THE WORLD BANK | GFDRR Global Facility for Disaster Reduction and Recovery | City Resilience Program

Risk Informed Urban Planning for Livable and Resilient Cities

Ross Eisenberg
Disaster Risk Management Specialist, City Resilience Program, World Bank

World Bank Land Conference, 2024

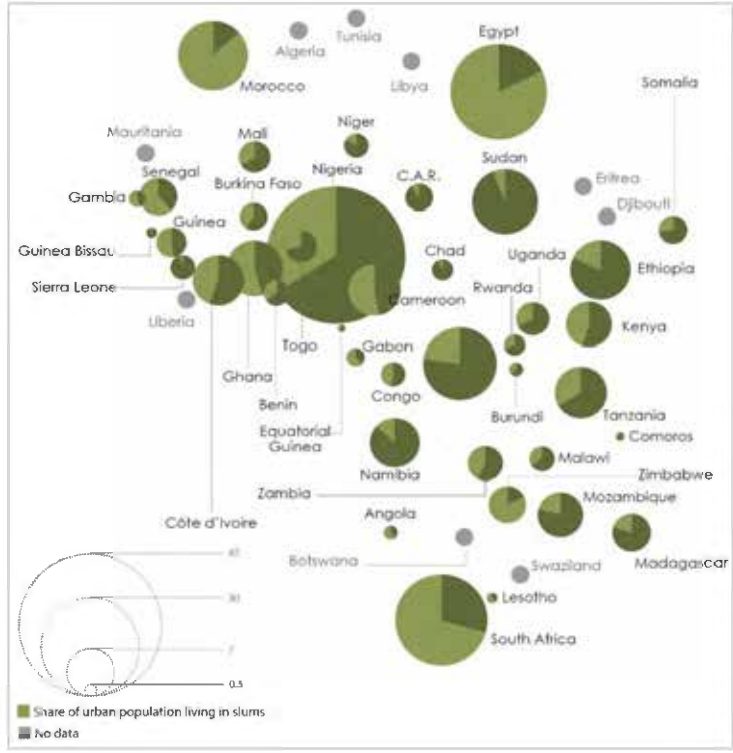
THE WORLD BANK | GFDRR Global Facility for Disaster Reduction and Recovery | City Resilience Program

The challenge

Rapid and haphazard urbanization

70% of the world's population will **live in cities by 2050**, up from 56% currently

3.1 billion **people are projected to live in slums** by 2050, up from 1.1 billion in 2020



Source: UNDESA, The World Urbanization Prospects, the 2009 Revision, 2010. Africa Progress Panel

THE WORLD BANK GFDRR City Resilience Program

The challenge

Climate crisis and increased disaster risk

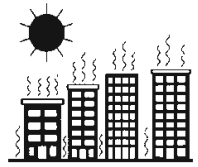
70%

of **greenhouse gas emissions** and **energy consumption** occurs in cities

$314

billion

annual cost to cities due to **weather-related and other disasters**, and could rise to $415 billion by 2030



↓11%

GDP loss for the worst-affected cities by 2100 due to the **urban heat island** effect and global warming

77

million

urban residents may be pushed into **poverty** due to the impacts of disasters and climate change

The challenge

Risky growth is outpacing safe growth

122 %

increase in **settlement extent** exposed to the **highest flood hazard** from 1985 to 2015

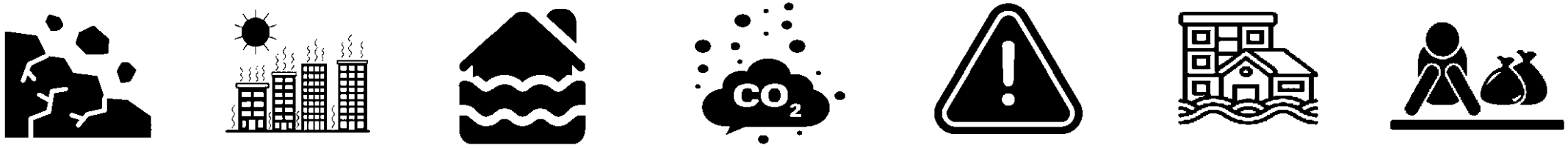
10x

sensitivity to variations in precipitation observed in **urban landslide hazards** compared to rural areas

Aerial images of urban growth in Catumbela, Angola 2004-2023.
Source: Based on Google Earth images.

Why Risk-Informed Urban Planning?

A **combination of factors** such as accelerated urban growth, intensification of land and natural resources consumption, environmental degradation, uneven access to livelihoods and basic services, inadequate infrastructure, and poor urban planning **heightens the susceptibility of cities to disaster risks and climate-related shocks and stresses**.



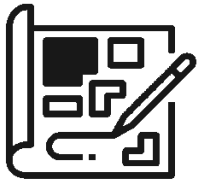
THE WORLD BANK GFDRR Global Facility for Disaster Reduction and Recovery City Resilience Program

Strong recognition of the importance of mainstreaming disaster risk management into urban planning, **there is still a gap** in practical implementation.

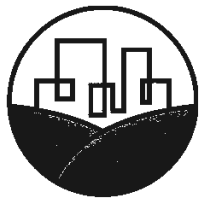
A Paradigm Shift

Moving beyond viewing cities solely as sites where disasters occur, to **recognizing the role of urbanization in creating and reducing risks**.

By recognizing that **hazards in urban settings are multifaceted** and not solely natural



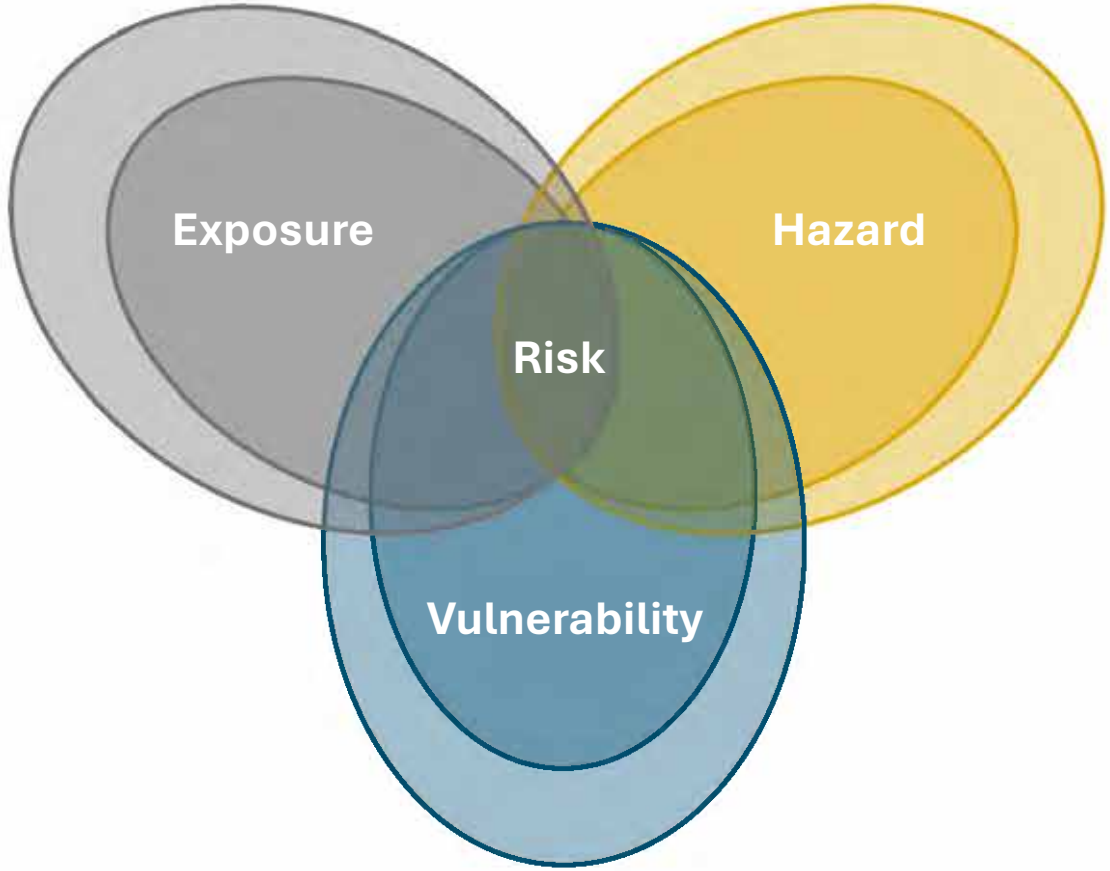
By reframing urban planning **to embed hazards and risk information comprehensively**



By promoting a **holistic approach to foster livable and resilient cities**

Urbanization as a driver of risk

Urbanization as a driver of increased exposure



Urbanization as a driver of increased hazards

Urbanization as a driver of increased vulnerability

Urbanization as a driver of capacity

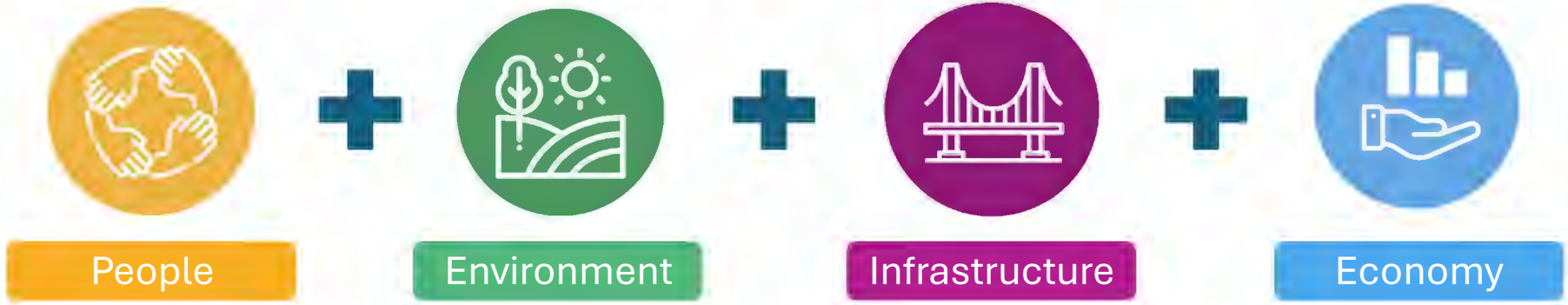
Urbanization can also contribute to building capacity to address and cope with natural hazards and risks

- Access to **infrastructure, services,** and improved **communication** systems
- Diverse **economy**, greater access to **resources and insurance**
- Concentration of expertise and resources, **stronger governance** structures and institutions
- **Social networks** and **community organizations**
- Enhanced **emergency services**

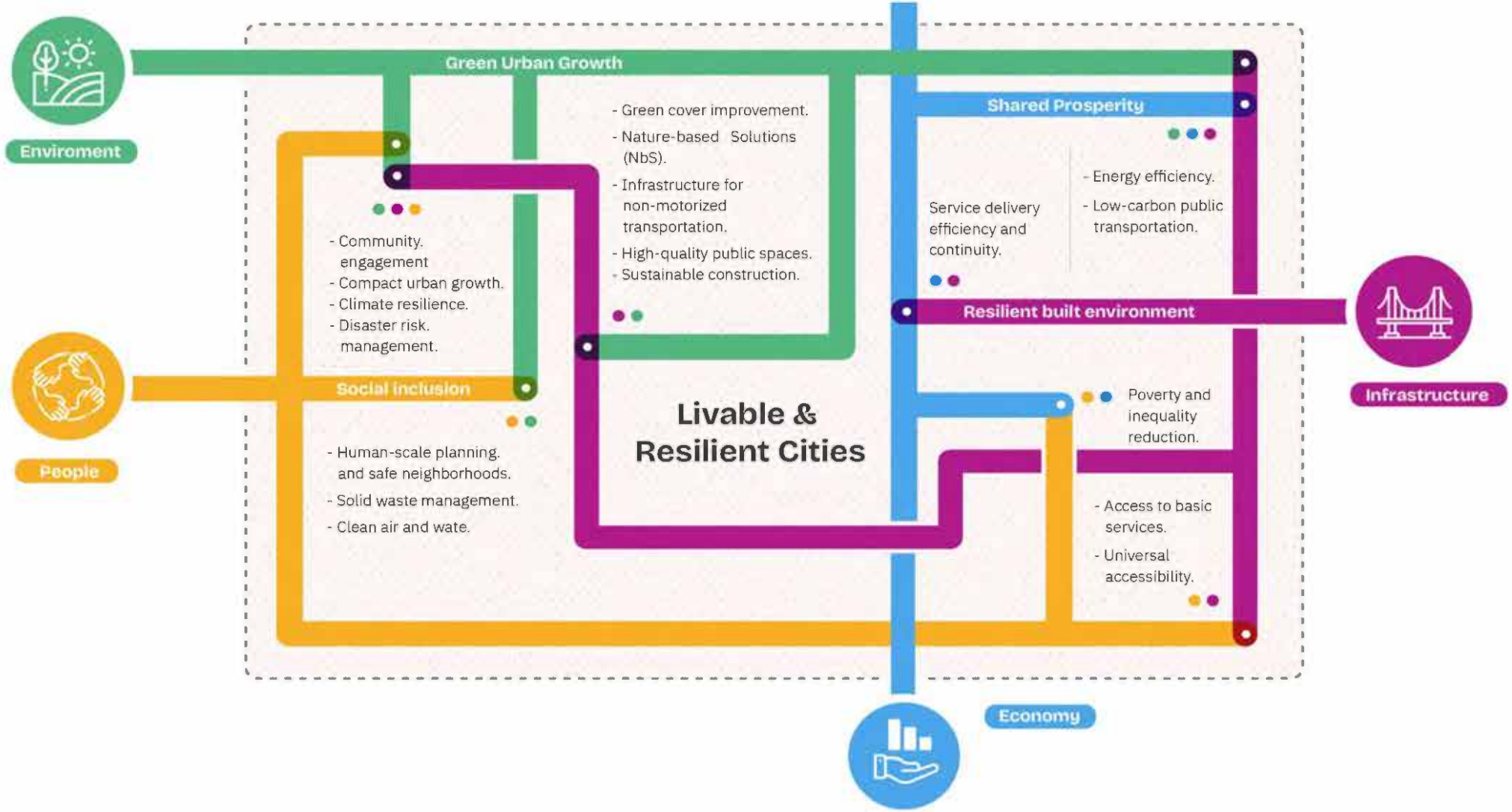
Livable and Resilient Cities

Urban areas and their surroundings, where **social inclusion**, **green urban growth**, **resilient built environments**, and **shared prosperity** are promoted, with a focus on reducing the effects and impacts of natural hazards and climate shocks.

Risk-Informed Urban Planning Goals:

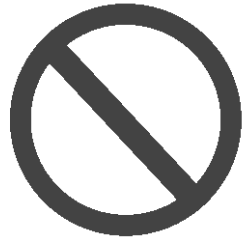


Overlapping Goals



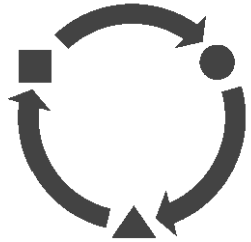
Measures:

Risk information should be the foundation for establishing **urban growth limitations, conditions** and **criteria** in zoning, land-use, urban design, and building provisions.



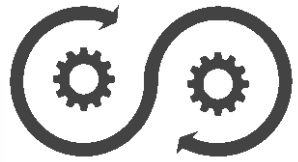
RESTRICT / AVOID:

Hazard, risk, and environmental conditions do not allow for land occupation and urban expansion.



CONDITION / ADAPT:

Hazard, risk and environmental conditions allow for urban development and expansion under certain conditions.



PROMOTE:

Strategic actions for preventing or reducing risks to natural and anthropogenic hazards.

Measures:

RESTRICT / AVOID

- Occupation of key ecosystems
- Critical infrastructure in high-hazard and high-risk areas
- Formal and informal growth in hazard-prone areas
- Polluting construction methods and materials

CONDITION / ADAPT

- Urban development to ecosystems' restoration to reduce exposure to risk
- Growth under conditions that maintain acceptable risk levels
- Infrastructure and housing development in compliance with high resilience standards

PROMOTE

- Eco-friendly construction and low-carbon transport
- Energy efficiency standards
- Compact growth and mixed land-uses
- Green cover improvement and high-quality public space

Risk-Informed Planning Operational Process

Risk-Informed Planning Operational Process

Identify key entry points, preliminary stakeholder engagement, initial data review and main objectives and outputs.

Understand and assess urban governance, multi-hazard risks, climate change impacts, urbanization trends, socio-economic and environmental challenges.

Define the urban development vision, evaluate impacts of scenarios and risk management strategies including growth, social, environmental, infrastructural and economic policies.

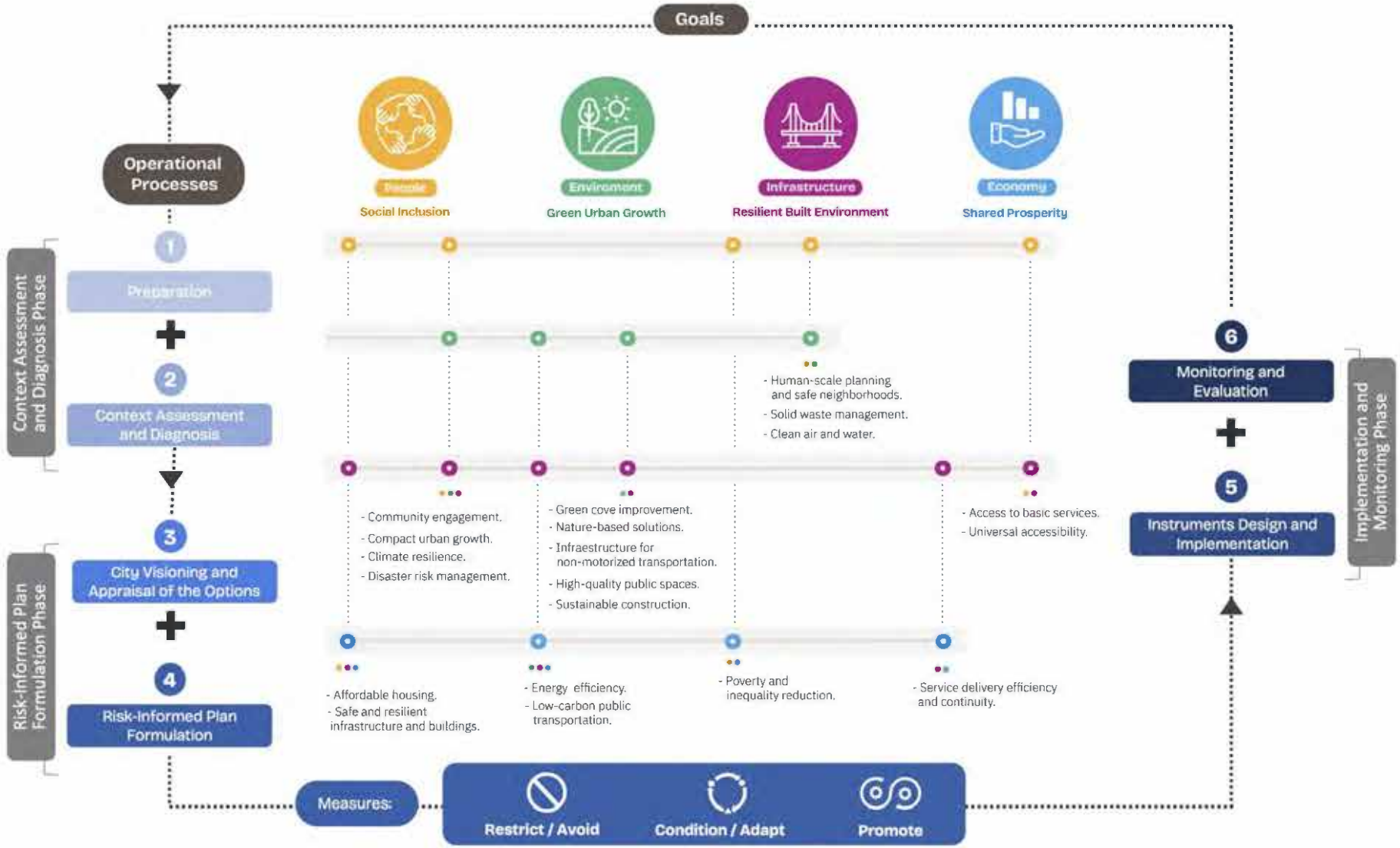
Set goals and targets, identify relevant restrictions, conditions, incentives, and standards to enhance livability and resilience.

Develop tools to implement urban plans, such as zoning regulations, land tenure and resettlement policies, financial incentives, land acquisition, building codes, eco-friendly development standards and incentives.

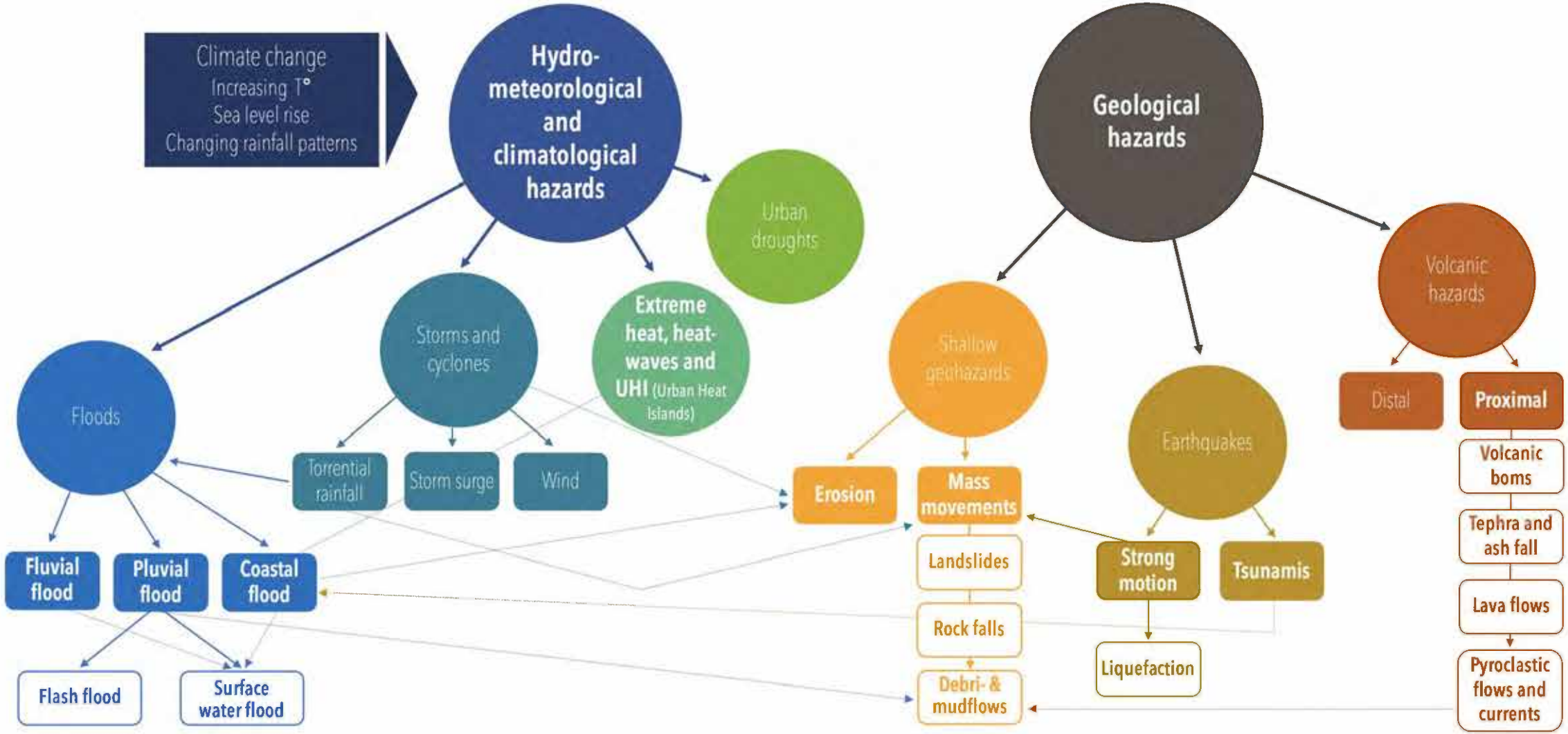
Monitor, evaluate, and review the effectiveness of strategies to meet city objectives and use the findings to refine the urban plan and its approaches.

THE WORLD BANK | GFDRR Global Facility for Disaster Reduction and Recovery | City Resilience Program

Risk Informed Urban Planning Framework



Urban Hazards and Risks



Example: flash flood risk

Characteristics:

- High-velocity and powerful currents
- High destructive potential
- Often carrying debris and mud, uprooting trees and devastating structures
- Potential to initiate and propagate mud or debris flows.
- Can lead to loss of life, damage to property, and infrastructure failures
- Rapid onset offers little or no warning

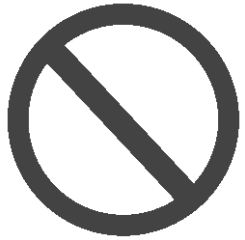
Triggers:

- Intense rainfall over steep terrain
- Intensified by heightened runoff resulting from extensive impermeable surfaces
- Sudden release of water from a dam or levees
- Unintentional water retention or damming (e.g, by inadequate hydraulic infrastructure and solid waste)

Photo: lash flooding of the Jukskei River in Johannesburg, 2016. Gulshan Khan/AFP

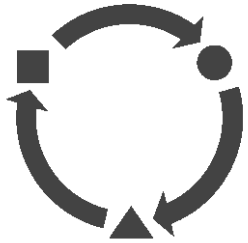
Photo: Flash flood damages in Lilongwe, Malawi, January 2019. Department of Disaster Management Affairs, Malawi.

Example: flash flood risk



Restrict

- Urban growth in areas prone to flash flood impacts
- Human settlements in areas at high risk of impact



Condition

- Stormwater management, minimizing impervious surfaces, discharge control measures
- Appropriate design of hydraulic infrastructure to avoid damming and dam break
- Urban development upon completion of risk reduction measures, such as:
  - Flow control infrastructure (retention ponds, gabion walls, weirs)
  - Flow deflectors to redirect the flow of water and reduce velocity
  - Channel modifications: Altering the shape or alignment of river channels to reduce flow velocity by increasing friction and dissipating energy

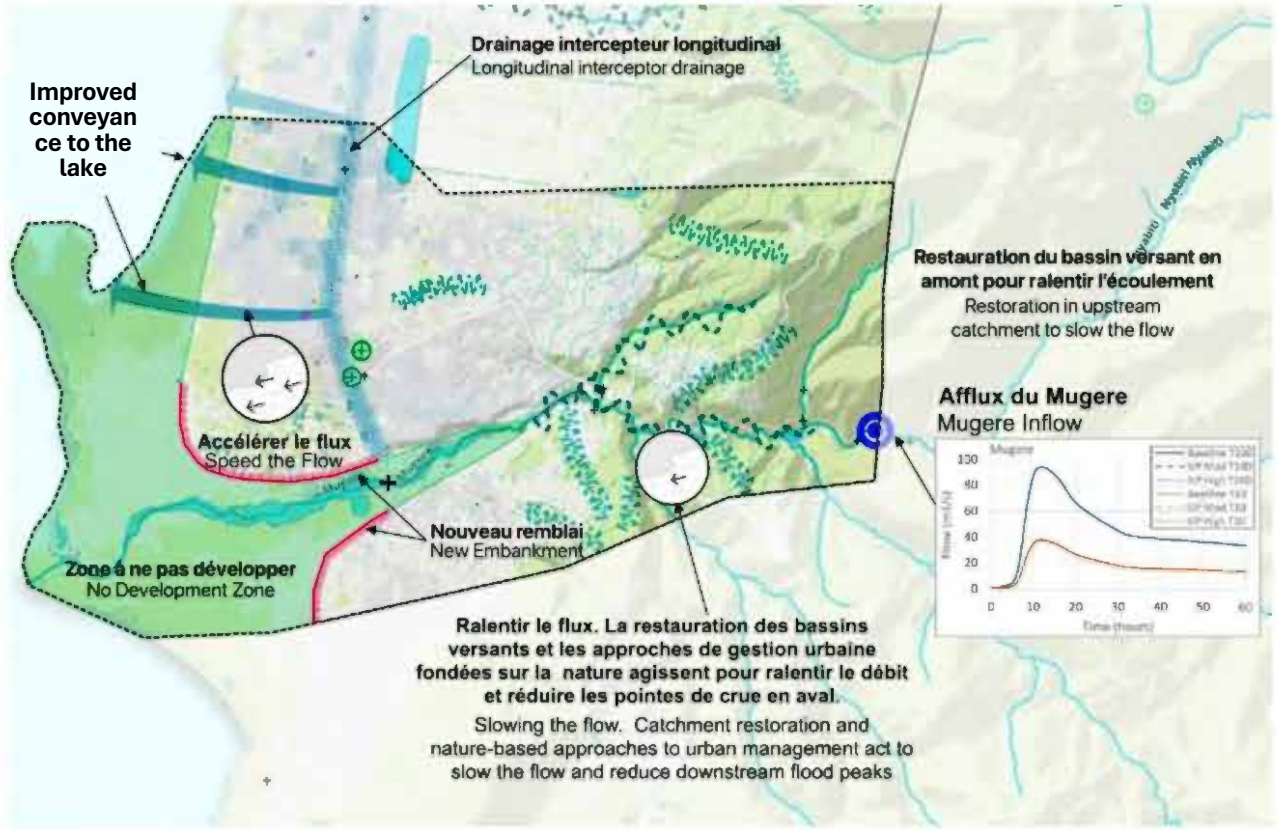
Promote

- Natural buffers (wetlands, forests, and floodplains) protection
- Non-invasive environmental conservation and ecosystem restoration risk reduction interventions

Example: flood risk

Bujumbura, Burundi

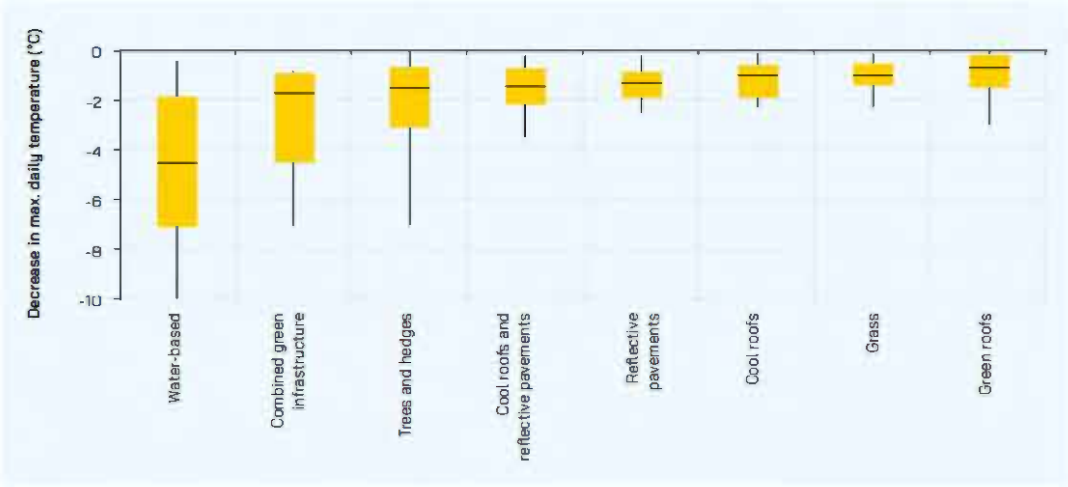
Photo Tchandrou Nitanga, Agence France-Presse, April 22nd, 2024



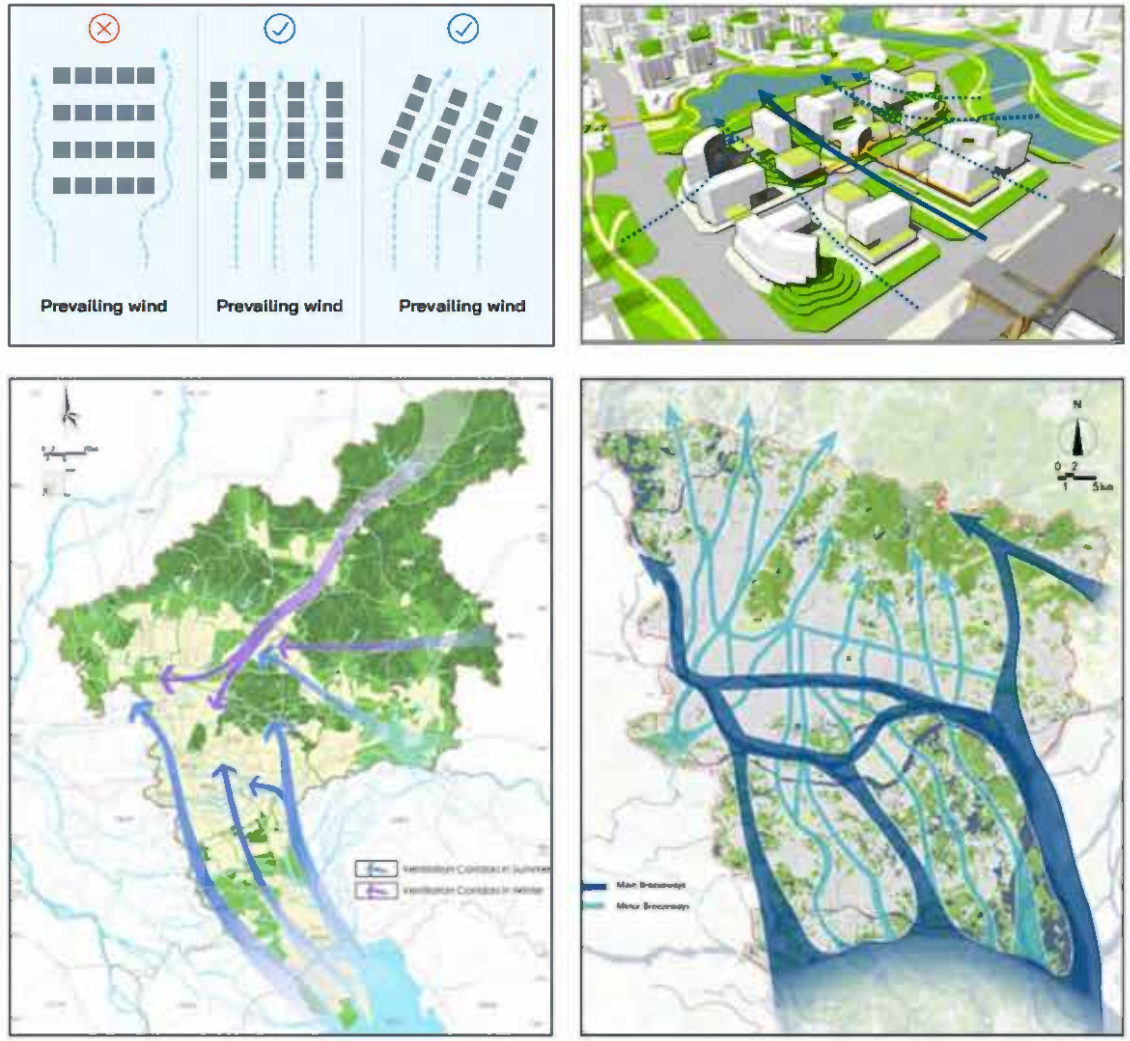
Source: Burundi Flood Mitigation Strategic Investment. Mugere locality in Bujumbura. Strategy Outline (JBA/WBG, 2023)

Extreme heat and UHI

- Restrict occupation of critical green spaces
- Condition growth and expansion to guarantee appropriate ventilation, shade, and cooling
- Promote urban greening at the building, site, and landscape level



Source: World Bank, 2023 – UNLIVABLE What the Urban Heat Island Effect Means for East Asia's Cities. Image source: Santamouris et al. 2017.



Source: World Bank, 2022 - Overview Piloting Nature-based Solutions for Urban Cooling in Guangzhou, China. Image from Guangzhou Urban Planning & Design Survey Research Institute (bottom) and China-Singapore Guangzhou Knowledge City Development and Construction Office (top right). World Bank, 2023 (top left).

THE WORLD BANK GFDRR Global Facility for Disaster Reduction and Recovery City Resilience Program

Guidance Note

RISK-INFORMED URBAN PLANNING FOR LIVABLE AND RESILIENT CITIES

Addressed to practitioners, decision-makers from national and local governments, researchers and non-governmental organizations.

WORLD BANK LAND CONFERENCE 2024

WORLD BANK GROUP

Angola's unfinished land reform

Presented by

Allan Cain

Development Workshop Angola

Washington – 14 May 2024

DW DEVELOPMENT WORKSHOP

Angola’s unfinished land reform

- Angola is currently undertaking major governance reforms
- Local power and decision-making will devolve to municipalities and lead to the election of the country's first local councils.
- Angola's first municipal elections that were to be held in 2022 but they have been delayed given the excuse of the Covid-19 Pandemic and the Government has not yet rescheduled them.
- A key to municipalization will entail decentralizing the management of land and the capture of land values to finance local development, while strengthening family land tenure and protecting the rights of women

DEVELOPMENT WORKSHOP

State ownership vs informal land markets

- Angola's post-socialist inheritance has left the State as the formal owner of all land.
- The State however has not developed the capacity to register and manage all the land that is held under its public (reserved) and private (transferable) domains.
- Weak control of land means that banks are reluctant use land guarantees to secure loans. Even contested titled land can take years to settle in the courts. There are less than 6000 mortgages currently registered.
- In practice however there is an active informal land market, large scale-land grabs by urban elites, and increasing conflicts affecting communities, small holders and families, particularly those headed by women.

DEVELOPMENT WORKSHOP

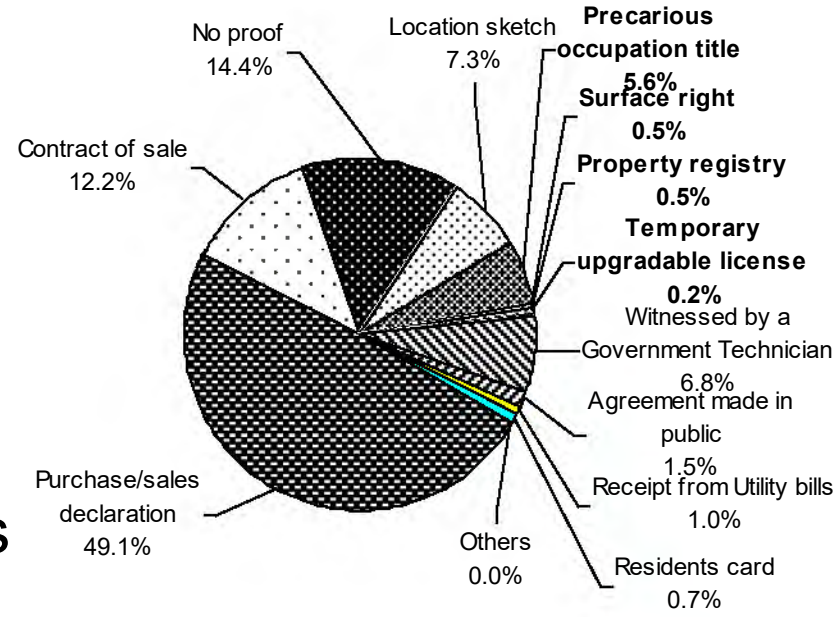
Post-Conflict rural land issues

- Angola's four decades of armed conflict were characterized by land expropriation, forced removals and the massive rural to urban displacement.
- However post-war land legislation did not provide restitution for their lands that had been expropriated during the colonial settlers' landgrab.
- Post-war legislation made no provision for existing or previous possession of occupants' rights (usucapiao) acquired through continued use over time.
- Rather, the government distributed farms to a urban-based absentee owners.
- The traditional inheritance system is a barrier to women to access land, as customary law gives precedence to the man as the main heir to the property.
- At the end of the war, almost 3 million people returned and resettled, producing innumerable local conflicts over land allocation and reclamation.

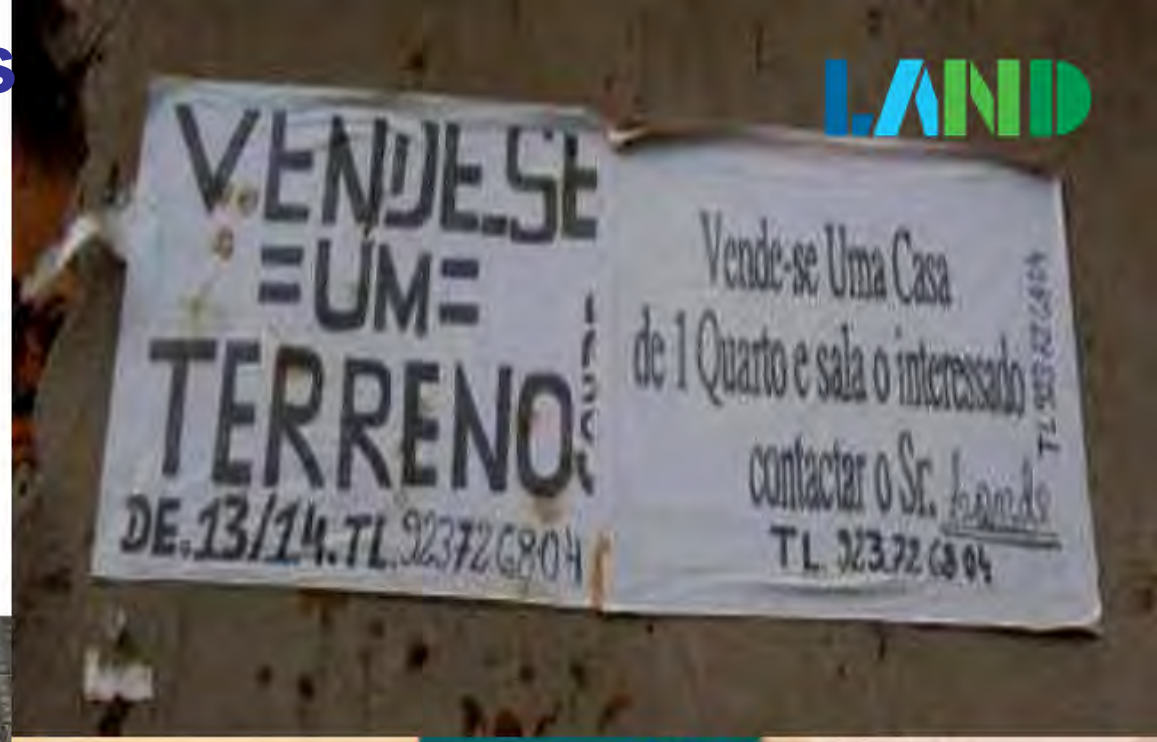
DEVELOPMENT WORKSHOP

Growing urban informal land markets

- Years of armed conflict and forced migrations have led to the massive urbanization of 68% of the country.
- Most migrants and slum residents bought land on the informal market and can demonstrate purchase contracts or other documents.
- They consider themselves as legitimate owners, but even in Luanda, less than 7% have legal titles.
- Due to rapidly raising property values in the inner-city, the poor have relocated into areas of high environmental risk such as coastal zones, river basins susceptible to flooding and erosion.
- Displacement may be due to forcible removal or voluntarily relocation out of economic necessity.

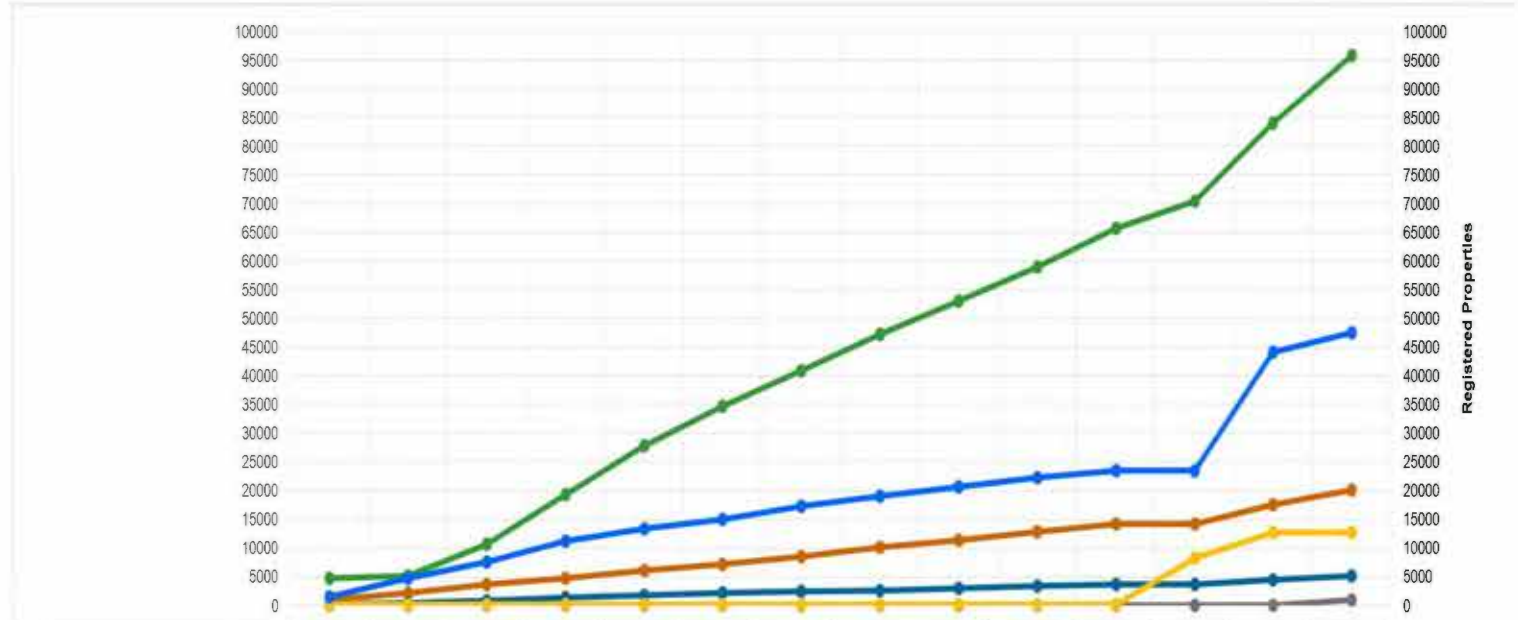


Informal land markets



Weak State management of land

- The Land Registry Massification program was launched in March 2021. The objective is to register, in a first phase, 800 thousand properties by 2022, and 2.9 million properties by 2025.
- However, between 2010 and 2023, DNIRN only issued a total of 182,173 property certificates of different types.
- Modest results for a population of over 36 million, and 4% of 4.5 million urban households.

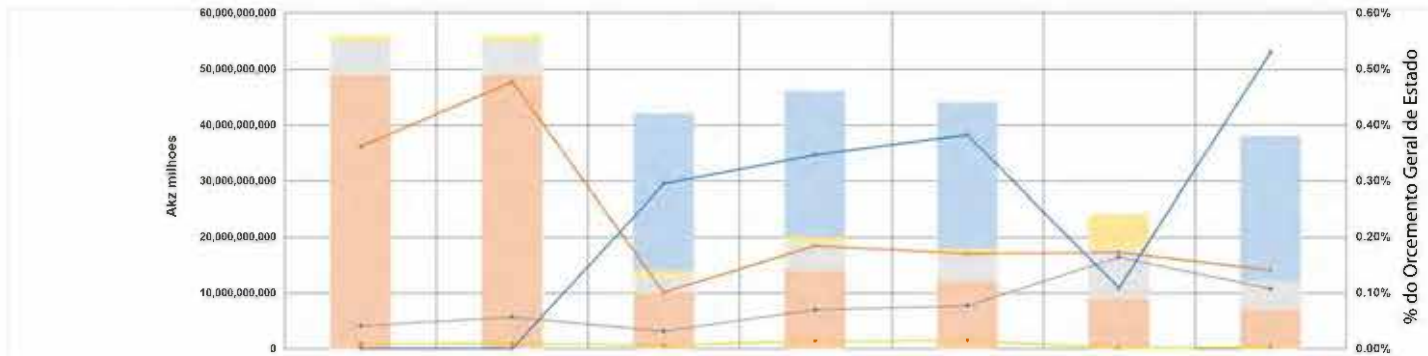


Land Registry Acts	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
State Property Rights	1440	4740	7558	11236	13299	14968	17308	19009	20650	22233	23472	23505	44098	47470
Surface Rights	1003	2214	3580	4709	6059	7191	8514	10162	11401	12775	14186	14219	17504	20169
Customary Rights of Use	0	0	2	2	2	2	13	13	14	15	15	23	61	923
Issuing a Land Certificate	4709	5170	10683	19248	27867	34684	40890	47222	53010	59034	65664	70448	84086	95768
Mortgage	127	426	863	1317	1755	2128	2453	2620	2976	3354	3631	3645	4461	5109
Allotment Authorization	92	94	97	107	111	114	119	123	127	129	129	8245	12688	12734
Total	7371	12644	22783	36619	49093	59087	69297	79149	88178	97540	107097	120085	162898	182173

Untapped land values

- At the end of 2023, the number of properties registered by the Ministry of Finance was 298,885.
- Therefore only 6.6 percent of Angola's urban households are registered to pay property taxes.
- However the registration of properties to pay tax does not confer land tenure rights.
- In 2023 the income from property taxes contributed to only 0.26 % of the State Budget

- From 2024 information has begun to be collected in a comprehensive manner recording property's, location, tax asset value, and identity both the owners and the occupiers (or renters).



Tipo de Imposto	2017		2018		2019		2020		2021		2022		2023	
	Akz milhoes	%	Akz milhoes	%	Akz milhoes	%	Akz milhoes	%	Akz milhoes	%	Akz milhoes	%	Akz milhoes	%
Imposto Predial Urbano	36,068,929,210	0.49%	47,772,770,574	0.49%	10,044,160,506	0.10%	18,410,384,190	0.14%	17,016,957,263	0.12%	17,272,568,605	0.09%	14,034,806,194	0.07%
Imposto Sobre Transmissão Imobiliária Onerosa (Sisa)	4,075,820,855	0.06%	5,619,363,032	0.06%	3,133,310,144	0.03%	6,917,230,360	0.05%	7,665,925,576	0.05%	16,384,087,607	0.09%	10,730,749,910	0.05%
Imposto Sobre Transmissão de Doações e Sucessões	819,960,173	0.01%	847,626,852	0.01%	582,061,568	0.01%	1,360,656,711	0.01%	1,419,586,513	0.01%	91,448,249	0.06%	152,760,061	0.00%
Imposto Predial Urbano - Renda	-	0.00%	-	0.00%	29,465,871,226	0.28%	34,593,160,512	0.26%	38,227,732,703	0.26%	10,871,636,412	0.00%	53,008,592,203	0.26%
Total IP	40,964,710,238	0.56%	54,239,760,458	0.56%	43,225,403,442	0.42%	61,281,731,773	0.46%	64,330,102,057	0.44%	44,619,742,873	0.24%	77,926,568,368	0.38%

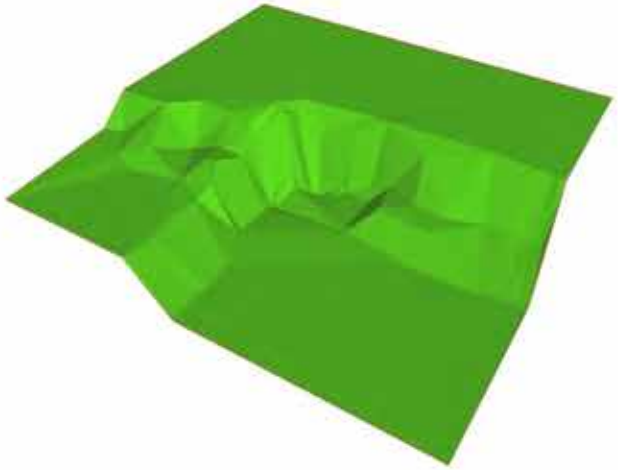
DEVELOPMENT WORKSHOP

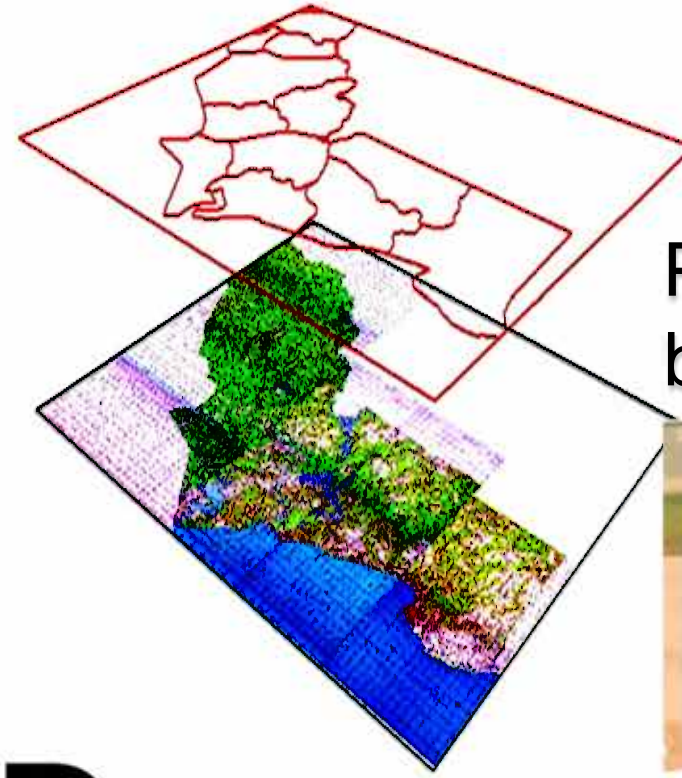
From oil-powered to land-powered development

- Angola has committed to the decentralization of governance and the transfer of authority and budgets to elected municipal councils.
  - Current Angolan municipalisation reforms present a unique opportunity to influence local practice on how community and individual land-holder tenure is administered and to protect women's equitable rights to land. Land reform is linked with the municipalisation process and gender-inclusive land information and management
  - The Ministries of Territorial Administration and Public Works Urbanisation and Housing with support of Global Land Tools Network, FAO and UN Habitat in promoting a land information system that is based on a Social Tenure Domain Model (STDM) to delimit, map and record people's land claims, occupation and use. The initiative was launched under the program "A Minha Terra" in 2017.

DEVELOPMENT WORKSHOP

Participatory land tenure mapping



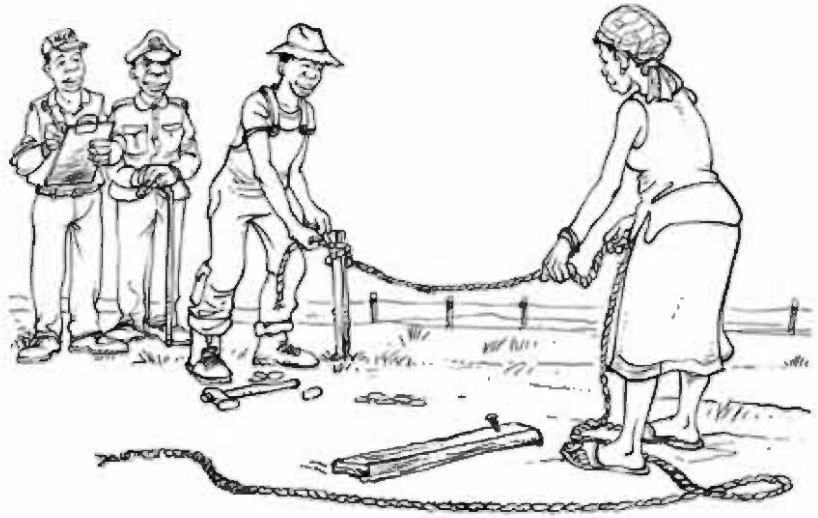


Participatory risk mapping is based on this data set

Remote sensing

DEVELOPMENT WORKSHOP

A Minha Terra – Participatory land delimitation



Municipal land cadastres

- The participatory process of collecting & recording information, by municipal administrations, registers the use of land by individuals or communities or by public institutions.
- Archiving of land use information in the form of maps data and digital information in the official municipal registry

DEVELOPMENT WORKSHOP

New land reform innovations

- In 2014, the Angolan Government began a process of reviewing the 2004 Land Law with a view to adapting it to the new Constitution of the Republic of Angola of 2010.
- A 2021 revised draft Law did not intend to change fundamental principles such as the original ownership of State.
- However, it intends to simplify procedures for the concession and transmission of land rights,
- The proposal more-clearly defines concepts such as the customary rights of local rural communities and the *useful use of land*.
- The newly introduced Property Identification Number (NIP) will provide a unique identifier for each concession.

Remaining unresolved dilemmas

- The proposed revision of the Law does not address the major issue of occupation in good-faith that affects a large majority of urban Angolans.
- The long-term occupation of land still does not grant the right to adverse possession, and the occupation of property in areas that have not yet been regularized can be considered a criminal act.
- The criminalisation what the majority of the population consider to be “legitimate” property ownership is a major problem.
- The inability to recognize the legality of legitimate land occupations may be a major barrier to promote the Land Registry and in-turn, will be discouraged citizens from cooperating with the Government’s attempt to build a tax base.

DEVELOPMENT WORKSHOP

Appropriating international good practice

- Under Angola's existing and proposed Law, the constitution of land rights is conditional on the existence of a Municipal Master Plan.
  - The acquisition of land rights should be conditioned on less stringent criteria, such as not being located in risk zones or environmental protection zones.
  - Angola could learn from the experience of the Special Zones of Social Interest (ZEIS) in Brazil that is employed in the upgrading of slums into formal bairros.
- Angolan legislation requires demonstration of useful and effective use of the land, requiring the completed and finished housing, in fact excludes a good part of the population who access housing through incremental self-construction processes over time.
  - Under Mozambican law, the Right to Use and Occupation of Land (DUAT) may be acquired by occupation in good faith, simplifying land registration.

DEVELOPMENT WORKSHOP

Towards a new land reform

- Prioritize the transfer of land management in urban areas to municipal administrations, supporting the creation and strengthening of municipal directorates for urban management, urban planning and the municipalization of the cadastre.
- Align the computerization of land administration services with initiatives to simplify land concessions.
- Land information management systems for legal registration, taxation, physical planning, national cadastre and local administration must be integrated.
- Broaden the debate on the new land law, and adopt a more participatory review process.

DEVELOPMENT WORKSHOP

Urban Pulse: Informed Urban Development Strategies with Biannual Insights from the World Settlement Footprint

M. Marconcini

German Aerospace Center – DLR

The World Settlement Footprint suite

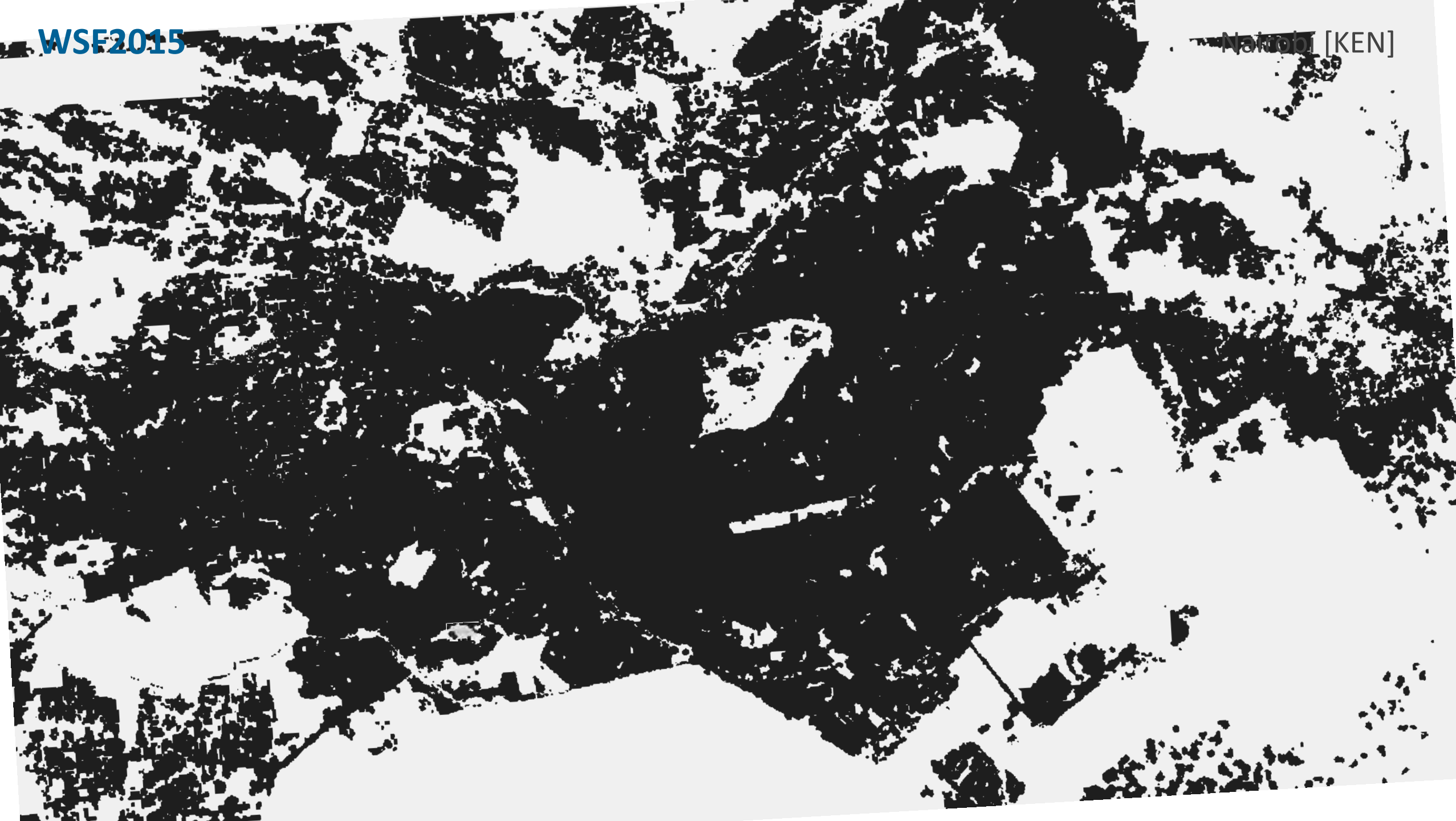
→ Developed at the German Aerospace Center (DLR) in collaboration with ESA, the World Bank and the Google Earth Engine team, the **World Settlement Footprint (WSF) suite** is a collection of novel open-and-free high-resolution global datasets aimed at advancing the understanding of urbanization at the planetary scale with unprecedented detail and accuracy.


Landsat- 8
Nairobi [KEN]


Sentinel-1
Nairobi [KEN]

WSF2015

Nairobi [KEN]

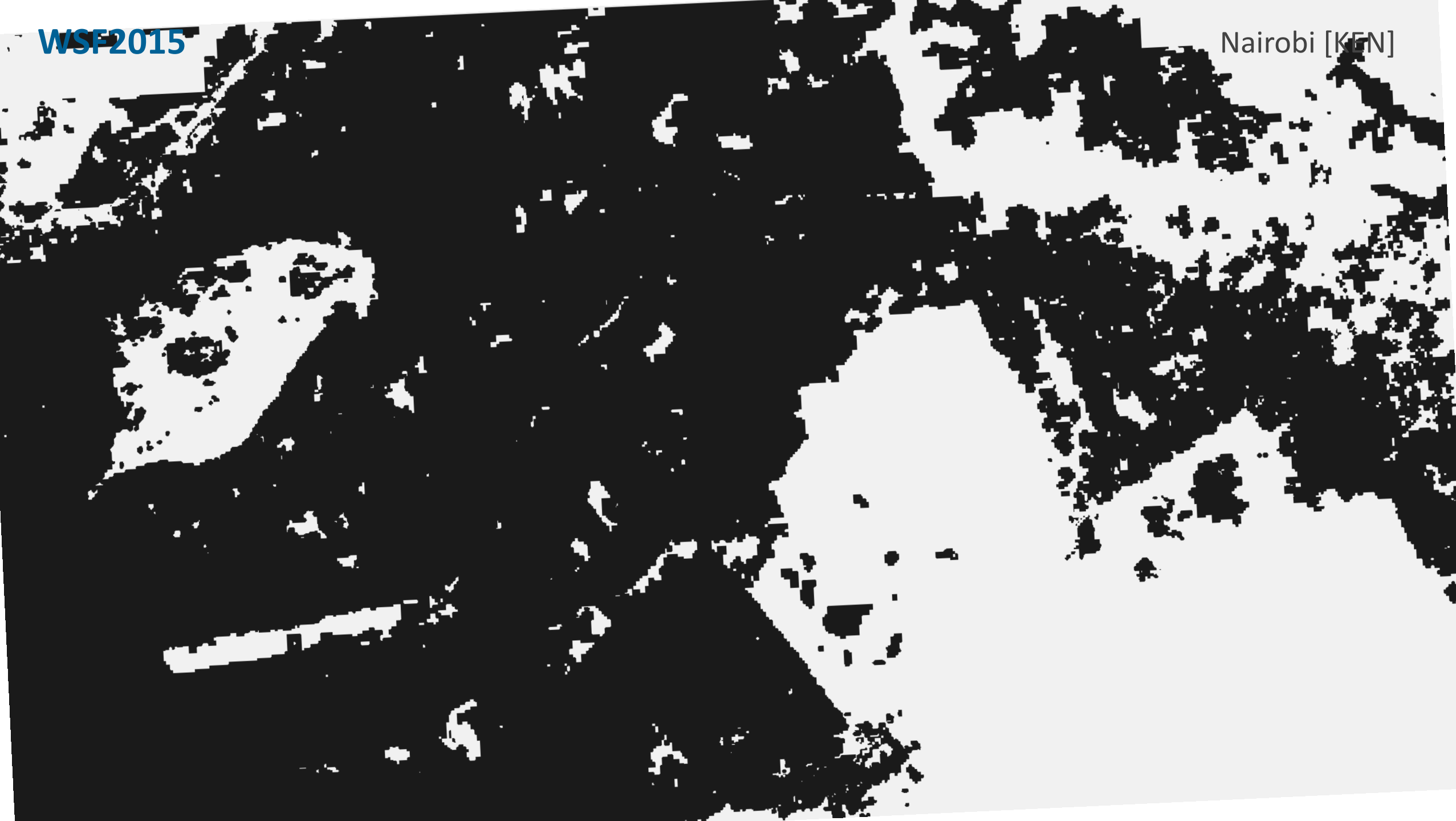



Landsat- 8
Nairobi [KEN]


Sentinel-2
Nairobi [KEN]

WSF2015

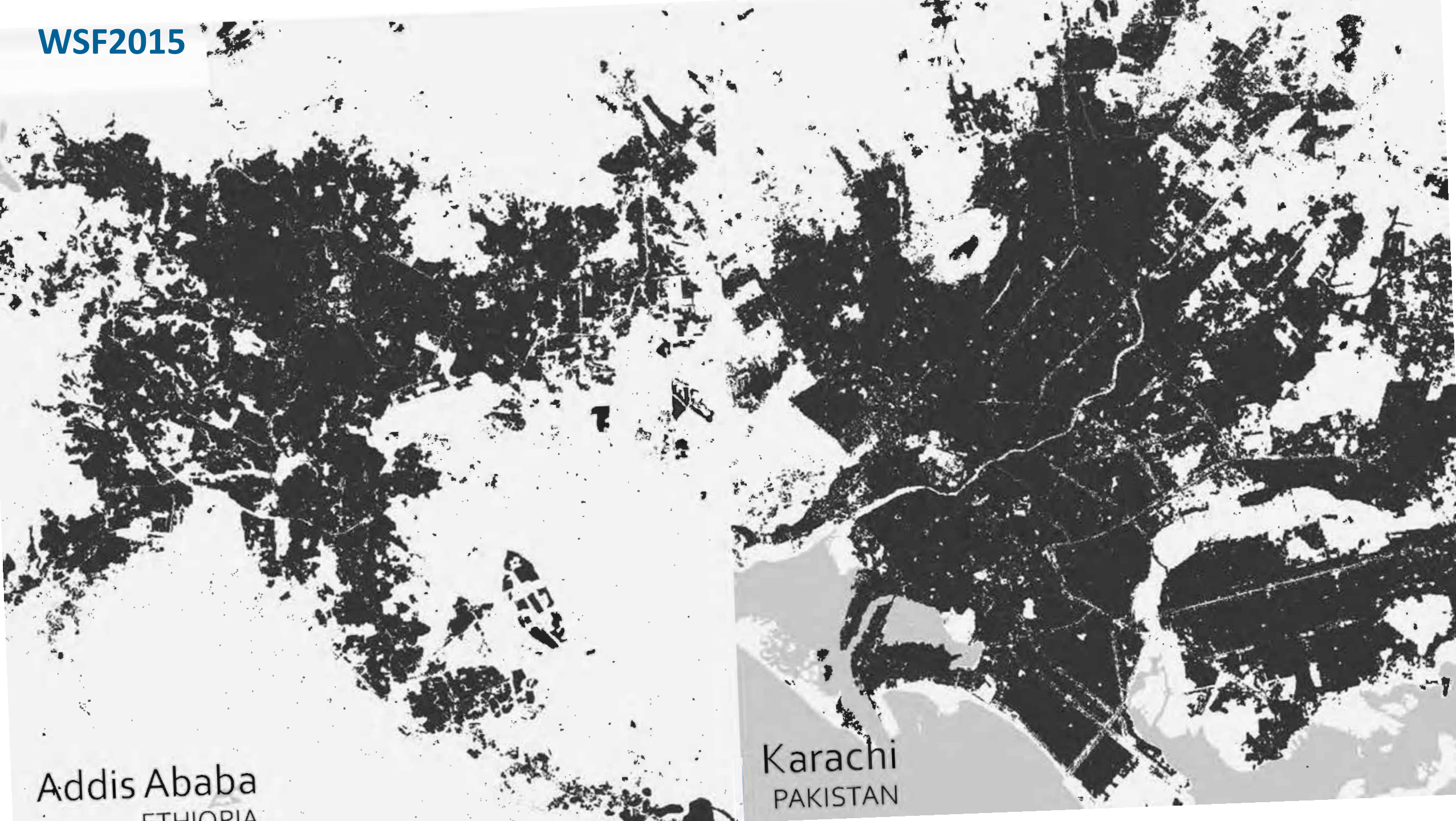
Nairobi [KEN]

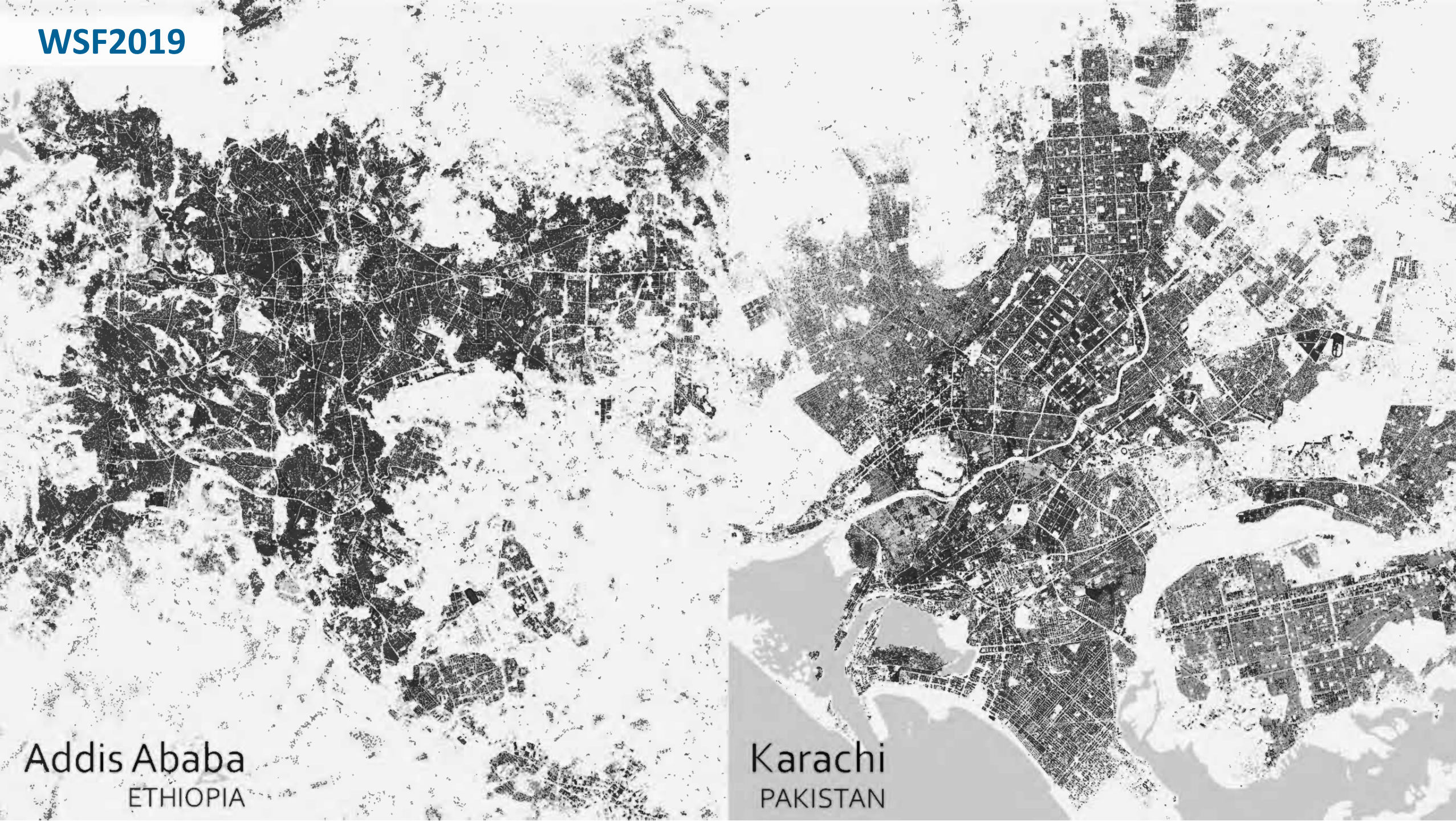


WSF2019

Nairobi [KEN]

WSF2015

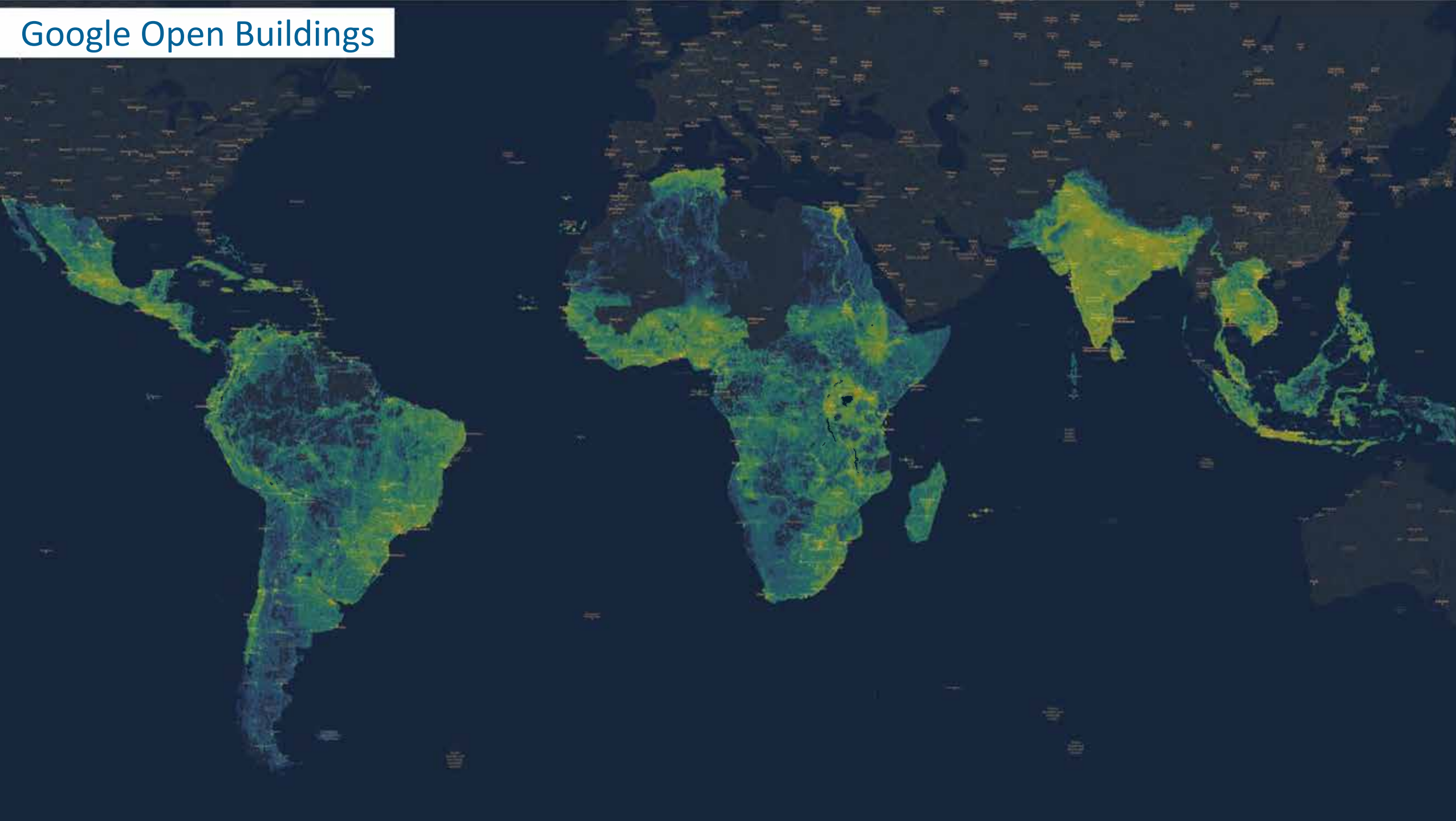



WSF2019
Addis Ababa
ETHIOPIA
Karachi
PAKISTAN

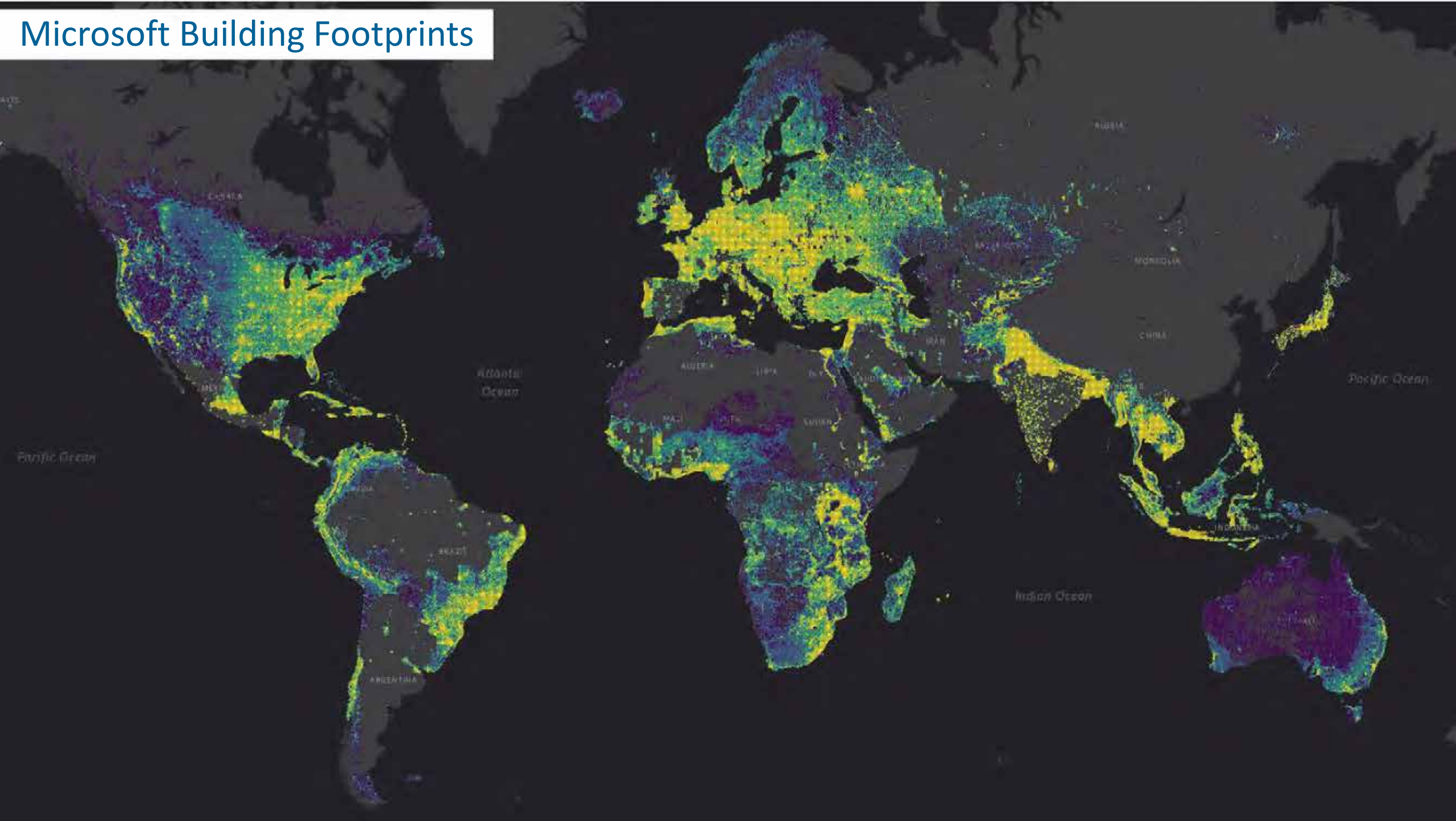
Google Open Buildings +
Microsoft Building Footprints

Mumbai [IND]

Google Open Buildings



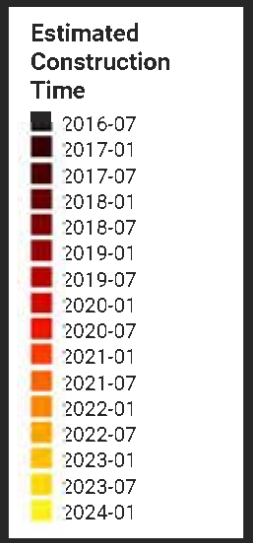
Microsoft Building Footprints




City
3km
B. Jeorji

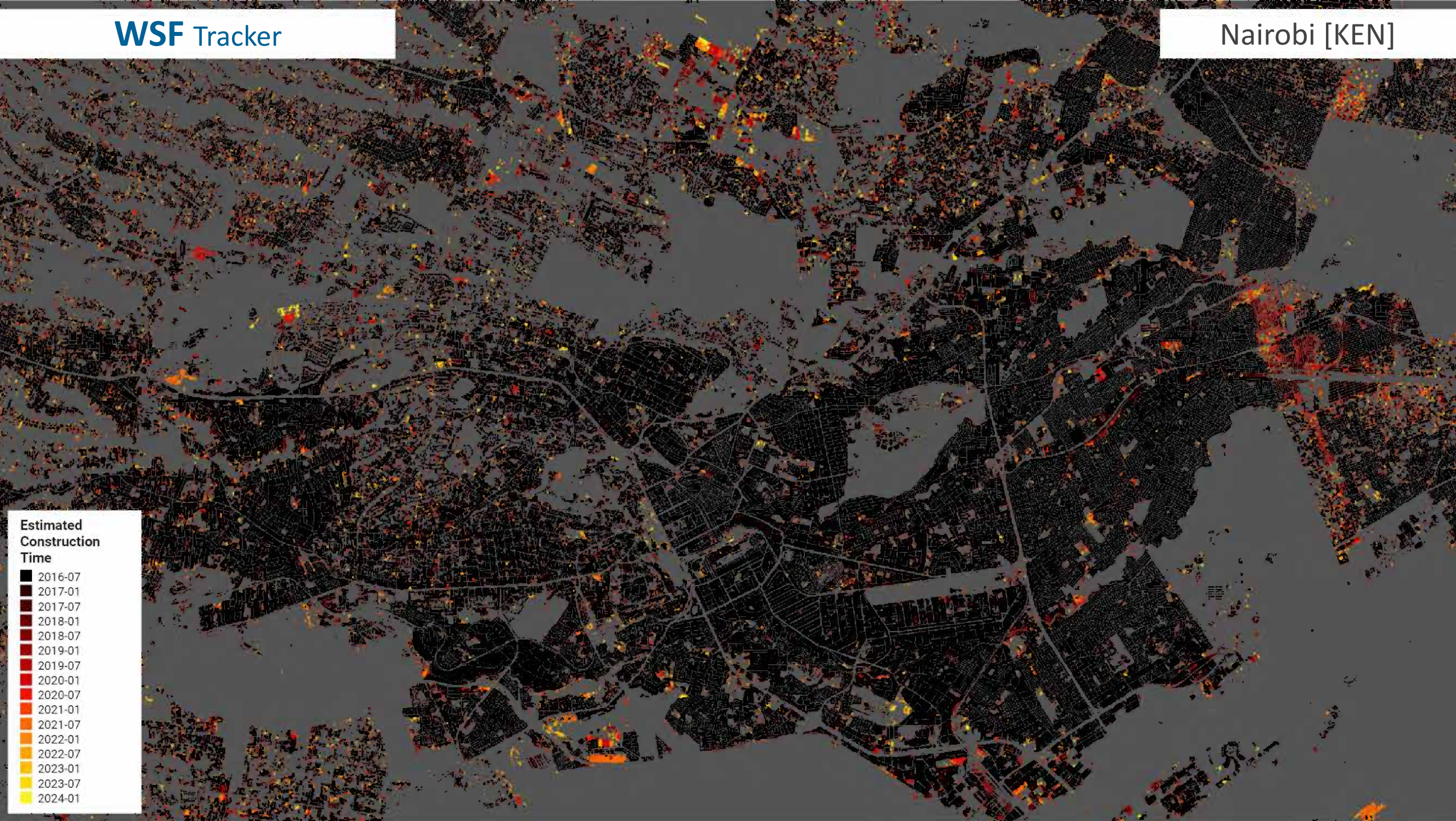
WSF Tracker

Nairobi [KEN]



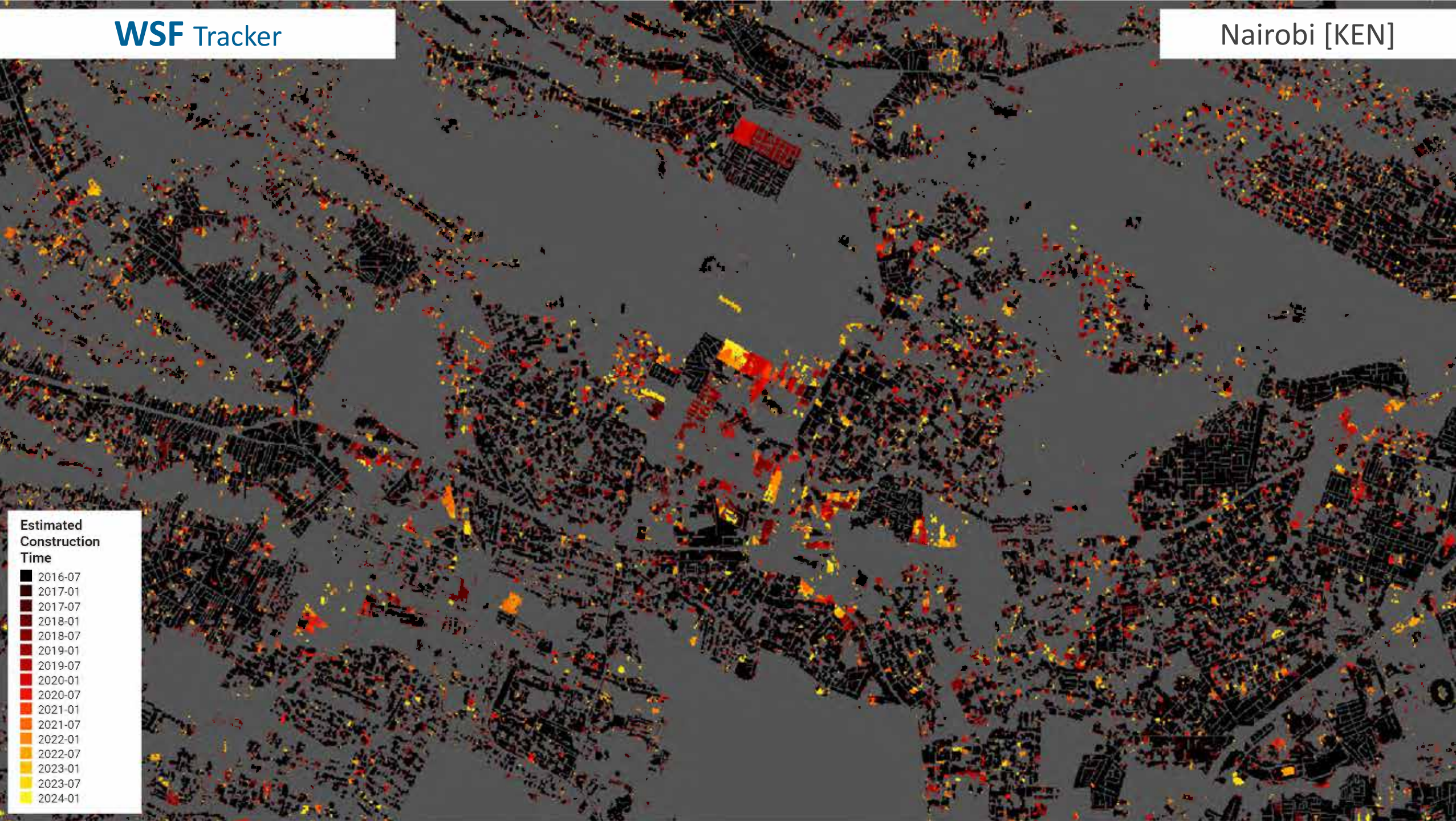
WSF Tracker

Nairobi [KEN]



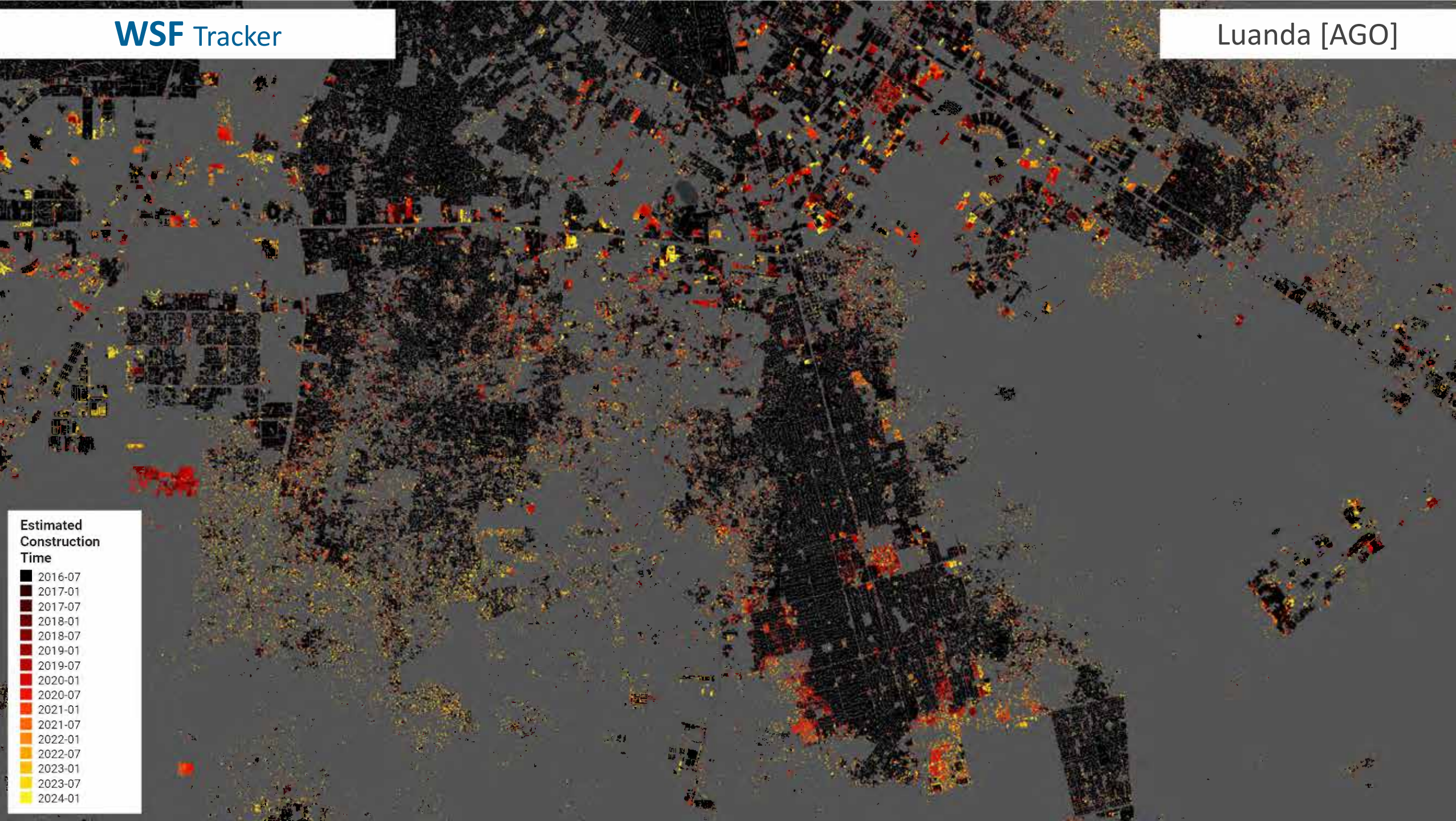
WSF Tracker

Nairobi [KEN]



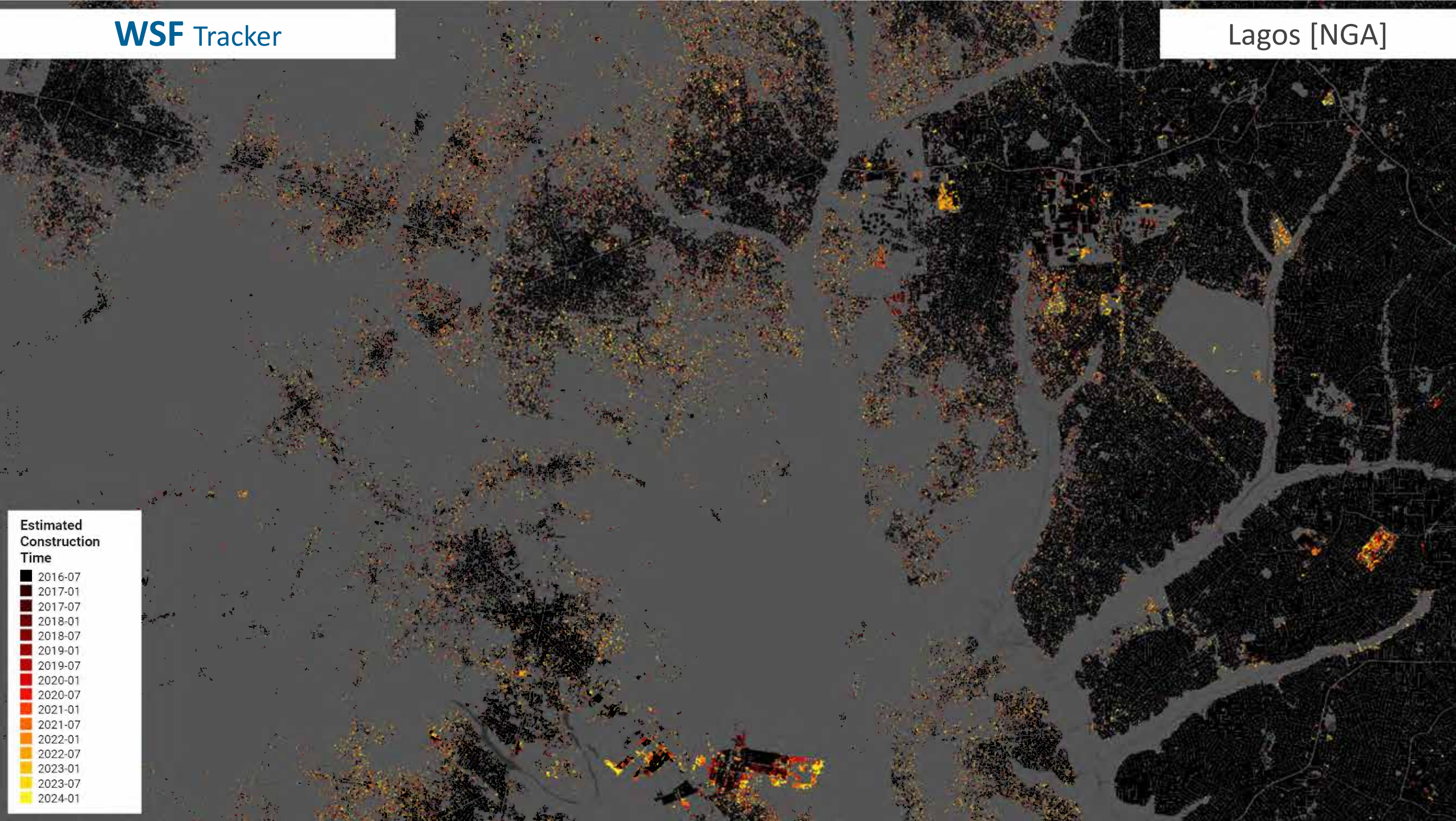
WSF Tracker

Luanda [AGO]



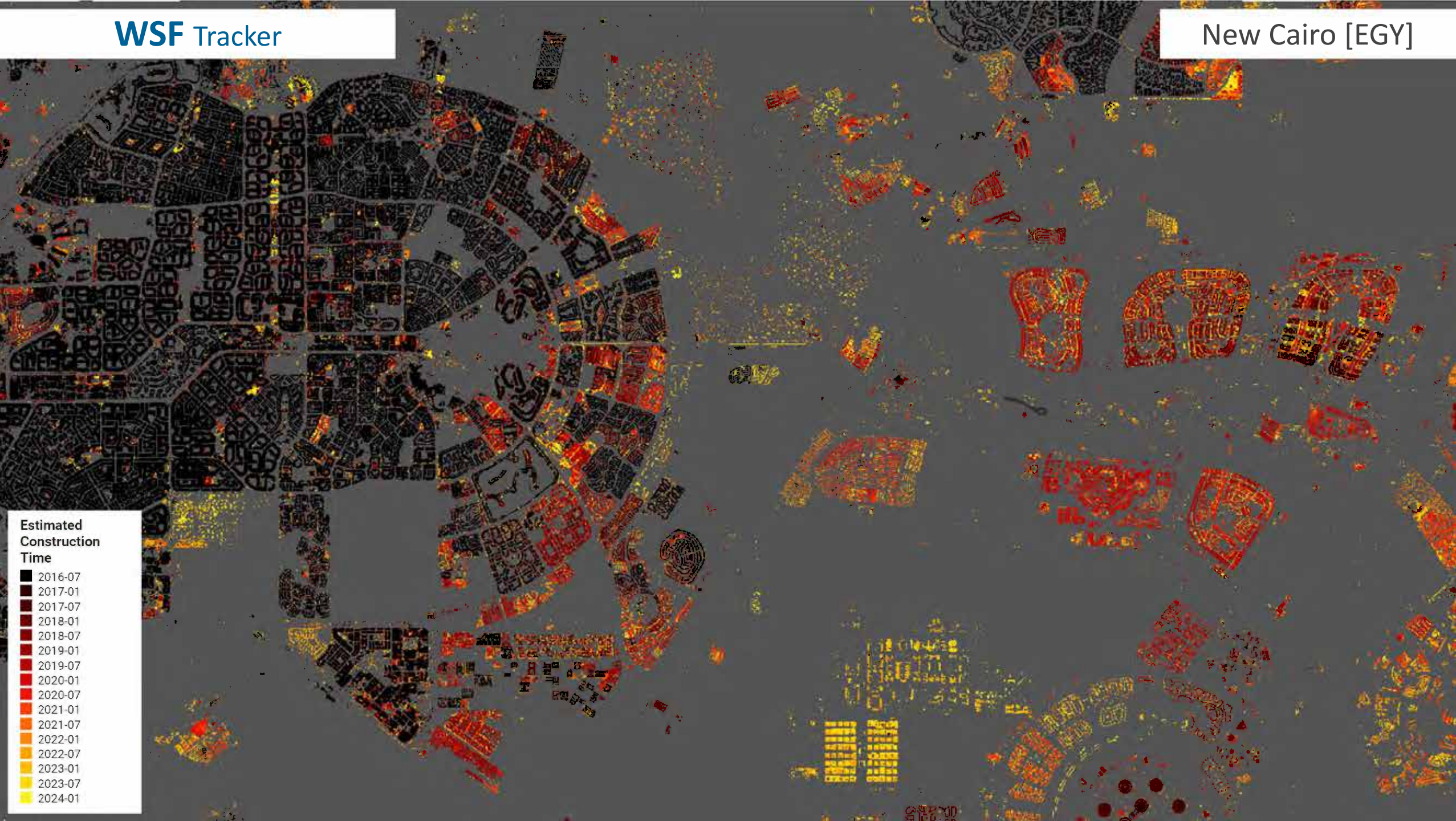
WSF Tracker

Lagos [NGA]



WSF Tracker

New Cairo [EGY]



WSF Tracker

Hanoi [VNM]

WSF Tracker

Chengdu [CHN]

WSF Tracker

Santiago [CHI]

WSF Tracker

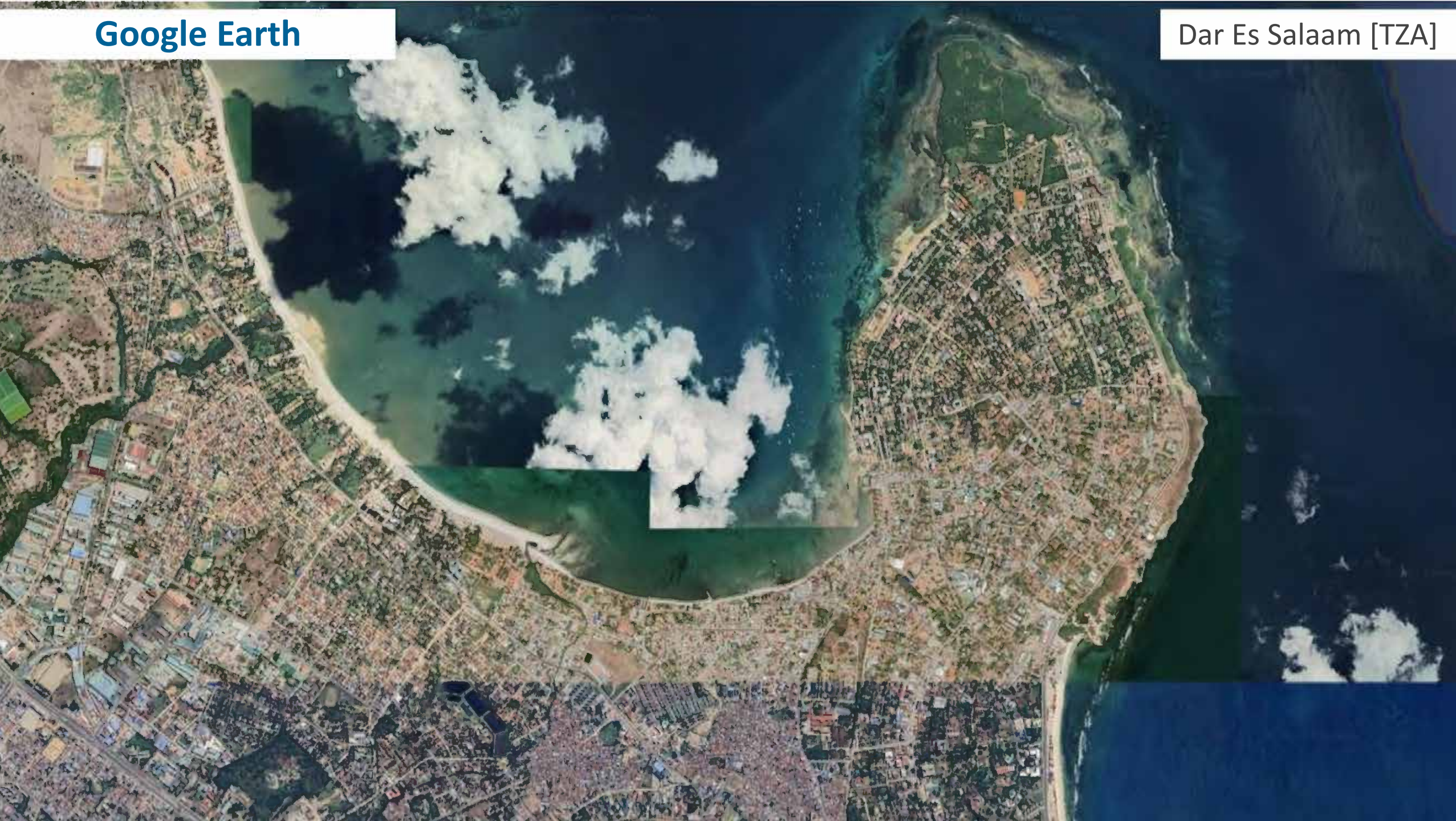
Port-au-Prince [HTI]

WSF Tracker

Washington DC [USA]

WSF Tracker

Dar Es Salaam [TZA]


Google Earth
Dar Es Salaam [TZA]

WSF Tracker

Dar Es Salaam [TZA]

WSF Tracker

Dar Es Salaam [TZA]


WSF Tracker
Dar Es Salaam [TZA]
Dec-2020
Estimated Construction Time
2016-07
2017-01
2017-07
2018-01
2018-07
2019-01
2019-07
2020-01
2020-07
2021-01
2021-07
2022-01
2022-07
2023-01
2023-07
2024-01

WSF Tracker

Dar Es Salaam [TZA]

WSF Tracker

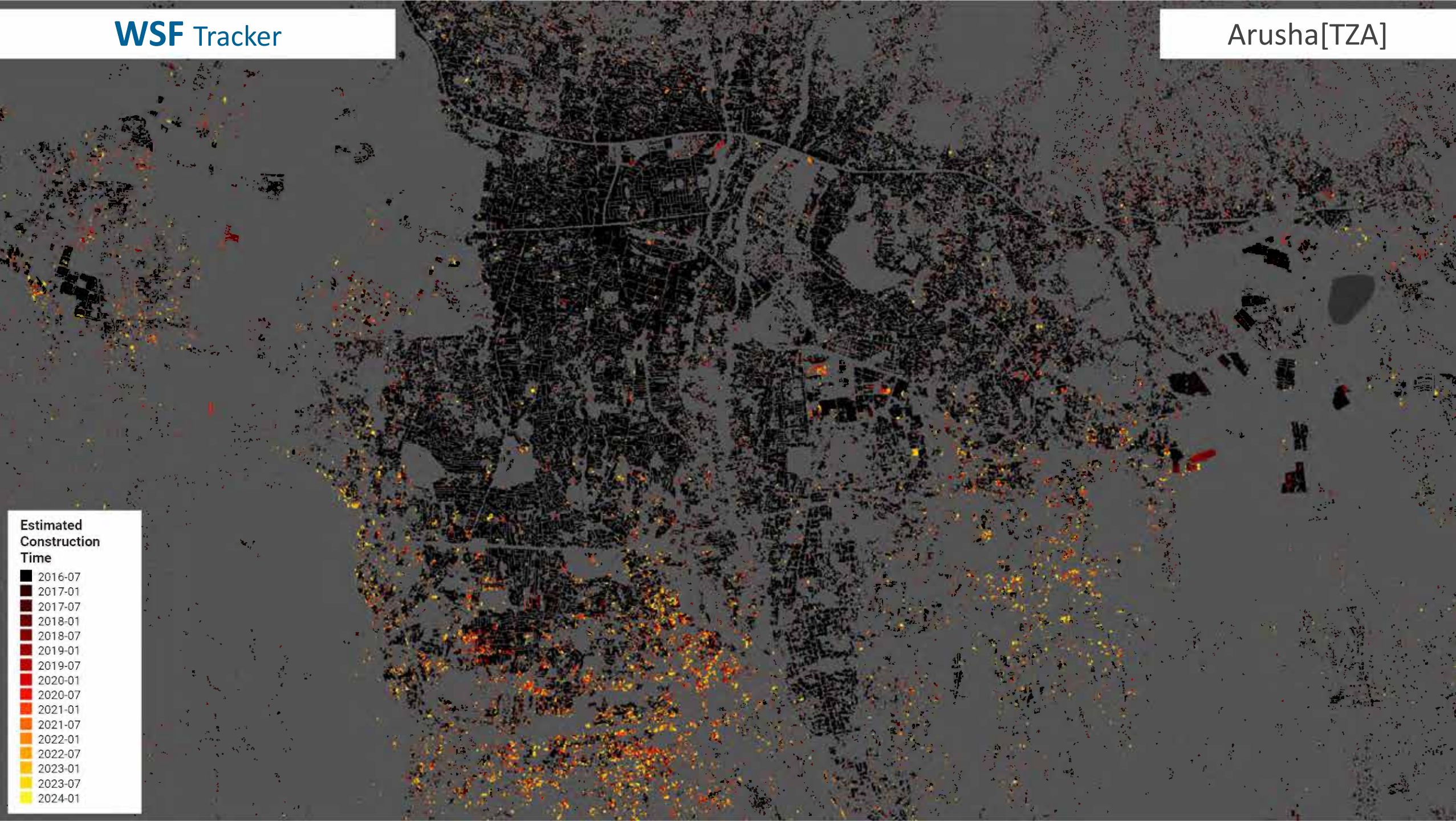
Dar Es Salaam [TZA]

WSF Tracker

Dar Es Salaam [TZA]

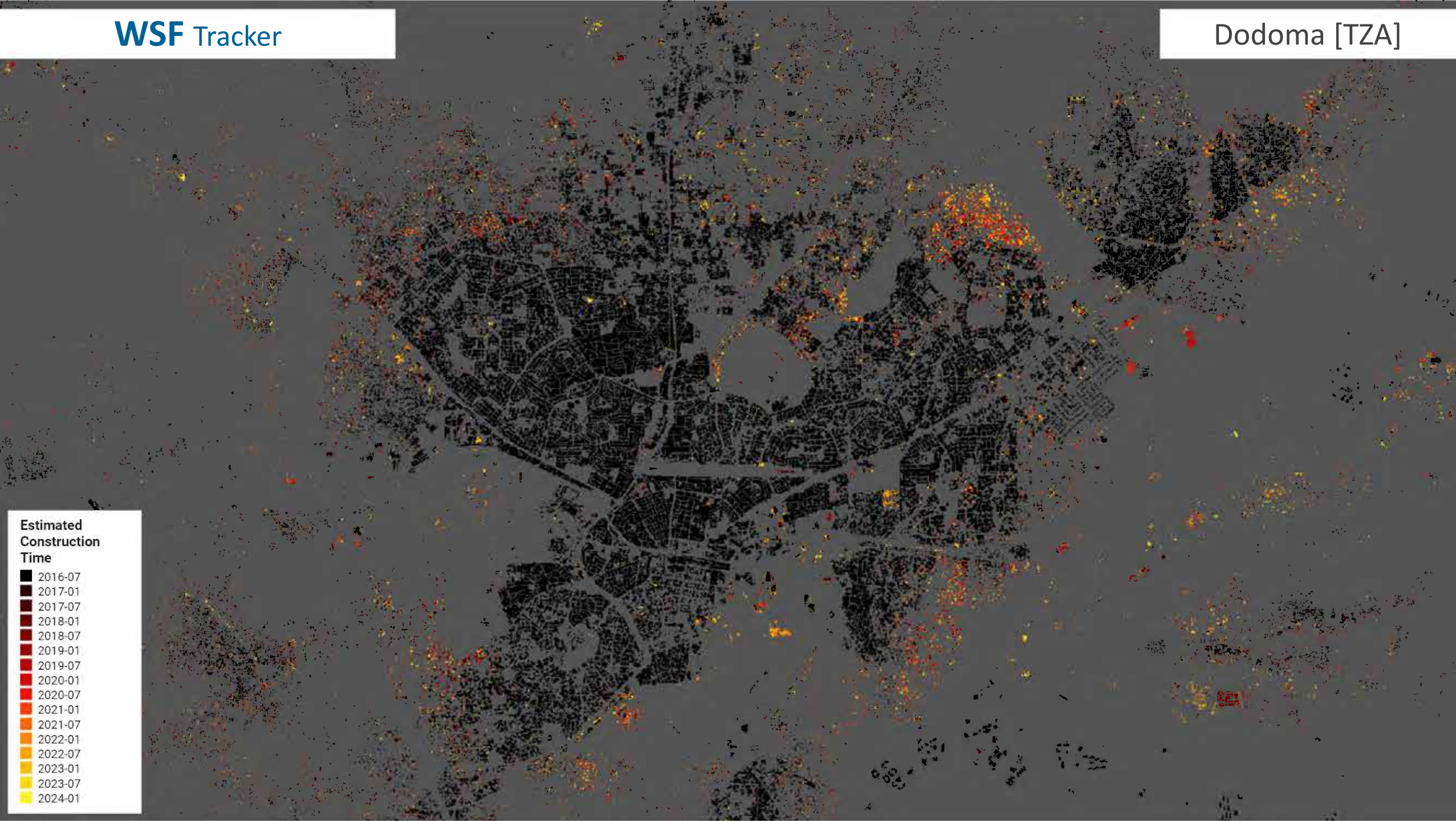
WSF Tracker

Arusha[TZA]



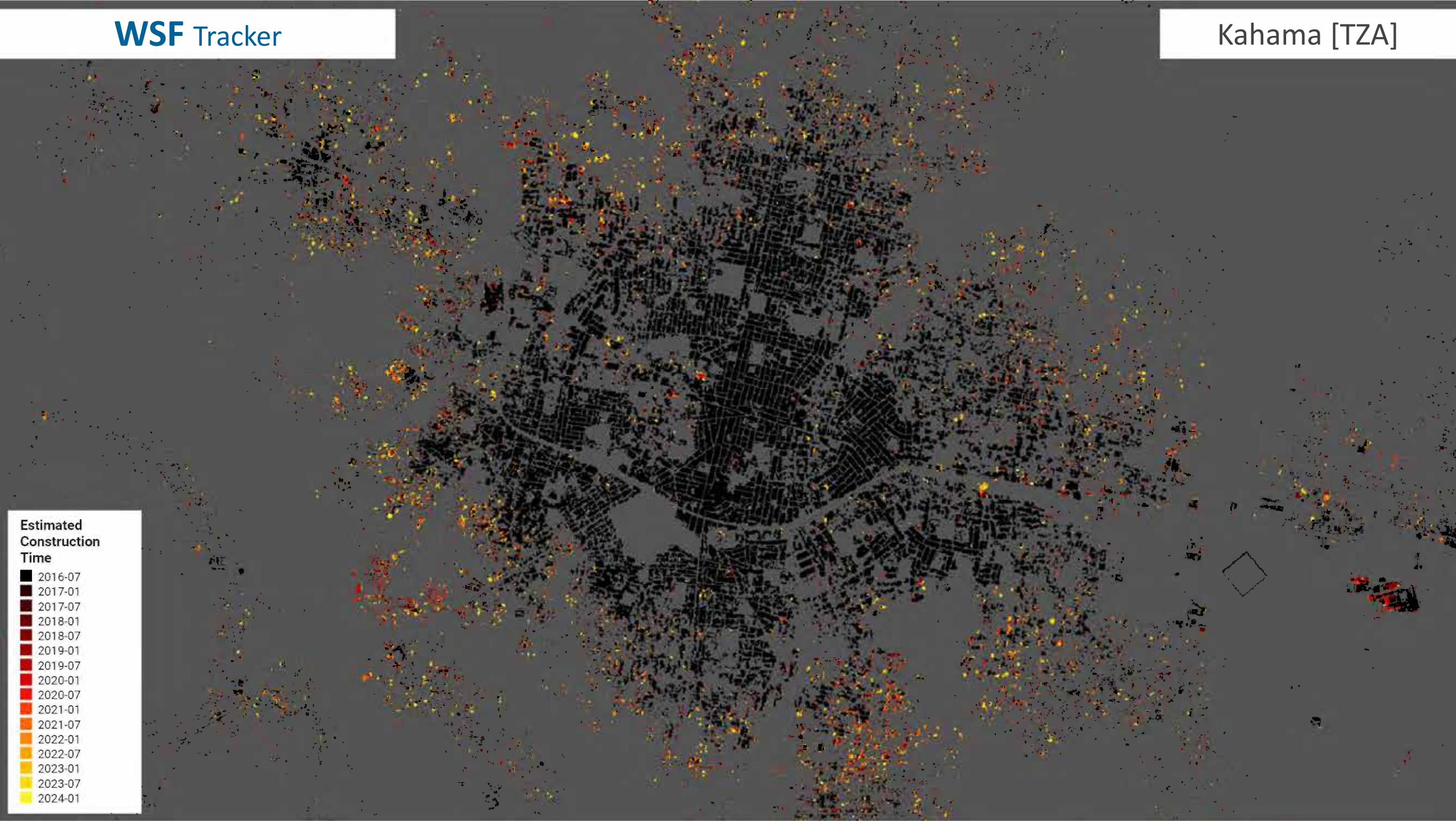
WSF Tracker

Dodoma [TZA]



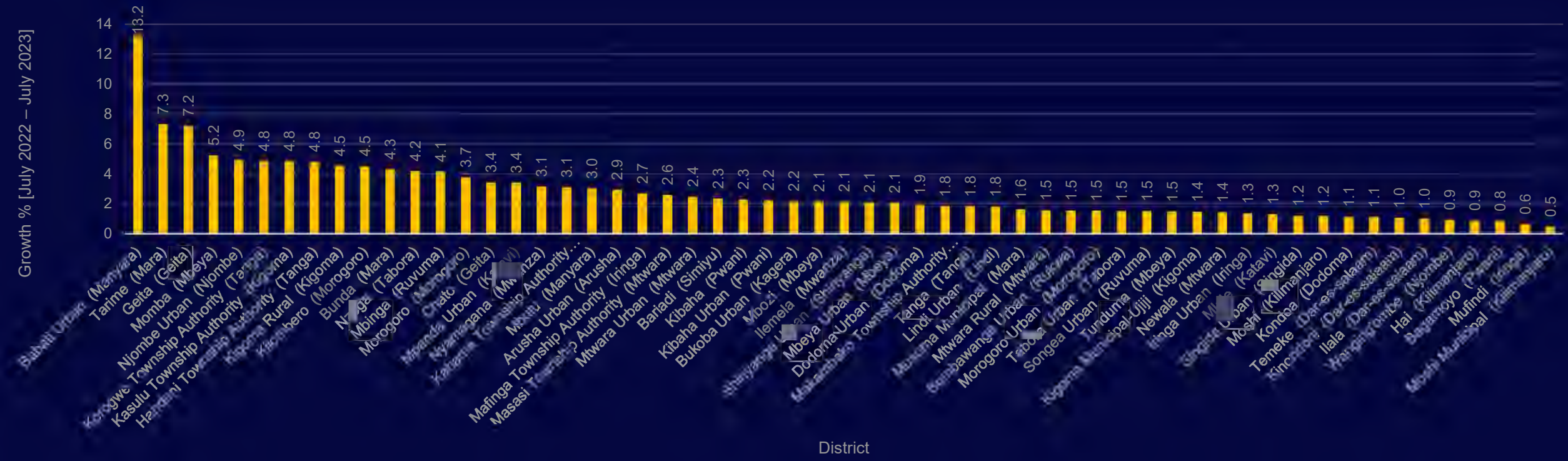
WSF Tracker

Kahama [TZA]



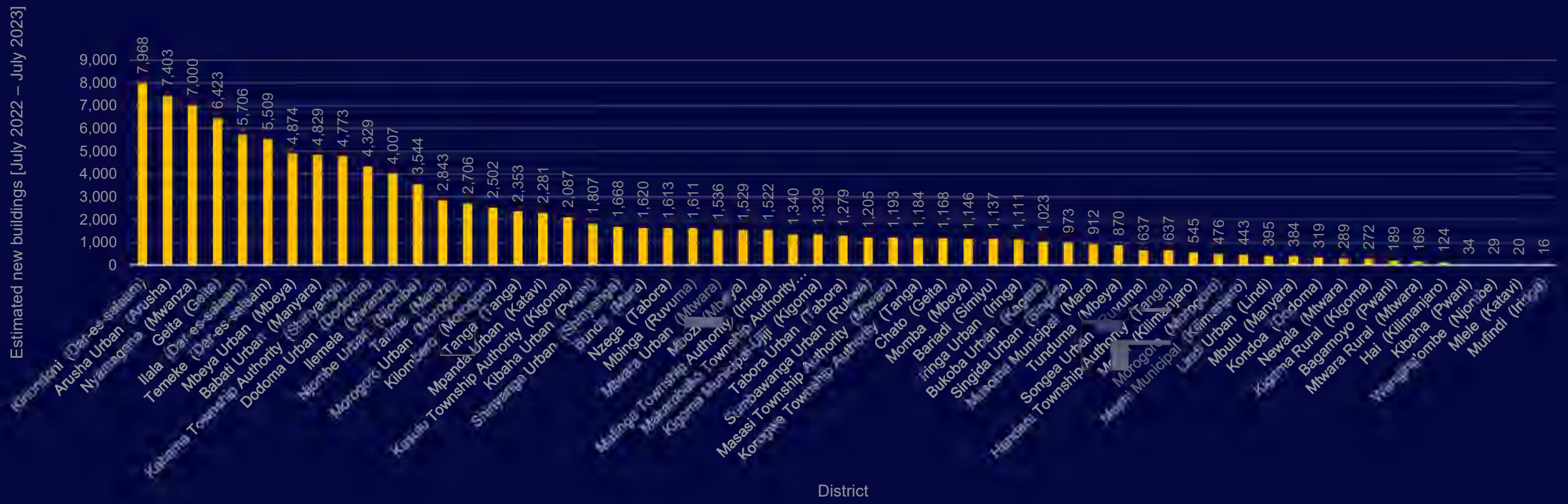
Fastest growing districts – growth rate

July 2022 - July 2023



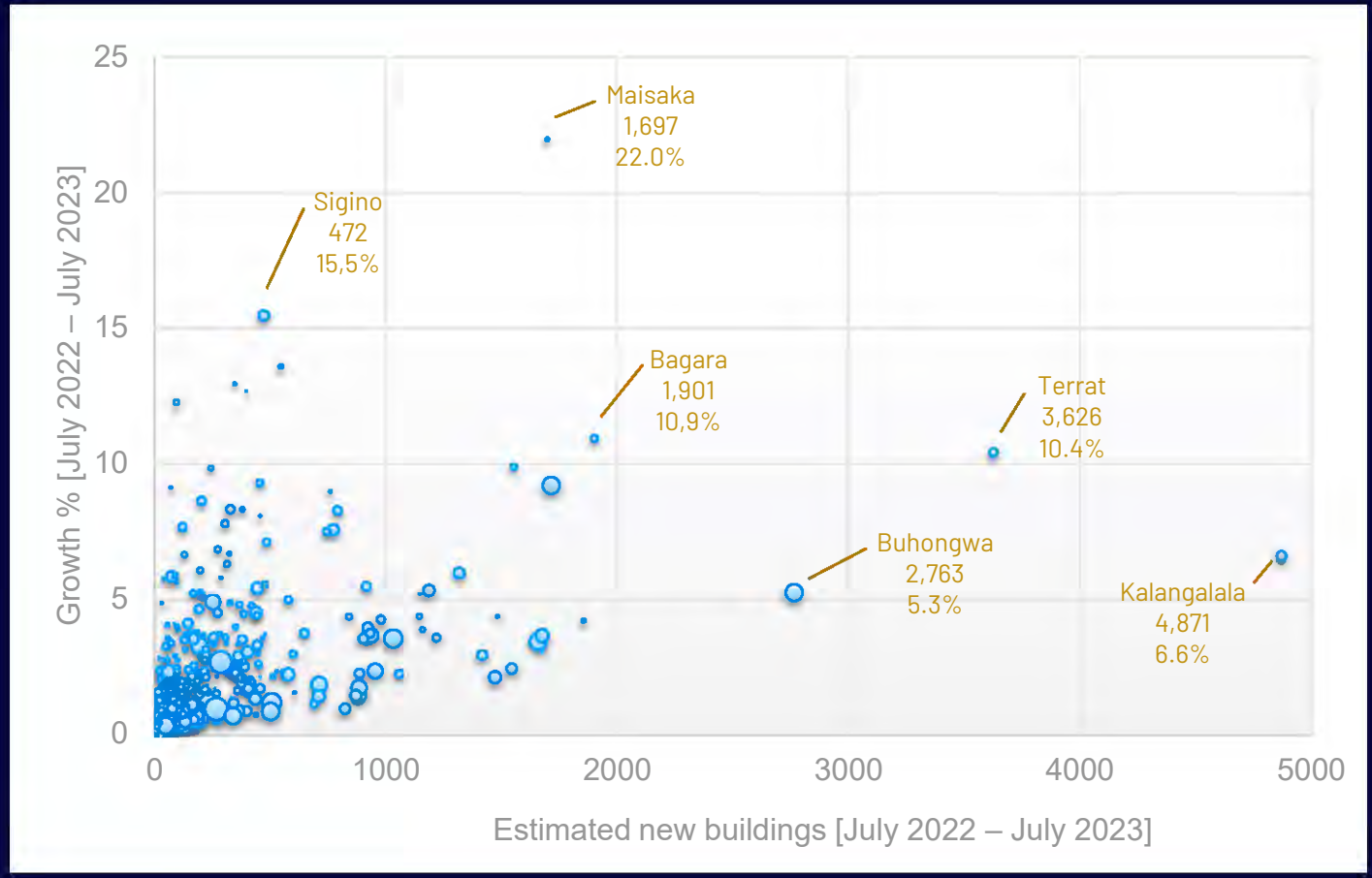
Fastest growing districts – new buildings

July 2022 - July 2023



Fastest growing wards

July 2022 - July 2023



Ofisi ya Rais - Tawala za Mikoa na Serikali za Mitaa

SETTLEMENT OVERVIEW | VERIFIED BUILDINGS | TOWN PLANS | FLOOD HAZARD LANDS | FOREST COVER | HEAT | LOCAL DATA

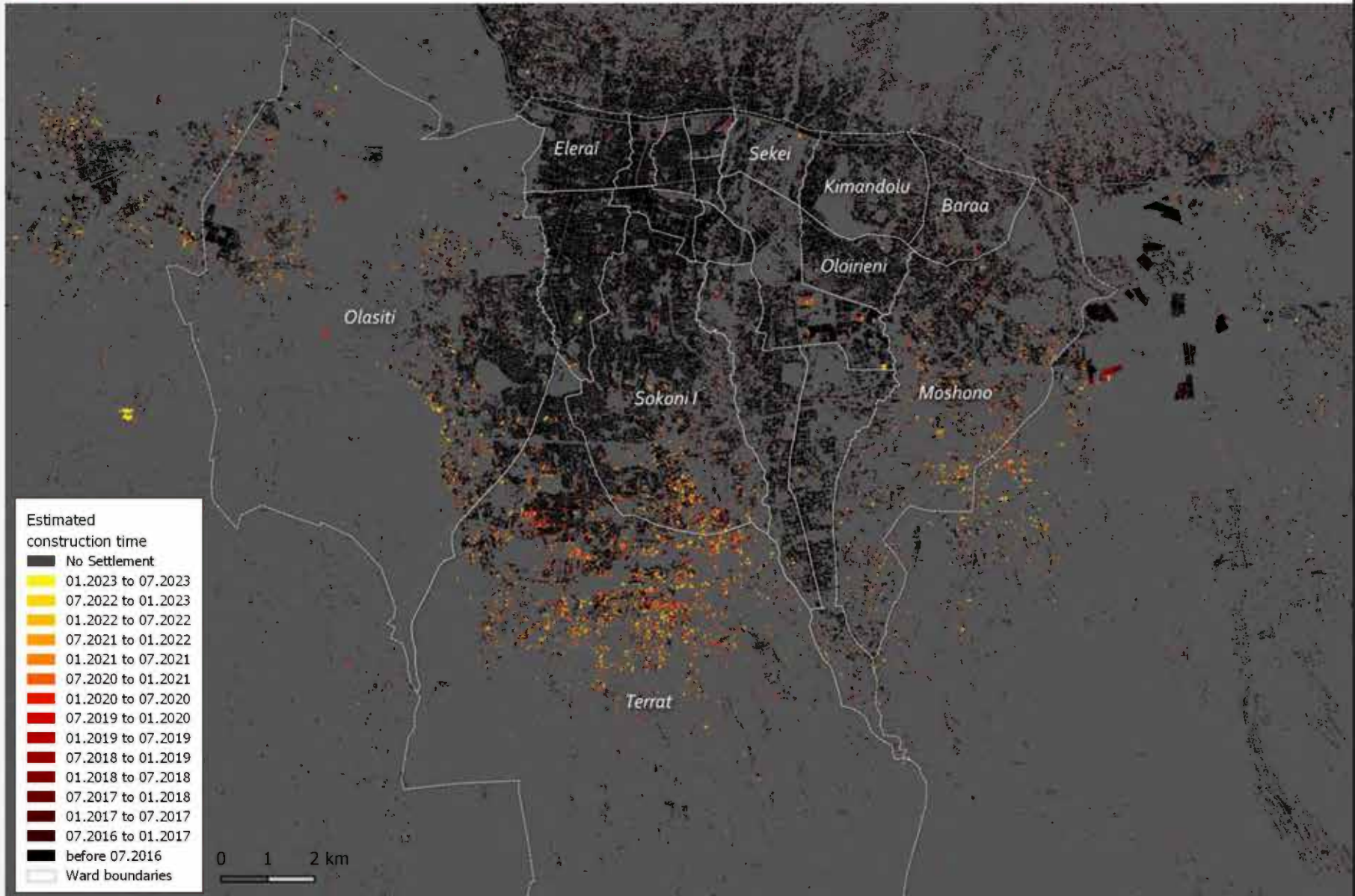
ARUSHA

BUILDINGS

Total Estimated # Buildings	260,506
# new buildings past 12 months	7,403
Average growth past 12 months	2.9%
Average growth since Jan-2017	15.0%
Rank in Tanzania	14th

Fastest growing wards	Growth 01.17–07.23	Rank TZ
Terrat	+ 59.6%	18
Moshono	+ 21,3%	147
Olasiti	+ 20.9%	152

Buildings Registered	#
Building Refence #	#
Property Registration	%
Construction Permits	#
Population	425,973
Electricity Access	%
Sewer Line	%
Water Access	%



Ofisi ya Rais - Tawala za Mikoa na Serikali za Mitaa

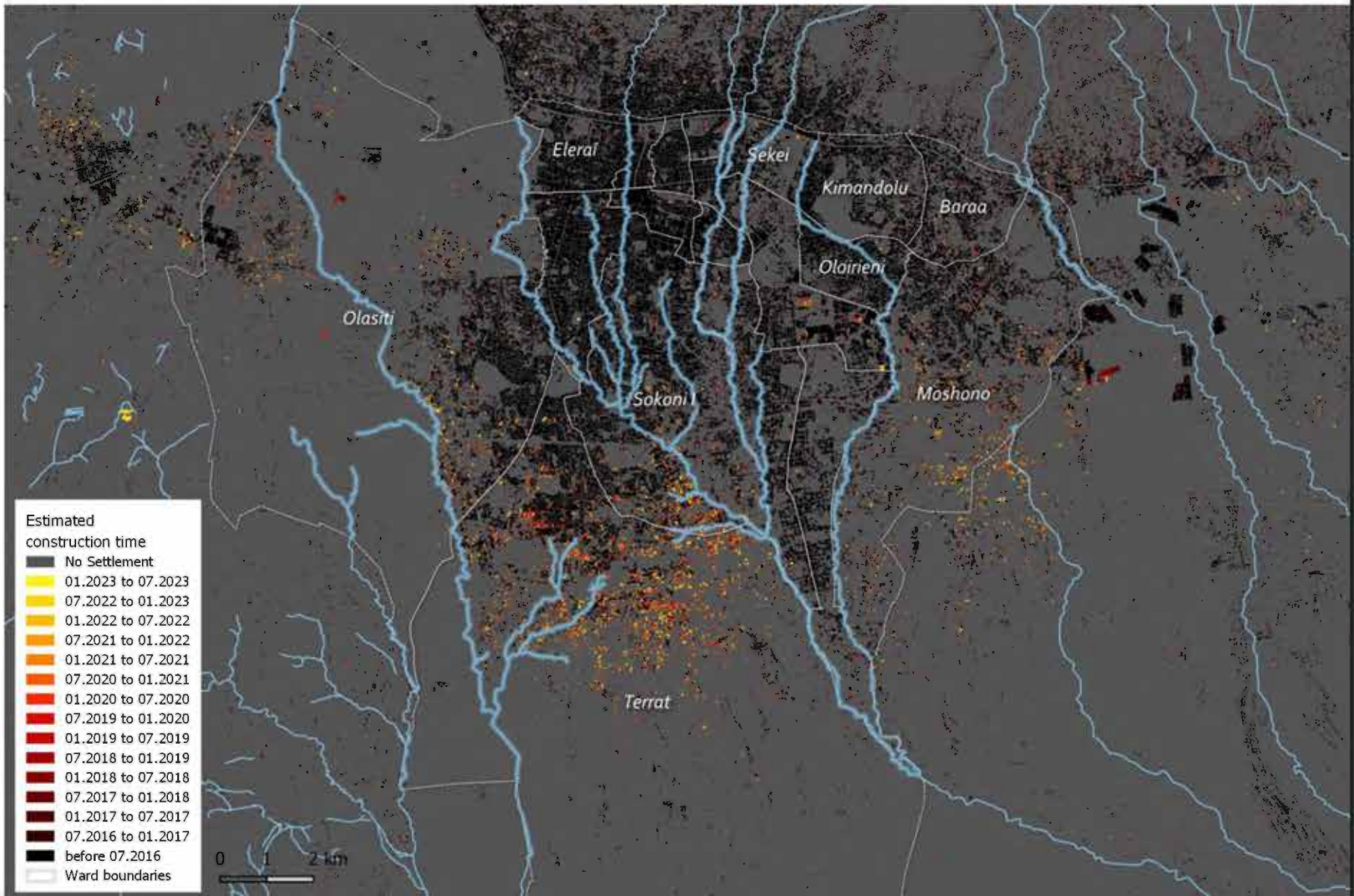
SETTLEMENT OVERVIEW | VERIFIED BUILDINGS | TOWN PLANS | FLOOD HAZARD LANDS | FOREST COVER | HEAT | LOCAL DATA

ARUSHA

BUILDINGS IN FLOOD HAZARD LANDS

Total Estimated # Buildings	260,506
# new buildings past 12 months	7,403
Average growth past 12 months	2,9%
Average growth since Jan-2017	15.0%
Rank in Tanzania	14th
Buildings in flood hazard lands	14,814
# new buildings past 12 months	441
Average growth past 12 months	3.1%
Average growth since Jan-2017	12,0%
Rank in Tanzania	13th

Buildings Registered	#
Building Refence #	#
Property Registration	%
Construction Permits	#
Population	425,973
Electricity Access	%
Sewer Line	%
Water Access	%



Ofisi ya Rais - Tawala za Mikoa na Serikali za Mitaa

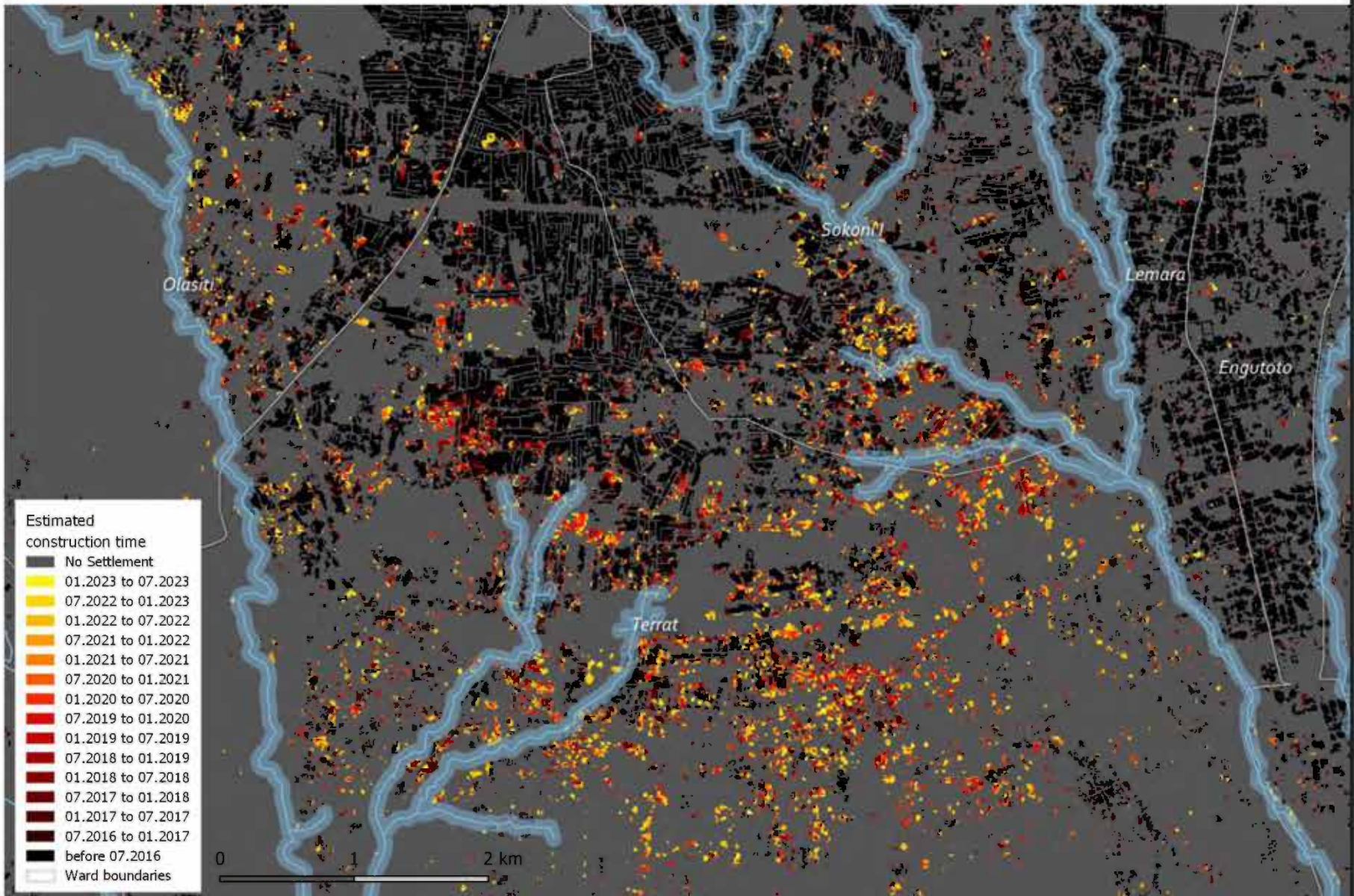
SETTLEMENT OVERVIEW | VERIFIED BUILDINGS | TOWN PLANS | FLOOD HAZARD LANDS | FOREST COVER | HEAT | LOCAL DATA

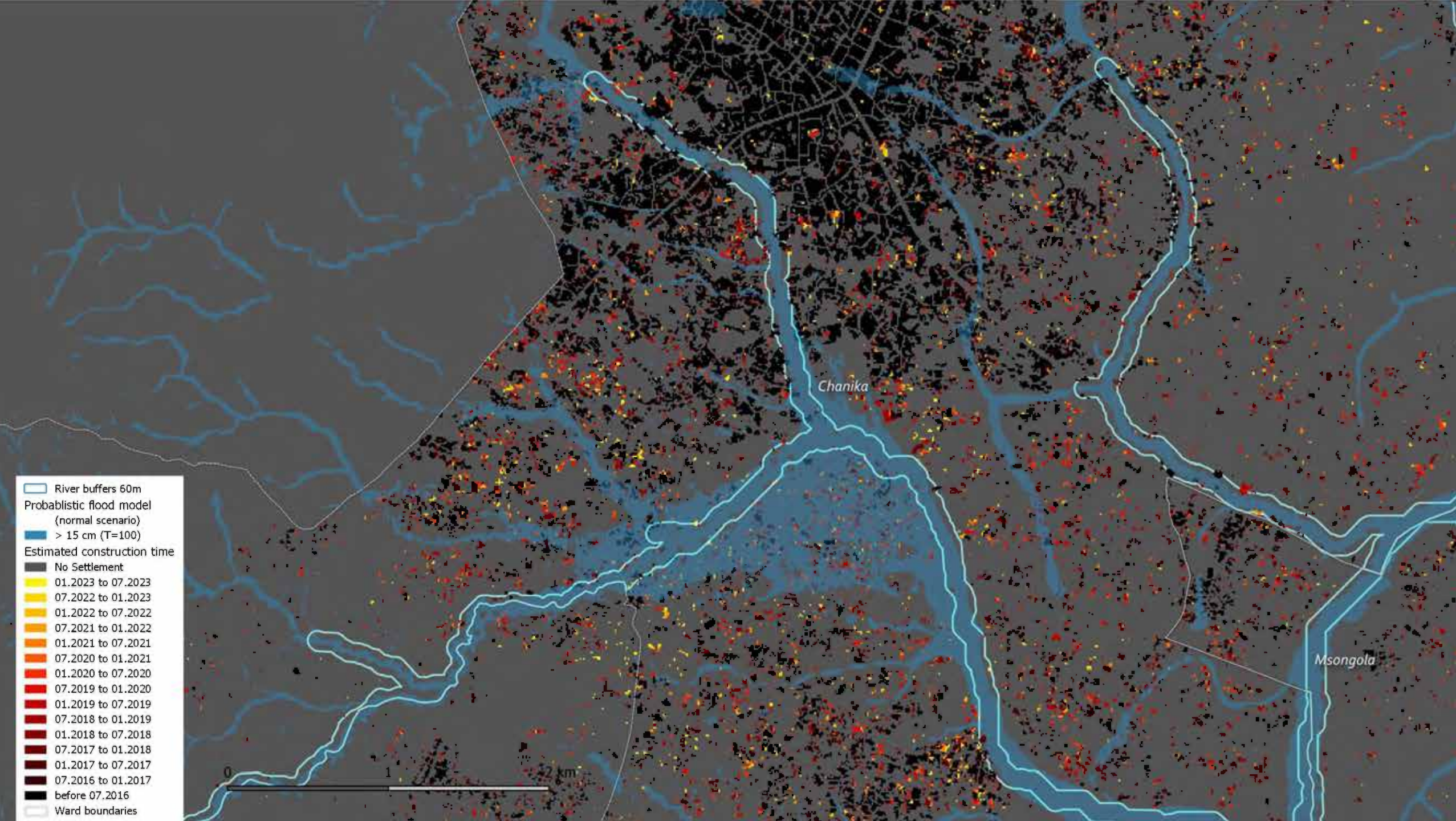
ARUSHA

BUILDINGS IN FLOOD HAZARD LANDS

Total Estimated # Buildings	260,506
# new buildings past 12 months	7,403
Average growth past 12 months	2,9%
Average growth since Jan-2017	15.0%
Rank in Tanzania	14th
Buildings in flood hazard lands	14,814
# new buildings past 12 months	441
Average growth past 12 months	3.1%
Average growth since Jan-2017	12,0%
Rank in Tanzania	13th

Buildings Registered	#
Building Refence #	#
Property Registration	%
Construction Permits	#
Population	425,973
Electricity Access	%
Sewer Line	%
Water Access	%

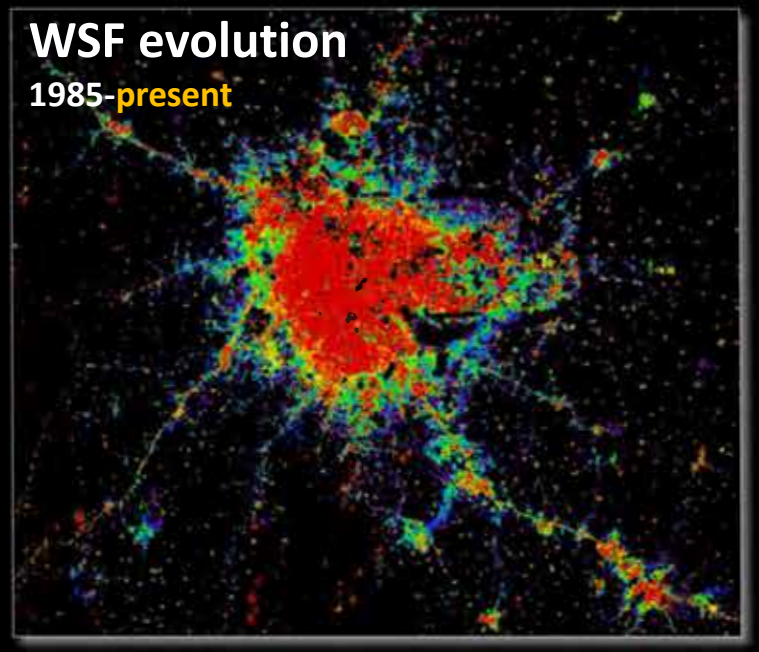



River buffers 60m
Probablistic flood model
(normal scenario)
> 15 cm (T=100)
Estimated construction time
No Settlement
01.2023 to 07.2023
07.2022 to 01.2023
01.2022 to 07.2022
07.2021 to 01.2022
01.2021 to 07.2021
07.2020 to 01.2021
01.2020 to 07.2020
07.2019 to 01.2020
01.2019 to 07.2019
07.2018 to 01.2019
01.2018 to 07.2018
07.2017 to 01.2018
01.2017 to 07.2017
07.2016 to 01.2017
before 07.2016
Ward boundaries
0
1
2 km
Chanika
Msongola


9

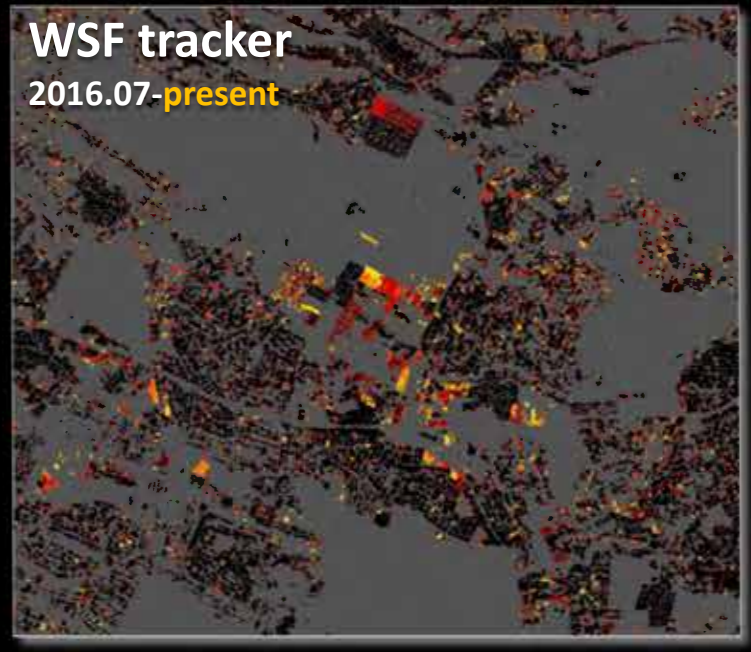
WSF evolution

1985-present



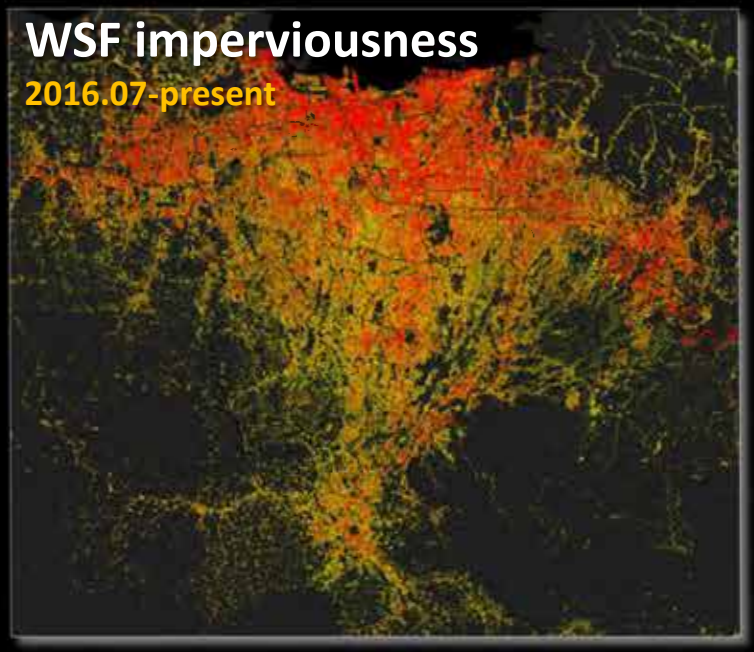
WSF tracker

2016.07-present

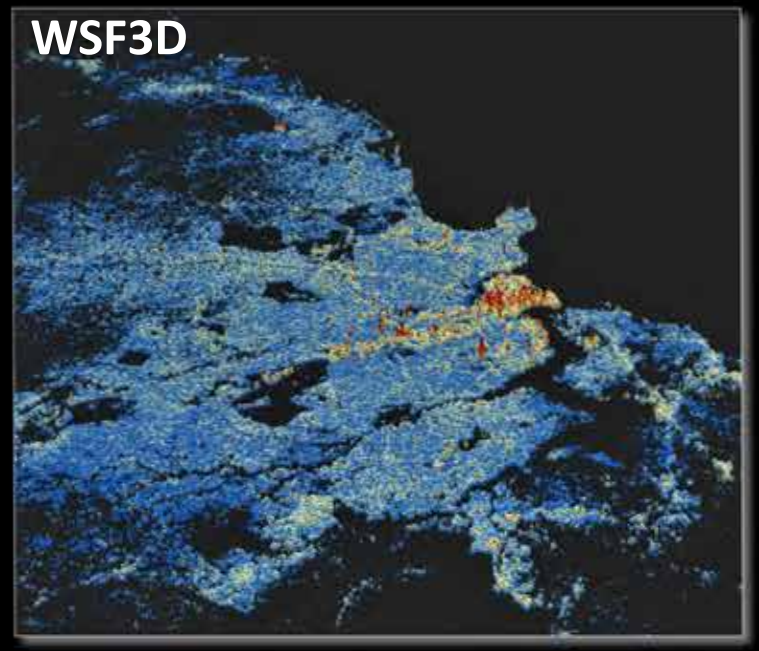


WSF imperviousness

2016.07-present

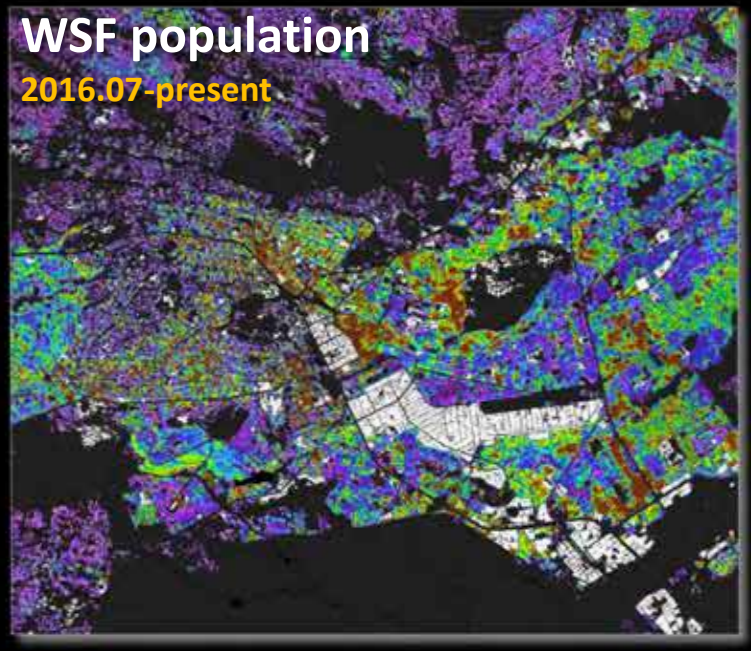


WSF3D



WSF population

2016.07-present



Want More on WSF?

Tomorrow 9:00 - 10:30
MC 4-800

Earth Observation Based Solutions to Leverage Development Assistance for Urban Planning and Development


That's all Folks!

WORLD BANK LAND CONFERENCE 2024

WORLD BANK GROUP

Strategies and Tools for Risk-Informed Urban Land Management:

Lagos Diagnostic and Pathway to Transformation

Authors: Fuad Malkawi, Oluwaseun Olowoporoku, Reyna Alorro, and Soraya Goga

Presented by: Reyna Alorro, Sr. Urban Development Consultant, World Bank

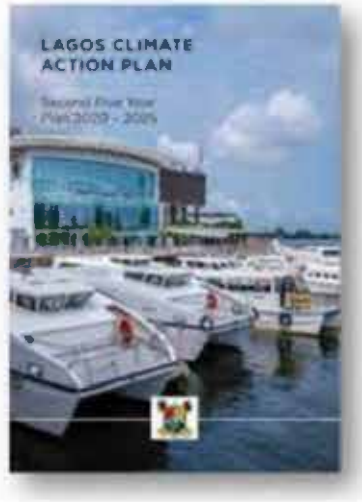
14 May 2024

CONTENTS

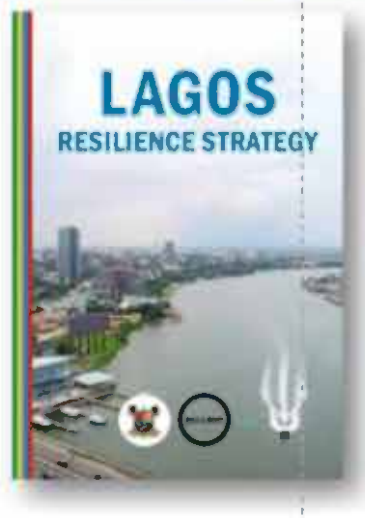
The Lagos State Government (LASG) set out the development vision and initiatives for the megacity in various plans and strategies

Lagos State Development Plan (LSDP)

Lagos Climate Action Plan 2020-2025 (CAP)



Lagos Resilience Strategy



Local Spatial Plans & Sectoral Plans

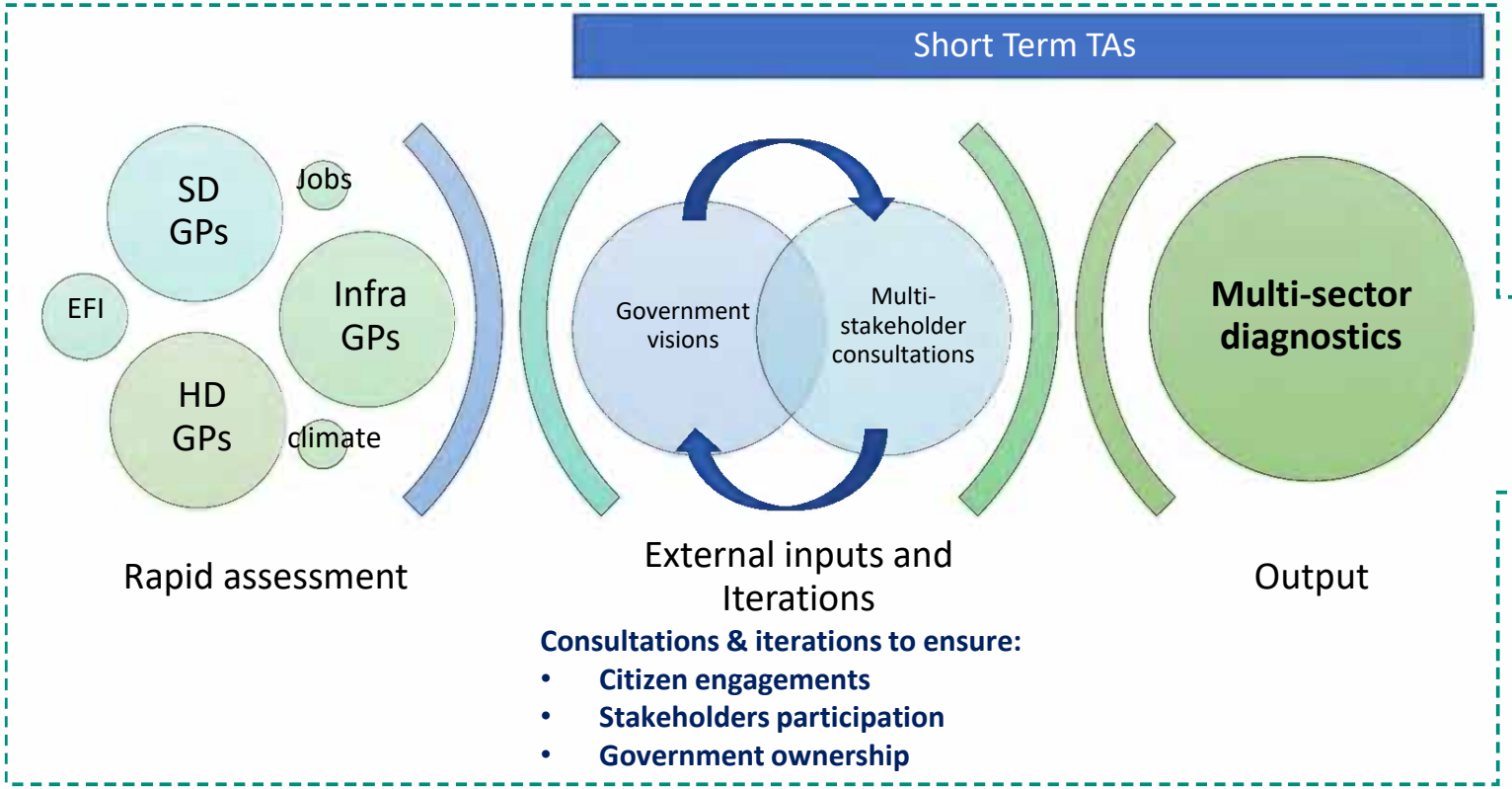
The LSDP proposes 417 initiatives and 77 capital projects to make Lagos "Africa's model megacity and global, economic, and financial hub"

The government's plans and agendas are on the right track, but there are gaps in ***technical capacity*** and ***catalytical interventions (including financing)*** to implement them.

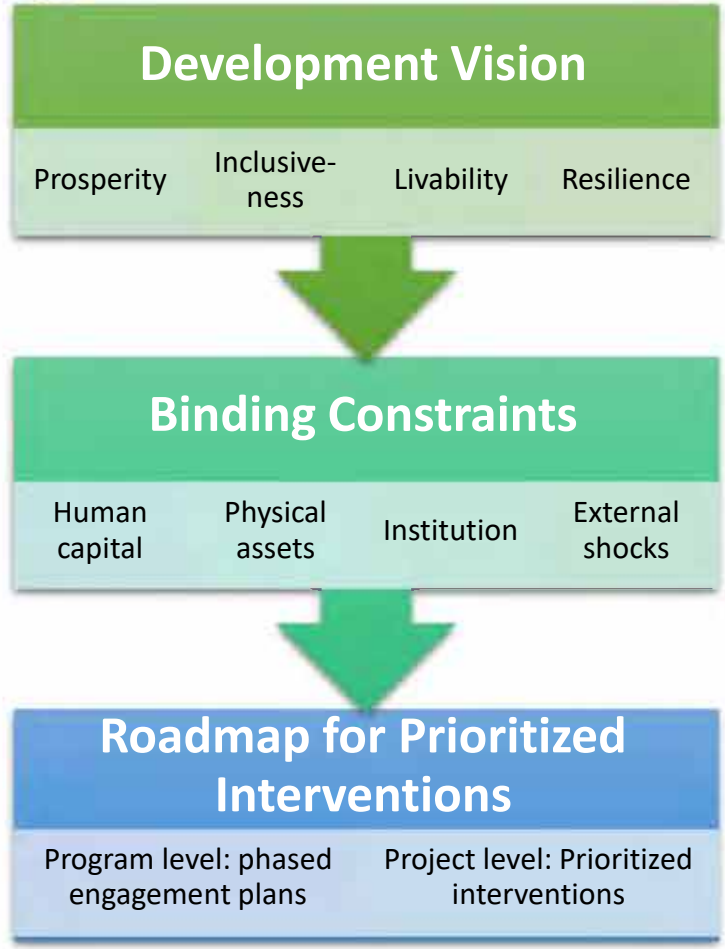
The Urban Development Platform:

An analytical tool developed by the WB for megacity transformation

1 Sector Diagnostics

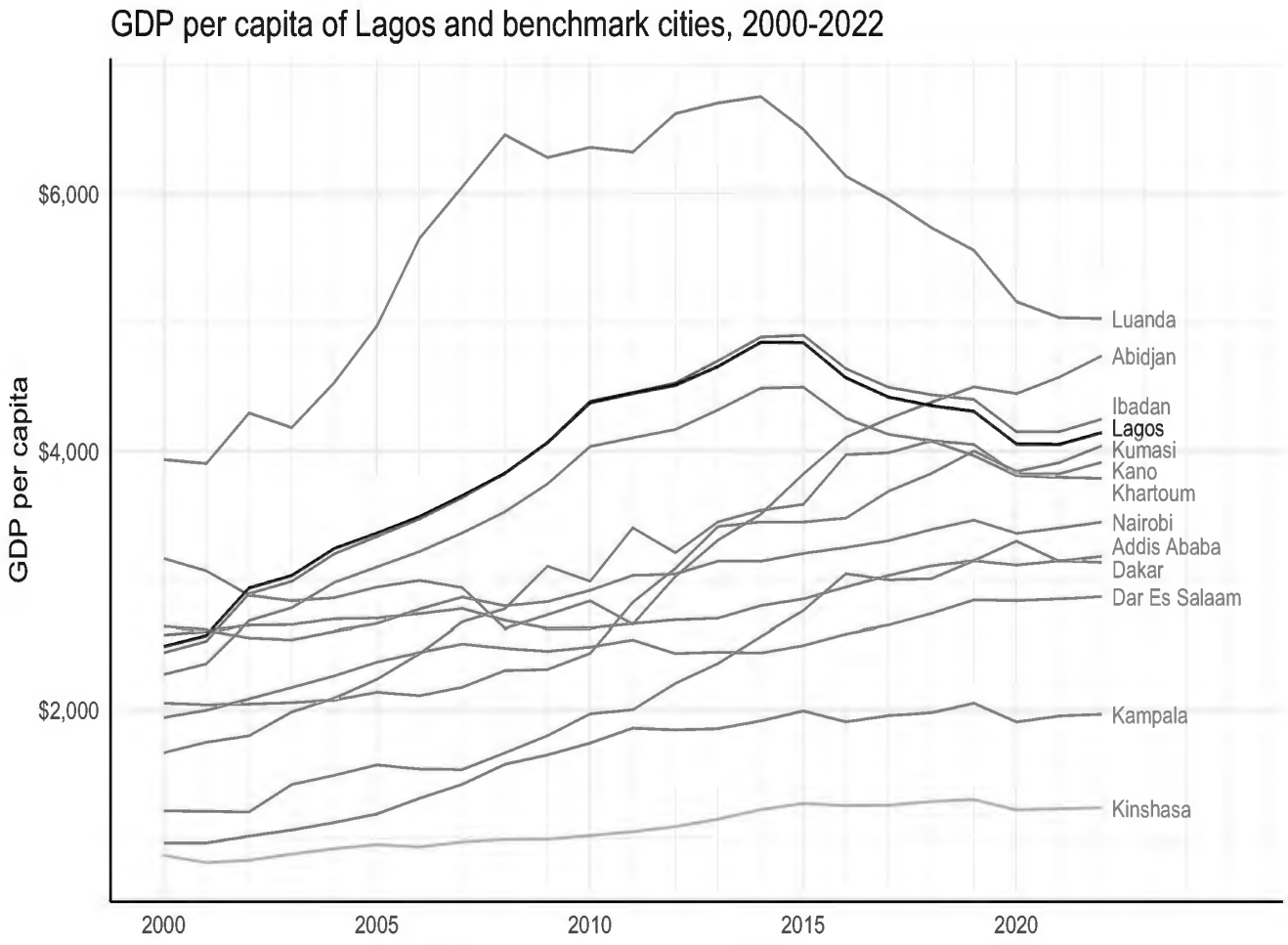


2 Engagement Framework



Successfully applied in world megacities such as Addis Ababa, Colombo, Dhaka, Karachi, and Zanzibar

1. Lagos is central to Nigeria's economy, but economic growth is stagnating while poverty remains high

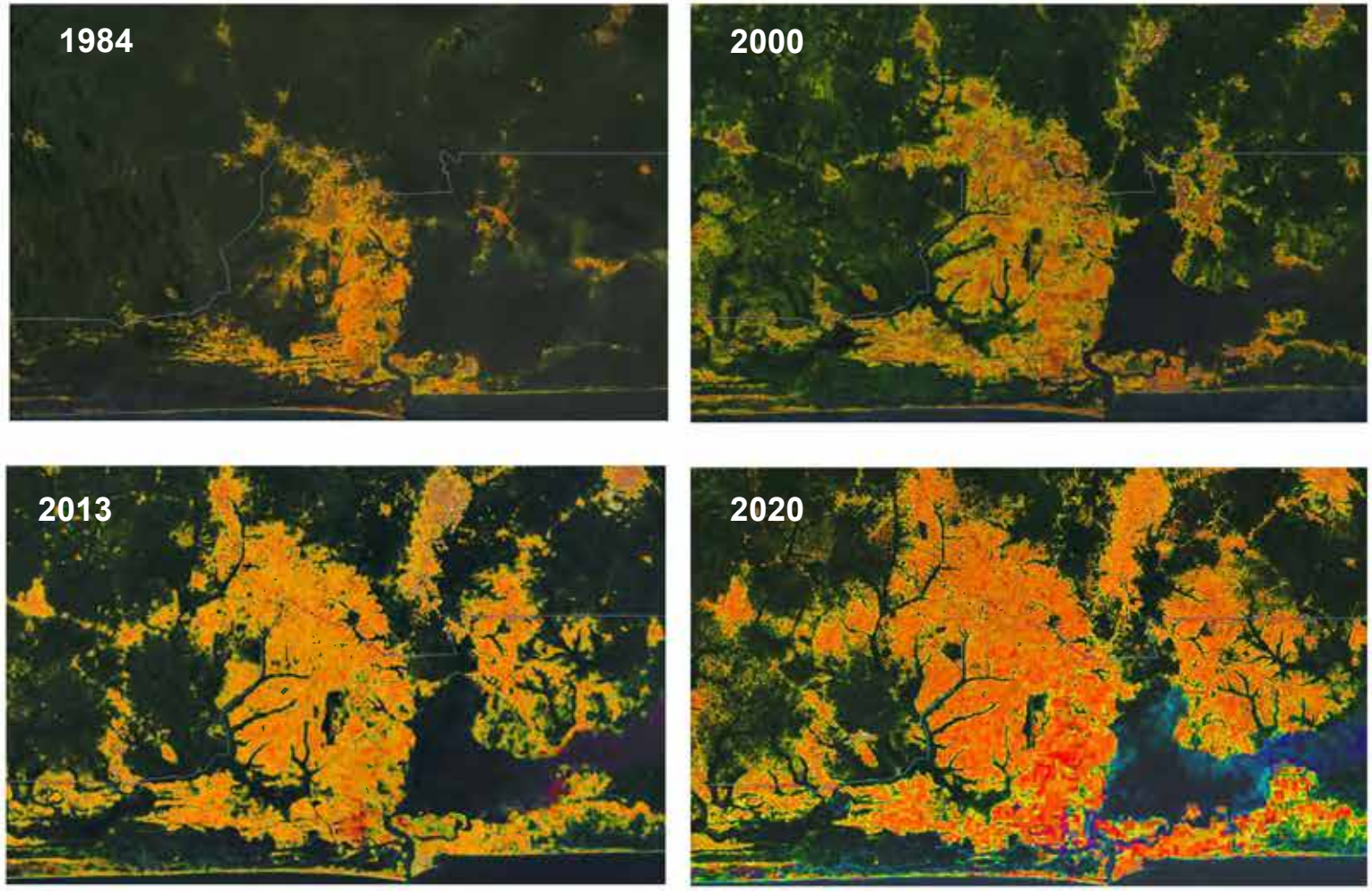


Source: Oxford Economics, 2022, "Competitive Cities Database".

- While Lagos constitutes **only 8% of Nigeria's population, the state generates ~22% of Nigeria's GDP.**
- **GDP growth greater than that of the country's growth** (5.8% vs. 5.2% between 2003-2019).
- **BUT GDP per capita has declined since 2015 to pre-2010 level.**
- **Informal sector plays a major role:**
  - Contributes about one-third of the economy, but also contributes to low productivity.
  - 45% informal employment, almost 42% of working age population is under- or unemployed.
- Lagos is the state with the lowest poverty rate (4.5%), yet **almost 80% of households are classified as poor** according to LASG.

2. Lagos is growing rapidly, both in population and space

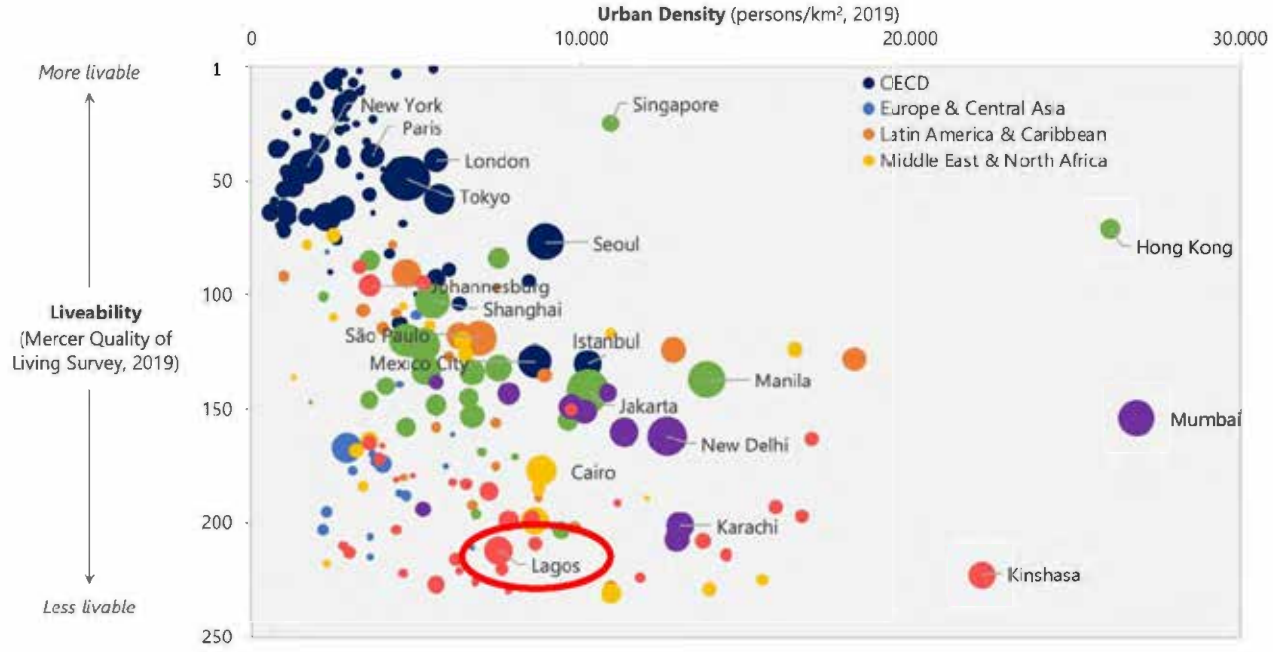
- Lagos is one of the largest and fastest growing mega-cities in Africa, with ~20 million:
    - Population annual average growth rate is 3.2%, above the national growth rate of 2.6%.
    - Lagos is projected to become the world's most populous city by 2100, with 88.3 million.
- Built-up area average annual growth rate of 2.6% since 2000.
- Urban expansion taking place beyond the metropolitan area, along peripheral areas as well as reclamation of water bodies along Epe, Badagry, and Ibeju-Lekki local government areas (LGAs).
- In the north, sprawling growth continues beyond the state's borders to neighboring Ogun state.



Source: Google Earth

3. Rapid urban growth comes with challenges: low livability, a huge housing deficit, and inadequate provision of infrastructure and services

- **Lagos ranked as the 2nd least livable city** out of 172 global cities (EIU Global Livability Ranking 2022).
- **Housing deficit of ~3.3 million units,** with 87% of the need for low and very low-income households.
- **Over half of the population live in informal housing**; over 140 slums identified.
- **Only 14% of households receive steady, reliable supply of electricity** (>8 hours per day).
- **Waste management and water issues:**
  - Waste collection rate is 20-30%; only 13% of recyclable waste is recycled.
  - Only 35% of the population has access to the public water supply; only 5% is connected to the public sewerage system.
- **Poor mobility** due to heavy reliance on road transport (98%) and insufficient transport infrastructure: **commuters spend an average of 4 hours daily in traffic.**



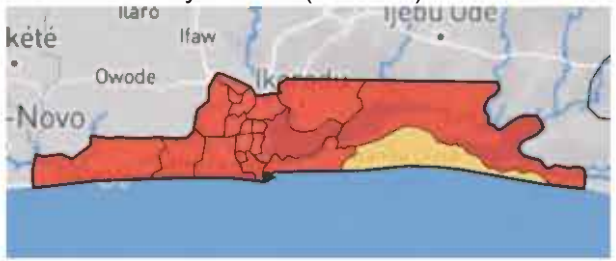
Sources: Mercer Quality of Living Survey (2019); United Nations Statistics Division (2014)

4. Development is taking place in a context of increasing natural disasters and climate change

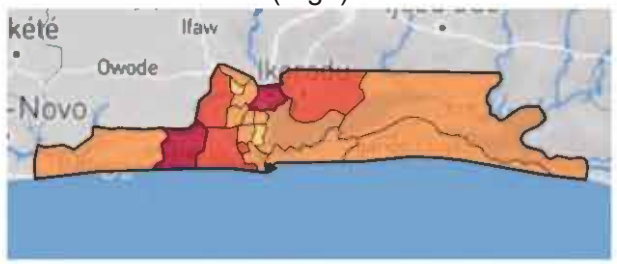
Rapid population and spatial growth of Lagos are taking place in a context of increasing natural disasters and climate change, threatening the mega-city's resilience

River flood hazard (High)

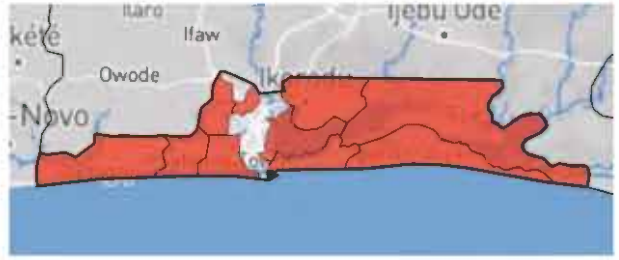
Water scarcity hazard (Medium)



Urban flood hazard (High)

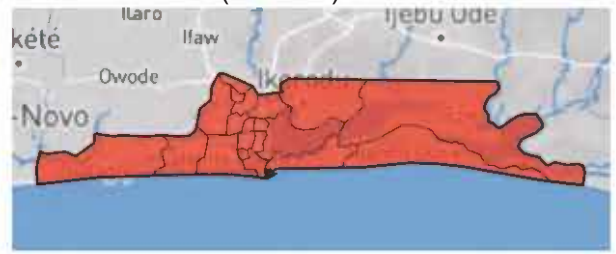


Extreme heat hazard (Medium)



Coastal flood hazard (Medium)

Wildfire hazard (Medium)



Source: GFDRR. *ThinkHazard! Lagos.* https://thinkhazard.org/en/report/2230-nigeria-lagos

- Flood damage (to assets, economic production and mortality) are estimated to cost almost $4 billion each year.
- The coastline is eroding at an average annual rate of 8% (8.2 meters per year). Loss of assets, economic production and land as a result of coastal erosion are estimated to cost $1.7 billion annually.
- Urban expansion has taken place through deforestation, the reclamation of water bodies and the reduction of green spaces, which are major drivers for temperature increases and for biodiversity loss in urban areas.
- Uncontrolled spatial expansion of the built-up area has increased the state's exposure to natural disasters, a trend that will worsen with climate change.

ThinkHazard! Hazard Levels
- High
- Medium
- Low
- Very Low

5. Buildings and infrastructure systems, together with urban sprawl, are major contributors to pollution and carbon emissions, exacerbating climate risks

- The highest share of GHG emissions is from stationary energy: residential buildings account for 21% of these emissions, manufacturing accounts for 23%, while commercial activity accounts for 11%.
- The transportation sector accounts for 20% of GHG emissions in Lagos.
- Pollution is mainly associated with improper solid waste/plastic disposal: the waste sector contributes the largest share of particulate matter (PM2.5) at 32% and is the third largest source of GHG emissions in Lagos.

6. Significant investment is needed to close the infrastructure gap and to upgrade to climate-smart systems

- Lagos needs **over USD 50 billion** [1] to address its investment gaps.
- By comparison, Lagos has managed to invest ***less than USD 1 billion annually over the last decade.*** [2]
- **At current levels of capital spending, it will take 50 years for Lagos to address the investment gaps.**

[1] & [2] IFC/WBG. 26 May 2021. Concept Endorsement and Approval Note for Blended Finance Committee for the Lagos City Infrastructure project (40065)

Summary of Key Challenges for Lagos

Rapid population growth: 3.2% state population AAGR compared to 2.6% national pop AAGR, while Lagos is ranked among the least livable cities in the world.

Unsteady electricity: Only 14% of households receive steady, reliable supply of electricity (>8 hours per day).

Housing deficit of ~3.3 million units, with 50-75% of the population living in informal housing.

High flood risk: High risk of river and urban flood and highly exposed to coastal erosion, with flood damages estimated to cost almost $4 billion each year and coastal damage estimated at approx. $1.7 billion each year.

Poor urban mobility: Heavy reliance on road transport (98%) and insufficient transport infrastructure result in commuters spending an average of 4 hours daily in traffic.

Low access to water supply and sanitation services: Only 35% of the population has access to the public water supply; only 5% is connected to the public sewerage system.

Limited waste management services: Waste collection rate is 20-30% and only 13% of recyclable waste is recycled. Dumpsites are far overloaded.

Climate risks: Buildings, transportation and the waste sector are major contributors to GHG emissions while improper solid waste/plastic disposal is the main source of air pollution, contributing 32% of particulate matter (PM2.5).

Four main constraints are holding Lagos back from fully realizing its development potential

Main Constraints / Drivers of Change:

1. **Ineffective urban planning system** holds down sustainable growth and exacerbates informality
2. **Fragmented land administration** stymies affordable housing development, exacerbates informality, hampers economic development and limits revenues
3. **Weak urban governance and finance systems** to deliver sufficient housing and services needed to meet the demands of Lagos' growing population
4. **A lagging business environment** inhibits private development, productivity and inclusive economic growth

Three core challenges constrain the functioning of a healthy land market in Lagos:

1. **Most land claims are insecure** and even state-granted titles can be revoked
2. **High barriers and costs to register land** result in extremely low registration, exacerbating informality and vulnerability to forced eviction
3. **Governments have limited land information and limited use of digitization,** hampering strategic and sustainable urban development

Multi Sector Diagnostics

Development Trends & Challenges

Guiding Principles

Government Programs and Plans
Vision, Goals and Objectives

Constraints & Opportunities
Prioritization Process

Areas of Intervention

1. Strengthen Urban Governance, Planning and Finance Systems

2. Activate land markets to grow the formal housing sector

3. Foster economic development and inclusive growth

4. Invest in Climate-Smart Infrastructure and Services

Recommendations

1.1: Strengthen urban management and service delivery through **governance reform, cross-sectoral digital coordination,** and **technical and financial capacity building.**

1.2: Support sustainable urban growth of Lagos through **community-driven and climate and disaster-risk informed spatial planning and development.**

2.1: Improve land administration through **complete digitization of regularization process and capacity building** to increase tenure security, foster better planning and urban development, enable private investment and support increased property tax revenue generation.

2.2: Increase access to formal, affordable and climate- and disaster-proofed housing through **comprehensive planning, increased private sector participation, innovative design, housing finance and slum upgrading programs.**

3.1: Prioritize infrastructure investment that creates jobs and promotes economic development.

3.2: Enhance process of doing business.

3.3: Support inclusive economic development.

4.1: Improve urban mobility through development of an enhanced transportation network that is integrated, multi-modal and supports carbon emissions reduction.

4.2: Develop an integrated solid waste management system (waste minimization, collection, separation and treatment) through comprehensive planning, investment and capacity building.

4.3: Increase access to water supply and sanitation services and develop an integrated water management system that coordinates water supply, sewerage, stormwater drainage, wastewater treatment, solid waste management and land use planning.

4.4: Increase access to reliable energy through implementing policy reform and supporting renewable energy sources, such as solar.

Stakeholder Consultations

The framework ultimately aimed to transform the LASG's 400+ initiatives into a prioritized set of implementable projects across different sectors

tool for the government

actual fundable projects

A *List of Identified Projects* was developed to advance the outcomes of key government visions and strategies. The projects were selected for their alignment with the government's objectives, as stated in strategic documents and plans, and dependent on their implementation potential.

The Multi-Sector Engagement Framework builds on the key findings of the Multi-Sector Diagnostic

Intervention Area 1: Strengthen Governance, Planning, & Finance Systems	Intervention Area 2: Invest in Integrated Climate-Smart Infrastructure and Services	Intervention Area 3: Activate Land and Housing Markets	Intervention Area 4: Foster Economic Development and Inclusive Growth
Projects support creating modern, digitized systems that ease planning and fiscal operations	Projects support key improvements in infrastructure for climate resilience and spatial development	Projects support policy interventions that stimulate housing production and improved livability conditions	Projects support the development of key infrastructure to support businesses

Projects grouped in 4 buckets that combine interrelated sectors/technical areas and act as umbrellas for implementable sub-projects

Bucket A Institutional Strengthening	Bucket B Smart Infrastructure and Service Delivery	Bucket C Affordable Housing & Land	Bucket D Urban Mobility and Spatial Development
Governance	Solid Waste Management	Housing	Spatial Planning & Development
Automation of Services	Water	Land Development	Mobility/Transport
Capacity Building	Drainage		
Development Financing	Climate Adaptability		
	Energy		

The **List of Identified Projects** houses:

89 sub-projects across

13 technical areas & sectors

Implementation of framework entails focused interventions

Spatially targeted infrastructural investments that require a combination of **capital investments** and **institutional reforms**

Example

Short-term projects for Apapa

A Green Infrastructure Programme The Apapa Model City Plan 2032 underscores the need to build a robust network of green infrastructure to address the shortage of population to open space ratio and provide for spaces of natural aesthetics.

The green infrastructure programme consists of:

1. Investment Projects

A. **Public Spaces Project**
   - Rehabilitate 6 existing parks by selecting a combination of sector parks, linear parks, neighbourhood parks, and school parks.

B. **Street Improvements**
   - Rehabilitation of 30km of inter-neighborhood roads.
   - Retrofitting 30 km of roads with cool pavement.
   - Upgrade main streets: equip with street furniture (shading devices, bus stops, planting trees, etc.)

C. **Drainage Infrastructure Improvements**
   - Rehabilitating primary drainage channels.
   - Rehabilitating existing secondary drainage systems that feed the primary channels.

Image Source: Lagos State Government. Ministry of Physical Planning and Urban Development, Final Report, The Apapa Model City Plan 2012 2032, p.173.

Implementation of framework entails focused interventions

Example (con't)

2. Technical Assistance for Institutional Reforms

Short-term projects for Apapa

A. **Improve Parking Management**
   - Introduce new tools to manage parking and assist in the pilot application of these tools in two districts.

B. **Inclusive & Sustainable Urban Design Guidelines**
   - Develop urban design guidelines that respond to climate vulnerabilities and reduce GHG emissions which include bioremediation landscape solutions; the use of permeable materials to absorb and filtrate water runoff; shade and cooling; and vegetation to cleanse polluted air.

C. **Policy Recommendations for Legal Protection of Open Spaces**
   - Develop a set of recommendations for legal amendments that safeguard the integrity of the open space network and stipulate development regulations around parks, lagoons, creeks, and canals.

Green Infrastructure Policy 3
Provision of planned furnished and maintained public spaces for social, cultural, economic, health and recreational benefits at all scales should be demographically-driven to respond to the prevailing needs of all age and economic groups at different time frames.

Source: Lagos State Government, Ministry of Physical Planning and Urban Development, Final Report, The Apapa Model City Plan 2012 2032, p.172.

Implementation of framework entails focused interventions

The framework also proposes medium- to long-term focused investments. Examples of proposed projects:

Development of New Multimodal Transport Gateway Hubs

- Construction of various bus terminals across the state in locations such as Agege, Abule-egba, Ojota, Iyana Ipaja etc.
- Construction of bus shelters

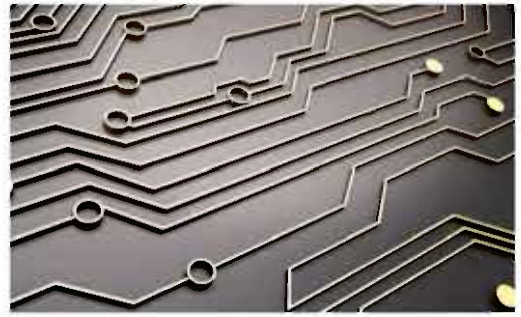
Construction and Rehabilitation of Critical Transportation Links & Build Truck Transit Parks

- Rehabilitate interstate roads and critical corridors selected by the Government including: Lekki-Epe, Gbagada-Apapa
- Develop multipurpose truck campuses

Flood Risk Assessment, Management, and Infrastructure

Establish a climate warning observatory and alert protocols for flood & extreme heat events

Digital Platform for Inter-Agency Coordination



Develop a database of infrastructure and utilities that are required to support urban development and management programs

The Lagos Platform for Development puts Lagos on the path to becoming a more livable, resilient, inclusive and prosperous megacity

- Through **a methodological approach**, the Lagos Platform for Development (LAPD) provided the LASG with **a tool to strategically prioritize and coordinate investments** to achieve the government's vision and realize the megacity's development potential.
- The LAPD involved several paradigm shifts, including shifting from disparate sector-based initiatives to **coordinated multi-sectoral interventions**.
- The platform promotes **integration and coordination between all sectors and actors involved in development of Lagos** to increase the effectiveness and impact of investments, in both the short and medium- to long-term.