

# Management of Social Services

**WEEK 11: INFRASTRUCTURE AS A SOCIAL  
SERVICE (Nature of infrastructure,  
Comparative analysis)**

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Recap – previous week

# Water and Sanitation Services

- Management of water and sanitation services in Uganda
- Comparative analysis
- Challenges of water and sanitation

*Fig. 1. Water and Sanitation – Gamma app*





## This Week ... ..

# Infrastructure as a Social Service

- Nature and scope of infrastructure services
- Status of infrastructure services in Uganda
- Status of infrastructure services in other countries (China, Kenya and Netherlands)

***Fig. 2. Infrastructure Services – Gamma app***



# Infrastructure Services in Uganda

Understanding the fundamental facilities and systems that support society's functioning and drive economic growth in Uganda.

***Fig. 2. Infrastructure Services – Gamma app***

# Understanding Infrastructure?

Infrastructure encompasses the fundamental facilities and systems essential for society's functioning. This includes transportation networks, utilities such as electricity and water supply, and communication systems that connect communities.

Well-developed infrastructure is crucial for economic growth, facilitating trade, enhancing productivity, and substantially improving quality of life for citizens across Uganda.

***Fig. 3. Infrastructure Services – Gamma app***



# Three Pillars of Infrastructure



## Transport Networks

Roads, railways, airports, and ports connecting communities

- 4,000 km of paved roads nationwide
- Kampala-Jinja Expressway project
- Ferry and boat services



## Electricity Supply

Power generation and distribution systems

- 23% current electrification rate
- Target: 60% access by 2027
- Rural Electrification Strategy



## Communication Systems

Digital infrastructure and connectivity

- 25% internet access nationally
- 65% mobile phone ownership
- National Backbone Infrastructure

# The status of Infrastructure in Uganda





# Transport Infrastructure;

1

## Road Transport

### Road Types & Access

57% of households report community roads as nearest type. Trunk roads include both tarmac and murrum surfaces, whereas feeder roads connect rural communities.

### Year-Round Usability

85% of households report roads usable all year, with urban areas experiencing significantly better conditions than rural regions.

**Fig. 4. Infrastructure Services – Gamma app**



## Maintenance Progress

Tarmac road maintenance improved from 61% in 2015 to 67% in 2021. Community and feeder road maintenance remains largely unchanged.

**Key constraints:** Bad weather, potholes, poor drainage, bushy roads, insecurity, and inadequate traffic management systems.

# Air Transport

Air transport serves limited households due to prohibitive costs. Service quality has varied over recent years, with improvements noted in some areas.

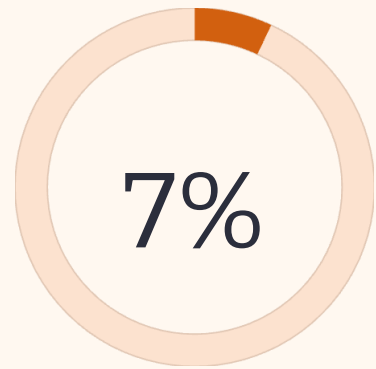
**Known safety measures:** Seat belt usage, proper hand luggage storage, and pre-flight safety briefings are gradually gaining awareness amongst passengers.



*Fig. 5. Infrastructure Services – Gamma app*

# Water Transport

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Household Usage

Down from 12% in 2015



Safety Awareness

Minimal understanding

Government provides ferry services whilst private operators dominate boat transport. Major challenges include bad weather, high costs, unreliability, and security concerns.



*Fig. 6. Infrastructure Services – Gamma app*

# Energy/ Electricity Infrastructure

Electricity Access: The Urban-Rural Divide

20%

46%

7.3%

33%

National Access

Urban Access

Rural Access

Solar in Rural Areas

Households using  
grid/mini-grid  
electricity for lighting

Significantly higher  
connection rates in  
cities

Limited grid connectivity  
in countryside

Alternative lighting  
solutions gaining  
traction

Electricity sources include the national grid, local mini-grids, solar home systems, solar lanterns, generators, and rechargeable batteries. The government's ambitious target aims to increase access to 60% by 2027, with emphasis on renewable energy sources.

Fig. 7. Infrastructure Services – Gamma app



# Electricity Reliability Concerns

## Daily Availability

Households report electricity available for an average of **17 hours per day**, indicating persistent supply gaps affecting productivity and daily life.

## Load Shedding Frequency

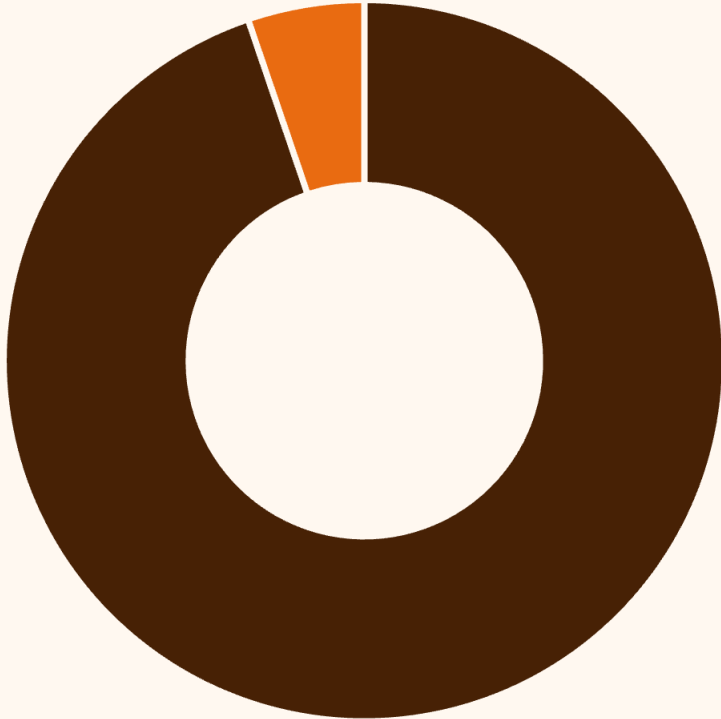
Power cuts occur approximately **three times weekly**, with total duration reaching 18 hours, disrupting business operations and household activities.

## Enterprise Impact

**26% of enterprise operators** experienced power outages in the last month, with urban businesses facing higher outage rates than rural enterprises.

# Energy in the Education Sector

## Energy Usage in Schools



■ Firewood

■ Other Sources

An overwhelming **94% of primary schools and 97% of secondary schools** rely on firewood for cooking, highlighting the need for sustainable energy solutions in educational institutions.

# Communication Infrastructure



*Fig. 8. Communication Services – Gamma app*

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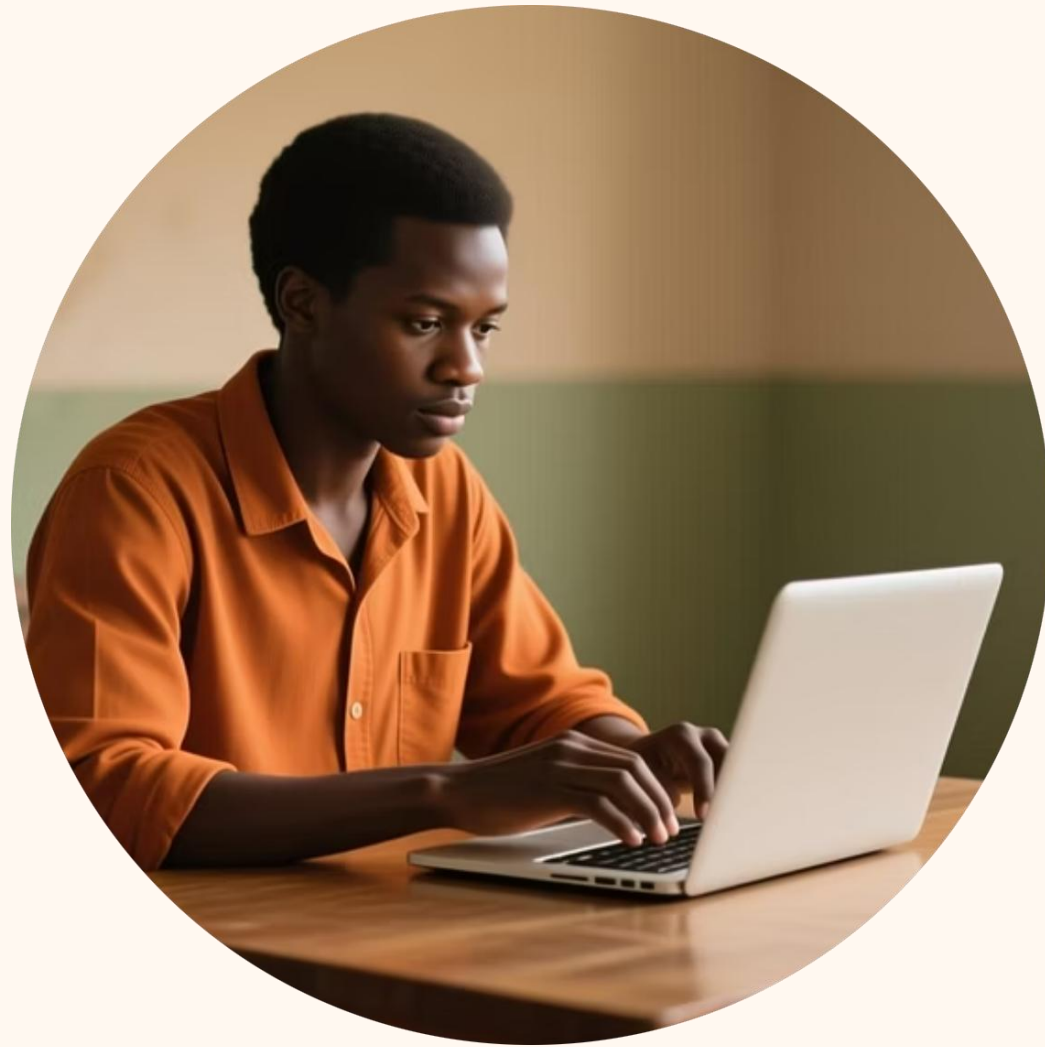
## Mobile Connectivity

**65% of persons aged 15+** own mobile phones (54% ordinary, 9% smartphones). Urban ownership rates substantially exceed rural areas, driving digital inclusion efforts.

# Communication Infrastructure

2

## Internet Usage



Only **9% used internet** in the last three months, primarily for social networking, academic work, and news. Urban usage significantly outpaces rural connectivity.

*Fig. 9. communication Services – Gamma app*



**Fig. 10. Communication Services – Gamma app**

Government online services awareness stands at just 13% amongst persons aged 15+, increasing with education level and urban residence.

3

## Information Access

**75% access through mobile phones, 67% radios, 25% televisions.** Traditional media remains crucial, particularly in rural households with limited digital access.

# ICT in the Education Sector

## ICT Adoption Growth

**82% of secondary schools** have introduced Information and Communication Technology for teaching, communication, and records management, representing significant progress in digital education.

*Fig. 11. Communication Services – Gamma app*

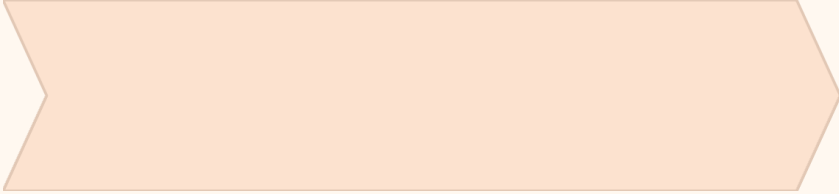


# Infrastructure Development: The Path Forward



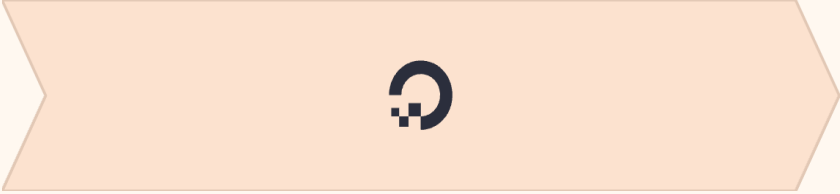
## Transport Enhancement

Continue tarmac maintenance improvements whilst addressing persistent challenges in community roads



## Energy Expansion

Accelerate electrification to meet 60% target by 2027 through renewable sources and grid reliability



## Digital Inclusion

Bridge connectivity gaps through National Backbone Infrastructure and increase awareness of online services

Sustained investment in infrastructure as a social service remains essential for Uganda's economic growth, improved productivity, and enhanced quality of life for all citizens.

# Nature and status of Infrastructure Services: International Comparison

*Fig. 12. Infrastructure Services – Gamma app*



# Global Infrastructure Landscapes

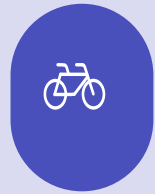
A comparative analysis of transport,  
communications, and energy systems across three  
diverse nations:

The **Netherlands**, **Kenya**, and **China**.



# Transport Infrastructure Overview

Modern transport networks are the backbone of economic growth and social connectivity. From Europe's cycling culture to Africa's emerging corridors and Asia's high-speed revolution, each nation charts its own path.



## The Netherlands

Sophisticated multimodal networks featuring world-leading cycling infrastructure, extensive railways, and Europe's busiest port in Rotterdam.



## Kenya

Rapid development with modern highways, the new Standard Gauge Railway, and expanding urban transit systems in Nairobi and Mombasa.



## China

Unparalleled scale: the world's largest high-speed rail network, extensive motorways, and massive port facilities dominating global trade.

# The Netherlands: Transport Excellence

## World-Class Connectivity

The Dutch transport system is a perfect example of integrated planning.

### Railway transport

The dense rail networks connecting every major city through;

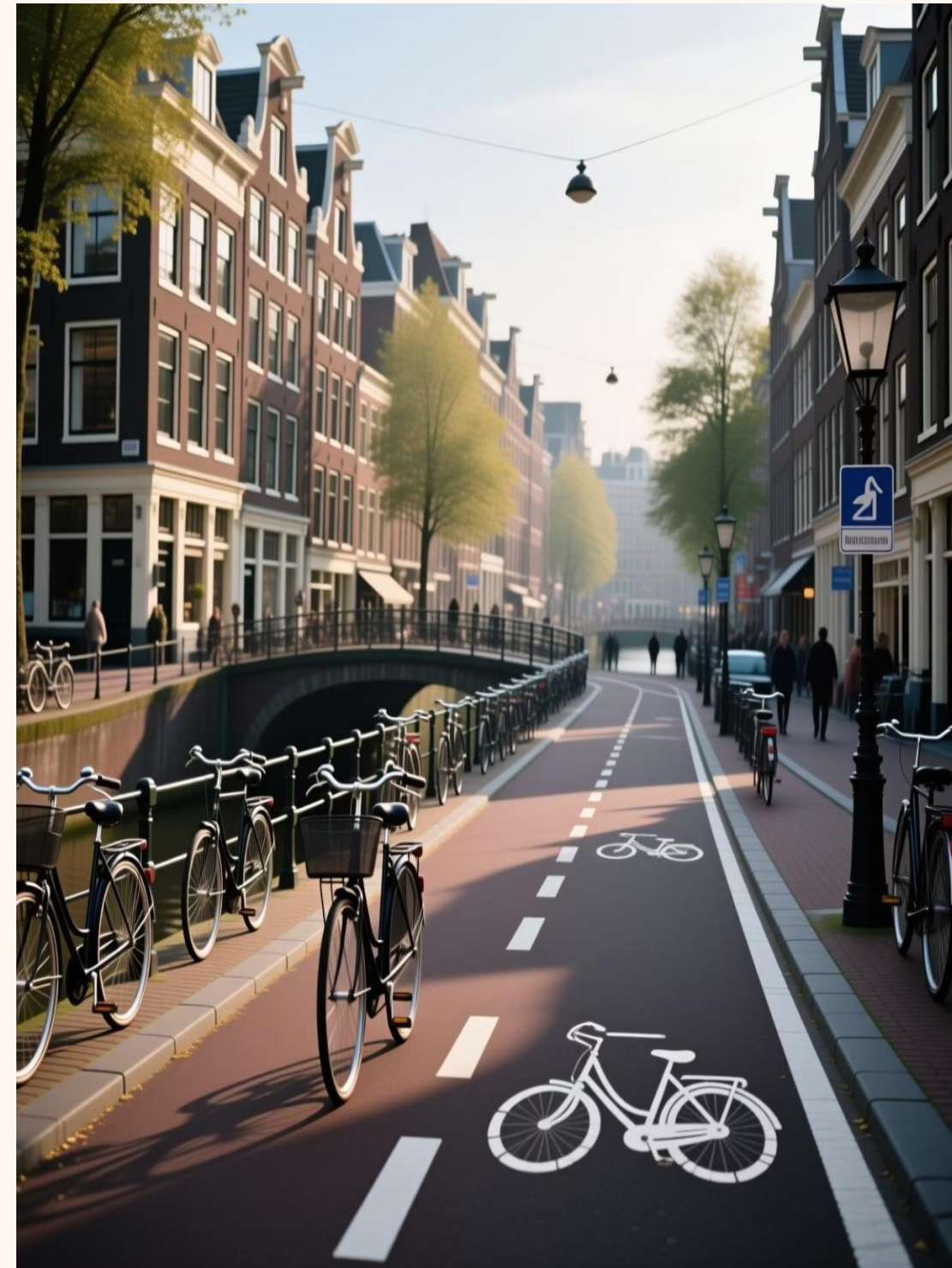
- ❖ Speed trains

- ❖ Trams

- ❖ Metro systems

### Air transport

Amsterdam Schiphol airport serves as a global aviation hub while Rotterdam's port handles 469 million tones annually.



*Fig. 13. Infrastructure Services – Gamma app*

## Water transport

Rotterdam's port handles 469 million tonnes annually.

Water transport includes ferries and water buses, reflecting the nation's maritime heritage

## Road transport

Road quality ranks amongst Europe's finest, with intelligent traffic management reducing congestion. complemented by over 37,000 kilometers of dedicated cycling paths.



# Kenya: Building Modern Corridors

Kenya's transport infrastructure has undergone remarkable transformation.

1

Road transport

Urban Transit

Nairobi Expressway and planned Bus Rapid Transit systems modernising city transport infrastructure.

Road Networks

177,800 km total, with ongoing tarmacking projects improving connectivity to rural areas and neighbouring countries.



Fig. 14. Infrastructure Services – Gamma app

2

## Railway transport

### Standard gauge railway

The Standard Gauge Railway connects

Nairobi to Mombasa

Reduces journey times from 12 hours to

4.5hrs

3

## Air transport

### Aviation Growth

Jomo Kenyatta International Airport  
expanding capacity, positioning Kenya as

East Africa's transport hub.



# China: Infrastructure at Unprecedented Scale

## Railway transport

**42K**

High-Speed Rail

Kilometres of track connecting hundreds of cities at speeds exceeding 300 km/h.

Urban metro - 45 cities with metro system

## Road transport

**168K**

Motorway Network

Kilometres of expressways, the world's longest highway system.

*Fig. 15. Infrastructure Services – Gamma app*



## Air transport

Rapid airport infrastructure expansion

## Water transport

7

Busiest Ports

Chinese ports amongst the world's top 10, dominating global maritime trade.



# Communications Infrastructure: Digital Foundations

Telecommunications and internet connectivity drive modern economies. Digital infrastructure determines competitiveness, innovation capacity, and social inclusion across all three nations.

## The Netherlands

Near-universal broadband coverage with 99% connectivity. Extensive fibre-optic networks deliver some of Europe's fastest internet speeds. Amsterdam hosts major data centres serving global tech companies.

## Kenya

Mobile-first infrastructure with 90% network coverage. Pioneering mobile money systems like M-Pesa. Submarine cables landing in Mombasa provide international connectivity, driving digital innovation.

## China

World's largest 5G network with over 3 million base stations. Advanced digital infrastructure supporting e-commerce, fintech, and smart city initiatives. Government-led expansion bridging urban-rural divides.

# Energy Infrastructure: Powering Progress

## Diverse Energy Landscapes

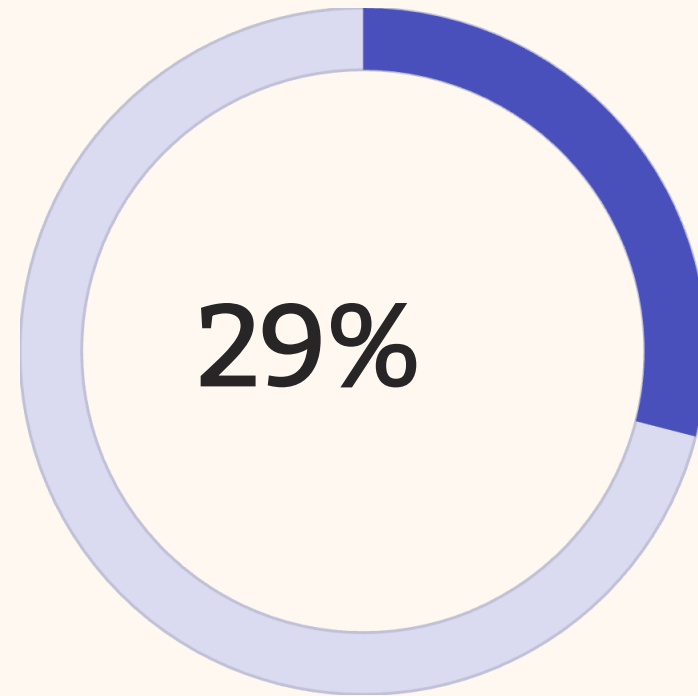
Energy security and sustainability define national priorities. Each country balances reliability, affordability, and environmental objectives through distinct infrastructure strategies and resource endowments.

*Fig. 16. Infrastructure Services – Gamma app*



# Netherlands: Renewable Energy Transition

## Renewable Share



Percentage of electricity from renewable sources in 2023, rapidly increasing.

## Grid Reliability



Near-perfect electricity access with minimal outages and sophisticated distribution.

The Netherlands combines offshore wind farms in the North Sea, solar installations, and natural gas infrastructure. The national grid interconnects with neighbouring countries, ensuring energy security. Ambitious targets aim for climate neutrality by 2050, driving substantial investment in renewable capacity and storage solutions.

# Kenya: Green Energy Leader

## Geothermal Power

Substantial capacity from the Rift Valley, providing over 40% of electricity generation.

## Renewable Focus

Over 90% of installed capacity from renewables including hydro, geothermal, wind, and solar sources.

## Grid Expansion

Rural electrification programmes increasing access from 28% (2013) to 75% (2023).

# China: Massive Scale Transformation

## Coal Dominance



Still 60% coal-fired generation, though declining as percentage while absolute renewable capacity soars.

## Grid Sophistication



Ultra-high-voltage transmission lines connecting remote generation to coastal demand centres efficiently.

## Renewable Investment



World's largest solar and wind capacity, adding gigawatts annually at unprecedented rates.

# Key Insights: Infrastructure as Destiny

## Development Stages

Infrastructure reflects and enables economic development. The Netherlands optimises mature systems, Kenya builds foundational networks, and China operates at unprecedented scale.

## Sustainability Imperative

All nations increasingly prioritise renewable energy and low-carbon transport, though timelines and capacities differ substantially.

## Digital Convergence

Communications infrastructure shows fastest convergence, with mobile-first strategies enabling developing nations to leapfrog traditional models.

## Investment Priorities

Strategic infrastructure investment determines future competitiveness, requiring sustained political commitment and innovative financing mechanisms.

# Conclusions

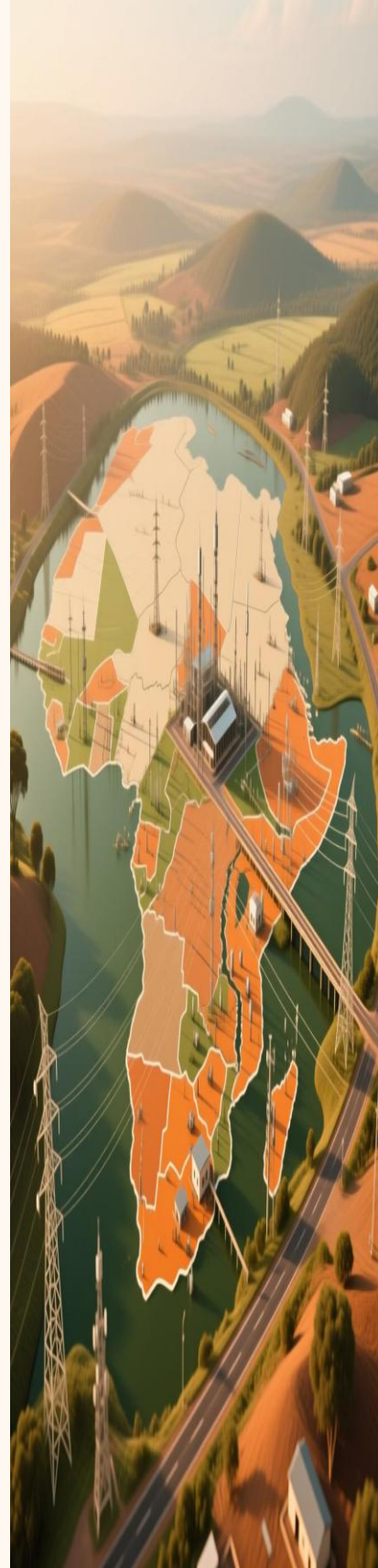
The analysis of the four countries reveals a clear infrastructure development continuum from basic access – represented by Uganda, to world-class integrated systems of the Netherlands, with each country facing distinct challenges based on their economic development stage.

Significant in developing nations is the rural-urban gap in infrastructure provision, which is minimal in advanced economies. In addition, advanced economies show better sector integration in infrastructure planning.

Netherlands excels in infrastructure upkeep while developing nations struggle with the poor maintenance culture. Uganda's 9% internet access viewed in the eyes of Netherlands' 98% shows extreme global disparity – the digital divide

For energy infrastructure, all countries are moving toward renewables but at vastly different paces.

Uganda needs to up her game in integrated planning, financing and deliberate implementation



# Reference list

- Figure 1. Water and Sanitation, Gamma app
- Figure 2-7, 12-16. Infrastructure services, Gamma app
- Figure 8-11. Communication infrastructure, Gamma app
- World Economic Forum (WEF). (2019). *The Global Competitiveness Report 2019*
- Ministry of Infrastructure and Water Management, Netherlands. (2020). *Mobility Report 2020*
- Kenya National Bureau of Statistics (KNBS). (2023). *Economic Survey 2023*. Nairobi: KNBS.
- African Development Bank (AfDB). (2022). *East Africa Regional Transport Infrastructure Program Appraisal Report*.
- World Bank. (2023). *Digital Progress and Trends*

# Next week

## Infrastructure Services:

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- Comparative analysis