivery model in Nacala

## Strategic location and deep water port

Increased trade through the Nacala Port has brought prosperity to Nacala. Mozambique is going through an economic boom driven by large inflows of Foreign Direct Investment (FDI) linked to natural resource exploitation, international development assistance and agriculture (ADB, 2011). Nacala has one of the deepest natural ports on the eastern coast of Africa. The port was the gateway to landlocked Malawi for decades before the outbreak of civil conflict in Mozambique. During the 15 years of conflict, Malawi was forced

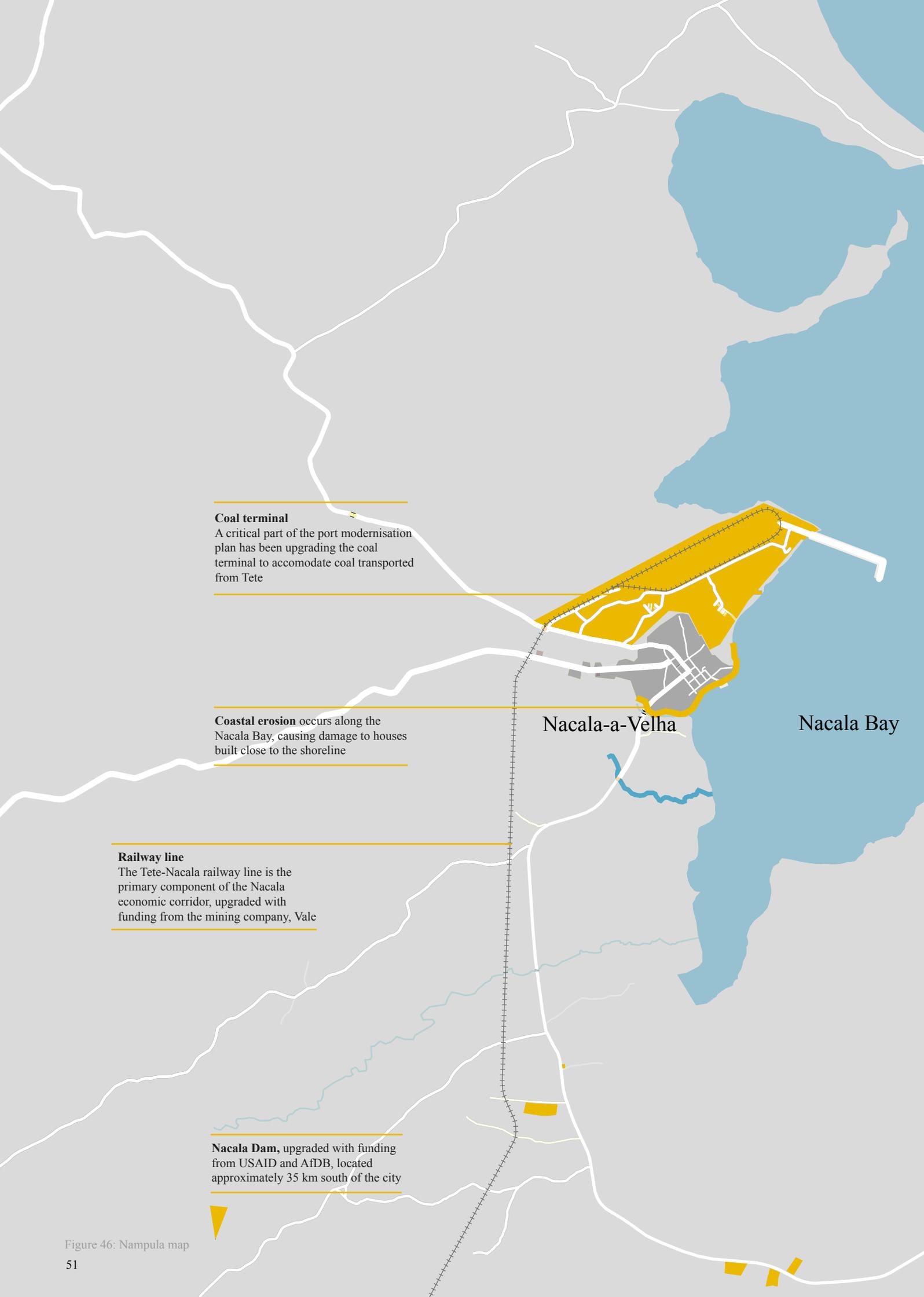
to export via Tanzania and South Africa. This added huge transport costs - in some cases up to a 56% surcharge (UN, 2014). Peace has provided an opportunity to revitalise the growth corridor linking Malawi to the rapidly expanding Nacala Port. The Port is also one of the principal gateways to the huge natural resources of Tete, one of the most mineral-rich provinces in the country.



Figure 45: Nacala Port  
Credit: Boston Samalia - marinetraffic.com

## Key Themes

 <p><i>Citizenship</i></p>	<p><b>High poverty</b> Over 50% of the population lives below the poverty line, and a large proportion lives in informal settlements.</p>	<p><b>Formal employment opportunities</b> Port modernisation has resulted in large opportunities for formal employment, evident through the relatively low informal sector presence in the city.</p>	<p><b>Skill development</b> Privately funded skills-building institutes are addressing the skilled labour shortages in the port and in emerging industries in the SEZ.</p>
 <p><i>Economy</i></p>	<p><b>Increased foreign investment</b> The SEZ has seen increased foreign investment in the manufacturing, construction and shipping sectors.</p>	<p><b>Tourism hub</b> Nacala's location on the coast and the presence of many tourist attractions like beaches, coral reefs and ruins along the northern coast make it an ideal location as a tourist hub.</p>	<p><b>Low local investment</b> The increased foreign investment in the SEZ has not been accompanied by an increase in local investment.</p>
 <p><i>Governance</i></p>	<p><b>SEZ formation</b> The districts of Nacala Porto and Nacala-Velha form the Nacala Special Economic Zone, run by GAZEDA, a central government agency. GAZEDA is able to better co-ordinate with the national government on a range of economic development and infrastructure upgradation projects.</p>	<p><b>Public-private partnership (PPP) law</b> A pending PPP law at the national level may be able to better direct the benefits of large infrastructure projects that the SEZ undertakes.</p>	<p><b>Lack of local coordination</b> Municipal government does not have the capacity or the institutional mandate for co-ordinating planning with the SEZ.</p>
 <p><i>Services</i></p>	<p><b>Poor service delivery</b> The city experiences poor service delivery, particularly in solid waste collection, industrial waste disposal, and water supply.</p>	<p><b>Investment in large infrastructure</b> As a result of private investment and international donor funding, large infrastructure investments like the Nacala dam upgrade and port modernisation have been completed, bolstering the city's capacity to provide services.</p>	<p><b>Poor public health system</b> The city is vulnerable to epidemics due to an under-resourced and insufficient health care system.</p>
 <p><i>Environment</i></p>	<p><b>Sea level rise</b> The shores of Nacala Bay are vulnerable to rising sea levels. 75% of the city's land area may be vulnerable to inundation due to climate change.</p>	<p><b>Water and soil pollution</b> The rise in a number of industries in the SEZ, along with low capacity for managing environmental hazards, is manifesting in increased pollution of soil and water bodies.</p>	<p><b>Coastal erosion</b> Coastal erosion has already caused damage to buildings along Nacala Bay and is projected to increase with sea level rise.</p>



**Coal terminal**  
A critical part of the port modernisation plan has been upgrading the coal terminal to accommodate coal transported from Tete

**Coastal erosion** occurs along the Nacala Bay, causing damage to houses built close to the shoreline

**Railway line**  
The Tete-Nacala railway line is the primary component of the Nacala economic corridor, upgraded with funding from the mining company, Vale

**Nacala Dam**, upgraded with funding from USAID and AfDB, located approximately 35 km south of the city

Figure 46: Nampula map

Coral reefs, ruins and beaches like the one at **Fernao Veloso** located along the northern Mozambique coastline make Nacala a potential tourist hub

**International Airport**

**Nacala Port**  
Ongoing modernisation of the port aims to fulfill Nacala's potential as a shipping hub for eastern Africa

**Informal housing**  
Just like other Mozambican cities, high levels of informal housing characterise Nacala

**Nacala**

**Emerging industries**  
Investment in industries has increased since the formation of the Nacala SEZ and initiation of port modernisation

To Nampula  
To Tete



## Summary of environmental risks

▶ Nacala’s location in a marshy area and susceptibility to cyclones and storms means flooding is the key hazard for the city.

Nacala was built in the 1960s on a drained swamp near Nacala Bay. A poorly maintained and inadequate drainage system that does not service the city’s population is compounding its natural exposure to flooding. The impact of rising sea levels is already felt in parts of the city with nearly 50% of the city’s area facing inundation. This figure is expected to rise to 75% due to sea level rise.

Poor housing conditions is a major factor increasing risk to Nacala’s residents against a range of environmental threats and hazards. Nearly 70% of the city’s residents live in poorly serviced informal housing. Housing materials are of poor quality and do not provide adequate protection against high temperatures, storms, and wildfire. Addressing informality and poor housing conditions will greatly reduce the risk from environmental threats.

### Three dimensions of environmental risk



#### *Climatic risk*

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



#### *Biological & natural resource risk*

The impact of scarcity or degradation of natural resources on urban populations and economies



#### *Geophysical risk*

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

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

<p> <b>Extreme temperature</b></p> <p>The city has a tropical climate with an average temperature of 25°C, predicted to increase by 2-2.5°C rise by 2040 due to climate change. Nearly 70% of Nacala’s residents live in informal housing with poor construction quality, exacerbating risk to residents.</p>	<p> <b>Storm</b></p> <p>Nacala is located on the Mozambique Channel, which sees a high number of storms and cyclones particularly during monsoons. The frequency of cyclones has risen in the last twenty years, and expected to increase further as a result of climate change.</p>	<p> <b>Wildfire</b></p> <p>Densely packed housing in informal settlements, with a majority having palm leaf or thatched roofs increases the possibility of the spread of wildfire.</p>	<p> <b>Drought</b></p> <p>A recent upgrade to the Nacala dam has augmented city water supply in the short-to-medium term.</p>	<p> <b>Flood</b></p> <p>High frequency of storms, location in a marshy area, and poor drainage systems increase Nacala’s risk against floods. The projected increase in storms and cyclones due to climate change is expected to worsen the future risk to floods.</p>
<p> <b>Air quality degradation</b></p> <p>Increased investment in industries and the presence of a large coal terminal with minimal enforcement of environmental policies are expected to worsen Nacala’s air quality.</p>	<p> <b>Contamination or depletion of fresh water</b></p> <p>While sewage is treated before releasing into water bodies, mixing of industrial and domestic sewage renders the process ineffective. Nacala relies on streams and rivers for drinking water supply, recently augmented by an upgrade to the Nacala dam.</p>	<p> <b>Crop disease, infestation or failure</b></p> <p>The city does not rely on agriculture as heavily as Nampula or Tete, but may be affected by crop failures projected by climate change models.</p>	<p> <b>Degradation or depletion of fisheries</b></p> <p>Fishing is a major economic activity on Nacala’s coastline. In the absence of sound environmental policy, there is a risk of fishing being affected by water pollution due to expanded shipping and industrial activity, and overfishing.</p>	<p> <b>Fuel scarcity</b></p> <p>72% of households rely on oil, kerosene and paraffin for energy. Increased investment in the hydropower sector can help reduce the reliance on fossil fuels, if accompanied by improvement in the city’s electricity distribution network.</p>
<p> <b>Soil contamination and erosion</b></p> <p>There is already erosion occurring along Nacala Bay, and this is expected to worsen due to sea level rise. Informal housing built near the coastline is particularly susceptible to erosion.</p>	<p> <b>Mineral depletion</b></p> <p>Oil and natural gas discoveries north of Nacala have spurred foreign investment in the sector. Nacala’s growth relies on coal extraction in Tete, where the size of coal reserves allays fears of mineral depletion.</p>	<p> <b>Raw materials degradation or scarcity</b></p> <p>There is little evidence for raw material degradation or scarcity around Nacala.</p>	<p> <b>Loss of biodiversity</b></p> <p>Water pollution off the Nacala coast may cause biodiversity losses, particularly as the city industrialises in a context of low environmental policy enforcement.</p>	<p> <b>Vector-borne disease</b></p> <p>Densely packed, poorly built and maintained housing combined with poor healthcare infrastructure makes vector borne disease a significant threat to Nacala’s residents.</p>
<p> <b>Water-borne disease</b></p> <p>Poor sanitation systems, ineffective sewage treatment, and poor housing conditions in Nacala increase the risk of water-borne diseases. During epidemics, healthcare infrastructure may not be able to manage the additional load.</p>	<p> <b>Air-borne disease</b></p> <p>Densely packed housing and poor health infrastructure are key contributors to significant risk of air-borne diseases.</p>			
<p> <b>Wave action</b></p> <p>Nacala’s land is highly susceptible to inundation, and expected to worsen due to sea level rise. High proportion of residents in informal settlements near the coastline exacerbate this risk.</p>			<p><b>Legend</b></p> <p>Current risk      Estimated future risk</p> <p> Low      </p> <p> Medium      </p> <p> High      </p>	

## Future challenges

▶ The growth of industries and port modernisation may overburden Nacala’s current sanitation and waste disposal systems, while sea level rise may severely impact its vulnerable coastal settlements

### Managing integrated planning

Currently, Nacala City does not have the political mandate to develop integrated plans in collaboration with the SEZ governing body, GAZEDA. While GAZEDA is able to coordinate and invite investment for key infrastructure and economic development projects in the SEZ, its unique mandate and direct access to the central government bypasses the need for collaboration with Nacala City and Nampula provincial government. Investment decisions in infrastructure development are prioritised based on key issues related to business interests – for example, rail and port infrastructure that prioritises mining and warehousing, or water supply and electricity projects that address specific issues faced by

manufacturing units in the SEZ area. The SEZ’s specific mandate – to promote investment and capacity to invest in large infrastructure projects – results in plans that run parallel to, but are not integrated into local government plans. The city government is currently not involved in decision-making regarding investments related to the SEZs and how these impact on the functioning of the city. At present, the municipal and provincial governments in Nacala do not have the capacity to co-ordinate effectively with GAZEDA, adding a further challenge to the need for close co-ordination. Efforts are needed in institutional reform and in capacity building at the local level to enable integrated planning and collaboration between Nacala City and the SEZs.

### Sea level rise

As a coastal city that was established through draining a tidal swamp, the impact of climate change is most discernible through sea level rise in the Indian Ocean. Among the Mozambican coastal cities, Beira is expected to be the most affected by sea level rise, but there are already visible signs of the impact of the rising levels in Nacala (Cities Alliance, 2015c). Sea level rise due to climate change is likely to pose a serious threat to the city and its important economic functions for the country. Coastal erosion is already increasing and has already caused displacement and damage to houses in the city. Half of the city’s land area is at high risk from inundation during storms and another quarter of the city’s area is likely to be at risk from sea level rise by the end of the 21st century.



### Achieving inclusive economic growth

Nacala has already benefited from its strategic location and SEZ, with increased foreign investment in manufacturing, construction and shipping sectors. In fact, Nacala SEZ has dominated investment and employment generation among SEZs and Industrial Free Zones (IFZs) in Mozambique. Annual investment in Nacala SEZ comprised more than 85% of all SEZ/IFZ investment for four of the six years between 2009 and 2014. In the same period, the SEZ generated over 25,000 jobs (USAID, 2014). However, the SEZ faces human resource and infrastructure constraints. Labour intensive industries in the SEZ are constraining the availability of skilled labour locally. A 2014 USAID report on SEZs and IFZs in Mozambique found that all firms interviewed by the team reported a shortage of skilled labour and low productivity levels. In the absence of consistent and far-reaching measures to improve skills and education levels, recent policy

changes, including higher minimum wage levels, have increased overall costs without an improvement in productivity (USAID, 2014). The report also concluded that frequent power outages and fluctuations have tripled the effective cost of energy for many firms, along with damage to sensitive equipment (USAID, 2014). It is likely that the national and international investment in large energy and water projects in and around the SEZ area are not accompanied by upgrades to the local distribution networks within the urban areas where these firms are located.

### Infrastructure deficits

Nacala is vulnerable to the risks caused by poor sanitation in informal settlements and public health infrastructure. Nacala's coastal location makes it susceptible to cyclones and storms, a number of which have damaged buildings in the city. Poor housing and health infrastructure compound the impact of these natural disasters, resulting in diarrhoea and cholera epidemics. The health challenges increase in the aftermath of storms, mainly due

to the lack of sanitation facilities, particularly in informal settlements.

Nacala's inadequate waste collection and disposal practices will impact the health and wellbeing of its citizens. While the urban core sees nearly 100% waste collection, coverage drops to around 35% in the peri-urban areas. A waste treatment plant is located approximately 10 km outside the city but does not follow good management or safety practices. Even after treatment, the residue causes soil pollution. Industrial and household waste is not necessarily separated, constituting an even greater risk of soil contamination. Waste water is similarly routed through a treatment plant, but the mixing of industrial and domestic waste renders the waste-water treatment ineffective. Mixing domestic and industrial waste may also cause environmental pollution in the future, particularly as Nacala experiences the anticipated scale of industrial growth related to the modernised port and increased investment in the SEZ.



Figure 49: Employment in Nacala  
Credit: USAID

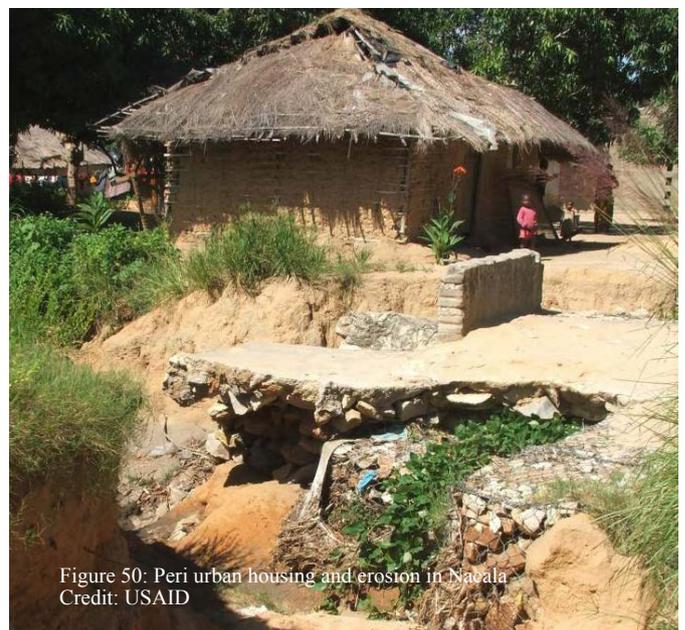


Figure 50: Peri urban housing and erosion in Nacala  
Credit: USAID

# Final Thoughts

► What are the key determinants for the future of the three cities?

## Emerging models of local governance

Like most African cities, urban governance in the three cities along the Nacala Corridor shares common issues: lack of financial capacity, lack of technical capacity, and fragmented governance. In this context, a growth corridor policy where the central government is the main driver of development opportunities seems an appropriate solution.

While challenges in local governance capacity may slow down improvements in local service delivery and economic growth in the growth corridor policy, innovative service delivery models have begun to meet the demand and fill the void in these cities. While these models

try to address one or more urban governance issues, they are not ideal solutions. In Tete, private investment is leading quality housing and service delivery provision without inclusiveness or the ability to address environmental hazards. In Nampula, collaborative partnerships create limited technical and financial capacity for service delivery but do not empower local governments or address fragmentation effectively. In Nacala, the creation of a SEZ enables a larger central role in improving infrastructure and service delivery that skips local government participation.

The ability of cities to address environmental risks in the future relies on effective local governance models. The cities of Tete, Nampula and Nacala represent interesting

attempts to overcome issues in a low-finance, low-capacity context like Mozambique. These models are moving towards empowering local governments in their own ways, such as the formation of a provincial coordination agency (UCODIN) at the provincial level as in Nampula, or the creation of community development funds to finance local projects as in Tete. All three models should continue to focus on a partnership approach with an overall objective to improve local governance capacity. As the process of decentralisation continues in Mozambique, new ideas for empowering local governments present the best opportunity to future proof these cities in the short to medium term.



Figure 51: Aerial view of Nampula  
Credit: photobucket.com

### Low coverage of urban services and infrastructure

The damage to major regional transportation and energy infrastructure during the long civil war has resulted in poor quality of urban services. The infrastructure deficiencies remain evident more than two decades after the end of the conflict. In spite of a wealth of natural resources, the lack of infrastructure blocks the growth of formal industries based on coal and iron ore.

Financial and institutional barriers to the development of major infrastructure are being addressed in a number of ways. The Nacala corridor is primarily a logistics corridor. Upgrades to transportation

infrastructure between Tete and Nacala are being carried out with funding from the private sector – the mining company Vale and investment house Mitsui – and implemented through a public-private-partnership. Upgrades to the Cahora Bassa and Nacala dams in the region have been carried out with funding from international development organisations.

To a large extent, upgrades to energy, water supply, and transport infrastructure have not been accompanied by an improvement in urban service provision within cities. Major factors are the lack of financial and technical capacity in provincial and city governments and the extent of the informality of housing in urban centres. The

lack of formal land title and tenure can be addressed through the 1997 Land Law that establishes the secure, long-term use rights for land known as the DUAT. This may open up opportunities to invest in service delivery improvements at the municipal level.



Figure S2: Nacala  
Credit: landolia.com

### Vulnerability to climate change

Mozambique is expected to be one of the worst-affected countries due to climate change. Sea level rise and coastal erosion will drastically affect its 2700 km long coastline, where two-thirds of its population and most of its infrastructure are located. In the hinterland, rising temperatures and changing rainfall patterns may increase the occurrence of droughts. Of particular concern is the projected 5-15% drop in annual rainfall. A large majority of the population in Tete and Nampula provinces rely on rain-fed subsistence agriculture, which may be severely impacted by the reduced rainfall. Reduced rainfall is also projected to lead to lower water levels in the Zambezi River,

affecting hydroelectric generation capacity – a major source of energy in northern Mozambique.

The major effects of climate change occur primarily in the countryside surrounding Tete and Nampula, which have high rural populations primarily engaged in agriculture. The loss of agricultural output may increase rural-urban migration into these cities. For Nacala, the impact of climate change may be more direct, with sea level rise projected to affect 75% of its area.

For cities with low urban service coverage and quality, increased migration may exacerbate the existing situation. Large infrastructure investments in northern Mozambique seem

particularly vulnerable to climate change. The Nacala port, which is a key driver of economic development in the city may be drastically affected by sea level rise, while the Cahora Bassa and Nacala dams may not be able to sufficiently meet rising energy demand, with lower water levels in the Zambezi River.

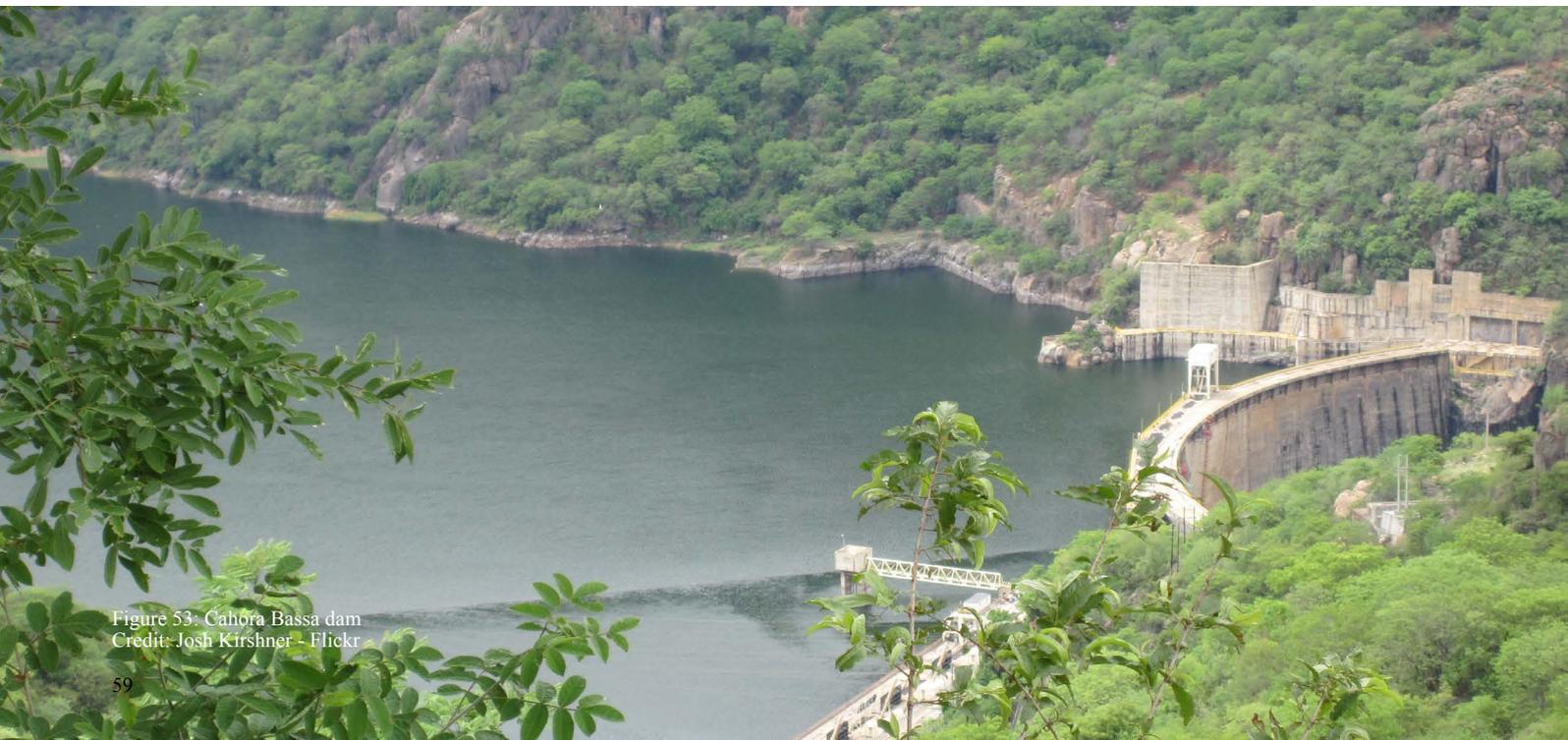


Figure 53: Cahora Bassa dam  
Credit: Josh Kirshner - Flickr

### Low carbon development

Mozambique has seen significant economic growth since the transition to democracy in 1994. A low economic base and a number of avenues for sustained economic growth presents an opportunity to mainstream low-carbon emission development as the basis for future growth. An Overseas Development Institute (ODI) supported study analysed economic and environmental factors in sub-Saharan Africa, and identified twenty long-term cross-sector transitions (or initiatives) that can promote a move to a low carbon development pathway in Sub-Saharan Africa (Hogarth et al, 2015). Based on our research we have found that some of these initiatives are more applicable to Mozambique than others. We have summarised the most relevant

initiative in Fig. 54. A full list of these initiatives is included in Appendix B.

For a majority rural country which is dependent on subsistence agriculture, the initiatives with the greatest impact involve agriculture. Increasing farm productivity can help address deforestation and stem rural-urban migration. Integrated rural land-use planning can also mediate between land for mining and agriculture. Effective, multi-use urban planning and the promotion of mass transportation will help address high levels of informality and prepare cities for continued population growth. Another set of ‘quick-wins’ involves the extraction and manufacturing industries, where low-carbon standards can set the foundation for long-term, sustainable low-carbon development.

For the most part, policy instruments to promote low-carbon development exist in Mozambique. The DUAT law provides national and local governments with a powerful tool for planning and land management in the urban and rural context. Through the Mining Act of 2014, the national government has displayed an intention to derive social benefits from coal mining, and can mandate low-emission policies in the extraction and construction sectors. National policy on setting up SEZs can also help incentivise the growth of low-emission manufacturing near ports.

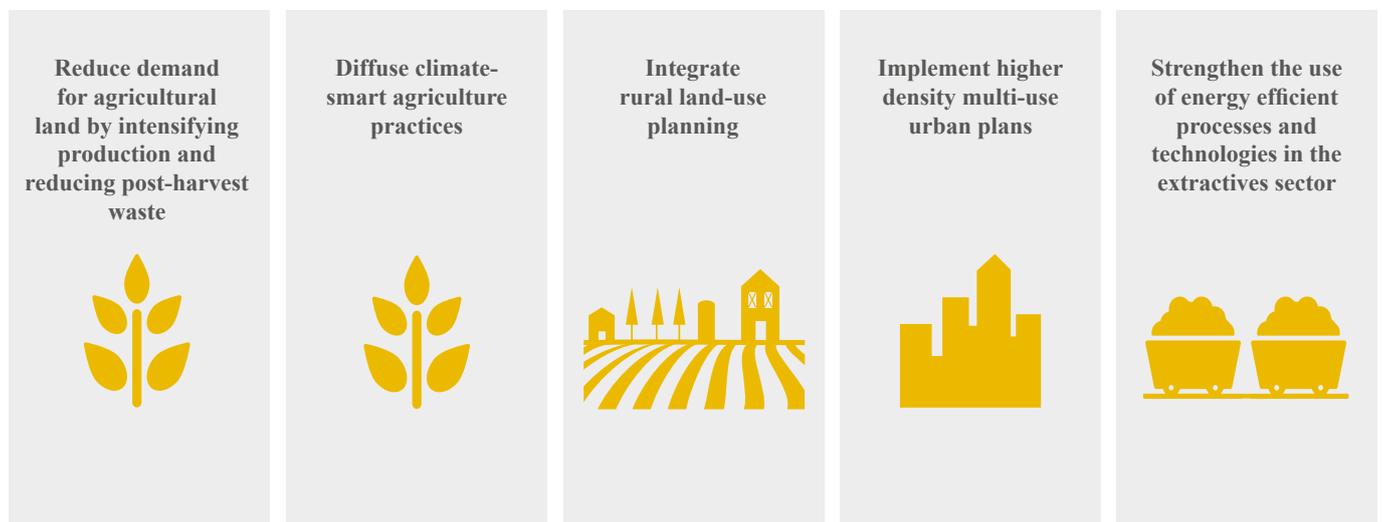


Figure 54: Key initiatives for low-carbon development along growth corridors in Mozambique



# 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.

For Mozambique overall, information on governance, economy, and services was moderately available although there was a lack of information in specific areas such as representation and accountability in local governance and emergency services. More broadly, information with respect to both citizenship and environmental services was generally lacking in Tete, Nampula, and Nacala.

	Tete	Nampula	Nacala	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	■	■	■	■

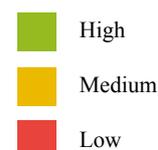
## Legend

- 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



Cross-sector transitions / initiatives	SSA	Moz.	Why is it relevant in Mozambique?	What is the opportunity in Mozambique?
<i>Agriculture</i>				
<b>Reduce demand for agricultural land by intensifying production and reducing post-harvest waste</b>	■	■	Majority of the population in northern Mozambique relies on subsistence agriculture. Low-productivity from agriculture has been identified as a key cause for soil erosion, land degradation and deforestation, and as a barrier to economic growth in rural areas, leading to high rates of rural-urban migration.	Northern Mozambique already has parastatals that provide support to rural households on training, technology and access to finance to enable the transition to commercial agriculture. The Nacala corridor will enable easier access to markets and ports through improved transport, reducing post-harvest waste.
<b>Reduce emissions from livestock</b>	■	■	No evidence of relevance	No evidence of opportunities
<b>Diffuse climate-smart agriculture practices</b>	■	■	Majority of the population in northern Mozambique relies on subsistence agriculture. Low-productivity from agriculture has been identified as a key cause for soil erosion, land degradation and deforestation, and as a barrier to economic growth in rural areas, leading to high rates of rural-urban migration.	Northern Mozambique already has parastatals that provide support to rural households on training, technology and access to finance to enable the transition to commercial agriculture. The Nacala corridor will enable easier access to markets and ports through improved transport, reducing post-harvest waste.
<i>Forestry</i>				
<b>Integrate rural land-use planning</b>	■	■	Land-use planning is centralised at the national level due to the DUAT law. In rural areas particularly in Tete province, the lack of integrated land-use planning has resulted in contestation for fertile land between mining interests and agriculture. A key source of population growth in cities is rural-urban migration	Better land-use and land management practices can help reduce rural-urban migration, reduce pressure on already stretched urban services. Some planning powers have been decentralised to the provincial government, which can enable better coordination of rural and urban planning. The DUAT law can be an important policy tool to enable better rural land-use planning.
<b>Capture the value of forests' ecosystems services</b>	■	■	Deforestation is a significant environmental risk driver, particularly around the city of Nampula. Key factors for deforestation include increasing agricultural coverage and use of firewood for fuel.	Development finance instruments such as REDD+ incentivise forest conservation. Ecotourism is one of the fastest growing sub-sectors under tourism.
<i>Energy</i>				
<b>Formalise the charcoal industry, and promote efficient charcoal kilns and biomass cook-stoves, and fuel switching</b>	■	■	A majority of the urban households in the three cities reviewed for this report relies on candles, kerosene and wax for energy. Rural areas primarily use firewood, a key cause for deforestation.	Switching to more efficient and reliable sources of energy will reduce environmental damage in urban and rural areas. Mozambique has seen a lot of investment in energy production, particularly around upgrading hydropower plants. Improvements in energy distribution systems can enable a shift away from firewood and carbon-heavy sources of fuel.
<b>Generate on-grid electricity from renewable sources and prevent lock-in of coal power</b>	■	■	Economic growth has been accompanied with increasing demand for energy, particularly as new industrial plants emerge around Nampula and Nacala.	Coal mining is a key driver of economic growth in Mozambique, and expected to drive growth in the near future. While large coal reserves may render renewable sources unfeasible, worldwide coal demand is dropping and the country will need to plan a shift to renewables in middle-to-long-term.
<b>Promote electricity access from off-grid and mini-grid systems in rural areas</b>	■	■	Economic growth has been accompanied with increasing demand for energy, particularly as new industrial plants emerge around Nampula and Nacala.	Coal mining is a key driver of economic growth in Mozambique, and expected to drive growth in the near future. While large coal reserves may render renewable sources unfeasible, worldwide coal demand is dropping and the country will need to plan a shift to renewables in middle-to-long-term.

<i>Transport</i>				
<b>Remove fossil fuel subsidies for consumption</b>			Large coal reserves and the discovery of coastal deposits of natural gas and crude oil in the north suggest that the country might rely heavily on fossil fuels for energy	Mozambique does not have income-targeted fuel subsidies. A World Bank study identified that fuel use is higher among richer households, who consequently derive more benefit from fuel subsidies - 30% of fuel subsidies benefit the highest quintile by income, whereas 14% of fuel subsidies benefit the lowest quintile. Income-targeted subsidies might be suitable considering the lack of reliable energy options for low income households in the short term and phased out in the long term.
<b>Shift to a low-carbon automobile fleet and fuels</b>			Mozambique has a low car ownership rate with only about 4% of all households in Mozambique owning cars	While the automobile industry is seeing growth in Mozambique, most production is export-oriented and may be meeting international standards for carbon emissions
<b>Implement higher density multi-use urban plans</b>			A majority of urban households live in dense and poorly serviced informal settlements on the outskirts of cities. National policy sees urban centres as drivers of economic growth, and high urban population growth is expected over the next few decades.	Effective planning and implementation will help Mozambique widely deliver the benefits of economic growth to communities in informal settlements, provide improved living conditions for future urban migrants, and lay the foundation for a low-carbon emissions in cities.
<b>Promote mass transportation systems</b>			A majority of urban households live in dense and poorly serviced informal settlements on the outskirts of cities. National policy sees urban centres as drivers of economic growth, and high urban population growth is expected over the next few decades.	An increase in per capita incomes will be accompanied by an increasing demand for cars, and planning mass transportation systems now will enable cities to manage transportation demand effectively.
<i>Extractives</i>				
<b>Strengthen the use of energy efficient processes and technologies in the extractives sector</b>			Mining is expected to be a significant contributor to Mozambique's economy in the near future.	A large proportion of coal mines in Tete are open-pit mines which have lower extraction costs than shaft mines. In spite of high transport costs, it may be financially feasible to incorporate energy efficient processes
<b>Switch to lower carbon fuel sources and renewable energy in the extractives sector</b>			Mining is expected to be a significant contributor to Mozambique's economy in the near future.	Hydroelectricity is already a major energy source in Mozambique
<b>Remove and avoid subsidies for fossil fuel production</b>			Mining is expected to be a significant contributor to Mozambique's economy in the near future.	Mining and oil extraction are not subsidised in the country. On the other hand, mining fees and revenue sharing arrangements with extractive industries are a key source of government revenue.
<i>Construction</i>				
<b>Reduce emissions from construction materials and methods</b>			High economic growth has been accompanied by a construction boom	Construction is driven by industrial demand, whether the construction of housing for mining employees in Tete and Moatize, or the upgradation of Nacala port. It may be easier to incentivise and implement low-emission methods in construction, and influencing a few large construction projects can derive a disproportionately large benefit.
<b>Reduce emissions from buildings operations</b>			With increasing incomes across Mozambique, energy consumption in buildings is projected to be higher.	National level criteria on low-emission operations that guide local building codes can be implemented in Mozambique's policy landscape. Many low-emission operational initiatives such as solar heating for hot water also help reduce operational costs for buildings.
<i>Manufacturing</i>				
<b>Increase use of energy efficient processes and technologies and clean energy in heavy manufacturing</b>			Industrialisation is picking up along growth corridors, particularly ports like Nacala, Beira and Maputo	Heavy manufacturing is driven by a few multinational organisations whether in mineral processing, crude oil refining or metal processing. The impact of implementing energy efficient processes can be high considering implementation does not involve many actors in this sector.
<b>Drive growth in light manufacturing</b>			Industrialisation is picking up along growth corridors, particularly ports like Nacala, Beira and Maputo	Light manufacturing, while being a low-emission option, can be a significant contributor to inclusive growth for the primarily agriculture-reliant economy
<b>Develop low-carbon products</b>			Industrialisation is picking up along growth corridors, particularly ports like Nacala, Beira and Maputo	National policy already focuses on driving industrial growth through the provision of fiscal regulations in SEZs and IFZs. These fiscal incentives for production can be directed to industries that produce low-carbon products.

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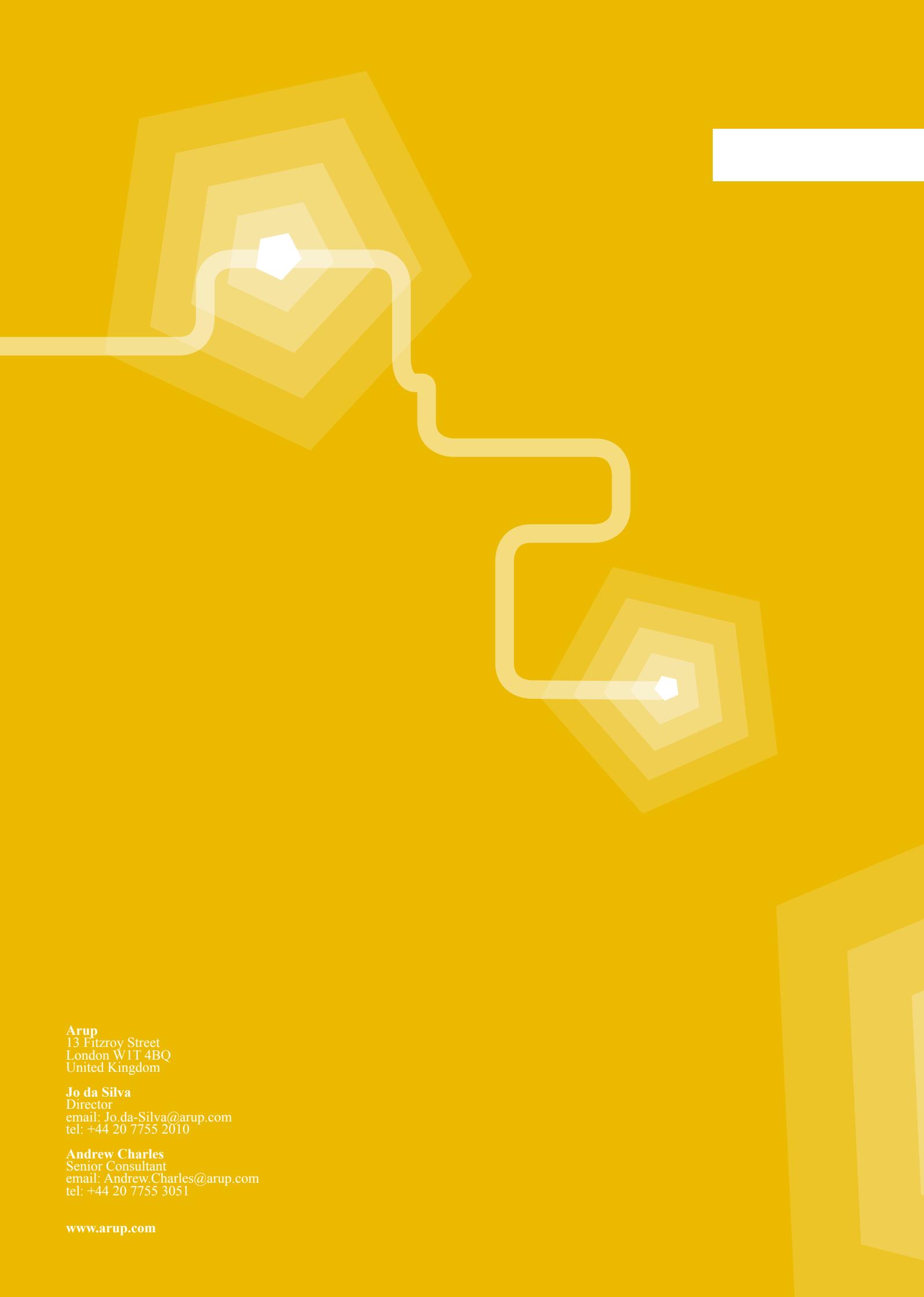
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## Icons

Cristina Torres, Clockwise, Mister pixel from The Noun Project

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