GOVERNMENT OF THE REPUBLIC OF NAMIBIA

A blueprint for Namibia's green industrialisation

August 2024

CONFIDENTIAL

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Part A

Where we stand

Great economic strides have underpinned sustained socioeconomic progress. Yet growth has slowed since 2015. Five economy-wide constraints are hindering a turnaround. It is high time to realise a new growth agenda – one that supercharges productivity, builds domestic skills, opens new markets, channels private investment, and enhances climate resilience.

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Part B

A new growth agenda

The world is changing quickly as it accelerates towards net zero. New markets are emerging for nations that can respond to revised global priorities. Green industrialisation is the growth trajectory that binds global, regional, and domestic agendas. Seizing the moment requires parallel development of public infrastructure enablers and private investments.

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Delivering the blueprint

Green industrialisation can increase productivity, deliver high-skill jobs, create new markets, attract FDI, and position Namibia as a climate leader. In doing so, Namibia can foster strategic cooperation, trade, and enhanced prosperity for southern Africa. Syndication of a comprehensive green industrialisation strategy is necessary to mobilise the required resources.

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Catalogue of investments

Realising priority infrastructure requires unprecedented resource mobilisation, that will need to target global markets and bilateral partners. In parallel, a shortlist of prioritised target industries have been identified that can spearhead the attraction of investors in modern, value-adding, employment-generating industries.

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Foreword

Namibia stands at the threshold of a transformative era, poised to harness her abundant natural resources and strategic advantages to forge a sustainable, prosperous future. Under the tutelage of our Minister of Industrialisation and Trade we have crafted Namibia's Green Industrialisation Blueprint, representing a pivotal roadmap for our nation's journey towards economic diversification, environmental stewardship, and social progress.

Guided by the visionary thinking of the 3rd President of the Republic of Namibia, Dr Hage Gottfried Geingob — and building on the Economic Advancement pillar of the Harambee Prosperity Plan II — this blueprint charts a pathway for Namibia to leapfrog into green and sustainable industrialisation. At its heart lies the immense potential of hydrogen, a clean energy carrier that promises to position the country as a frontrunner in the unfolding and inevitable energy transition.

The objectives set forth in this document are ambitious yet achievable. On one hand, this blueprint outlines the way in which our vast solar and wind resources, coupled with our strategic location and stable political environment, provide a unique opportunity to create a thriving green hydrogen industry, attracting investment, fostering innovation, and generating thousands of skilled jobs for our people. On the other, it encompasses the creation of extensive downstream opportunities that will add value to our natural resources while creating significant economic opportunity. Moreover, the strategy aligns perfectly with our climate action commitments, taking concrete steps to reduce our carbon footprint while preserving our unique natural environment.

In the Harambee Prosperity Plan II, President Geingob noted: "We cannot achieve the goal of a prosperous Namibia if we do not deepen regional integration and Pan-African solidarity. For this reason, our goals for a prosperous and inclusive Namibia will remain closely aligned with the plans of the Southern African Development Community (SADC) and Agenda 2063: The Africa We Want of the African Union."

The success of Namibia's green industrialisation goals, therefore, hinge on collaboration and partnerships with our regional and global peers. We call upon all stakeholders — government, the private sector, academic institutions, and civil society — to engage actively with this strategy and contribute to its implementation.

James Mnyupe
Green Hydrogen Commissioner

Dr. Hage G. Geingob
(1941-2024)

To the memory of His Excellency Dr. Hage G. Geingob, the late President of the Republic of Namibia.

His visionary leadership and unwavering commitment to prosperity and economic transformation have been instrumental in shaping this blueprint, laying the foundation for Namibia's green energy future.

A Where we stand

Significant socioeconomic progress

Great strides have been made since Independence. Significant economic growth, which has outperformed regional peers, has enabled a remarkable improvement in socioeconomic performance across the board.

KEY SOCIOECONOMIC INDICATORS

% change 1990 to 2023

+3.5%

Average growth rate far outperformed peers.

GDP

-50%

People living below the poverty line has halved during the period.

Poverty

+100%

55% of the population now has regular access to electricity.

Electricity access

+100%

Per capita income has doubled (in constant USD terms).

Income

-50%

Deaths per 1,000 births has declined considerably.

Infant mortality

+25%

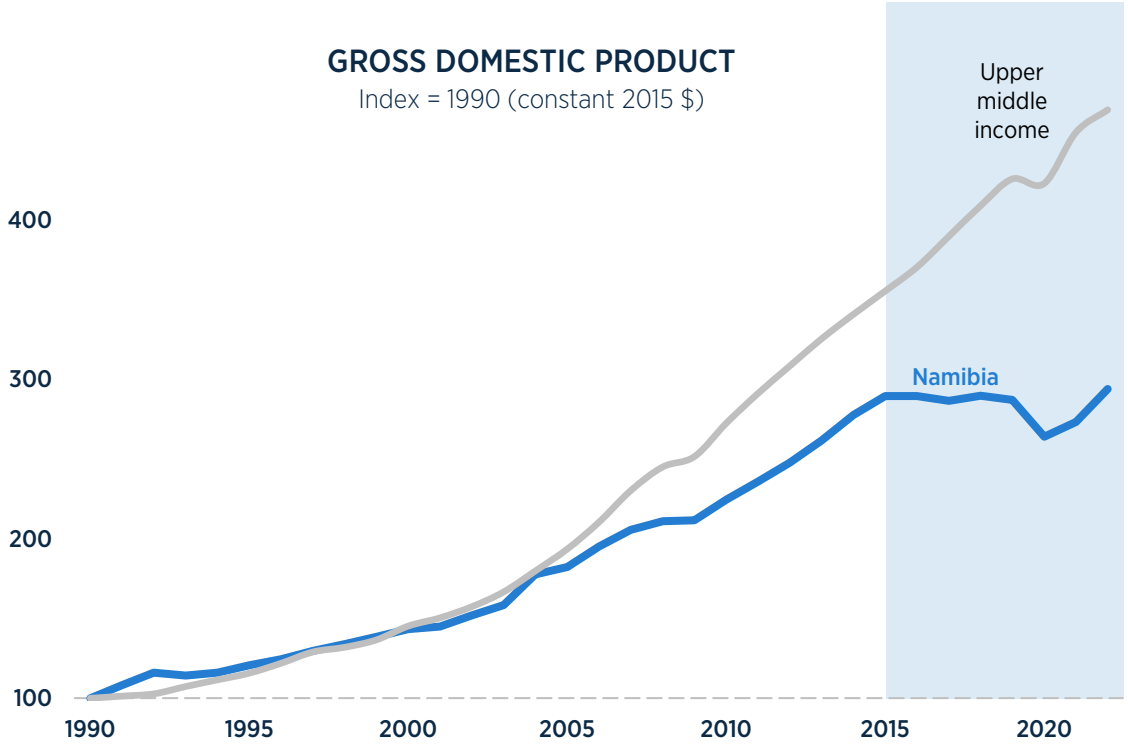
92% of the population can now read and write.

Literacy

Source: World Bank Development Indicators

Running out of steam

After a generation of rapid economic expansion, a growth gap with upper middle-income peers has become entrenched. Namibia may be stuck in a "middle-income trap", struggling to compete in higher value-add and labour-intensive sectors.



Extended period of economic growth

25 years of sustained economic growth averaging a remarkable 4.5% per annum led to achievement of upper-middle-income status.

Return on capital accumulation is tapering off

Capital accumulation has driven growth—primarily through public infrastructure and private mining investment. But growth has slowed since 2015.

The old growth model is running out of steam

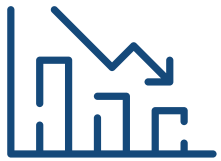
The role of productivity and human capital in growth has been negligible. Public investment has crowded out private investment.

Source: World Bank Development Indicators

Binding growth constraints

There is emerging consensus around the key development challenges that are holding back economic growth in Namibia, with its potential conditioned by five overarching circumstances.

1 Low and declining productivity



- Since 2015 the economy has performed below potential, dragged down by falling productivity.
- Overreliance on public investment, a skills gap, and limited innovation contribute to this trend.

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2 Human capital mismatches

- A polarised labour market defined by high-paying productive jobs and low-paying unproductive jobs.
- Competitive industries ultimately hamstrung by limited skills have relied on imported capabilities.

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3 Constrained markets

- Very exposed to external market swings, e.g. from its main trading partner South Africa.
- The economy is also notably vulnerable to the volatility of global commodity prices.

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4 Suppressed private opportunities

- Declining investment and productivity in key sectors have restrained competitiveness.
- State-owned enterprises remain dominant and have often stifled private opportunities.

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5 Climate change threats

- Water availability is central to sustaining the traditional economy and rapid urbanisation.
- The forecast increase in water scarcity represents a strategic challenge for the country.

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See Annexe 3 for in-depth spatial analysis and economic diagnostic

1 Low and declining productivity

Decades of strong growth have masked a deteriorating productivity, contributing to high unemployment and income inequality.

Falling Total Factor Productivity (TFP)

› TFP measures the efficiency with which different factors of production are utilised. Growing TFP is critical to sustain economic growth.

› Growth has been driven by capital stock accumulation, while contribution from TFP has in fact been negative (40% below peers).

Minimal contribution from labour productivity

› Low labour productivity relative to GDP is particularly challenging in economies where informality is high.

› The informal sector represents more than 40% of employment, contributing to income insecurity and vulnerability.

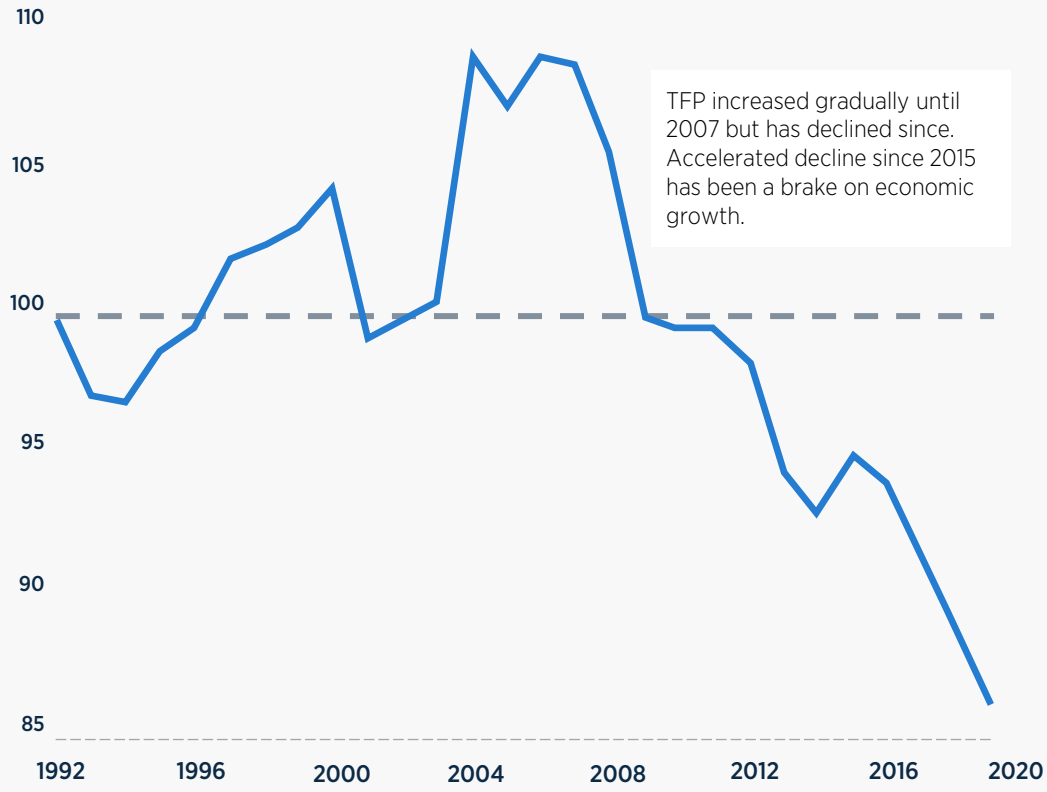
Technology and infrastructure a further constrain

› Namibia is a technology frontrunner in Africa, but the technical skills available are insufficient to drive the aspired digital transformation.

› Despite improvements in total utility access service provision is geographically concentrated and costs remain high.

TOTAL FACTOR PRODUCTIVITY IN NAMIBIA

Index 1992 = 100



Source: Federal Reserve Economic Data

2 Human capital mismatches

The domestic labour market is defined by a substantial gap between high-paying productive jobs and low-paying unproductive jobs.

Lagging performance in education and health

› Despite improved access, the quality of social services is still poor (on the World Bank's HCI, Namibia ranks 117th out of 157 countries).

› With a HCI score of 0.45, performance is poor even relative to other upper middle-income (avg. 0.56, excluding very large/small countries)

Improved access has not yielded the expected results

› The education receives considerable backing, but increased access has not translated into effective outcomes and wider job prospects.

› Policy efforts have also targeted improvements in health facilities and outcomes, which currently constrains economic potential.

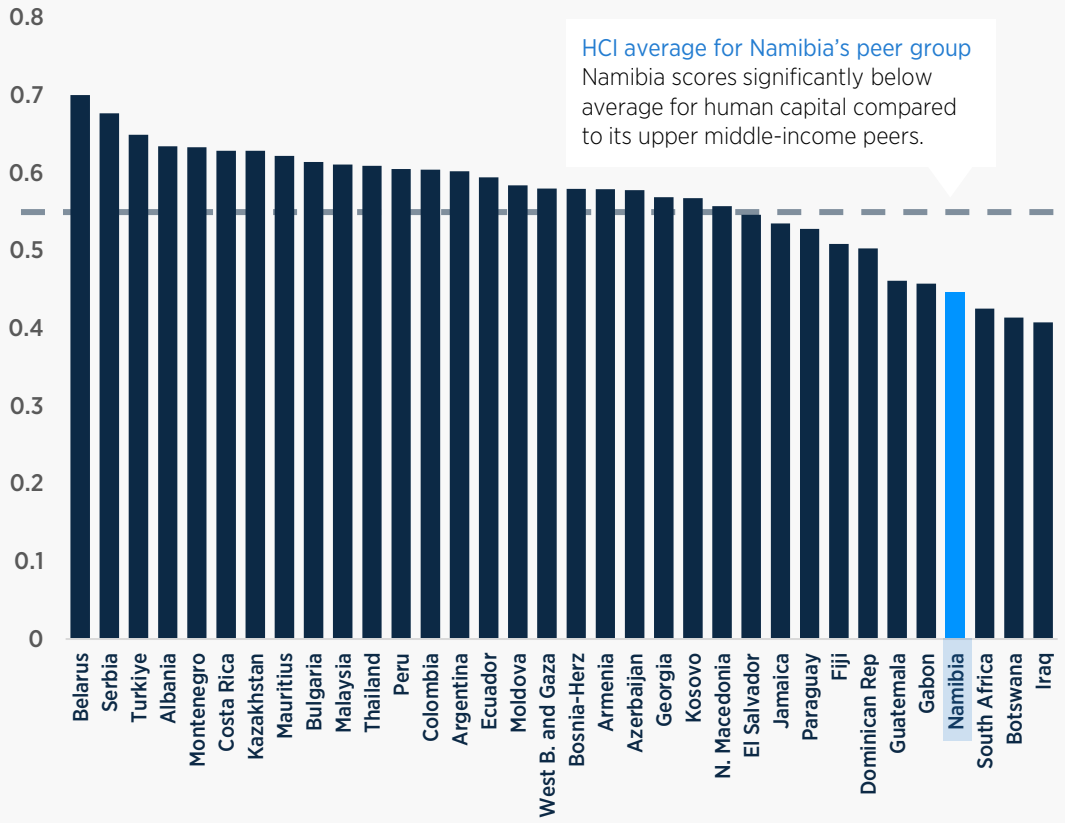
Low skills drag down economic productivity

› There is an evident mismatch between skills demand and supply. Low-skilled labour constrains higher-productivity economic activity.

› Due to a limited availability of workers with specialized capabilities, the economy has often reverted to importing higher skills.

HUMAN CAPITAL INDEX

Upper middle-income countries, excluding very large and small nations



The HCI is a World Bank indicator that estimates the contribution of health and education to workforce productivity. It assesses how much capital each country loses through poor education and health.

Source: World Bank Human Capital Index

3 Constrained markets for Namibian products

A concentrated market structure leaves the Namibian economy particularly vulnerable to exogenous shocks.

Market restrictions

› A small nation of 2.5M people drastically constrains opportunities for local product development aimed at the domestic market.

› South Africa is the main trading partner, and as such the economy is vulnerable to the economic cycles in the neighbouring country.

Export concentration

› Namibian export structure is heavily concentrated in the natural resource sectors.

› Diamonds and precious stones, followed by other mining products (uranium, gold, copper) represent the lion's share.

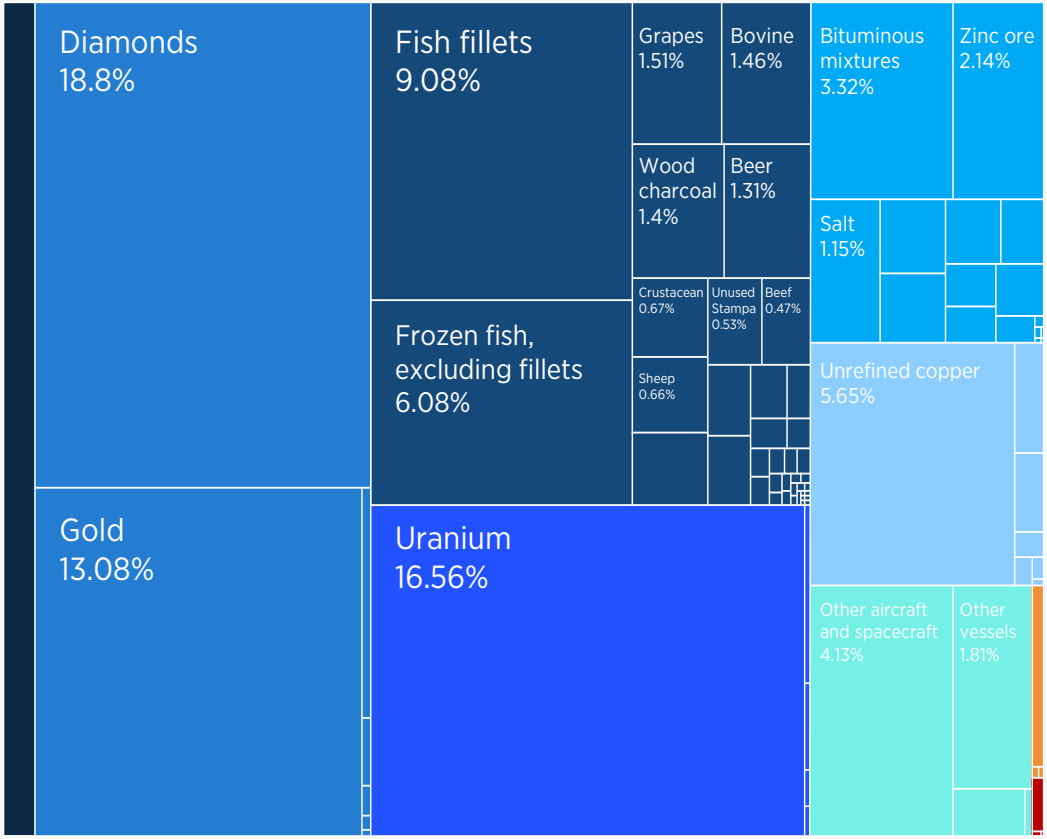
Exposure to exogenous shocks

› The economy has long relied on investment and revenues generated by the extractives sector.

› Reflecting its export structure, national income is particularly vulnerable to the inherent volatility of global commodity prices.

NAMIBIA EXPORT STRUCTURE

By percentage, 2021



Namibia's export structure shows significant economic concentration in primary sector products.

Source: MIT/Harvard Atlas of Economic Complexity

4 Suppressed private opportunities

The World Bank concludes that a strict regulatory environment has undermined domestic investment and contributed to sub-potential non-mining FDI.

Private sector straitjacket

› An economy constrained by confined private investment, suggesting that risk-adjusted returns could not compensate the cost of capital.

› Declining investment in key economic sectors has restrained competitiveness, stifling growth and job creation.

Crowding out entrepreneurship

› A large public sector present in the private space through parastatals and SOEs creates market inefficiencies and crowds out private actors.

› A monopolistic market structure where few big players dominate and use their position to restrict entry by new competitors.

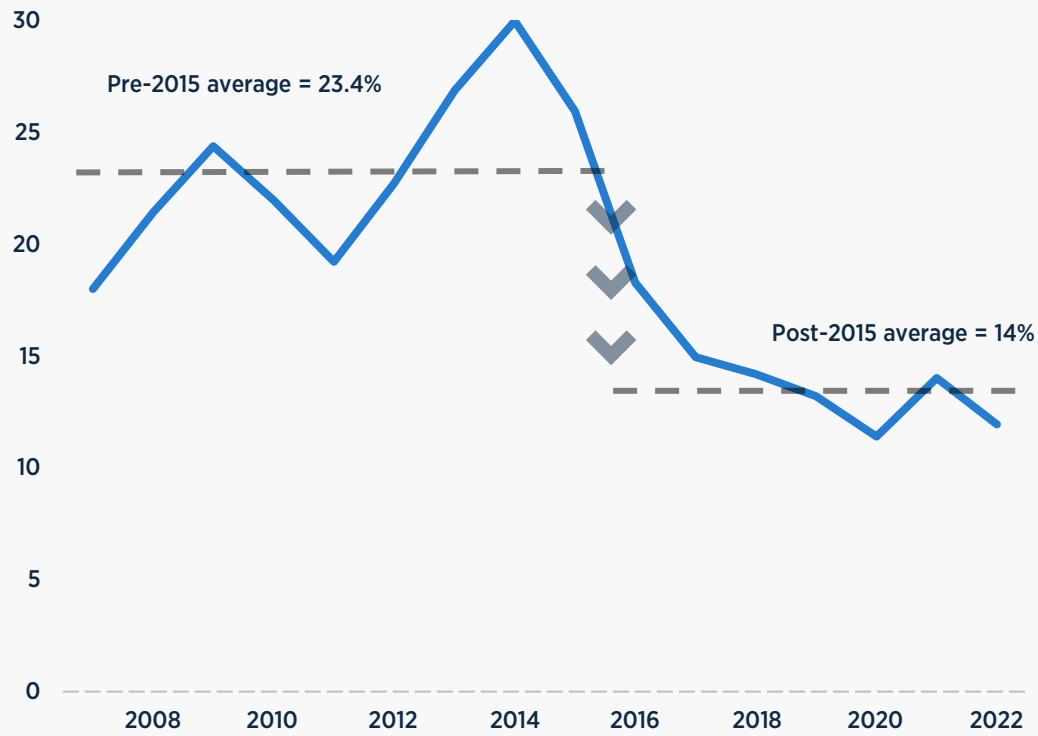
Financial limitations

› Credit to the private sector as percentage of GDP is very low relative to the average of upper-middle-income countries (72% vs 126%).

› A concentrated banking sector (4 banks hold 98% of financial assets) limits competition and restricts lending, particularly to MSMEs.

PRIVATE SECTOR CAPITAL INVESTMENT IN NAMIBIA

Private sector fixed capital formation, % of GDP, 15-year trend



Source: World Bank Development Indicators

5 Climate change threats

Climate change is forecast to intensify water stress, droughts, and agricultural insecurity.

High vulnerability to climate change

› The northeast will suffer the largest increase in temperature, while the southwest will suffer the greatest rainfall reduction.

› However, changes in temperature and precipitation will result in both prolonged droughts and flooding events more frequent.

Increasing water scarcity impacting all economic sectors

› Prolonged droughts are increasingly common and pervasive. One-third of the population rely on agriculture for incomes.

› Water shortages have affected Ruacana hydropower project, with generation severely curtailed during 2022/23 drought.

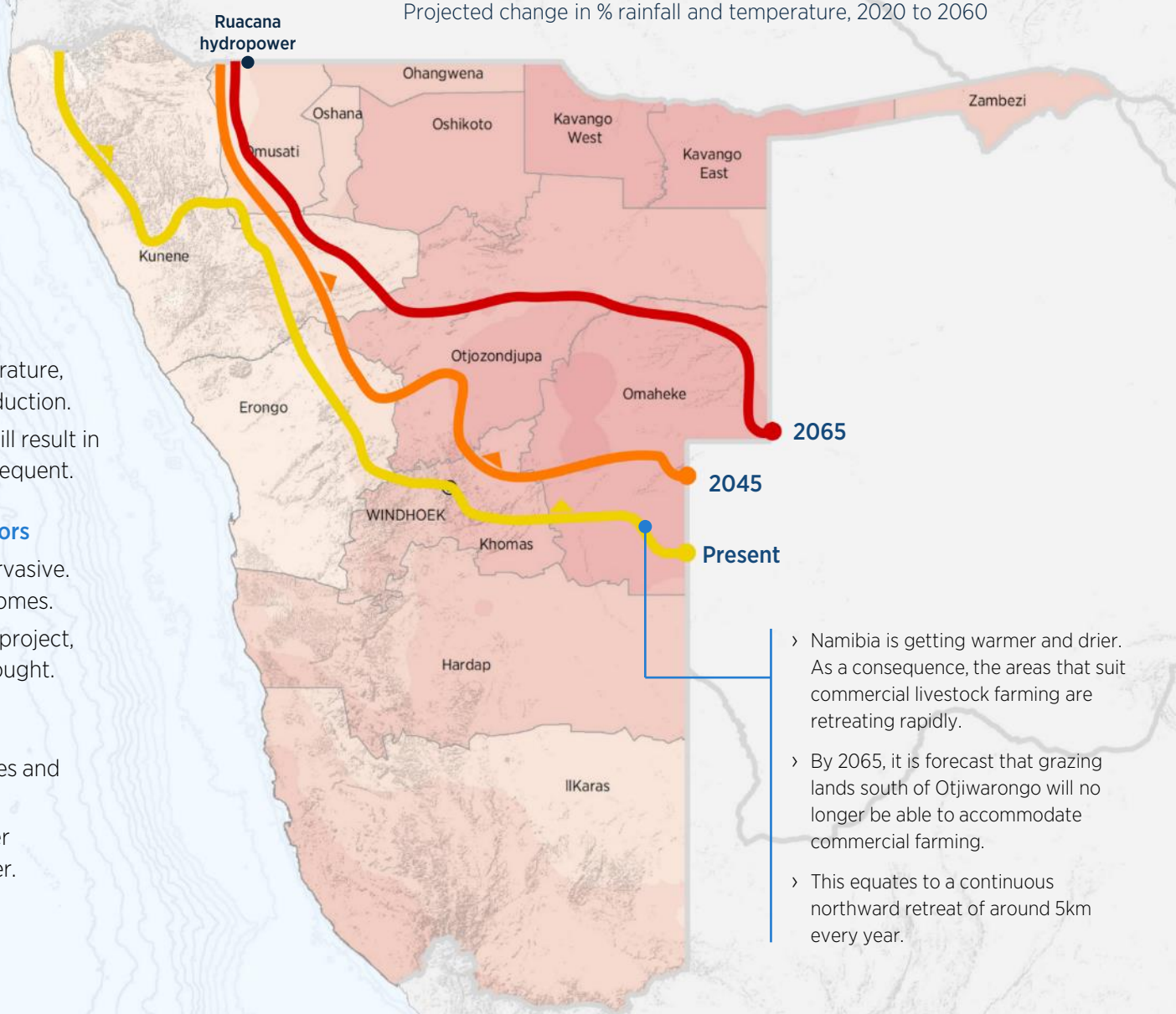
Energy transition presents opportunities

› Namibia could lead the region adoption of technologies and techniques to increase climate change resilience.

› This may encompass from smart agriculture and water desalination, to the harvesting of solar and wind power.

CLIMATE CHANGE

Projected change in % rainfall and temperature, 2020 to 2060



› Namibia is getting warmer and drier. As a consequence, the areas that suit commercial livestock farming are retreating rapidly.

› By 2065, it is forecast that grazing lands south of Otjiwarongo will no longer be able to accommodate commercial farming.

› This equates to a continuous northward retreat of around 5km every year.

Source: Brown, L.H. (2009) The economic impact of climate change on commercial agriculture in Namibia

Looking to the future

Namibia must realise a new growth agenda – one that supercharges productivity, builds domestic skills, opens new markets, channels private investment, and enhances climate resilience.

FROM	TO
Lethargic productivity	**Technology and innovation** Embracing economic modernisation to add value throughout the economy.
Mismatched skills	**Engineered talent pipeline** Upskilling the nation to serve high productivity industries and boost incomes.
Domestic market limitations	**Diversified global marketplace** Employ competitive advantage to leverage regional economies of scale.
Sluggish private sector	**Revitalised commercial opportunities** Foster untapped business opportunities to attract private capital and expertise.
Climate-constrained	**Low-carbon industry pioneer** Become an early regional mover to capitalise on a whole new global industry.

B A new growth agenda

The global agenda: Accelerating energy transition

The world is changing quickly as it accelerates towards net zero. New markets and new growth pathways are emerging for nations that can react to current global priorities.

>140

countries now have a net zero 2050 target

DECARBONISATION TARGETS

- In 2020, the global commitment to decarbonisation was entrenched during the COP26 conference.
- The number of countries with a net zero target doubled. Targets have been integrated into public policies.
- Other policy instruments (new carbon subsidies and taxes) will further drive this global push.

3/4

of new energy capacity from renewables (2023)

ENERGY TRANSITION

- The global energy mix is radically and rapidly shifting from fossil fuels to renewables.
- By 2030, renewables are expected to represent at least 40% of the global energy mix.
- Yet the current scale of expansion falls short of net zero commitments – more green capacity is needed.

85%

reliance on China for critical mineral supply chain

RESOURCE SECURITY

- Over-reliance on a small number of oil/gas producing nations has had geopolitical repercussions.
- As the energy transition unfolds, the focus turns to critical minerals – which are dominated by China.
- There is a concerted and competitive effort underway to diversify access to critical minerals.

$850bn

of green debt issued (2023)

GREEN CAPITAL

- The global urgency to address climate change is increasingly mobilising minds and money.
- As such, assets with strong green credentials are ever more attractive to global investors.
- Governments and investors that embrace the green agenda will have advantage in the race for capital.

The regional agenda: Deepening trade and integration

Shifting geopolitics and the emergence of a renewed push towards African integration unlock regional collaboration, trade, and investment opportunities.

Deepening African trade integration

AGENDA 2063

- Agenda 2063 brings unity, economic independence, and collective prosperity to the fore.
- The agenda charts a path to transform Africa into a global powerhouse.
- It will also bring intercontinental value chain linkages that support industrialisation in Namibia.

AFRICAN CFTA

- AfCFTA, key to Agenda 2063, has grown to be the world's largest free trade area.
- Free movement of goods and services supports regional value chains and value adding.
- Namibia can capitalise on reduced trade barriers to centralise regional trade.

Industrialised nations seeking trade allies

CRITICAL RAW MINERALS CLUB

- Aims to strengthen EU's raw material supply by forging long-term trade relations.
- It pursues collaboration with resource-rich countries to diversify mineral value chains.
- Co-chairing of Club launch at COP28 validates Namibia's strategic role and opportunity.

BILATERAL AGREEMENTS

- Competition has seen countries increasingly pursue green bilateral agreements.
- Existing deals with Germany and Japan have paved the way – more can follow.
- Such deals are most effective when they both mobilise funds and secure offtake markets.

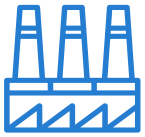
The domestic agenda: Vision 2030

The goals set out in Vision 2030 remain valid – especially the intent to industrialise via thriving manufacturing and service sectors. The global green agenda offers Namibia the window to capitalise.

VISION 2030

Prosperity | **Industrialised nation** | Harmony | Peace & political stability

DIVERSIFICATION



- Primary sectors underpin a variety of new secondary sector opportunities.
- Higher-skill manufacturing industries come to the fore (target 80% of GDP).

VALUE ADDING

- Namibia builds processing capacity to valorise its own natural resources.
- In parallel, it offers neighbours the means to add value to regional commodities.

SKILLED WORKFORCE

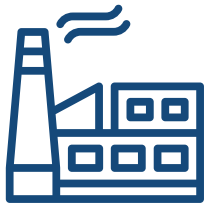
- Continued investment in skills development responds to industrialisation needs.
- Targeted investment in knowledge-economy skills delivers higher productivity.

REGIONAL INTEGRATION

- Greater alignment of regional political, economic, and institutional arrangements.
- Namibia as regionally interconnected leads collaborative initiatives.

Vision 2030 economic targets

While there has been continued progress since Vision 2030 was first adopted, a significant acceleration is required if we are to achieve our 2030 targets.

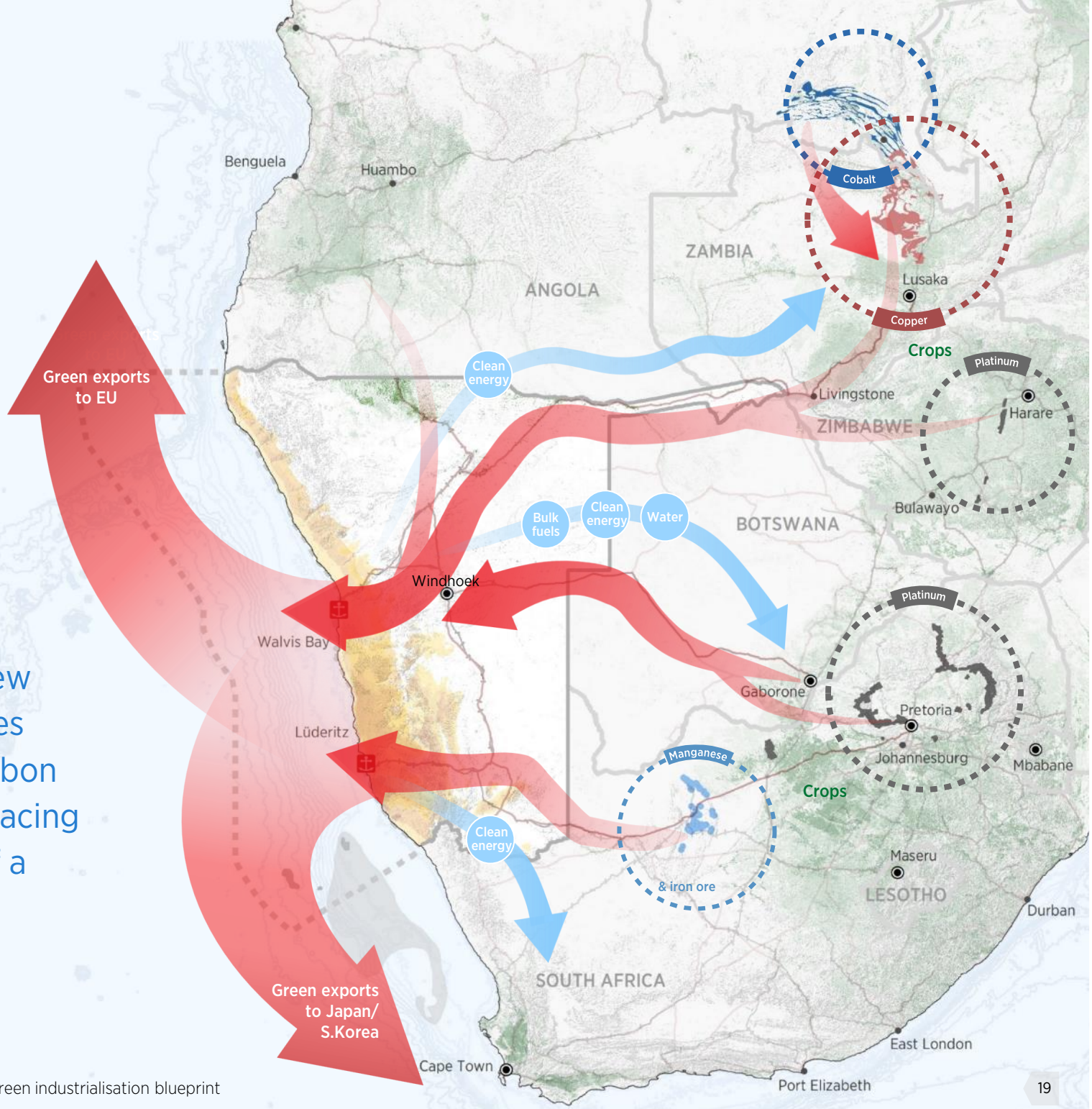
VALUE ADDING	JOB CREATION	ECONOMIC STABILITY	INCOME DISTRIBUTION
			
Secondary share of GDP	Unemployment rate	Inflation rate	Gini coefficient
Target	Target	Target	Target
42%	**2.3%**	**4.5%**	**0.30**
Latest: **15.8%**	Latest: **33.4%**	**TARGET MET**	Latest: **0.56**

Source: Namibia Statistics Agency

The emerging vision

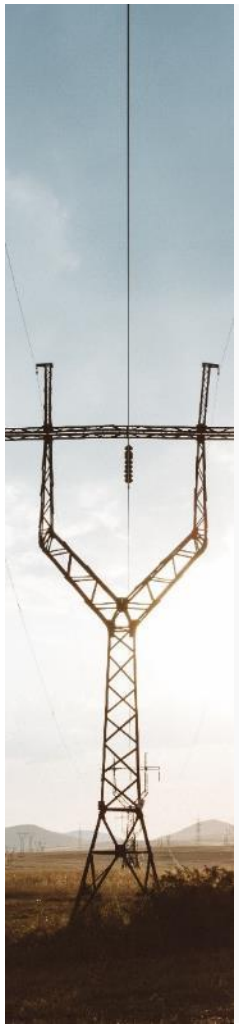
Green industrialisation is the opportunity that binds domestic, regional, and global agendas.

> Namibia, working with its neighbours, to deliver a new global gateway that creates modern trade and low-carbon industrial opportunities, placing the region at the centre of a rapidly greening world.



The dual pillars of a green industrialisation blueprint

This ambitious industrialisation agenda requires mobilisation of resources to fund public infrastructure enablers and the engagement of private companies to take up investable opportunities.



1 INFRASTRUCTURE ENABLERS

Moving goods that are key to the global green agenda

Competitive transport & logistics

› A modern infrastructure network including railways, powerlines, port access, and trade hubs.

› A regional approach will generate economies of scale and increase global competitiveness.

Publicly driven enablers

› The public sector takes the lead to consolidate plans and mobilise resources.

› Holistic approach includes cross-country coordination through governments collaboration.

Multi-party financing

› A programme of this scale will require significant funding tailored to the region.

› Public-driven PPPs and constitution of consortiums with multilateral funding.

See infrastructure catalogue on pages 29-34

2 INVESTABLE INDUSTRIES

Adding value to global green growth goods

Competitive industries and high-value services

› Taking up large investment opportunities in green manufacturing, renewable energy, trade & logistics.

› A broad regional strategy creates synergies and reduces production costs.

Privately driven investments

› Unparallel opportunity to mobilise FDI and boost overall level of investment.

› Particularly attractive for large players and OEM to localise technology and connect to markets.

Financial

› Vast capital needs for emerging industries to be met by private funding.

› Funds mobilisation respond to ambitious regional narrative, rather than individual investments

See industry catalogue on pages 35-51

SEE ANNEXE p29-34 FOR DETAILS

1 Key infrastructure enablers

Realisation of the agenda will require delivery of a handful of priority pieces of infrastructure to enhance access to neighbouring markets and beyond.

		Rationale	Investment requirements	Policy considerations	Capex (est.)	Location
Rail		› Extend cost-effective transport distances to capture regional trade from further afield. › Bulk capacity to transport minerals & inputs needed for target industries.	› Track upgrade to SADC standard (speed & axle load) › Rolling stock replacement › New rail connections to Zambia, Botswana and beyond	› Reform international freight policy. › Digitise border processing › Scale-up Corridor Trip Monitoring System pilot.	**>$10 billion** Donor-support for upgrades PPPs for new builds	› Trans Caprivi › Trans Kalahari › Trans Orange
Ports		› Broaden commodity type & capacity that can be exported. Non-container capacity currently constrained. › Ensure specialised deepwater capacity for gH_2 industries and offshore oil/gas.	› New deepwater ports: Walvis Bay North Port, Angra Point, and (in long term) Cape Fria › Sustaining capex at Walvis Bay › Quay extension at Lüderitz	› Regulations and policy required to accommodate new industries. › Need for skilled logistics professionals.	**$3 billion** Walvis Bay North **$2.1 billion** Lüderitz Angra Pt Both PPP model	› Walvis Bay › Lüderitz › Cape Fria (Kunene)
gH_2		› Monetise world-class solar and wind resources via liquid energy trade. › Underpin investment opportunities in gH_2 upstream/downstream, and energy intensive industries.	› Hydrogen technology pilots › GW scale solar and wind farms › Electrolysis/ammonia/desal plants › Electricity transmission and gH_2 pipelines to supply neighbours	› Broker offtake/market access. › Raised blended finance to support investments. › Develop gH_2 and synthetic fuels regulatory framework.	**$9.4 billion** by Hyphen ($1bn to be raised by SDG Namibia One Fund)	› Karas (South Valley) › Erongo (Central Valley) › Kunene (North Valley)
Electricity		› With hydro vulnerable and imports requiring renegotiation, renewables can reduce import-dependency › They also lower tariffs, green the sector, & expand access to electricity	› Continued private investment in renewables generation › Public sector investment in transmission & battery storage infrastructure	› Renewables combined with battery storage could enable a zero-carbon energy sector. › Continued competition in generation key to further lowering consumer tariffs.	**Private capital** Generation **$138.5m** Transmission & battery storage	› National
Industrial zones		› Avoid risk of enclave industry with limited domestic value add. › Establish common user infrastructure to lower development cost and risk. › Clustering industries to minimise footprint and maximise efficiencies.	› Town planning and infrastructure @ Luderitz › !Nara Namib Industrial Economic Zone @ Walvis Bay › Common user infrastructure for Southern Valley gH_2	› Skill-specific training centres and programmes needed. › Develop tailored gH_2 zoning regulations. › Support to local firms to exploit linkage opportunities.	TBD	› Walvis Bay › Lüderitz

SEE ANNEXE p35-51 FOR DETAILS

2 Target investable industries

A shortlist of prioritised target industries have been identified that can spearhead the attraction of modern, value-adding, employment-generating industries.

		Opportunity description	Execution model	Value-add potential (direct+indirect+induced)	Employment potential (direct+indirect+induced)	Possible location
Renewable energy hardware	1. Solar panel manufacturing	Cell manufacture & panel assembly to serve domestic gH_2 needs, then expand regionally as costs decline.	Attract OEM cell producers, incubate local companies for module assembly, then localise adjacent industries.	2030 $194m 2040 $1.3b 2050 $1.8b	2030 2.5k 2040 12k 2050 22k	Erongo & Karas
	2. Electrolyser manufacturing	Assemble electrolyser stack & balance of plant to serve gH_2 needs, then expand upstream and regionally.	Invite major OEMs or int'l energy firms to set up local production by orchestrating offtake agreements.	2030 $148m 2040 $822m 2050 $1.3b	2030 3.2k 2040 13.4k 2050 28k	Karas (or Erongo)
	3. Wind turbine manufacturing	Produce wind turbine towers and blades locally to serve gH_2 needs, then supply blades regionally.	Incubate local firm to produce towers and invite major OEMs to set up domestic blade production.	2030 $186m 2040 $627m 2050 $666m	2030 7.7k 2040 20k 2050 27k	Karas/ Kunene
Mineral refining	4. Lithium refinery	Refine local concentrate to technical grade lithium for export to EU, taking advantage of diversification push.	Broker technical-grade lithium refining JV between local player and EU-based battery-grade refiner.	2030 $165m 2040 $207m 2050 $248m	2030 5.8k 2040 7.1k 2050 8.6k	Walvis Bay
	5. Rare earth elements refinery	Leveraging announced REE projects, develop domestic separation facility to produce rare earth oxides.	Collaborate with Chinese refiner or invest in R&D with EU/US-based REE operator to explore new technology.	2030 $89m 2040 $176m 2050 $176m	2030 2.6k 2040 4.1k 2050 4.1k	Walvis Bay/ Kunene
Low CO_2	6. Flat glass production	Use low-cost, low-CO_2 energy to produce flat glass for Africa & EU, then expand into local raw materials.	Attract int'l player to launch local production. Export to Africa/EU, then expand to downstream products.	2030 $184m 2040 $387m 2050 $553m	2030 2.4k 2040 4.9k 2050 7.1k	Erongo
gH_2 derivatives	7. Synthetic fuel production	Use bush biomass to produce biogenic CO_2 feedstock and gH_2 to produce synthetic fuel for EU aviation	Push JV between int'l SAF developer and existing player to produce e-SAF using local gH_2 & biogenic CO_2.	2030 $47m 2040 $605m 2050 $1.9b	2030 0.6k 2040 4.9k 2050 16k	Walvis Bay/ Kunene
	8. Hot briquetted iron production	Produce green HBI/DRI using gH_2 for EU, then grow to supply other 'green steel' demand centres (e.g., S.Africa).	Incubate local firm & engage miners/ traders to secure iron supply. Strike offtake agmts with int'l steel players.	2030 $245m 2040 $736m 2050 $1.2b	2030 1.3k 2040 4k 2050 7.9k	Walvis Bay

C Delivering the blueprint

The blueprint for green industrialisation

The new agenda brings together a series of prioritised and integrated public and private investments.

INVESTABLE INDUSTRIES

Renewable energy hardware

1 **Solar panel manufacturing, p36**
Capex (by 2050): $170m
Location: Walvis Bay/Lüderitz

2 **Electrolyser manufacturing, p38**
Capex (by 2050): $250m
Location: Lüderitz (or Walvis Bay)

3 **Wind turbine manufacturing, p40**
Capex (by 2050): $200m
Location: Lüderitz & Kunene

Mineral refining

4 **Lithium refinery, p42**
Capex (by 2050): $900m
Location: Walvis Bay

5 **Rare earth elements refinery, p44**
Capex (by 2050): $300m
Location: Walvis Bay (or Kunene)

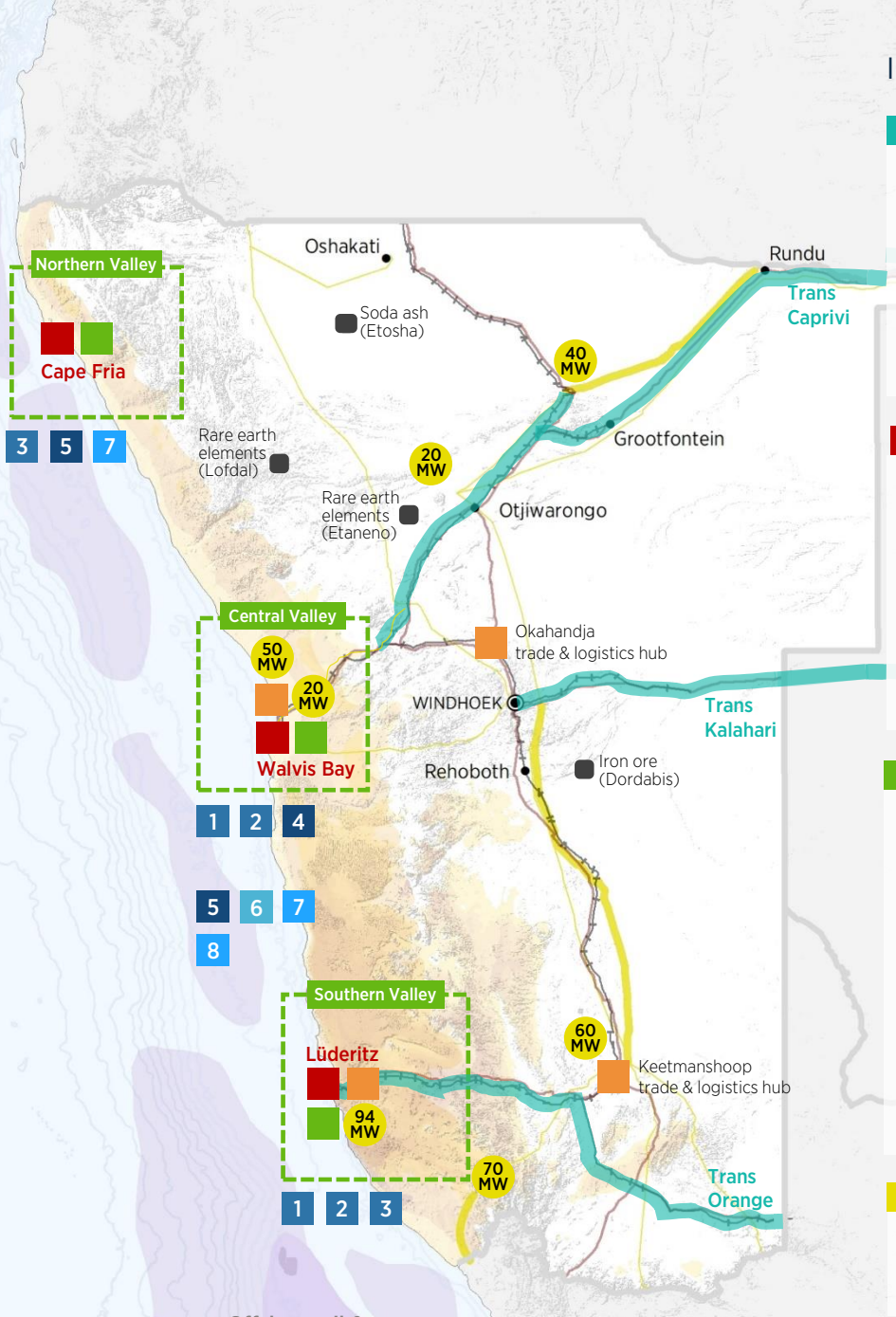
Low CO_2

6 **Flat glass production, p46**
Capex (by 2050): $1.5bn
Location: Walvis Bay

gH_2 derivatives

7 **Synthetic fuel production, p48**
Capex (by 2050): $20bn
Location: Walvis Bay & Kunene

8 **Hot briquetted iron production, p50**
Capex (by 2050): $6bn
Location: Walvis Bay



INFRASTRUCTURE ENABLERS

Rail p30

Trans Caprivi
- Upgrades Walvis Bay-Tsumeb
- New rail Otavi-Katima Mulilo
- Connection to Zambia

Trans Kalahari
- Upgrade Windhoek-Gobabis
- New rail to Gaborone

Trans Orange
- Upgrade Lüderitz-RSA

Port p31

Cape Fria
- gH_2 derivatives port

Walvis Bay
- Container terminal upgrades
- North Port deepwater
- Container terminal extension

Lüderitz
- Quay extension
- Angra Point deepwater
- Dry/liquid bulk export terminals

Green hydrogen p32

Northern Valley
- Solar/wind/ammonia plant + desal.

Central Valley
- Pilot: gH2 Tugs/cranes
- Pilot: gH2 locomotives
- Pilot: gH2 green villages
- Pilot: gH2 refuelling
- Pilot: gH2 utility power
- Solar/ammonia plant + desalination

Southern Valley
- 7.5GW solar/wind power
- 370ktpa hydrogen plant + desalination
- 2mtpa ammonia plant
- Power connection to RSA

Electricity p33

- NamPower generation
- IPP generation
- Transmission backbone
- Battery energy storage systems

Industrial zones p34

- Walvis Bay
- Lüderitz
- Inland trade hubs

Domestic benefits

Green industrialisation can establish a new growth trajectory. By addressing Namibia's current structural challenges, it will deliver high-skill jobs, increased productivity, create new markets, attract FDI, and position Namibia as a climate leader.

1 Growth

+$10bn

GDP

Potentially doubling the size of the economy.

- $6bn added to the economy from gH_2 projects.
- $5bn directly from green manufacturing and indirect/induced sectors.
- The total benefits from infrastructure only partially accounted for.

2 Employment

+250k

jobs

Equal to 1/5th of 2040 projected labour force.

- Estimated 185,000 direct jobs in the hydrogen industry alone.
- 70,000 direct, indirect, and induced jobs from green manufacturing.
- Even more from infrastructure upgrades e.g., ports and rail.

3 Markets

+$20bn

exports

Quintupling current annual national exports ($4.7bn).

- $12bn in gH_2 exports (assumes 5mtpa H_2e at $2,400/$tH_2e$).
- $10bn from new green manufacturing sectors (p.32-48).
- Infrastructure investment to enable improved transport and logistic.

4 Investment

+$55bn

FDI

Nearly ten times the national stock of FDI.

- ~$40bn to kickstart gH_2 and green manufacturing industries.
- Over $15bn to support regional connectivity and port developments.
- Major investments already well advanced, e.g. Hyphen.

5 Decarbonisation

75mtpa

CO_2 abated

20x Namibia's total annual CO_2 emissions.

- Carbon abatement from Hyphen's 370kt green hydrogen project.
- Allows for a zero CO_2 and zero-import domestic energy grid.
- Elevates Namibia as a global green industry manufacturing leader.

Note - estimated impacts by 2040. Based on published statements only and hence non comprehensive.

Regional relevance

Namibia sits at the centre of a regional opportunity to foster strategic cooperation, green growth, two-way trade, and prosperity for southern Africa.

1 Regional growth

- Increased trade and export capacity for land locked countries.
- Improved economies of scale and improved economic linkages.
- Increased efficiency of cross-border movements through the AfCFTA.

2 Skilled employment

- High skill employment opportunities in a tech-advanced industry.
- Jobs unlocked in value adding industries through low cost, clean energy.
- Coordinated capacity building and regional skills specialisation.

3 Connected markets

- Expedited market access and reduced cost to market.
- Decongestion of trade routes and improved access to market.
- A gateway to a multi-billion-dollar, high value global green market.

4 FDI destination

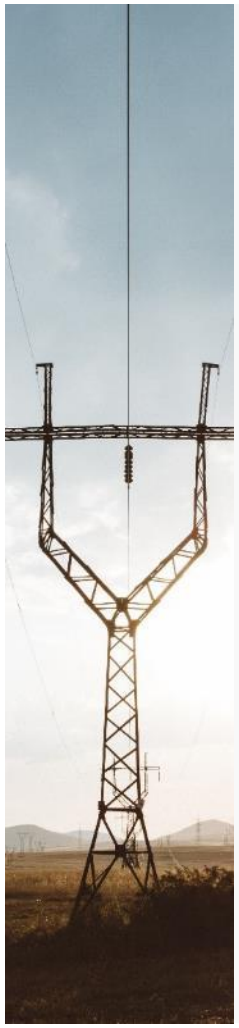
- Enhanced opportunities to attract green capital from EU/Japan/US.
- Significant critical mineral investment opportunities as a regional supply hub.
- Greater investment attractiveness as a region working together.

5 Low-carbon leader

- Progress against national carbon targets through clean energy access.
- A premium attracted for services through low-carbon economic activity.
- An opportunity to become pioneers in the global race to net zero.

Financing needs and approach

Both public infrastructure and private industry opportunities require very considerable capital investment. Syndication of a coherent green industrialisation strategy can underpin mobilisation of the necessary resources.



>$15bn

INFRASTRUCTURE ENABLERS

Spending commitments fall short of needs

› Planned $4bn spend on infrastructure over 5 years – using public, private, and development finance.

› Frontloaded nature of investment in infrastructure force innovative financing approaches.

Off-budget financing required

› Enabling infrastructure investment needs far exceed mid-term budget muscle.

› Domestic and international private sector funding will be needed via PPPs, concessions, etc.

Holistic financing strategy key

› Private investors require confidence that public enabler infrastructure can be funded.

› First step to approach multilateral, bilateral, and others to establish financing capacity & approach.

Note: Capex estimate inc. rail and port only.

>$40bn

INVESTABLE INDUSTRIES

Step-change in FDI inflows required

› Namibia has attracted a cumulative total of $6.3bn in FDI, with focus on mining, tourism. & agriculture.

› Whilst bankable projects will attract funds, this implies a five-fold increase in total stock of FDI.

Government support key to mobilising funds

› Namibia is a stable, attractive investing destination – but these projects are bigger than any previous.

› Government support needed to broker relationships with donors, local firms, OEMs, and off-takers.

New delivery mindset and muscle

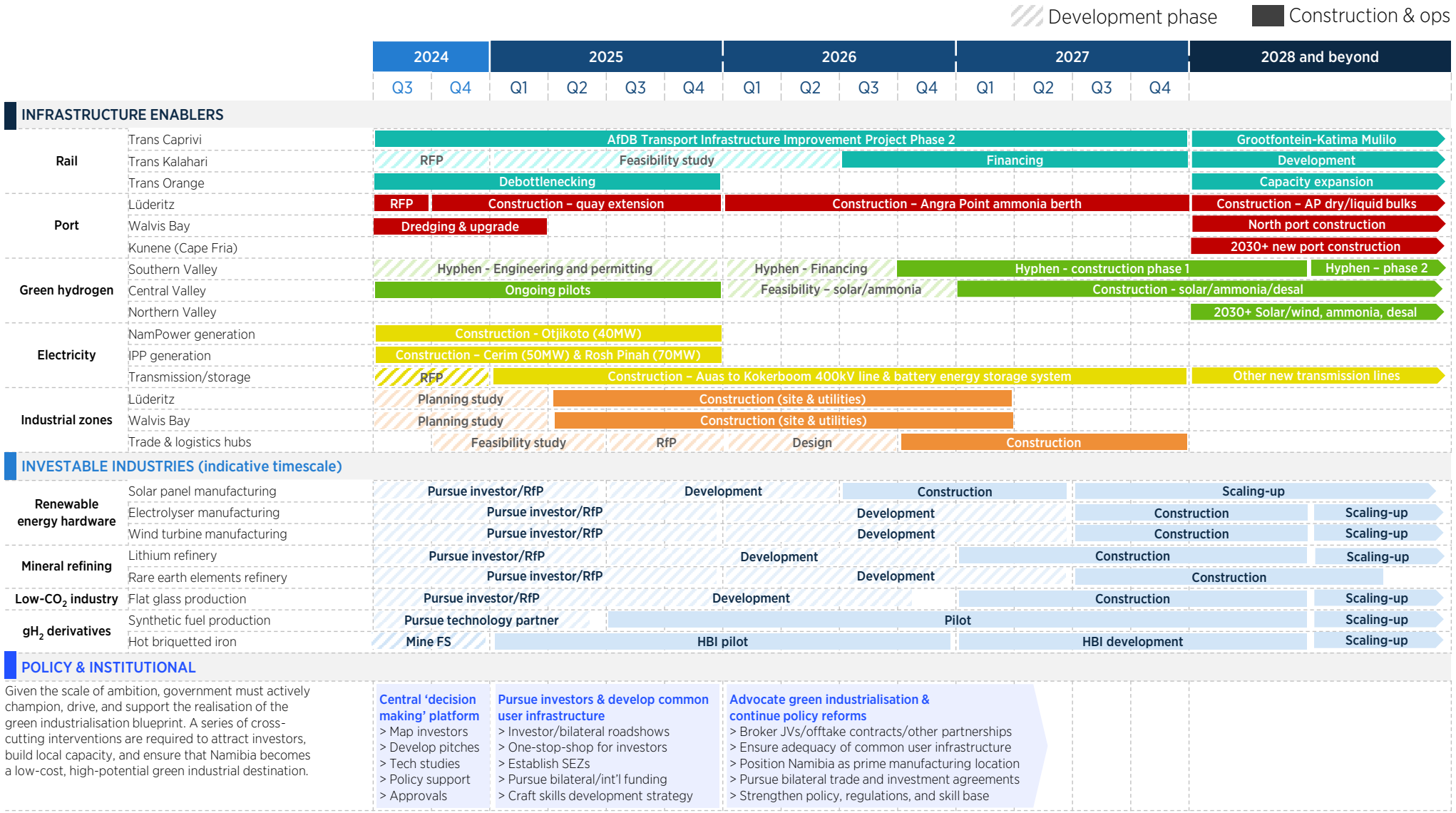
› Dedicated delivery capability required to coordinate, convene, and convince investors.

› Gov't must formulate and pitch a blueprint that combines the languages of business and diplomacy.

Note: Capex estimate inc. gH_2 and manufacturing .

Roadmap

Realising the blueprint requires parallel delivery of three distinct workstreams. Government must act quickly and decisively to streamline policy, attract investors, and deliver enabling infrastructure.



Given the scale of ambition, government must actively champion, drive, and support the realisation of the green industrialisation blueprint. A series of cross-cutting interventions are required to attract investors, build local capacity, and ensure that Namibia becomes a low-cost, high-potential green industrial destination.

Central 'decision making' platform
> Map investors
> Develop pitches
> Tech studies
> Policy support
> Approvals

Pursue investors & develop common user infrastructure
> Investor/bilateral roadshows
> One-stop-shop for investors
> Establish SEZs
> Pursue bilateral/int'l funding
> Craft skills development strategy

Advocate green industrialisation & continue policy reforms
> Broker JVs/offtake contracts/other partnerships
> Ensure adequacy of common user infrastructure
> Position Namibia as prime manufacturing location
> Pursue bilateral trade and investment agreements
> Strengthen policy, regulations, and skill base

Annexe 1 Catalogue of infrastructure enablers

WHAT

Infrastructure – rail

Debottlenecking and new cross-border connections required to prevail as preferred regional trade gateway.

Northern connections (Trans Caprivi; Trans Cunene)

- **Short-term:** Kranzberg - Otjiwarango track replacement & Walvis Bay – Tsumeb signalling upgrades
- **Mid-term:** Otavi – Grootfontein track replacement; Grootfontein - Katima Mulilo new track.
- **Long-term:** connections to Livingston & Lubango.

Eastern connections (Trans Kalahari)

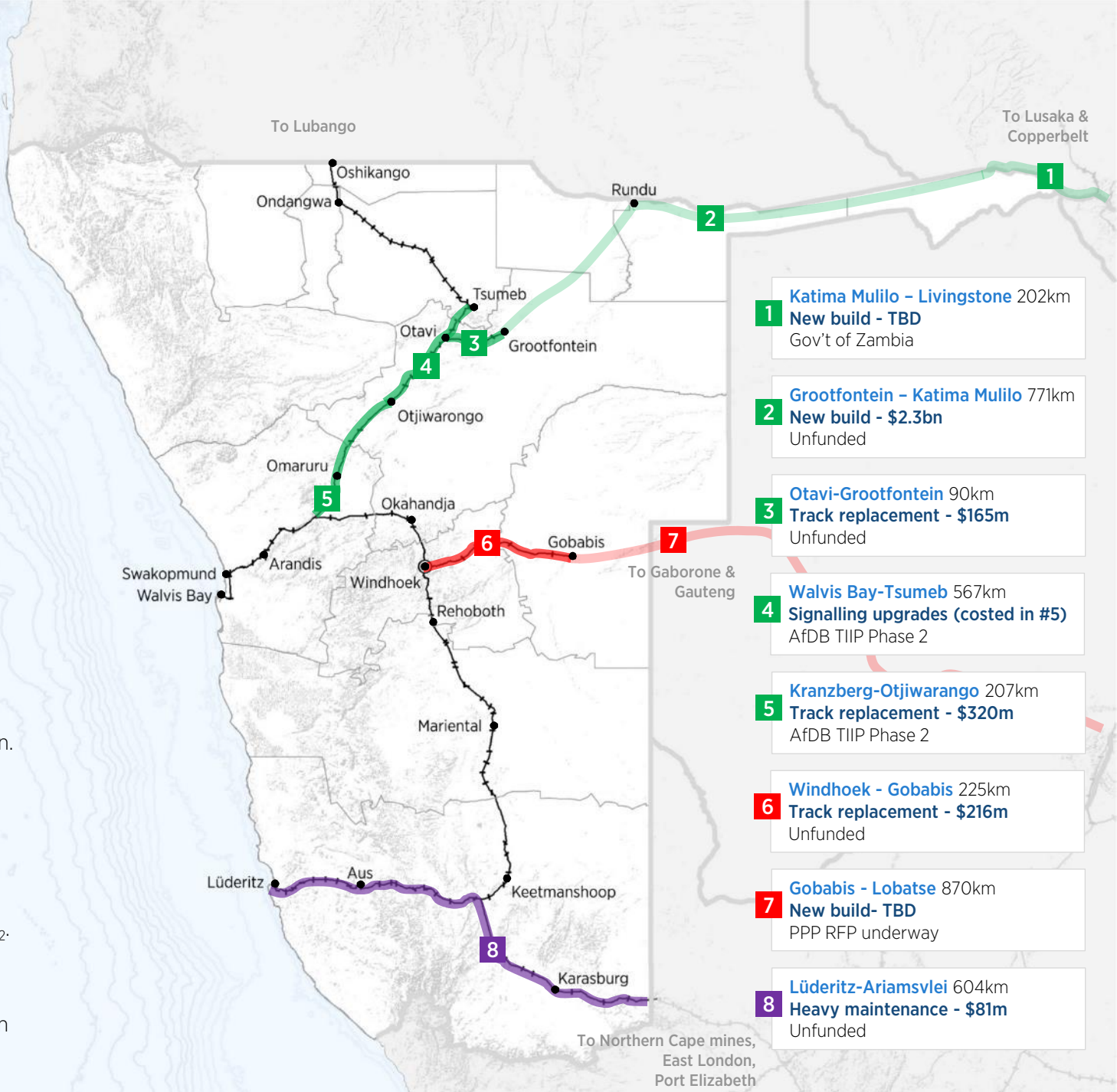
- **Short-term:** Walvis Bay - Gobabis new rolling stock to transport Botswanan coal
- **Mid-term:** Trans Kalahari PPP proposals under evaluation.

Southern connections (Trans Orange)

- **Short-term:** Heavy maintenance Lüderitz-Ariamsvlei to debottleneck Northern Cape manganese.
- **Long-term:** Increase capacity to enable RSA iron ore for green hot briquetted iron/direct reduction iron using gH_2.

Sector wide initiatives:

- **Rolling stock modernisation** – DBN/DBSA US$114m loan
- **Hydrogen dual-fuel rolling stock** (HyRail) - €7.6m pilot



1 **Katima Mulilo – Livingstone** 202km
New build - TBD
Gov't of Zambia

2 **Grootfontein – Katima Mulilo** 771km
New build - $2.3bn
Unfunded

3 **Otavi-Grootfontein** 90km
Track replacement - $165m
Unfunded

4 **Walvis Bay-Tsumeb** 567km
Signalling upgrades (costed in #5)
AfDB TIIP Phase 2

5 **Kranzberg-Otjiwarango** 207km
Track replacement - $320m
AfDB TIIP Phase 2

6 **Windhoek - Gobabis** 225km
Track replacement - $216m
Unfunded

7 **Gobabis - Lobatse** 870km
New build- TBD
PPP RFP underway

8 **Lüderitz-Ariamsvlei** 604km
Heavy maintenance - $81m
Unfunded

WHAT

Infrastructure – ports

Expand port capacity to accommodate enhanced regional trade flows and exploit green manufacturing industries.

Walvis Bay

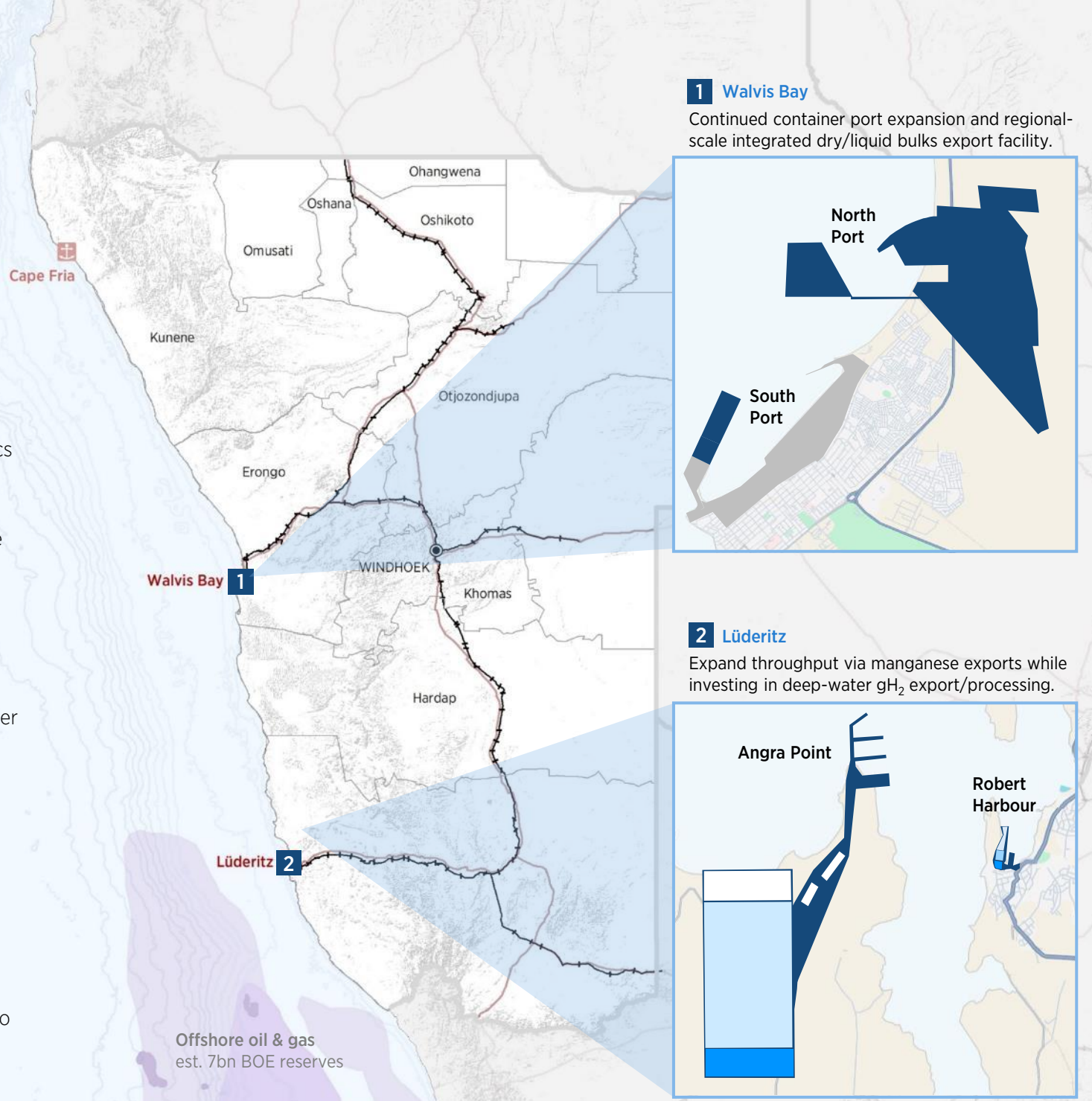
Well-positioned to emerge as dominant regional logistics hub, exploiting cost-competitiveness and good connections to serve landlocked neighbours.

- **Short-term:** New South Port container concessionaire to dredge channel ($42.5m) to expand capacity, plus investment in new handling equipment ($53m).
- **Mid-term:** Greenfield North Port (>$3bn) to serve SADC, focusing on dry bulk & liquid bulk. Key to gH_2 ambitions and serving offshore oil/gas prospects.
- **Long-term**: Extend South Port to accommodate further regional containerised trade and trans-shipment.

Lüderitz

Capacity-constrained and lacks deepwater access. New port & onshore facilities critical to gH_2 potential agenda.

- **Short-term:** Extend Robert Harbour quay to serve manganese export and gH_2 construction.
- **Mid-term:** Greenfield Angra Point deepwater port to establish gH_2 export industry.
- **Long-term:** Dedicated dry bulk/liquid bulk terminals to meet specialised needs of clean energy industries.



Infrastructure – green hydrogen

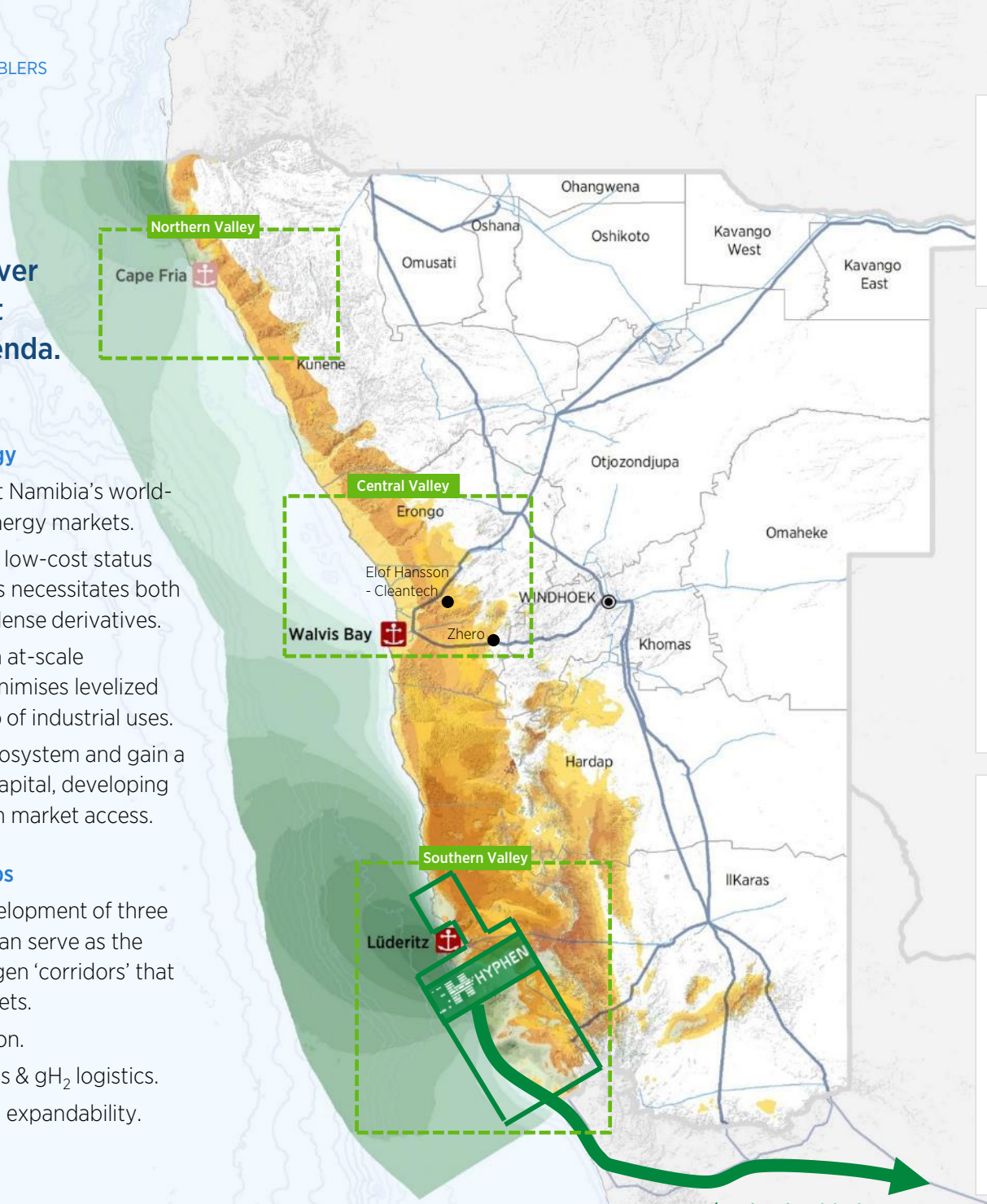
A hydrogen ecosystem to deliver energy security and jump start Namibia's industrialisation agenda.

An integrated long-term delivery strategy

- gH_2 is the intermediary that can connect Namibia's world-class solar & wind resources to global energy markets.
- But distance to key markets jeopardises low-cost status required to gain market share – and thus necessitates both scale and local processing into energy-dense derivatives.
- Long-term strategy therefore targets an at-scale integrated hydrogen ecosystem that minimises levelized energy cost and maximises the portfolio of industrial uses.
- Key success factors to building a gH_2 ecosystem and gain a global foothold include attracting vast capital, developing new technology, and securing long-term market access.

Sequenced development of multiple hubs

- The strategy envisages progressive development of three distinct green hydrogen 'valleys'. Each can serve as the Namibian node of regional green hydrogen 'corridors' that connect SADC resources to global markets.
- **Short-term:** Karas – Ammonia production.
- **Mid-term:** Erongo – Industrial derivatives & gH_2 logistics.
- **Long-term:** Kunene – Ammonia/synfuel expandability.



Kunene
Northern Valley

Solar/wind farm and hydrogen/ ammonia plant @ Puros, with new port @ Cape Fria to facilitate ammonia (and mineral) exports.

Erongo
Central Valley

Hydrogen pilot hub:

- Tugs/crane conversion (NamPort)
- Dual-fuel locos (TransNamib)
- Green villages (Daures)
- Refuelling station (Cleanergy)
- gH2 utility-scale powerplant (HDF)

Infrastructure to enable future at-scale gH_2 industrial applications, inc.

- Solar/ammonia (EH-C; Zhero)
- HBI/green steel (Hyron)
- Synthetic fuels
- Solar panels/flat glass

Karas
Southern Valley (SCDI)

Project Hyphen – 1st step in Namibia's gH_2 industrialisation

Fully integrated $9.4bn project

- 3.5GW solar & 4GW wind power
- Electrolysis plant to produce 370ktpa gH_2
- Ammonia plant to convert gH2 to 2mtpa ammonia for export to EU
- Backbone common-user infrastructure for future up to x10 capacity expansion.

WHAT

Infrastructure – electricity

Public-private collaboration is transforming the electricity sector, with renewables at the forefront.

The emergence of a hybrid decentralised model

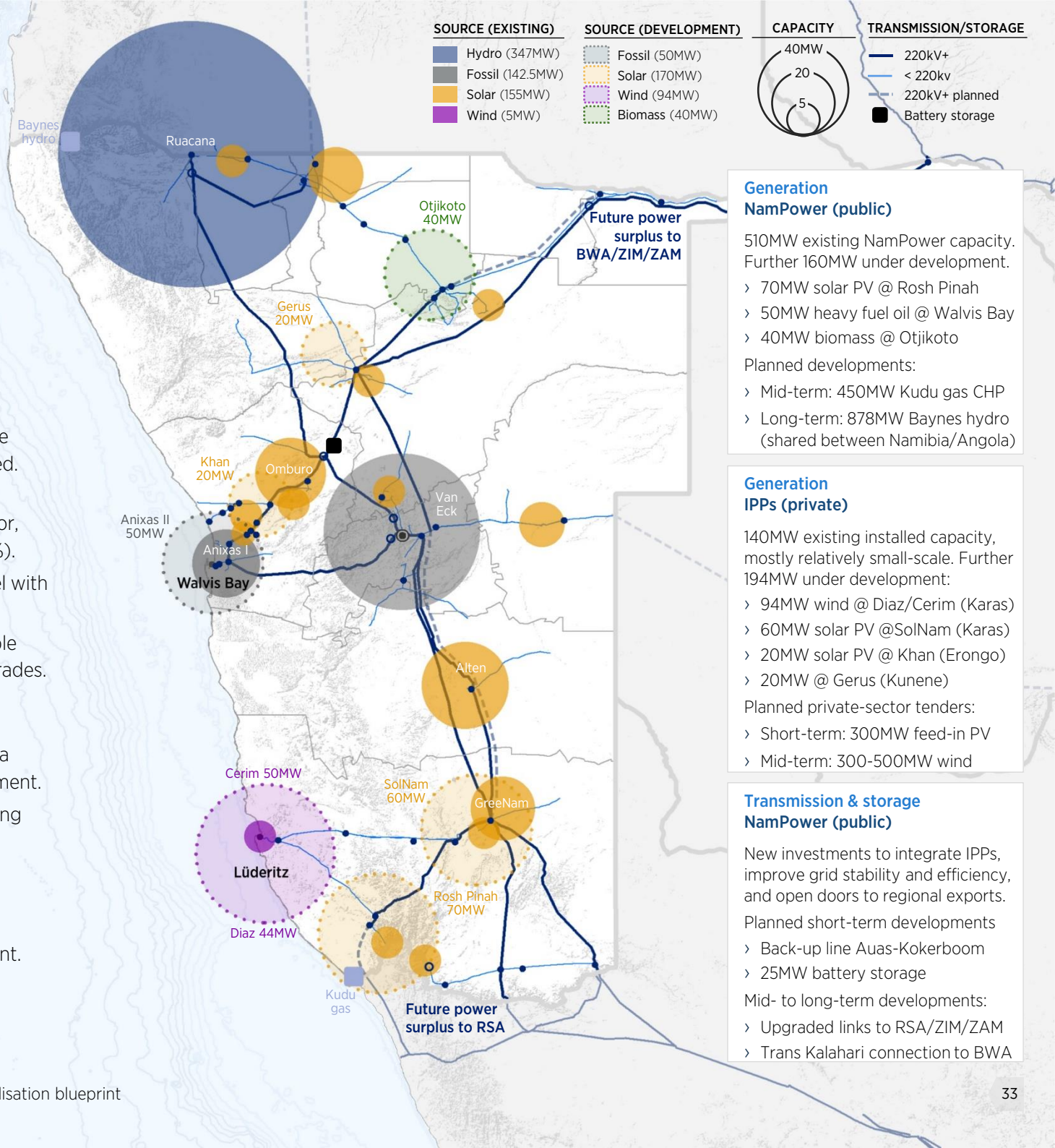
- The sector has long been characterised by heavy reliance (~70%) on electricity imports – much of which is coal fired.
- World-class solar and wind resources underpin scope to reduce import-dependency, lower tariffs, green the sector, and expand access to electricity (currently sitting at 55%).
- Government has embraced a hybrid decentralised model with multiple actors generating electricity.
- Policy increasingly channels private capital into renewable generation, alongside publicly-funded transmission upgrades.

Accelerating towards a secure and clean energy future

- Opening-up generation to IPPs has turned Namibia into a leading African destination for renewable energy investment.
- The transformation has been accompanied by plummeting costs, which are now some of the lowest in the region.

Transmission upgrades reinforcing the backbone

- Investment in upgraded transmission and new storage infrastructure is key to scaling-up renewables deployment.
- This will both help manage intra-day demand peaks and facilitate power exports through regional integration.



Generation
NamPower (public)

510MW existing NamPower capacity. Further 160MW under development.

- 70MW solar PV @ Rosh Pinah
- 50MW heavy fuel oil @ Walvis Bay
- 40MW biomass @ Otjikoto

Planned developments:

- Mid-term: 450MW Kudu gas CHP
- Long-term: 878MW Baynes hydro (shared between Namibia/Angola)

Generation
IPPs (private)

140MW existing installed capacity, mostly relatively small-scale. Further 194MW under development:

- 94MW wind @ Diaz/Cerim (Karas)
- 60MW solar PV @SolNam (Karas)
- 20MW solar PV @ Khan (Erongo)
- 20MW @ Gerus (Kunene)

Planned private-sector tenders:

- Short-term: 300MW feed-in PV
- Mid-term: 300-500MW wind

Transmission & storage
NamPower (public)

New investments to integrate IPPs, improve grid stability and efficiency, and open doors to regional exports.

Planned short-term developments

- Back-up line Auas-Kokerboom
- 25MW battery storage

Mid- to long-term developments:

- Upgraded links to RSA/ZIM/ZAM
- Trans Kalahari connection to BWA

WHAT

Infrastructure – industrial zones

Two industrial zones supporting adjacent ports, plus two logistics hubs supporting inland trade movements.

Industrial policy

› Green industrialisation requires a concerted programme to attract investors, inc. incentives via manufacturing SEZ.

› Zones consolidate use of infrastructure to manage impact and make potential investments more competitive.

Geographical focus

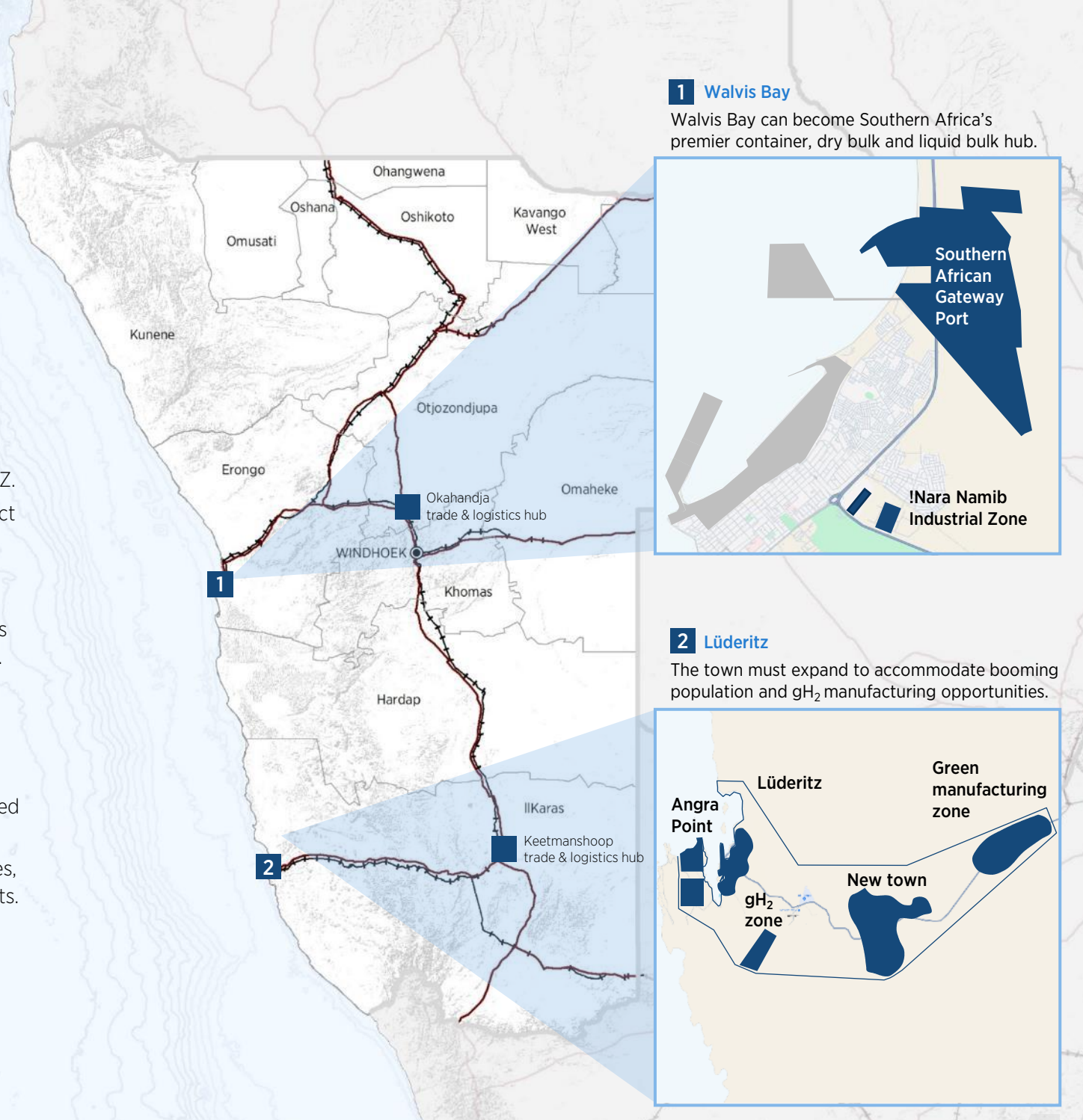
› Walvis Bay can build on !Nara Namib to exploit synergies and interconnectivity as a diversified manufacturing site.

› Lüderitz is best placed to accommodate new town and industrial expansion, incl. large scale gH_2 manufacturing.

Trade and logistics hubs

› Centralised stoking & trading facilities strategically located at key transport nodes working in line with seaports.

› At junctions of major highways to neighbouring countries, Okahandja & Keetmanshoop offer good potential markets.



1 Walvis Bay

Walvis Bay can become Southern Africa's premier container, dry bulk and liquid bulk hub.

2 Lüderitz

The town must expand to accommodate booming population and gH_2 manufacturing opportunities.

Annexe 2 Catalogue of investable industries

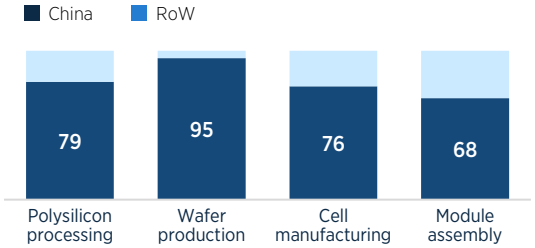
1 Solar panel manufacturing

Manufacture solar cells and assemble PV modules locally, using imported intermediate product, to serve anticipated domestic gH_2 demand. Expand regionally once cost-competitive.

INDUSTRY OVERVIEW: Four steps in value chain; China dominates all

- Solar panels are the most valuable component in PV systems.
- Panel manufacturing involves industrial processing of silicon and step-by-step manufacturing of wafer >> cell >> PV module.
- China dominates all steps, especially raw materials & intermediate product.
- Silicon production is resource-dependent, while wafer/cell/module manufacturing are less complex and more labour-intensive.

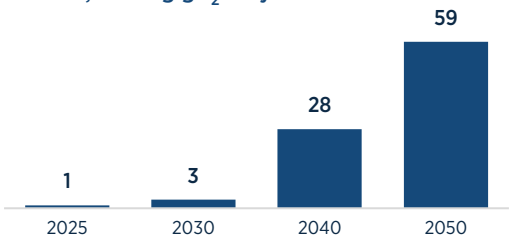
% global PV panel production, by value chain stage



MARKET OUTLOOK: Local panel demand inextricably tied to gH_2

- Namibia panel demand driven by green hydrogen export industry.
- Green hydrogen projections equate to 59GW panel capacity by 2050.
- Global panel production capacity currently outpaces demand…
- …but US/EU diversification push for geopolitical supply chain resilience.
- Regulations & incentives emerging to reduce dependence on China.
- Scope to sell regionally to access market beyond Namibia gH_2.

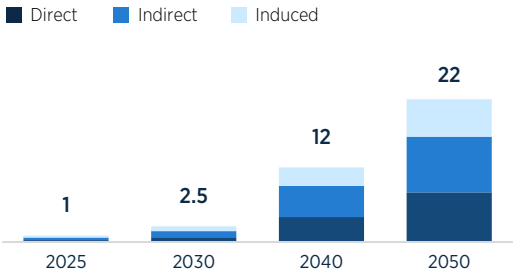
Namibia solar capacity in GW, forecast, serving gH_2 only



DOMESTIC OPPORTUNITY: Reinforce low-cost global gH_2 status

- Greatest localisation potential lies in PV module assembly and cell manufacturing (China retains monopoly in silicon and wafer production).
- Green hydrogen will drive local PV demand, but focus needed on cost competitive production and enabling environment.
- Potential 2050 industry scale (including indirect and induced):
  - $1.8bn value add (15% of current GDP)
  - Up to 22,000 jobs

Jobs, '000s FTE



1 Solar panel manufacturing

Incentivise international cell producers to set up locally, while incubating local firms for module assembly. Subsequently localise adjacent industries (esp. glass) to help reduce costs.

Intervention	Description	Timing	Tasks
1. Pursue international manufacturers	Attract established producers to set up local production, facilitated by securing offtake agreements with green hydrogen developers.	0-6m, 6-18m	› Market study to map players. › Develop pitch book. › Run investor roadshow. › Broker offtake agreements.
2.Establish bilateral incentives	Pursue bilateral agreements with preferential terms to support transfer of excess cell and module production capacity to Namibia.	0-6m, 6-18m	› Offer preferential land deals. › Develop favourable tax rates. › Simplify regulatory framework. › Legislate bilateral incentives.
3.Set up Special Economic Zones	Demarcate special economic zones for production and develop utilities and transport infrastructure required to support major investments.	0-6m, 6-18m	› Screen potential locations. › Commission feasibility study. › Legislate planning policies. › Develop shared infrastructure.
4.Adopt localisation mandates	Create committed demand ("order book") by mandating part solar PV component production locally to encourage domestic investment.	6-18m	› Firm up OEM investment. › Quantify supply capacity. › Draft local content legislation. › Broker offtake agreements.
5.Foster local start-ups with incentives	Support local start-ups at growth stage in production, e.g. time-bound tax allowances, reduced import duties, access to finance.	18m+	› Issue RFP to adjacent firms. › Award targeted set-up grants. › Establish incentive package. › Connect firms to financing.

$170 m

by 2050

Capex requirement

$1.8 bn

by 2050

Annual value add potential

Importance of enablers

Comparatively low reliance on infrastructure, inputs, demand.

- ■□□□ Water
- ■■□□ Power
- □□□□ Gas
- ■□□□ Ports
- ■■□□ Local raw materials
- ■□□□ Local demand centres

2 Electrolyser manufacturing

Assemble electrolyser stack and balance of plant locally, using imported components, to serve domestic gH_2 rollout. Then pursue upstream value chain and regional sales.

INDUSTRY OVERVIEW: Central equipment in green hydrogen production

- Electrolysers used in many industries to split natural substances into constituent components, e.g. water into hydrogen and oxygen gases.
- Scaling-up global green hydrogen production requires a substantial ramp up of installed electrolyser production capacity.
- Manufacturing and assembly of electrolysers are the least concentrated production stage, implying lower barriers to entry for Namibian producers.

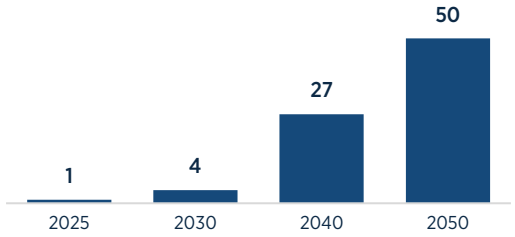
Electrolyser manufacturing value chain — Localisation potential

	Component mfg.	Component assembly	Cell & stack assembly	BoP/system assembly
Cost	$140-155	$10-20	$20-35	$230-250
Avg. margin	15-30%	25-30%	30-40%	30-40%
# of key suppliers	+/-10	30+	15	30

MARKET OUTLOOK: Exponential growth fuelled by green hydrogen boom

- Currently ~33GW of installed electrolyser capacity globally – yet demand expected to rise to 250GW by 2030 on back of green hydrogen.
- Namibia forecast to require 4GW capacity by 2030 and 50GW by 2050.
- Global production capacity not fully responding to demand due to challenge of converting green hydrogen orders into firm commitments.
- Production capacity concentrated in Europe (40%) and China (26%), although fragmented market suggests relatively low barriers to entry.

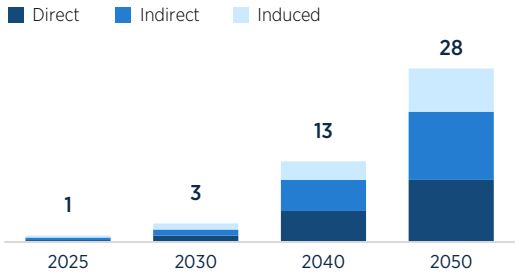
Namibia electrolyser capacity in GW, forecast, serving gH_2 only



DOMESTIC OPPORTUNITY: Early-mover in a globally important industry

- Anticipated demand from domestic green hydrogen industry creates short-term opportunity to on-shore electrolyser manufacturing.
- Longer term, scope to expand upstream into electrolyser component manufacturing. Requires minimum scale and competitive steel cost.
- Potential 2050 industry scale (including indirect and induced):
  - $1.3bn value add (11% of current GDP)
  - Up to 28,000 jobs

Jobs, '000s FTE



2 Electrolyser manufacturing

Invite major OEMs or international energy players with existing local footprint to set up assembly plant, while orchestrating offtake agreements with gH_2 developers.

Intervention	Description	Timing	Tasks
1. Pursue vertically-integrated OEMs	Engage vertically-integrated OEMs that provide renewables generation and industrial equipment solutions to set up local assembly capabilities.	0-6m 6-18m	› Market study to map players. › Develop pitch book. › Roadshow with major OEMs. › Create fast-track licensing.
2. Adopt localisation mandates	Consider mandating/incentivising electrolyser stack and Balance of Plant assembly to take place locally to secure demand.	6-18m	› Firm up OEM investment. › Quantify supply capacity. › Draft local content legislation. › Broker offtake agreements
3. Encourage existing oil majors to invest	Engage energy majors that operate domestically and have diversified into green hydrogen and electrolyser production to invest locally.	6-18m	› Map suitable firms › Develop pitch deck. › Engage local execs. › Roadshow to parent firms.
4. Pursue enhanced raw materials access	Pursue or strengthen trade agmts to increase trade flows of raw materials (e.g., provide carbon credits to offset cost of electrolyser metals inputs).	18m+	› Map component producers › Analyse existing agreements. › Engage target countries. › Tailor tariffs for key imports.

$250m
by 2050
Capex requirement

$1.3 bn
by 2050
Annual value add potential

Importance of enablers

Comparatively low reliance on infrastructure, inputs, demand.

- □□□□ Water
- ■■□□ Power
- □□□□ Gas
- ■□□□ Ports
- □□□□ Local raw materials
- ■■■□ Local demand centres

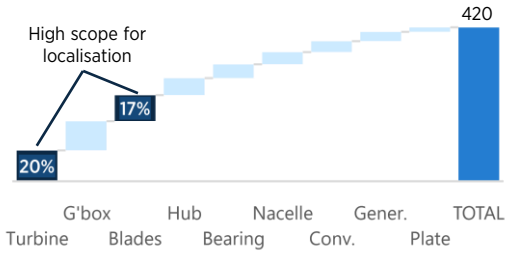
3 Wind turbine manufacturing

Manufacture wind turbine towers and blades locally to serve anticipated gH_2 demand (initially Karas, then Erongo, and finally Kunene).

INDUSTRY OVERVIEW: Tower & blade size incentivise local manufacturing

- Turbines comprises a tower (up to 120m), a 'nacelle' (containing gearbox and generator), and three rotor blades (+/- 60m each).
- Each of tower, gearbox, and blades represent ~20% of turbine cost.
- High transport costs encourage local tower manufacturing (and, to lesser extent, blades). Ideally plant located within 150km radius of wind farm.
- Namibia cost-competitive for concrete towers and potentially blades.

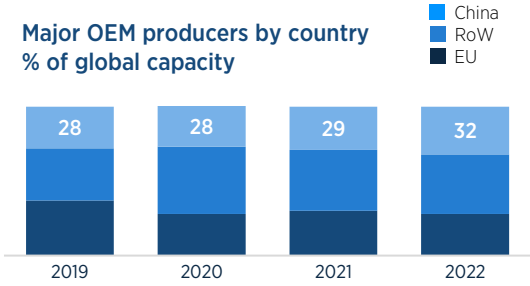
Indicative turbine cost breakdown, USD, 000's



MARKET OUTLOOK: Local demand more than sufficient to support industry

- Domestic green hydrogen production will require ~20GW of wind energy generation capacity by 2050.
- First plant would manufacture 80-200 towers annually, rising to ~500 towers and blade sets at peak (from 2040).
- Production historically Euro-centric, but China gradually emerging as largest player largely due to government support for the industry.

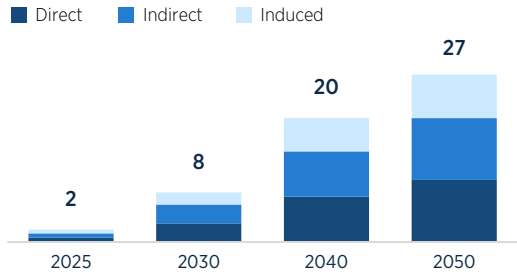
Major OEM producers by country % of global capacity



DOMESTIC OPPORTUNITY: Piggy-back local gH_2 to then supply regionally

- Namibia has world-class wind resources and existing successes.
- Serve domestic gH2 demand (tower and blades) – initially Karas & Erongo, later Kunene. Scope for regional export of blades if cost-competitive.
- Existing domestic firms could produce towers; blades requires OEM FDI.
- Potential 2050 industry scale (including indirect and induced):
  - $675m value add (>5% of current GDP)
  - Up to 27,000 jobs

Jobs, '000s FTE



3 Wind turbine manufacturing

Incubate local player to produce concrete or hybrid towers, and attract major OEM (e.g., Siemens, Vestas, Gamesa, GE, Envision) to set up local blade manufacturing plant.

Intervention	Description	Timing	Tasks
1. Pursue OEM blade manufacturers	Engage OEMs (e.g., Siemens, Vestas, Gamesa, GE, Envision) to build and operate blade manufacturing plants.	0-6m, 6-18m	› Market study to map players. › Develop pitch book. › Roadshow with major OEMs.
2. Adopt localisation mandates	Consider mandating/incentivising a percentage of turbine manufacturing locally to secure demand.	6-18m	› Firm up OEM investment. › Draft local content legislation. › Broker offtake agreements
3. Ease access to land	Facilitate land access for production and installation via relevant policies and government operations.	6-18m	› Define public land lease terms. › Allocate public land. › Ease titling & deed allocation.
4. Streamline set-up regulations	Simplify and accelerate licensing and permitting process for international OEMs.	6-18m	› Implement one-stop shops. › Streamline application process. › Fast-track OEM applications.
5. Foster local start-ups with incentives	Support homegrown start-up tower producers by connecting to finance and other incubation services.	18m+	› Host industry workshops. › Provide seed funding grants. › Draft tax exemptions.
6. Develop build & operating standards	Consider developing regulations that govern standards and practices for locally produced towers and blades.	18m+	› Consult industry experts. › Draft standards guide. › Create compliance mechanism.
7. Set parameters for installation	Consider designing "wind ordinances" to provide guardrails for installation requirements.	18m+	› Develop risk asmnt guide. › Define installation parameters. › Set up enforcement capability.

$200m

by 2050 (towers & blades)

Capex requirement

$675m

by 2050

Annual value add potential

Importance of enablers

Size means proximity to intended installation site is critical.

- ■■■□ Water
- ■■□□ Power
- ■□□□ Gas
- ■□□□ Ports
- ■□□□ Local raw materials
- ■■■■ Local demand centres

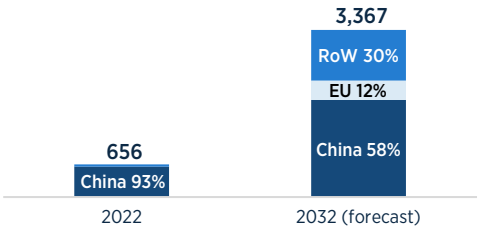
4 Lithium refinery

Refine domestic lithium concentrate to intermediate ("technical grade") lithium for export to Europe, taking advantage of EU push to diversify it critical mineral supply chain.

INDUSTRY OVERVIEW: Historically, lithium shipped to China for refining

- Lithium does not occur naturally in elemental form – it must be extracted from lithium-bearing minerals (most commonly hard rock or liquid brine).
- Refining yields technical-grade lithium carbonate (intermediate product) & further refining for battery-grade lithium hydroxide/lithium carbonate.
- Refineries are technically complex and expensive – China has until now dominated the industry, with >90% of processing capacity.

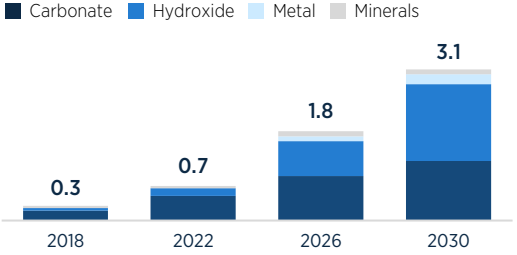
Lithium refinery capacity, mt carbonate equivalent



MARKET OUTLOOK: EU end-refining capacity requires intermediate input

- Lithium demand surging on the back of electric vehicle market, with demand forecast to increase 10x from 0.3mtpa in 2018 to 3.1mtpa in 2030.
- Concerted end-user efforts underway to diversify refining. Significant onshoring in Europe, Australia, and US – but none to date in Africa.
- EU investing heavily in battery-grade refining capacity – creates opening for Namibia to supply intermediate processed lithium to new EU refineries.
- EU Critical Raw Materials Act establishes platform for strategic partnership.

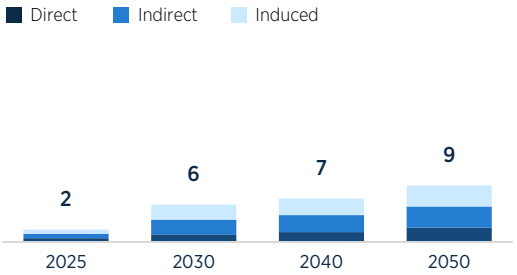
Lithium demand, mt carbonate equivalent



DOMESTIC OPPORTUNITY: Strong conditions for intermediate refining

- Namibia has quality raw materials, good port infrastructure, and low-cost energy, but securing EU offtake agreements is prerequisite for success.
- Technical-grade refinery likely to be cost-competitive. Scope for domestic miners and EU refiners to JV for investment in technical-grade refinery.
- Potential 2050 industry scale (including indirect and induced):
  - $250m value add (2% of current GDP)
  - Up to 8,600 jobs

Jobs, '000s FTE



4 Lithium refining

Broker JV for technical-grade refinery between existing local players (e.g., Andrada, Lepidico) and EU-based battery-grade refinery developers to pilot then invest in intermediate refinery.

Intervention	Description	Timing	Tasks
1. Shortlist potential pilot plant partners	Shortlist EU firms with announced refining projects, to identify viable partners for pilot & refinery JV.	0-6m	› Map EU developer capability. › Assess Africa invest interest. › Formulate potential JVs.
2.Establish cost competitiveness	Conduct a thorough quantitative cost analysis on lithium refining in Namibia.	0-6m	› Benchmark global refining cost › Analyse local input costs. › Review supply chain logistics.
3.Showcase sector opportunities	Develop a pitch book showcasing Namibia's comparative advantages and investment opportunities.	0-6m	› Map comparative advantage. › Formulate pitch book. › Run targeted roadshow.
4.Assess infrastructure enablers	Evaluate availability of energy and transportation infrastructure around sites considered for lithium refining.	0-6m	› Model energy needs. › Map transport needs. › Flag infrastructure gaps.
5.Secure EU financial & technical support	Mobilise EU investment support (e.g., EIB & InvestEU), including grants, low-cost loans, & technical support.	6-18m	› Storyboard business case. › Develop pitch deck. › Run EU financing roadshow.
6.Leverage Critical Raw Materials Club	Capitalise on co-chair of Critical Raw Materials Club by promoting Namibia attractiveness for refinery JVs.	6-18m	› Draft refining strategy paper. › Promote refining potential. › Engage w/ EU counterparts.
7.Define power modernisation plan	Engage NamPower to plan for improved power supply in lithium refining region (i.e., Walvis Bay).	18m+	› Survey regional energy supply. › Optioneer new routes using AI. › Initiate infrastructure upgrade.

$900m

by 2050

Capex requirement

$250m

by 2050

Annual value add potential

Importance of enablers

Water/electricity for processing and port access for lithium imports.

- ■■■□ Water
- ■■■□ Power
- ■□□□ Gas
- ■■■□ Ports
- ■■□□ Local raw materials
- ■□□□ Local demand centres

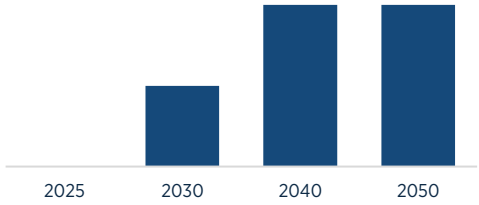
5 Rare earth elements (REE) refining

Building upon mining capabilities and announced REE projects, develop and operate a separation facility in Namibia to add value by producing rare earth oxides.

INDUSTRY OVERVIEW: REEs are essential throughout the green transition

- Occur naturally in clustered deposits – but separating elements from each other during refining requires considerable technical expertise.
- Namibia home to "heavy REEs" – notably dysprosium and terbium. Both classified as critically important to clean energy and critical supply risk.
- China has grown to be dominant player throughout the value chain on back of strong government support and lowest cost operations.

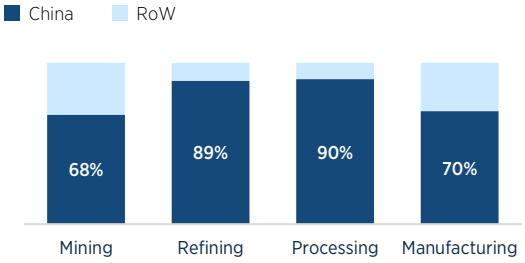
Namibia potential production of REEs, '000 t



MARKET OUTLOOK: China's dominance raises supply chain concerns

- Refined REE market worth $9bn – with dysprosium and terbium accounting for 20% of production by value.
- Introduction of China export quotas has raised global supply concerns and triggered price increases and volatility.
- EU and US responding by seeking to diversify supply sources to build supply chain resilience.
- Security of supply concerns may allow costlier production to enter market.

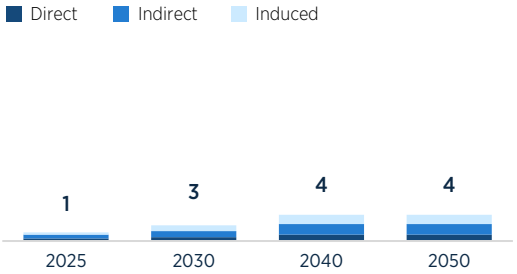
REE supply chain market share, %



DOMESTIC OPPORTUNITY: Technical expertise required to add local value

- >50mt local high-grade resource base to feed domestic separation plant.
- JV required between domestic producers and international refiners – either Chinese or EU/US – to develop local processing and operational expertise.
- China JV offers rapid tech access but may hamper access to EU markets.
- Potential 2050 industry scale (including indirect and induced):
  - $175m value add (>1% of current GDP)
  - Up to 4,100 jobs

Jobs, '000s FTE



5 Rare earth elements (REE) refining

Collaborate with Chinese partner to expedite market entry (3-6 years) or invest in R&D jointly with EU/US-based REE operators (e.g., USA RE, REEtec) to test refining technologies locally.

Intervention	Description	Timing	Tasks
1. Shortlist potential int'l partners	Evaluate partnering pros/cons with China/EU/US firms, re market entry, strategic alliances, and ops efficiency.	0-6m	› Map industry players. › Assess Africa invest interest. › Formulate potential JVs.
2.Assess infrastructure enablers	Evaluate current availability of energy, water and transportation infrastructure.	0-6m	› Model energy needs. › Map transport network. › Flag infrastructure gaps.
3.Formulate JV terms and conditions	Define criteria for "fair partnership" with external partner for JV REE plant, e.g. transfer pricing regulations.	6-18m	› Engage legal support. › Consult industry experts. › Draft transfer pricing policies.
4.Secure int'l financial & technical support	Mobilise financial and technical resources (EU/Invest EU/AfDB) for R&D and establishing a refinery.	6-18m	› Storyboard business case. › Develop pitch deck. › Run EU financing roadshow.
5.Streamline permitting process	Transparent & expedited permitting processes (e.g., construction, manufacturing, environmental).	6-18m	› Implement one-stop shops. › Provide government support. › Expedite priority applications.
6.Adopt regulatory framework	Establish fit-for-purpose regulations for sustainable implementation, inc. handling of radioactive waste.	6-18m	› Review environmental policy. › Draft sustainability regulations. › Assign GoN oversight.
7.Regional promotion of Namibia refinery	Promote the advantages of a shared facility within Namibia and across the broader Southern Africa region.	18m+	› Publish economic impact study › Host regional investor forum. › Pitch w/regional partners.
8.Define water/power modernisation plan	Engage NamPower and NamWater to plan for improved water/power supply in REE zone (Walvis Bay).	18m+	› Survey regional supply routes. › Optioneer new routes using AI. › Initiate infrastructure upgrade.

$300m

by 2050

Capex requirement

$175m

by 2050

Annual value add potential

Importance of enablers

Requires reliable water and power supply.

- ■■■□ Water
- ■■■□ Power
- ■□□□ Gas
- ■■□□ Ports
- ■■□□ Local raw materials
- ■□□□ Local demand centres

WHAT

Low CO_2

6 Flat glass production

Produce flat glass using low-cost, low-CO_2 energy to target Africa & EU markets, then expand into local raw materials production (e.g., soda ash) and higher-value flat glass derivatives.

INDUSTRY OVERVIEW: Access to raw materials and low-cost energy crucial

- Demand driven by construction sector. Of the 4 main types of glass, flat glass has largest market and is the easiest to transport.
- Energy and raw materials each account for 25% of glass cost.
- Namibia competitive advantage due to raw material availability, low-cost clean energy, skilled labour, and quality infrastructure.
- Major glass manufacturers are setting ambitious emission reduction targets.

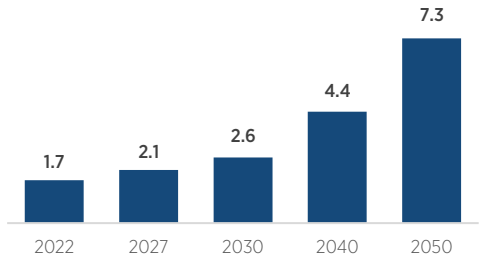
Major flat glass producer emission reduction targets

	Scope 1-2 emissions	Scope 3 emissions
SAINT-GOBAIN	-33% by 2030 (vs 2017)	-16% by 2030 vs. 2017
AGC	-30% by 2030 (vs 2019)	-30% by 2030 vs. 2019
CORNING	-30% by 2028 (vs 2021)	-17.5% by 2028 vs. 2021
NSG	-21% by 2030 (vs 2018)	"Committed to reduce"
ŞİŞECAM	-5% by 2022 (vs 2017)	N/A

MARKET OUTLOOK: Rapid growth anticipated, particularly in Africa

- Global market reached $122bn, with 8% YoY growth forecast. $40bn of flat glass exported annually, with N.America, Europe, & Asia major importers.
- Africa is world's fastest growing market for imported flat glass (albeit still comparatively small) – increasing 5% p.a. since 2013 vs 1% p.a. global.
- Africa & Europe import growth to 2050 will require >150 new flat glass plants (40+ to serve Africa and 110+ Europe).

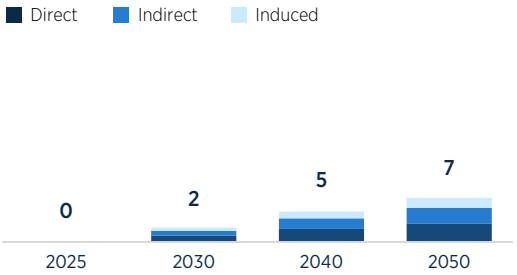
Estimated flat glass imports to Africa, m tonnes



DOMESTIC OPPORTUNITY: Cost competitive and low-carbon exporter

- Domestic market small, but cost-competitive for exports to Africa/Europe (13% cheaper than current Africa price; 23% cheaper than Europe price).
- Opportunity to set up production plant and then expand upstream via domestic production of silica and soda ash.
- Potential 2050 industry scale (including indirect and induced):
  - $550m value add (4% of current GDP)
  - Up to 7,100 jobs

Jobs, '000s FTE



HOW

Low CO_2

6 Flat glass production

Attract international player (e.g., Saint Gobain, AGC) to launch local production and export to Africa & Europe, then expand into downstream products and possibly upstream into soda ash.

Intervention	Description	Timing	Tasks
1. Assess potential for local silica supply	Support local silica suppliers (e.g., Hakahana Ind. & Groot Silica Mining)	0-6m	› Assess glass industry demand. › Engage with local suppliers.
2.Target int'l players to set up locally	Engage int'l glass players without regional presence, e.g., AGC.	0-6m	› Develop pitch deck. › Run international roadshow.
3.Assess feasibility of soda ash production	Conduct feasibility study on soda ash production at Trona (in Etosha NP).	0-6m	› Conduct quantity survey. › Commission feasibility study.
4.Infrastructure quality assessment	Assess infra for glass plant location, raw materials sites, & port, w/MoWT	0-6m	› Review port > site route. › Assess infrastructure gaps.
5.Environmental impact assessment	Conduct EIA for prod. and dist. of glass products, incl. soda ash mfg.	0-6m	› Formulate EIA ToRs. › Commission & conduct EIAs.
6.Attract expertise for soda ash production	Engage large players, e.g., Solvay re soda ash production from Trona.	6-18m	› Map industry players. › Develop pitch & roadshow..
7.Lock-in access to adequate gas supply	Ensure LNG access/capacity (i.e., pipeline and regasification centres).	6-18m	› Review existing infrastructure. › Establish strategic gas reserve.
8.Support export quality standards	Promote quality standards (e.g., ISO) for target markets (e.g., CBAM in EU).	6-18m	› Create report of EU standards. › Model their compliance policy.
9.Adopt recycling targets	Set % target for used glass (cullet) in prod. to cut emissions & energy cost.	6-18m	› Analyse glass recycling centres › Consult suppliers & set targets.
10.Ensure availability of skilled labour	Identify source of skilled local labour to meet needs for flat glass prod.	6-18m	› Lead technical training courses. › Partner with educational inst.
11.Expand export handling capacity	Increase port handling capacity to allow production expansion & export.	18m+	› Upgrade port facilities. › Improve customs processing.
12.Adopt localisation mandates	Consider min. % of locally-produced coated flat glass in domestic PV cells.	18m+	› Conduct supply chain analysis. › Draft local content legislation.
13.Promote transition to zero-carbon glass	Encourage move to a zero-carbon glass by replacing gas with gH2.	18m+	› Create zero-carbon subsidies. › Build reliable gH2 supply chain.

$1.5 bn

by 2050

Capex requirement

$550m

by 2050

Annual value add potential

Importance of enablers

Energy intensive requires power & gas. Ports for international export.

- ■■□□ Water
- ■■■□ Power
- ■■■□ Gas
- ■■■□ Ports
- ■■□□ Local raw materials
- ■□□□ Local demand centres

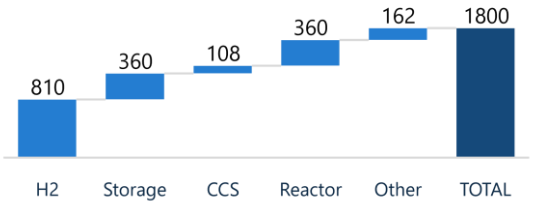
7 Synthetic fuel production

Use domestic bush biomass to produce biogenic CO_2 feedstock and gH_2 to produce synthetic fuel for export to EU aviation market, scaling up from 2030 to supply EU mandates.

INDUSTRY OVERVIEW: High potential carbon-neutral fuel alternative

- So-called "drop-in" synthetic fuels (biofuel or e-fuel) can decarbonise transport sector without the need for fuel blending or new engines/infra.
- They are carbon neutral since they are manufactured using bio-bound or captured CO_2 that balances out the CO_2 released when fuel is combusted.
- E-fuel produced when gH_2 used to convert CO_2 to synthetic fuel. H_2 plant is the most expensive capex component in a typical e-fuel plant.

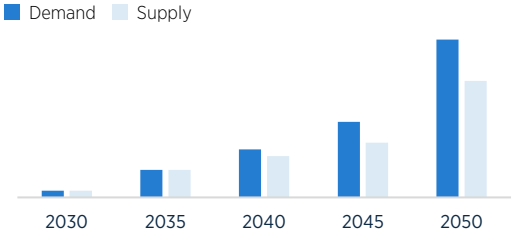
Capex breakdown for typical e-fuel plant, $m



MARKET OUTLOOK: Booming EU SAF demand & emerging e-SAF supply gap

- EU sustainable aviation fuel (SAF) mandates to create market from 2025 (rising to 40mtpa by 2050). E-SAF fulfils mandates if produced with gH_2.
- At present commercially unproven, but significant ongoing R&D. Can be used for up to 50% blend with conventional jet fuel.
- EU biofuel market facing oversupply, but e-fuel market expected to see increasing supply gap – reaching 6mtpa by 2050.

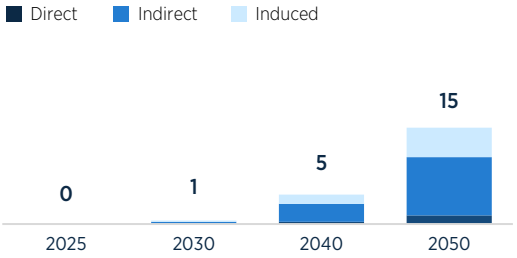
E-SAF projected demand and supply, mtpa



DOMESTIC OPPORTUNITY: gH_2 & biogenic CO_2 supply to underpin industry

- Scope to produce e-SAF from 2030 to export to EU aviation customers.
- A bush biomass plant could supply biogenic CO_2, while low-cost domestic gH_2 production establishes Namibia's competitive advantage.
- Potential 2050 industry scale (including indirect and induced):
  - $1.9bn value add (>15% of current GDP)
  - Up to 15,500 jobs

Jobs, '000s FTE



7 Synthetic fuel production

Set up JV between international SAF developer and existing domestic player (e.g., NAMCOR) to produce first e-SAF based on gH_2 and local biogenic CO_2.

Intervention	Description	Timing	Tasks
1. Attract pilot plant developer	Engage potential candidates for pilot projects to test feasibility of SAF production.	0-6m 6-18m	› Map industry players. › Assess Africa invest interest. › Formulate potential JVs.
2.Encourage biomass power w/CCS	Follow up on NamPower's plan to build 30MW biomass power plant and CCS capabilities.	0-6m 6-18m	› Commission feasibility study. › Assess compatibility w/SAF. › Evaluate grant support.
3.Assess infrastructure requirements	Assess infrastructure requirements with focus on Walvis Bay capacity to handle additional SAF demand.	6-18m	› Survey current infrastructure. › Conduct feasibility study. › Analyse potential gaps.
4.Identify upstream/ downstream partners	Prioritise and select partners/players for feedstock supply, e-SAF prod., oil refineries and SAF traders.	18m+	› Input: gH2 proj. & NamPower › Prod.: Shell, Total, BP, Sasol › Ref.: SAPREF, Natref/Sasolburg
5.Facilitate offtake agreements	Broker offtake agreement between major EU airlines and fuel producers to de-risk early investments.	18m+	› Map potential customers. › Draft pitch book. › Run customer roadshow.
6.Streamline permitting process	Simplify and accelerate licensing/ permitting process to operate SAF plant (specifically retail/wholesale).	18m+	› Implement one-stop shops. › Provide government support. › Expedite priority applications.
7.Develop law for offtake specs	Expedite legal framework on offtake specifications (including hydrogen standards).	18m+	› Research similar laws. › Formulate and draft policy. › Publish clear offtake guidelines.

$20 bn

by 2050 (excluding biomass)

Capex requirement

$1.9 bn

by 2050

Annual value add potential

Importance of enablers

Proximity to green hydrogen and other major industries required.

- ■□□□ Water
- ■■■□ Power
- ■□□□ Gas
- ■■■□ Ports
- ■■■□ Local raw materials
- ■□□□ Local demand centres

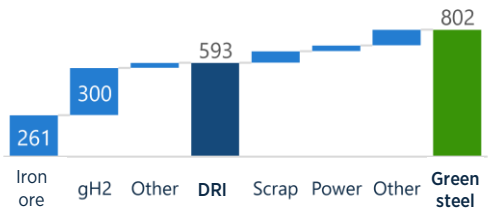
8 Green hot briquetted iron (HBI) production

Produce green HBI/DRI at Lüderitz, using green hydrogen, to export to EU markets. Then grow to serve potential regional 'green steel' customers (e.g., South Africa).

INDUSTRY OVERVIEW: gH_2 to produce HBI can slash steel CO_2 emissions

- Green hot briquetted iron is a low-carbon iron produced by using gH_2 to reduce high-grade iron ore pellets to Direct Reduction Iron (DRI).
- When green HBI used in steel-making, it can cut CO_2 emissions by 85-95% - thereby earning the label of "green steel".
- gH_2 accounts for ~50% of DRI costs (and 35% of green steel cost), meaning that low-cost renewable energy is key to economics.

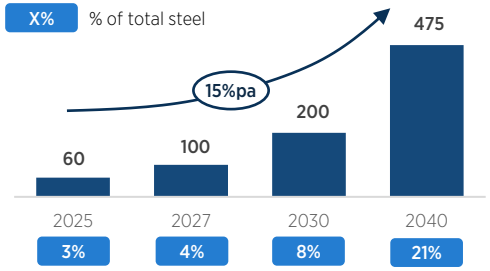
Green steel production cost, gH_2 DRI, $/t



MARKET OUTLOOK: Green steel to grow exponentially & enter mainstream

- Green steel demand to grow at least eight-fold to 2040, and transition from niche product (3% of total steel) to mainstream (>20% of total steel).
- Growth motivated by government regulations and corporate commitments to decarbonise, particularly in transport and construction sectors.
- China, India, and S.Africa to emerge as major green steel producers, while green price premium anticipated in Europe due to growing undersupply.

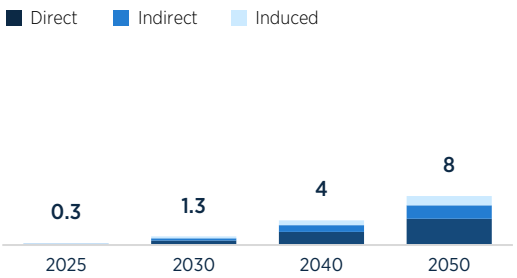
Global low-carbon steel demand forecast, mt



DOMESTIC OPPORTUNITY: Move rapidly to exploit gH_2 cost advantage

- Namibia can produce and export green HBI to Europe due to low-cost gH_2, which is expected to offset other cost disadvantages.
- But…window of opportunity risks closing if delayed, as Europe gH_2 costs decline (in part due to mooted gH_2 pipelines from Middle East/N.Africa).
- Potential 2050 industry scale (including indirect and induced):
  - $1.2bn value add (10% of current GDP)
  - Up to 7,900 jobs

Jobs, '000s FTE



8 Green hot briquetted iron (HBI) production

Incubate local player and engage miners (e.g., Rio Tinto, Glencore) and traders (e.g., Cargill, AA Marketing) to secure supply, and strike offtake agmts for green HBI/DRI with int'l steel players.

Intervention	Description	Timing	Tasks
1. Facilitate integrated Joint Venture	Broker JV of green HBI producers (Lodestone/HyIron), HBI off-takers (AA/Marubeni), & iron miners (RT etc)	0-6m	› Map potential stakeholders. › Host multi-stakeholder forum. › Streamline JV permit approval.
2.Support EPC/EPCM partnerships	Guide assessment of EPC/EPCM partnership between HBI players & DRI tech (Midrex & EnergIron/HYL).	0-6m	› Evaluate DRI build capabilities. › Negotiate EPC/EPCM contract, › Broker partnership.
3.Evaluate impact of local sourcing regs	Evaluate impact of natural resource legislation (esp. iron ore) on HBI players (i.e., local vs. int'l sourcing).	0-6m	› Analyse current resource laws. › Consult with industry players. › Report legislative findings.
4.Develop necessary local skills	Collaborate with higher education institutions to develop local talent for HBI and/or attract regional talent.	0-6m	› Promote demand for workers. › Lead technical training courses. › Partner with educational inst.
5.Showcase Namibia green HBI ambition	Showcase Namibia's attractiveness and ambition towards green HBI production in international forums.	6-18m	› Draft HBI strategy paper. › Promote refining potential. › Host industry forum.
6.Support export quality standards	Communicate and/or support for application of CBAM trade requirements for HBI production.	6-18m	› Detail CBAM guide to suppliers. › Provide compliance incentives. › Monitor to ensure compliance.
7.Negotiate steel trade agreements	Consider steel trade agreements with potential markets (incl. EU, S.Africa, & US) to minimise green HBI tariffs.	6-18m	› Evaluate potential markets. › Create pitch deck for HBI. › Contact relevant trade minister

$6 bn

by 2050

Capex requirement

$1.2 bn

by 2050

Annual value add potential

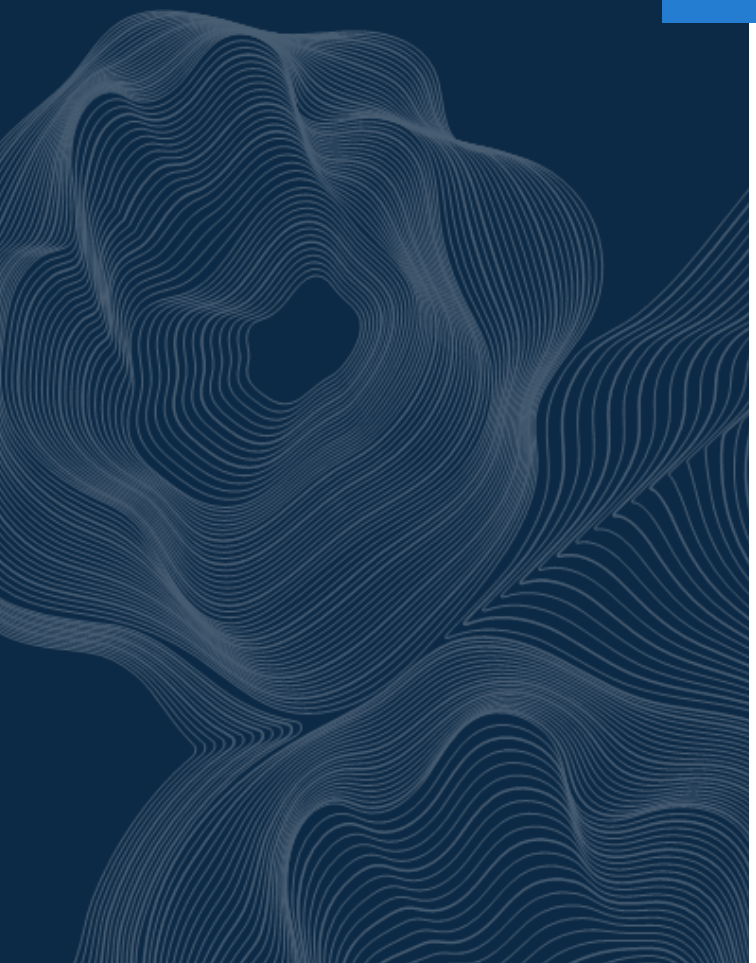
Importance of enablers

Large power need – and proximity to port if no local iron supply.

- ■□□□ Water
- ■■■□ Power
- ■□□□ Gas
- ■■■□ Ports
- ■■□□ Local raw materials
- ■□□□ Local demand centres

Annexe 3

A spatial diagnosis of Namibia and its economy



1 Spatial analysis

Namibia overview

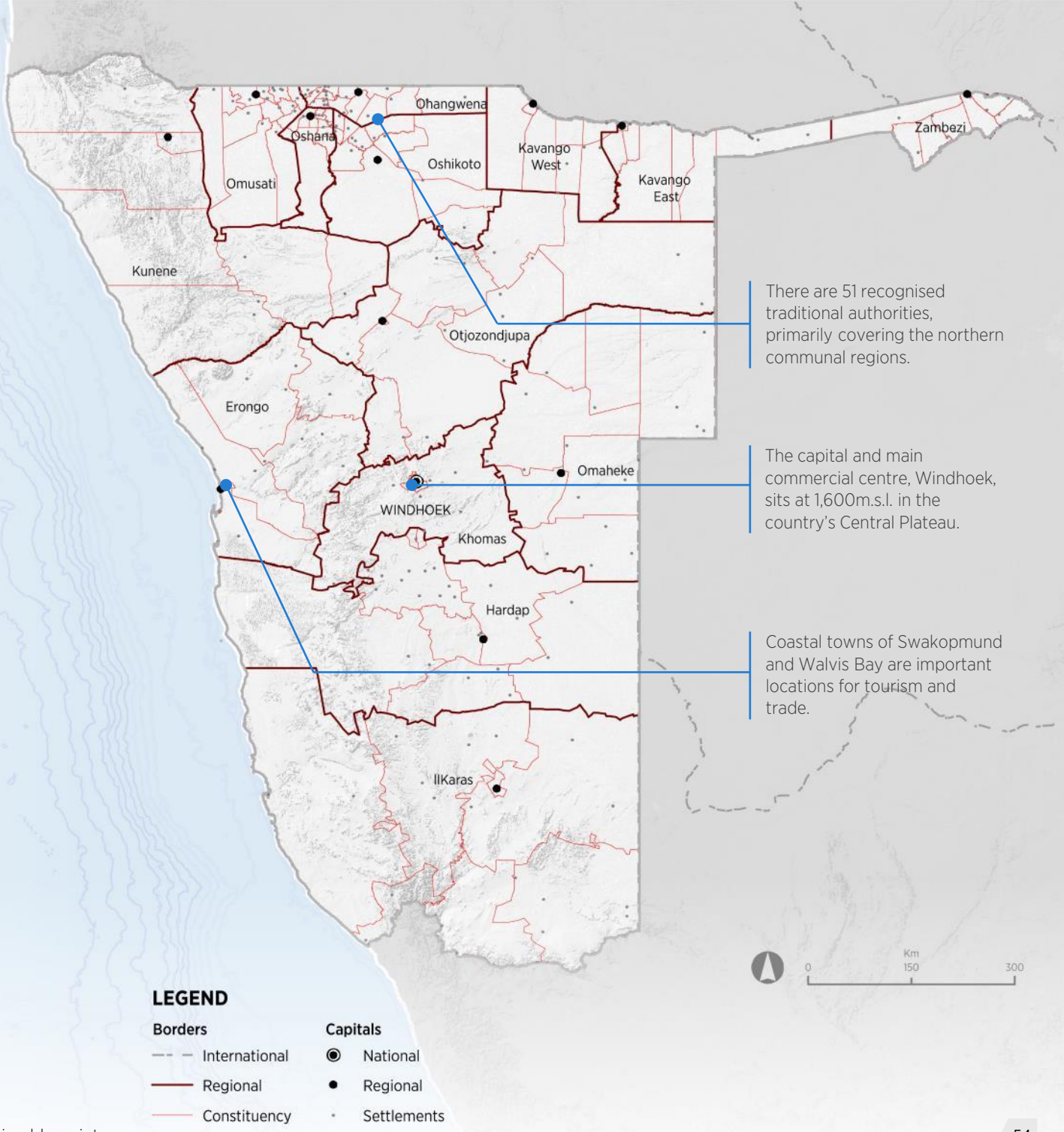
Namibia has long operated a decentralised form of governance across three levels.

The national government is situated in the nation's capital city, Windhoek. Below this are 14 regional administrative councils, and 121 local constituencies.

Although formally adopted in policy in 1997, plans for decentralisation in Namibia date prior to independence in a 1988 blueprint.

Whilst in the top ten for GDP per capita in Sub-Saharan Africa, Namibia ranks as one of the world's most unequal countries. This reflects territorial segregation and resource misallocation during the colonial period.

There is a prominent north-south divide. The north is more densely populated and reliant on subsistence farming, compared to the more sparsely populated south with more commercial activity.



Population centres

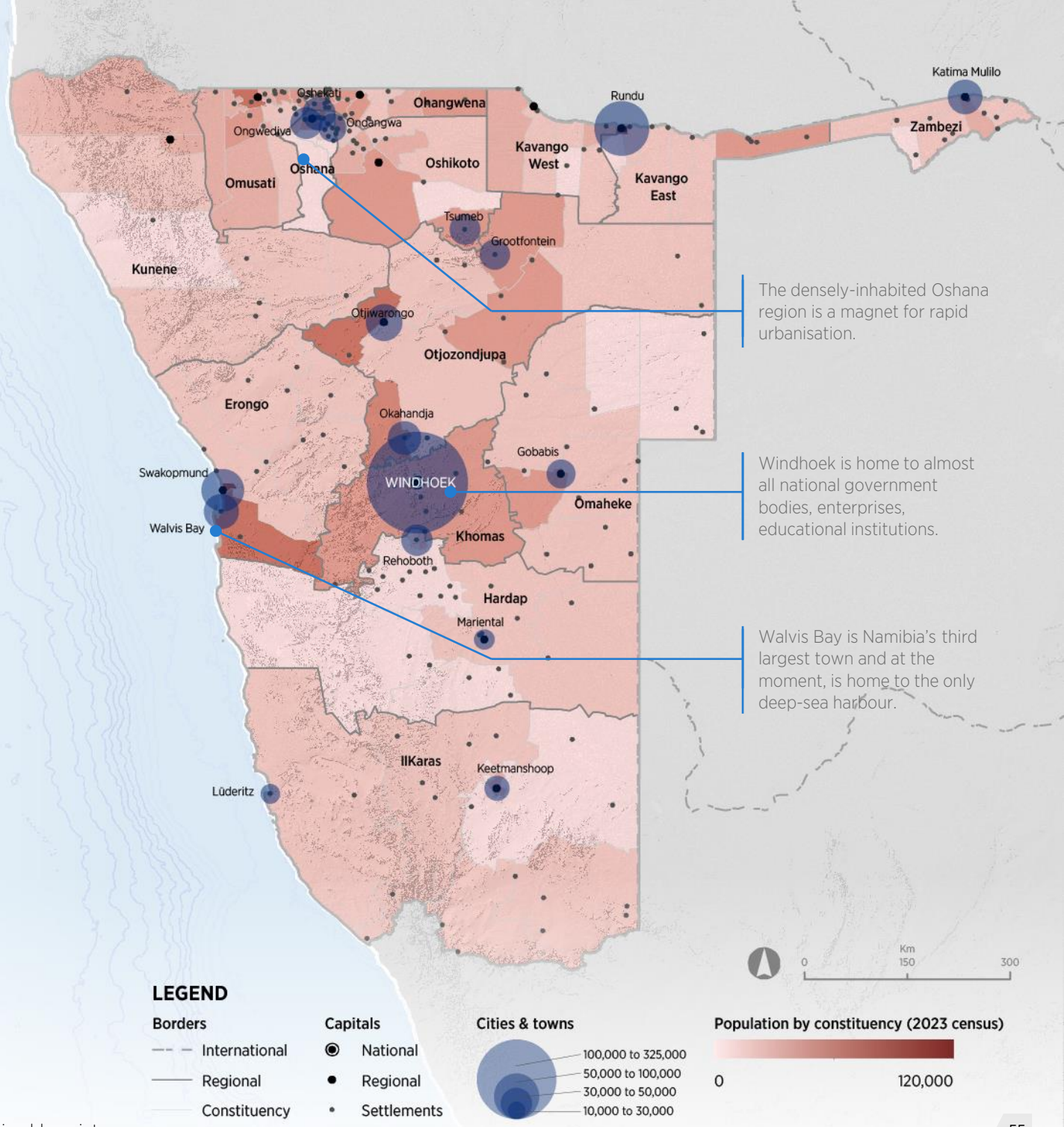
Namibia's population is concentrated in the capital city of Windhoek and the traditionally owned lands of the far north.

Owing to its small population and sizeable land mass, Namibia ranks as the 2nd least densely populated country in the world. Windhoek is the dominant urban area, over five times bigger than the second largest town, Rundu.

Outside of Windhoek, the majority of Namibians (around half the population) reside in the far north of Namibia in a mix of rural and urban areas.

Other key towns support trade and mining operations in Namibia. Walvis Bay's port is pivotal to the wider region connecting neighbouring landlocked countries to the world.

Beyond this, small settlements are scattered throughout the rest of the country, pointing to the country's overall spareness.



Population growth

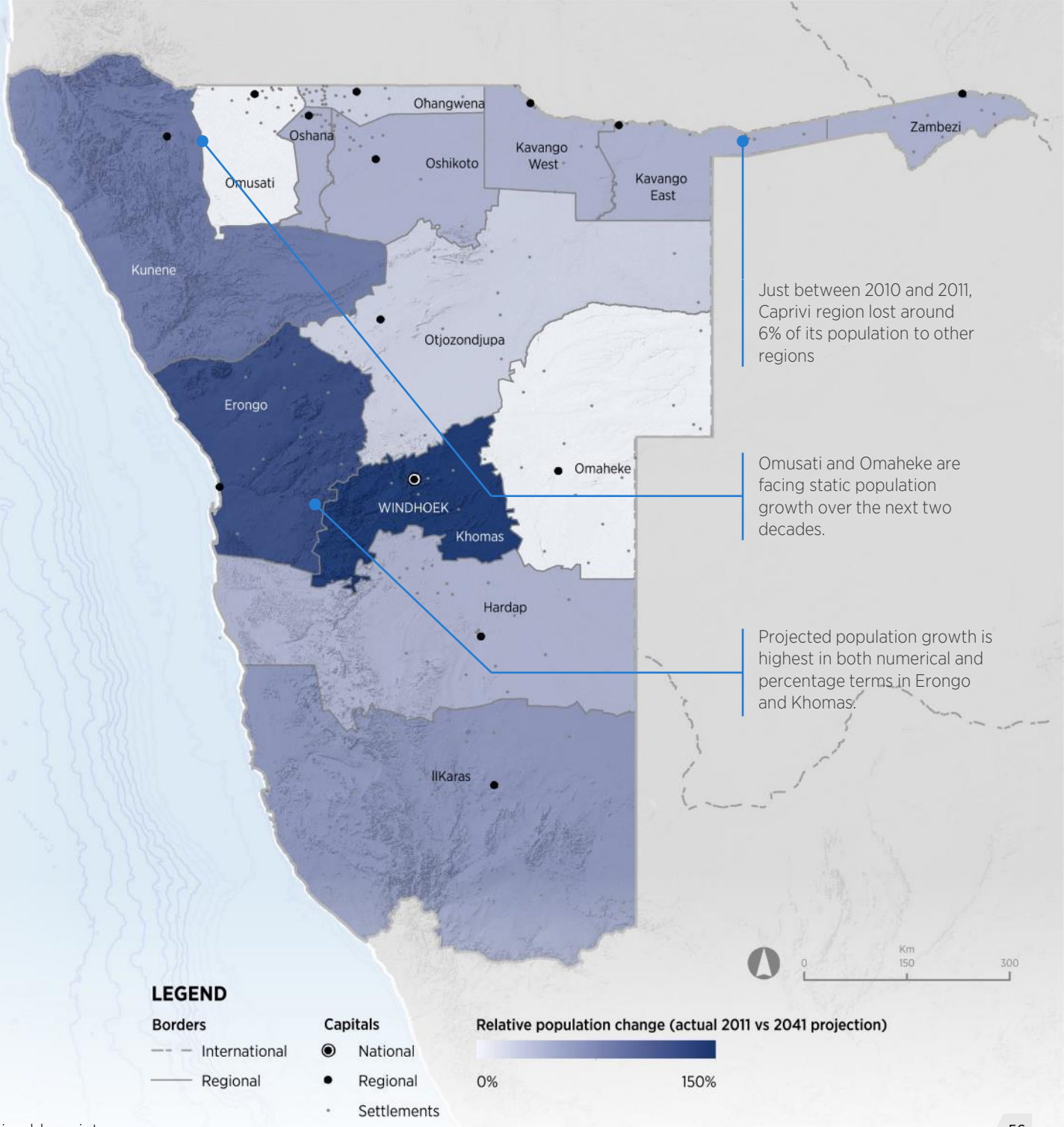
Internal migration from the north is projected to drive population growth in the Khomas and Erongo regions.

Population growth naturally increases demand for space and resources. Rapid population growth can stifle sustainable and inclusive development, affecting those living in poverty and the environment.

In contrast to the presently densely populated north, the wealthier Khomas and Erongo regions are expected to experience over 100% population growth between 2011 and 2041.

Omusati is currently the second most populous region but is expected to experience little to no population growth during this period, as people seek economic opportunities elsewhere.

This migration pattern is not new: by 2010, over 40% of those residing in Khomas and Erongo were born elsewhere, while 1 in 6 persons born in the densely populated northern regions of Ohangwena and Omusati were already residing elsewhere.



Source: NSA Population Projections 2011-2041

Age distribution

Namibia has a relatively young population with significant levels of youth unemployment.

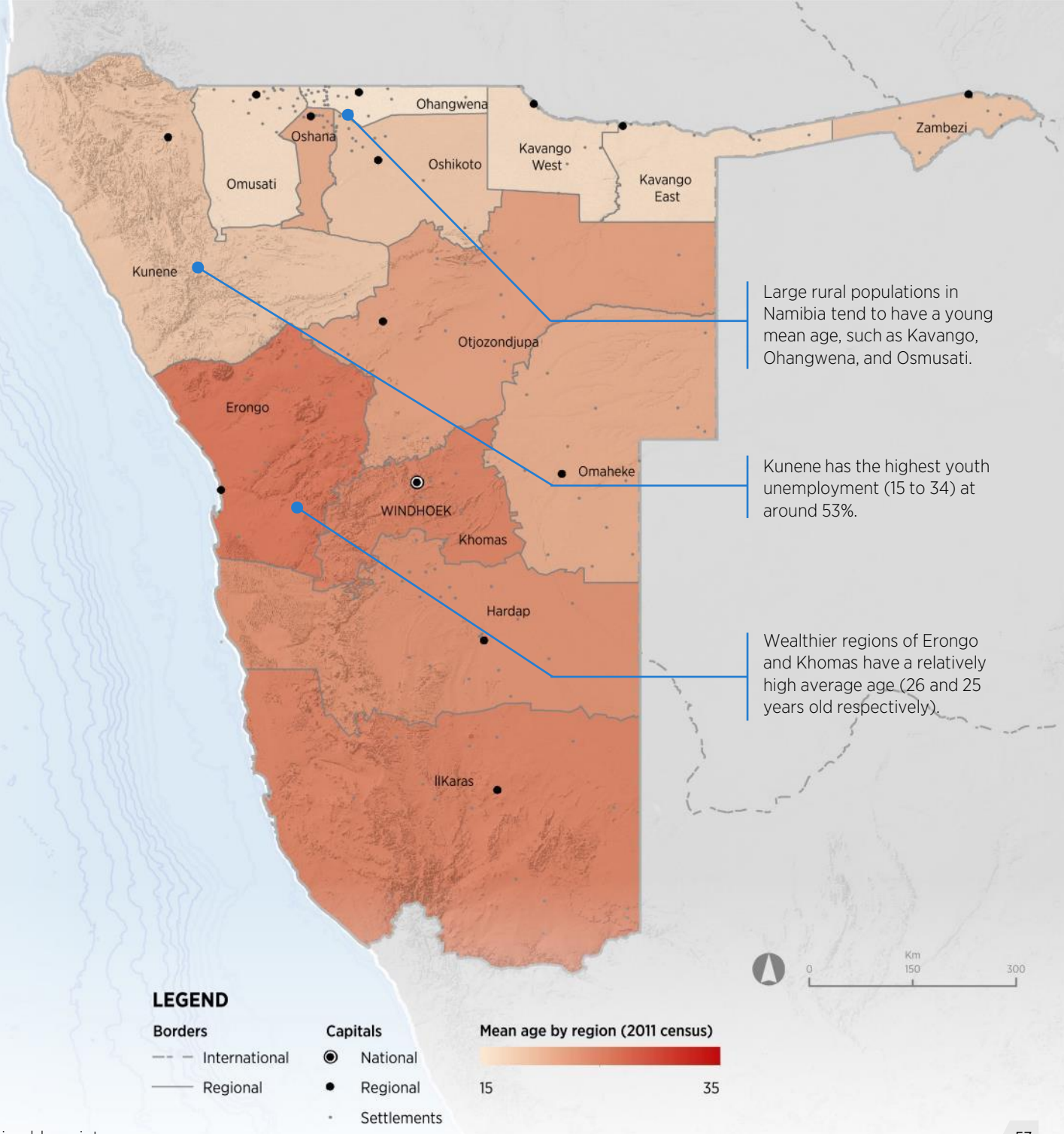
Namibia has a young population with the mean age around 22 years old, albeit this is above average in Sub-Saharan Africa. The mean age in the more urban wealthy regions tends to be higher with the working age populations drawn to these places.

The age dependency ratio in Namibia – the number of elderly (<15 and 65>) relative to the working population – sits at 67%. This is considerably higher than other upper middle-income countries, but lower than the average of sub-Saharan Africa.

Around 90% of the age dependent group are below 15 years of age (around 900,000). Creating decent job opportunities and education that matches the job market is necessary to support the large number of youths.

Youth unemployment is reported as being very high at 40%, but this is indicative of Namibia's strong reporting standards, particularly when comparing this to the sub-Saharan average of 15%, which may be higher in reality.

Source: NSA Labour Force Survey 2018; World Bank 2022



Income sources

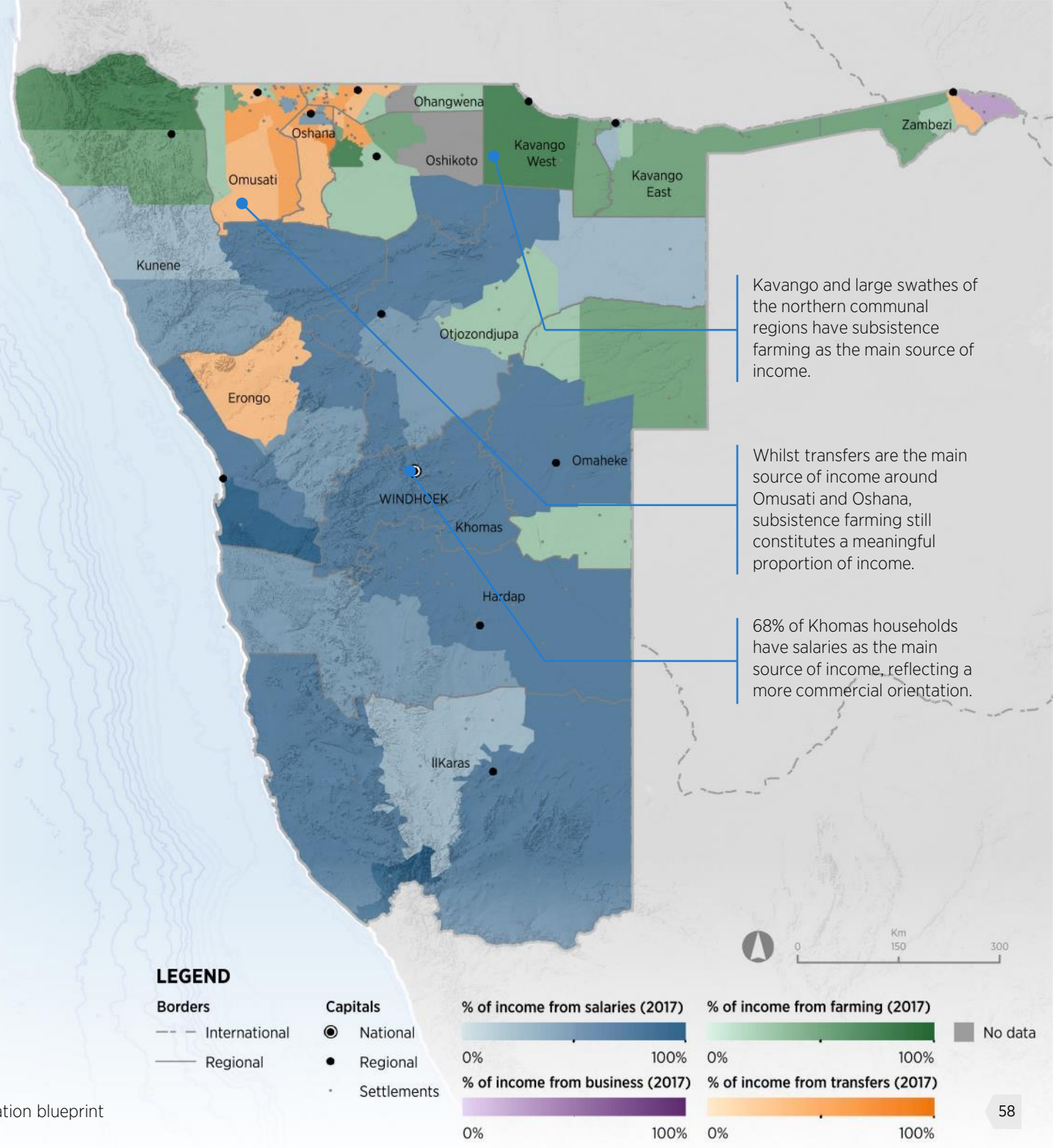
Primary sources of income differ significantly – farming dominates the north and employment elsewhere.

Sources of income and income distribution across a country reflect levels of inequality and socio-economic development, regional infrastructure, and population activities.

Of Namibia's 14 regions, ten report salaries as the main source of income. The dependency on salaries largely aligns with the wealthier and more commercial regions in Namibia.

The regions where subsistence farming is the main source of income are typically found in the northern communal regions. Transfers (pensions, remittance, retirement fund, orphan's grant, disability grant), as a primary source of income are mainly in the central northern region.

The dualistic nature of the Namibian economy is partially expressed in the map, with most of the country's wealth dependent on capital-intensive industry in the south, contrasting the traditional subsistence farming sector.



Source: NSA Labour Force Survey 2018

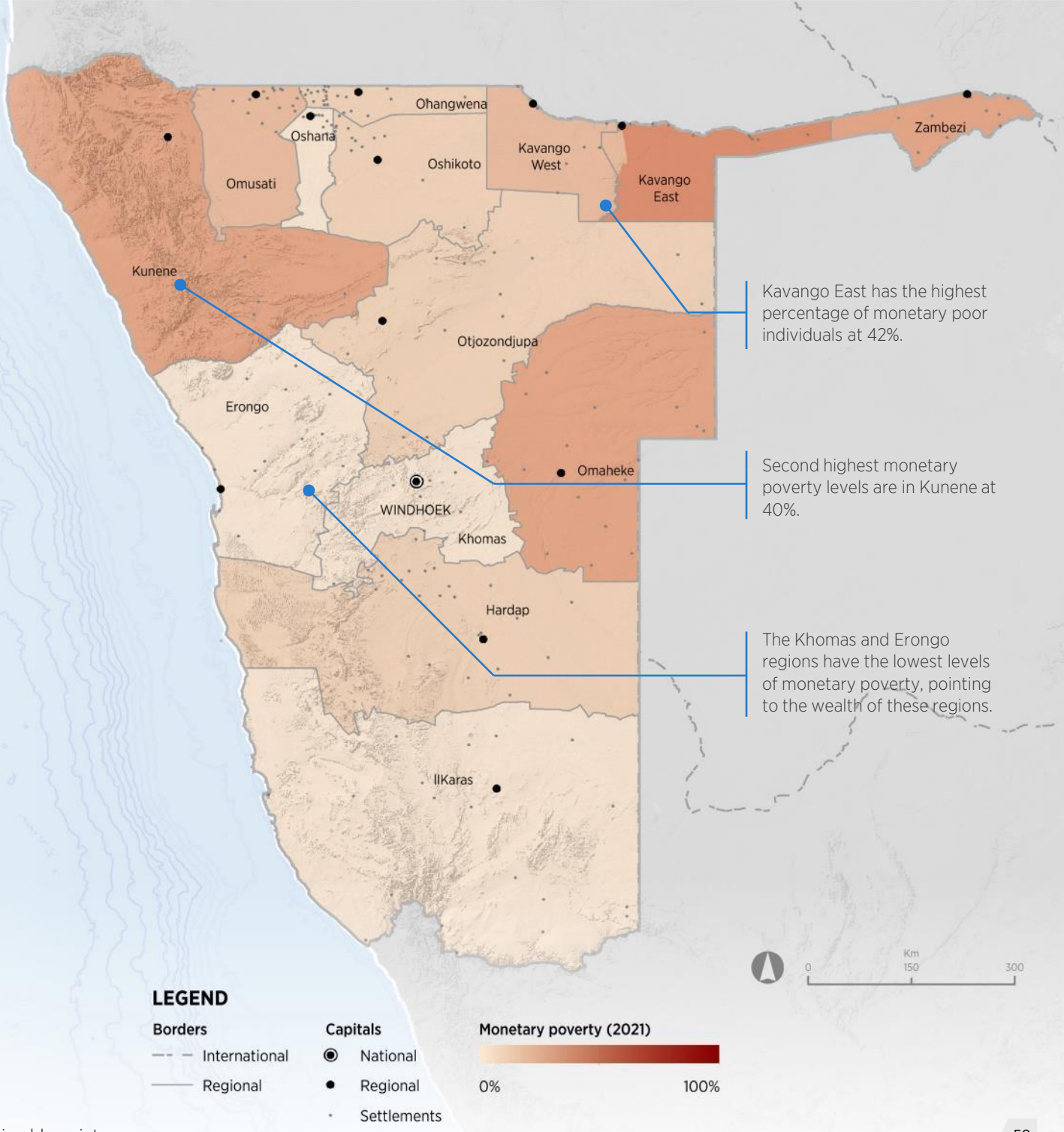
Poverty analysis #1: monetary poverty

Monetary based poverty levels have fallen but are generally still higher than other middle-income countries.

A monetary poverty analysis is a cost-of-basic-needs approach. It considers as poor the population that cannot consume more than N$520 per month on basic needs.

Since independence, strong economic growth has significantly reduced poverty levels. poverty remains high than countries with similar income levels to Namibia, however, which points to significant income disparity.

As shown in the RHS map, high economic disparities are manifested in a north south divide. In particular, the highest levels of monetary poverty are concentrated in Kavango East (42%), Kunene (38%), and Omaheke (34%). At 4.7%, the Khomas region, has the lowest level of monetary poverty



Source: NSA Multidimensional Poverty Index 2021

Poverty analysis #2: multidimensional poverty

National income has increased significantly, but high levels of poverty persist throughout the economy.

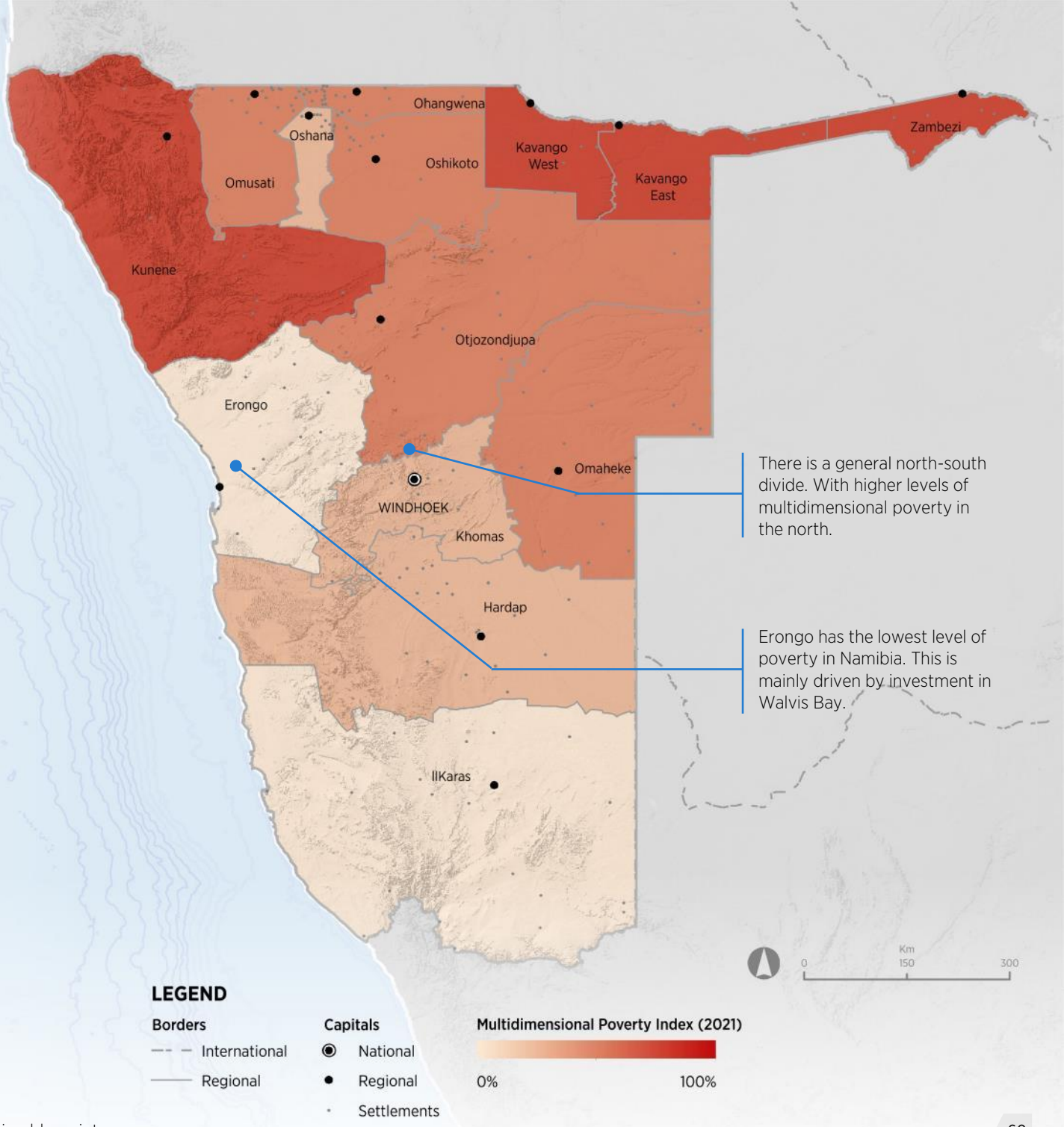
According to the Namibian multidimensional poverty index, 43% of the population live in poverty (for reference, the World Bank estimates the global multidimensional poverty line at 27% of the global population).

While Namibia ranks 112th in terms of GDP per capita, it ranks as 139th in terms of Human Development Index. As a result, it is one of the few upper-middle-income countries not classed with "high" levels of development by the UN.

High multidimensional poverty is driven by low performance in health, education, and service access. For example, 68% percent of the population does not have access to standard sanitation. 25% children under 5 years old are stunted—four times more than the average of upper middle-income counties.

In sum, Namibia has prioritised social spending, which has helped reduce monetary poverty from 37.5% to 17.4% (2004 to 2016). This has generally improved service access but with relatively poor outcomes.

Source: NSA Multidimensional Poverty Index 2021



Income inequality

Despite an extended period of income growth, Namibia remains one of the world's most unequal countries.

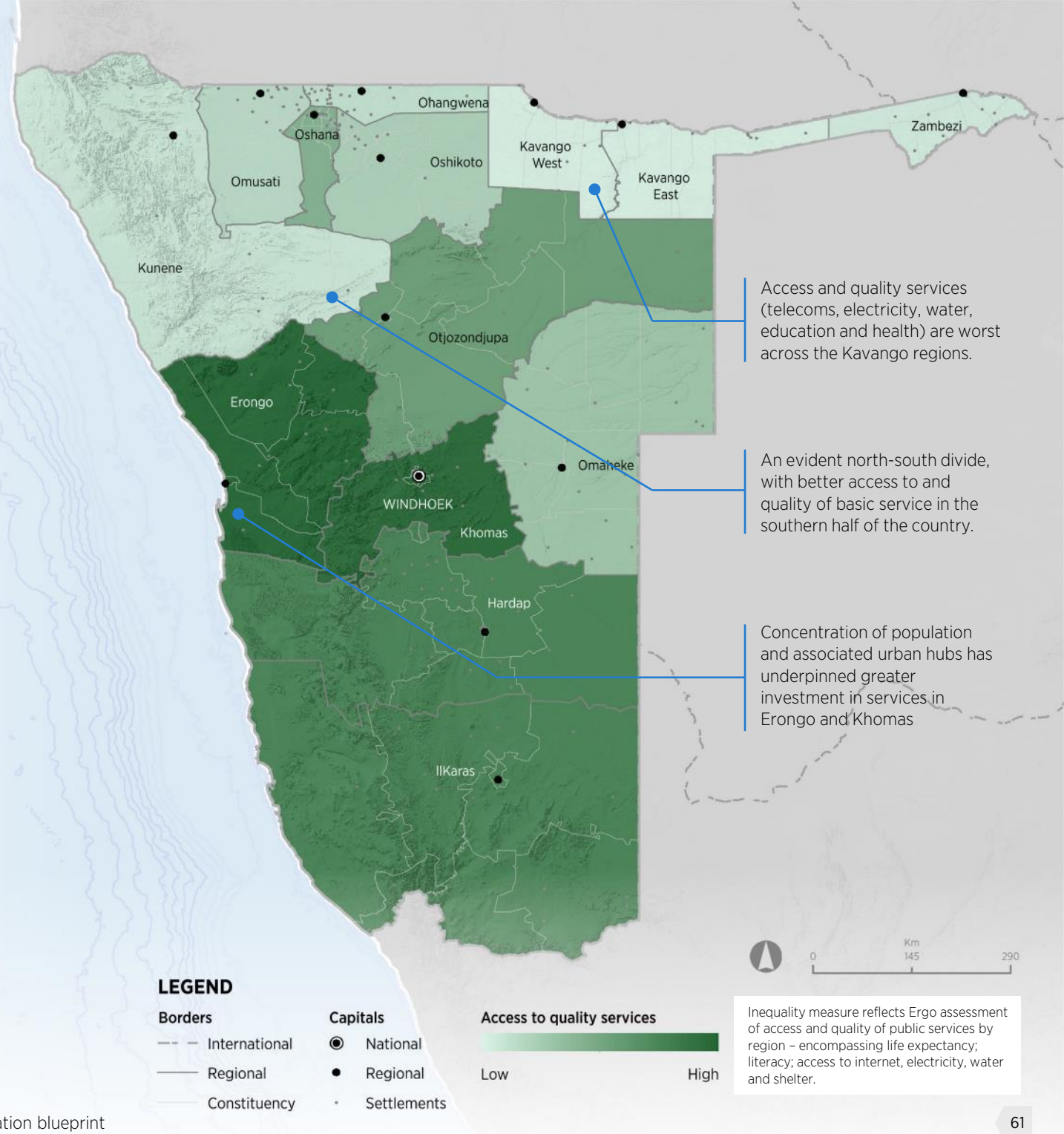
Extreme inequality levels characterise socio-economic conditions in Namibia, a strong legacy from historical colonial segregation. Namibia's Gini coefficient (a measure of income inequality, from 0 to 100) is 59.1, second highest only to South Africa.

Current inequality is particularly poignant against a backdrop of strong economic growth since independence. For example, land ownership remains highly concentrated, with 4,000 farmers owning approximately 50% of total agricultural land and 70% of commercial farmland.

Entrenched income inequality results in inequality of opportunities, hindering human capital and poverty reduction, and further driving market segmentation.

In addition to income and land ownership, geographical disparities are also evident. There is a clear north-south and rural-urban divide. While Windhoek is a modern sophisticated city, areas with low population density - where the cost of public services delivery is disproportionally high- are lagging.

Source: Namibia Labour Force Survey, 2018



Land ownership

Historical divisions still determine land ownership with traditional authority dominating the north.

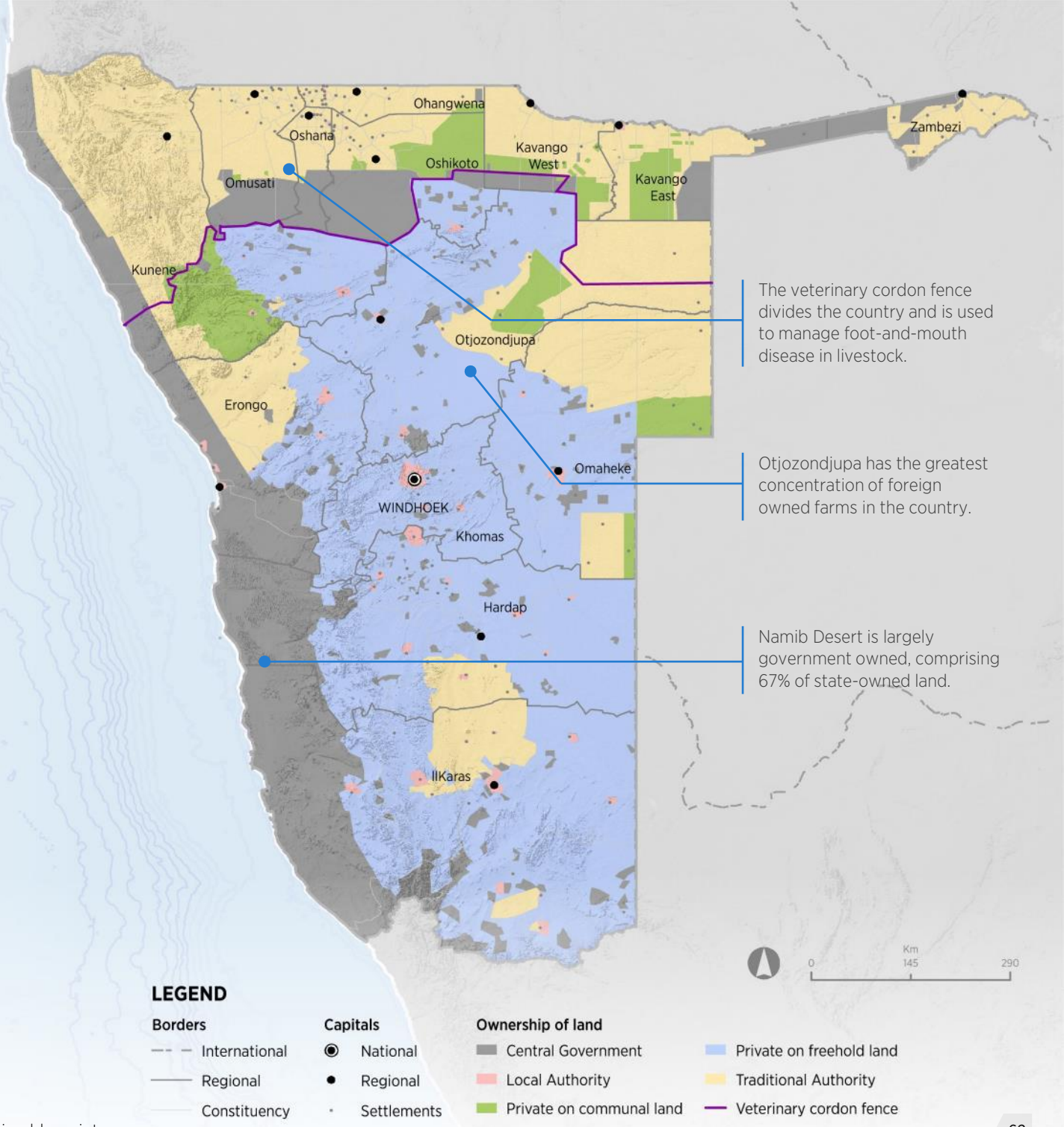
Most of northern Namibia is under traditional authority, while privately controlled land largely covers the rest of the country. The entire Namibian coastline, including the Namib desert, is owned by the central government.

Of the freehold agricultural land, 70% is owned by previously advantaged Namibians – those socially, economically or educationally advantaged by discriminatory laws or practices in the past – contrasting to 16% owned by previously disadvantaged Namibians.

Since independence there has been continual pressure for the redistribution of commercial farmland. The National Resettlement programme has redistributed 3 million hectares benefiting households predominantly in the Hardap, Khomas, Omaheke, and Otjozondjupa regions.

The historic backdrop partially defines land use and ownership that remains distinctively divided by the veterinary cordon fence. This splits Namibian agriculture into two types, subsistence and commercial.

Source: NSA Namibia Land Statistics, 2018



Natural regions

A vast country relative to its population, Namibia can be classified into five distinct natural regions.

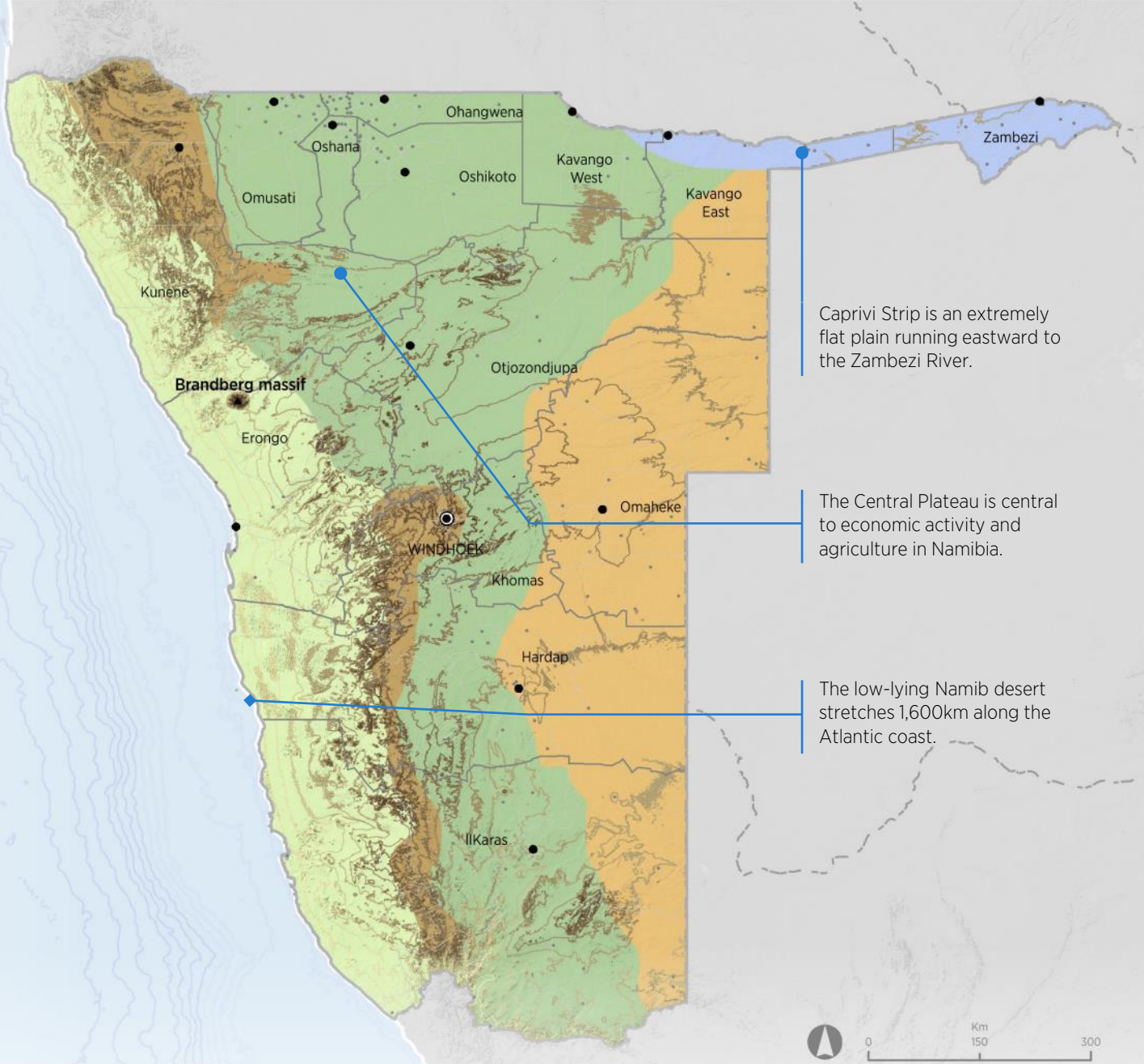
The Central Plateau runs north to south, reaching an altitude of 2000 metres with Windhoek located in the centre. It is home to the majority of population settlements and commercial industry.

The Namib desert runs along the Atlantic coast and is largely uninhabitable. The northern part mainly consists of gravel plains whereas the central part is known for its sand dunes.

The Great Escarpment separates the Central Plateau with the coastal Namib. It can be described as a 1000-metre-high mountain range, stretching from the north to the south of Namibia, but is not continuous.

The Kalahari region is to the east of the Central Plateau. After good rainfalls, it is well vegetated and home to an abundance of wildlife. It forms part of the Kalahari Basin, stretching over seven countries

The Kavango-Caprivi area is sub-tropical and forms a separate region in the otherwise arid Namibia. Due to the humid climate wildlife is abundant and many parts of the region have been declared national parks.



Aridity analysis

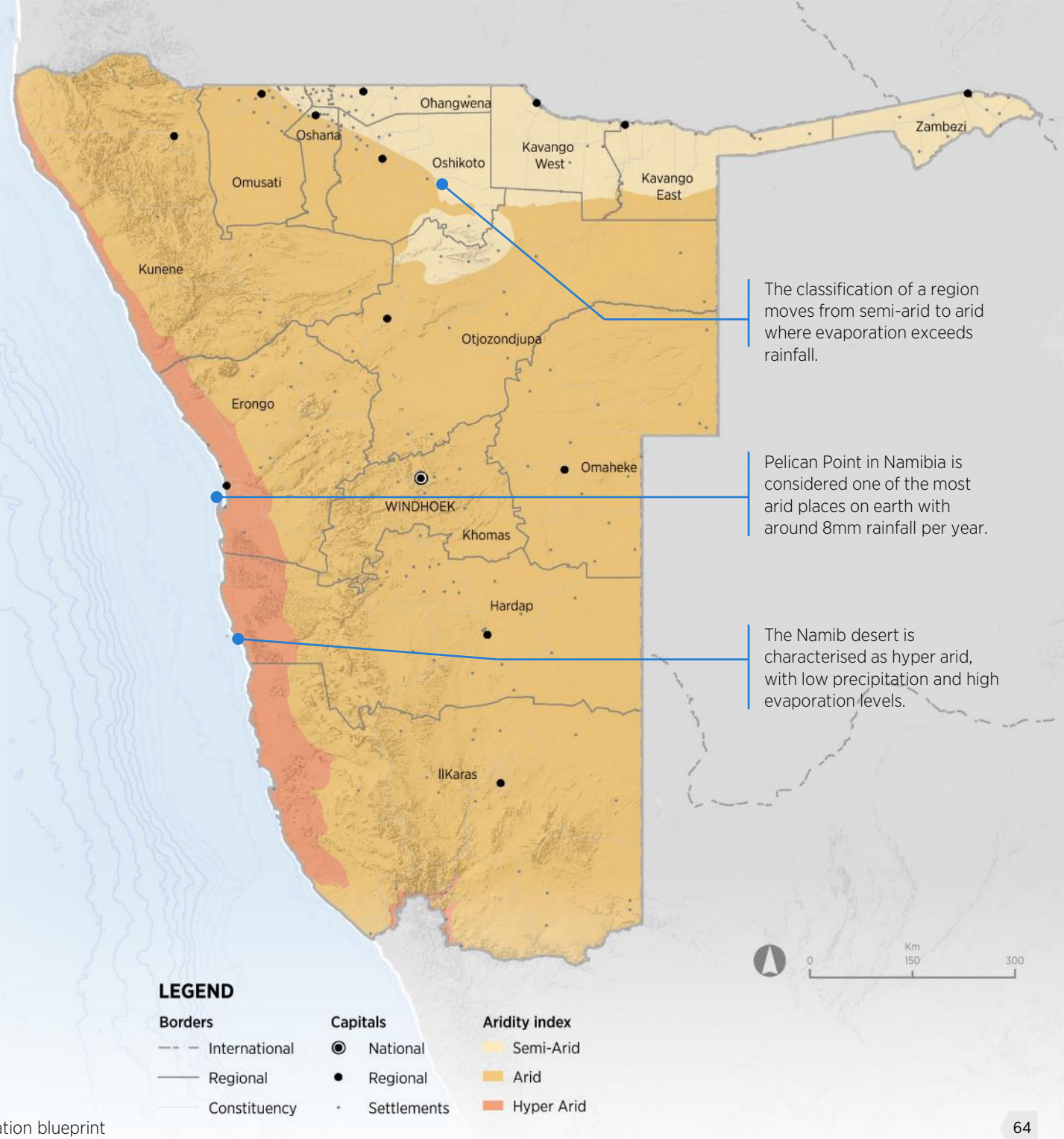
Virtually all of Namibia is considered hyper arid, arid, or semi-arid. This condition constraints farming potential.

Namibia is a severely dry country, with its levels of aridity ranked second only to the Sahara desert, and most of the country classified as at least arid.

Aridity relates to both precipitation and evapotranspiration (evaporation plus transpiration). The low precipitation and high evaporation levels in Namibia determine its extreme aridity.

Evaporation is at least five times greater than average precipitation. A natural desert, Namibia is already considered water scarce and increasing levels of aridity are a strategic challenge to the economy looking into the future.

Rising temperatures are projected to transition parts of Namibia's arid state into hyper arid. This threatens the agriculture sector with additional deficits in soil moisture and increased droughts frequency.



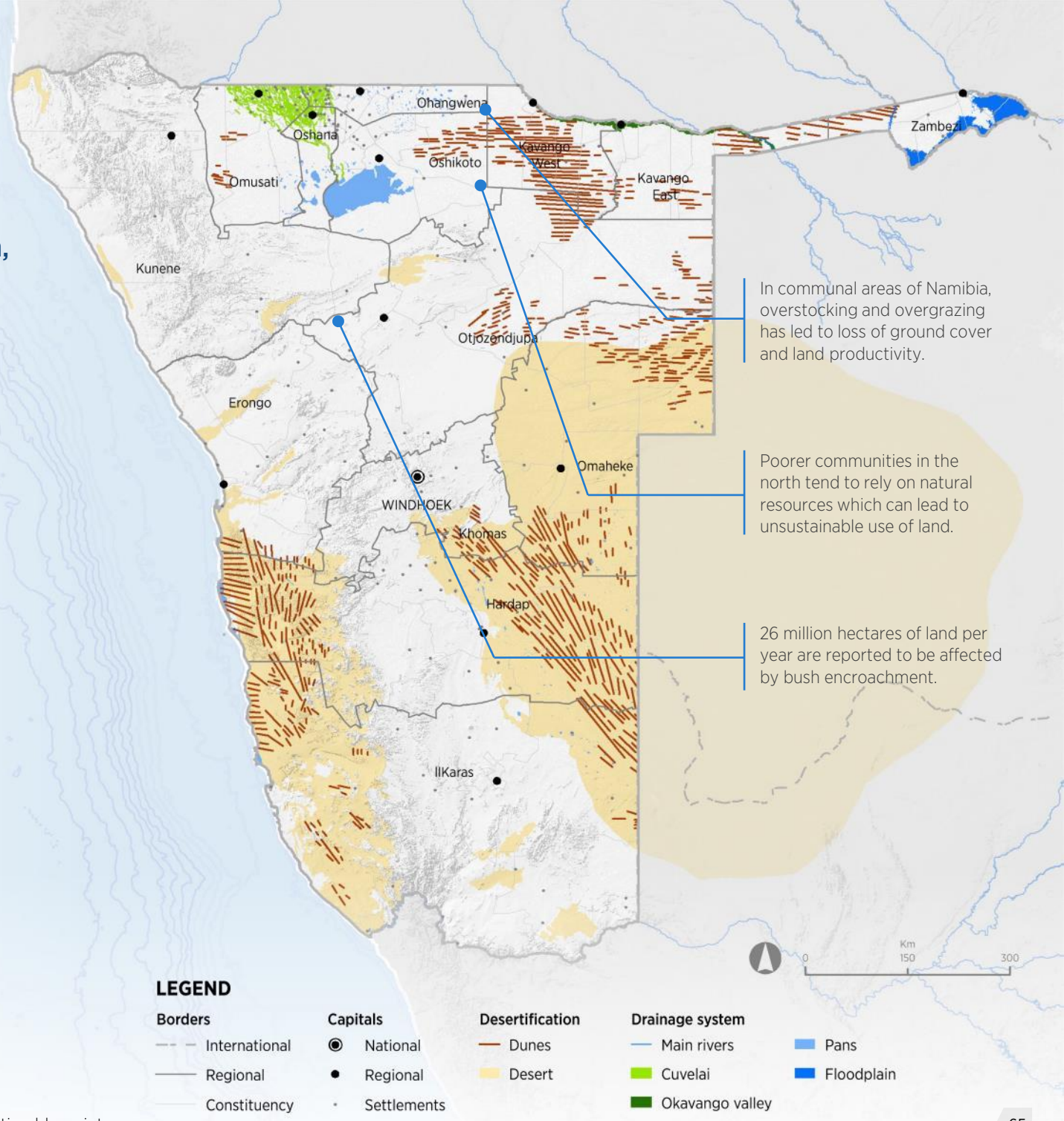
Desertification

High propensity to increased desertification, bringing with it further water shortages and agricultural challenges.

Most of the Namibia's population are located throughout the Central Plateau and northern regions, sandwiched by the Namib desert on the coast and the Kalahari to the east.

Desertification emerges as degraded land spreads and merges together. This is primarily caused by unsustainable land and agricultural practices. Namibia's climate coupled with population growth and urbanisation makes it particularly susceptible to increased desertification.

Increased desertification will lead to water challenges and impact the agricultural industry. The Namibian Government has launched an action plan to combat Desertification, Land Degradation and Droughts – viewing it as a key threat to long term development of the country.



Source: ME&T Third Action Programme to Combat Desertification, 2014

Precipitation

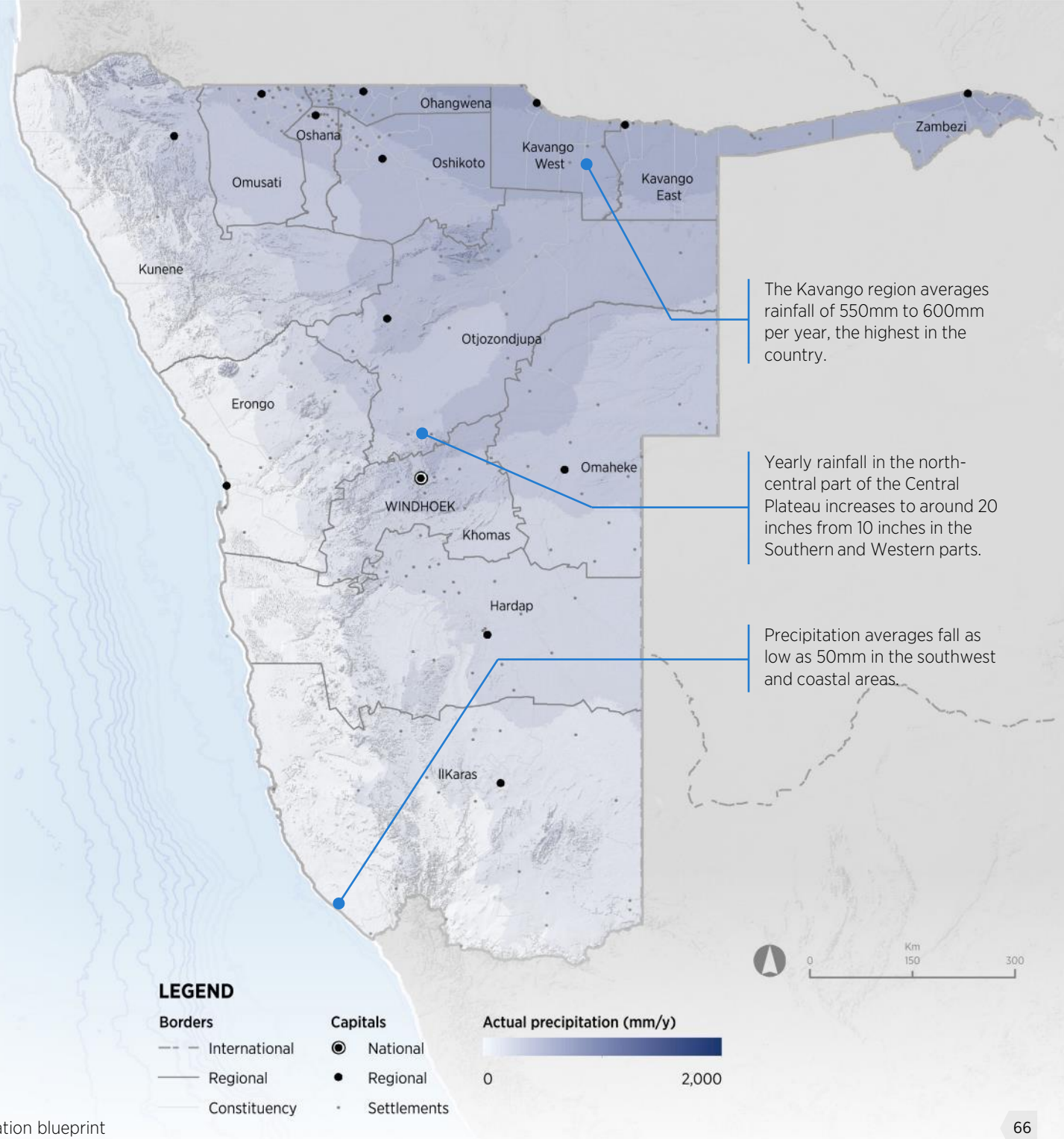
Namibia is extremely dry with little rainfall through the year, making water scarcity prevalent.

Rainfall increases from west to east, although precipitation is low throughout the country. Total average rains average to 278mm. Limited precipitations contribute to high levels of aridity.

There is variability, however. The dry western Namib Desert running along the Atlantic coast presents the greatest contrast with the sub-tropical Kavango-Caprivi Region in the northeast that experiences around 600mm of rainfall per year.

Areas with relatively higher levels of precipitation are more capable to support economic activity including; agriculture (arable and livestock), tourism and urban commercial centres.

More generally, limited rainfall challenges traditional development models beyond agricultur including constrained access to water for industry and urbanisation.



Source: Climate Change Knowledge Portal, World Bank

Water catchments

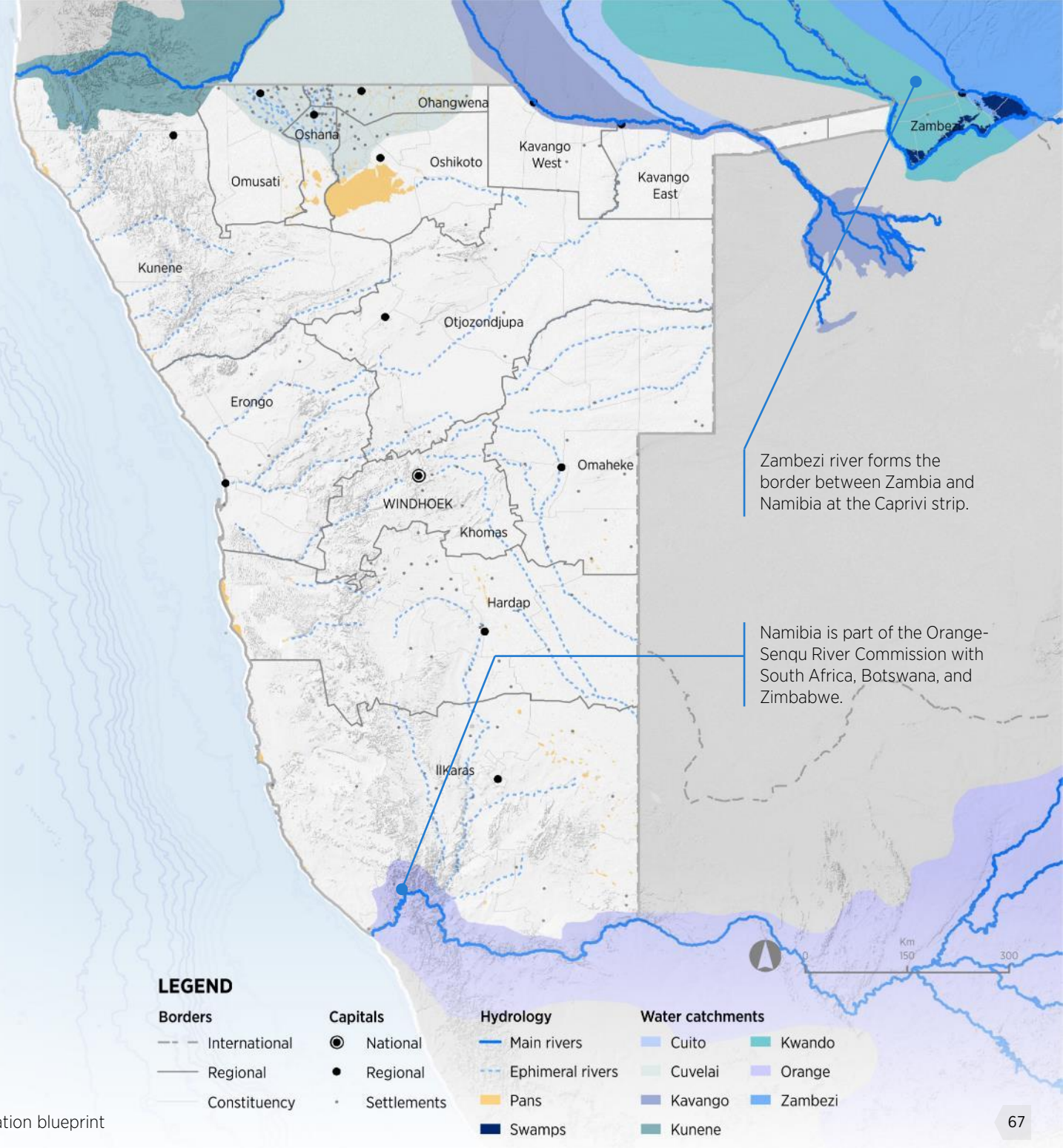
Perennial rivers only flow along the northern and southern borders, making transboundary co-operation crucial.

Namibia shares all its perennial rivers with neighbouring countries, whereas the internal rivers mainly run dry as a result of the country's high aridity. The network of internal rivers flow for brief periods after rainfall.

The Orange River is shared with South Africa at the southern border, whilst the Kavango and Zambezi rivers are shared with Angola, Zambia, and Botswana in the north.

Water scarcity remains a prevalent issue and water management is therefore an important factor for social well-being and economic development.

The reliance on unnatural and non-sustainable water sources makes efficiency crucial. There is an urgency to develop new and innovative infrastructure to meet the growing water demands.



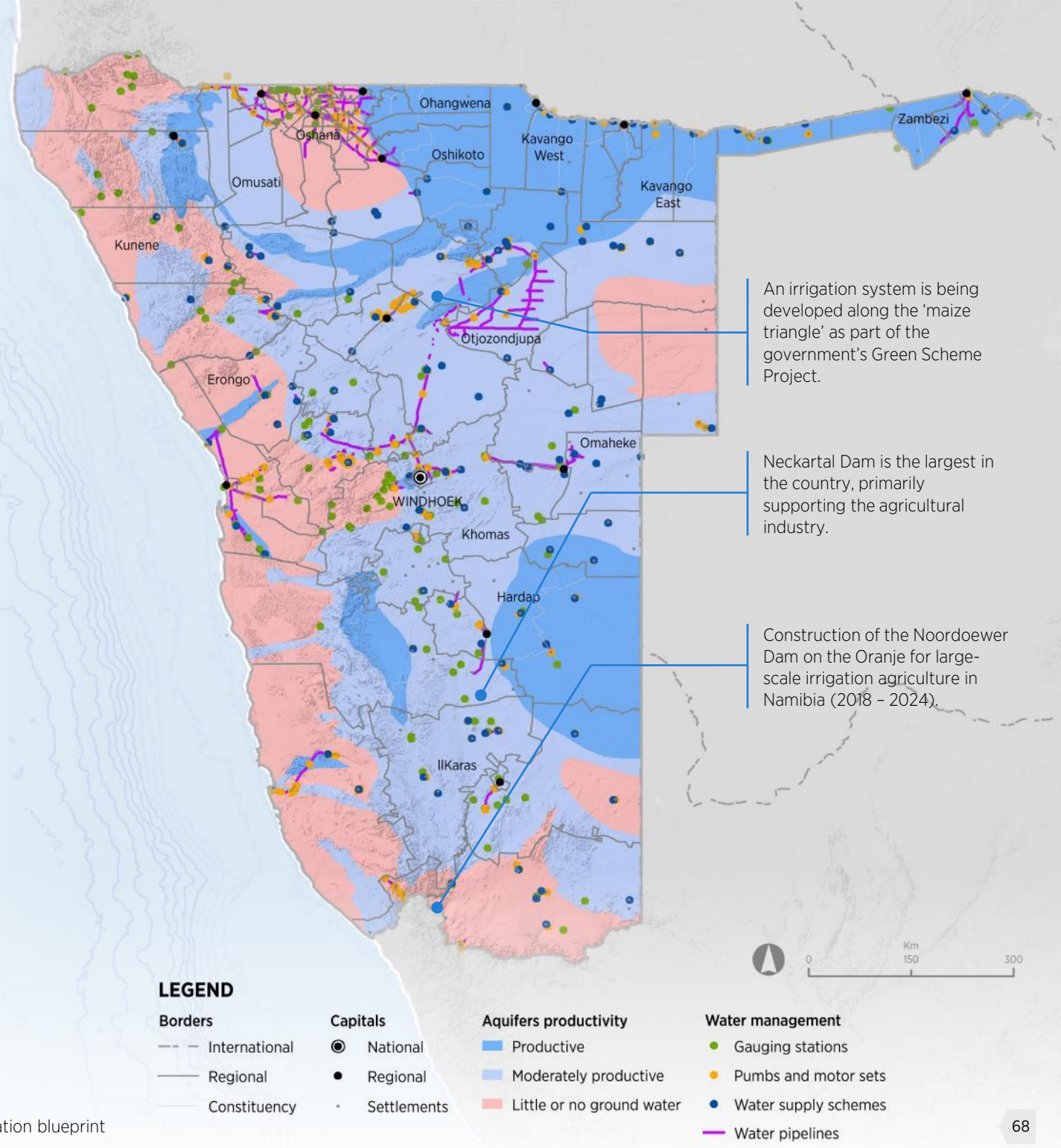
Water availability

With limited rainfall, Namibia is dependent on groundwater, making water transportation a key challenge.

Demand for water is expected to increase by over 30% by 2030. Three key sources of water exist in Namibia, border rivers, dams, and aquifers (groundwater). High evaporation makes water availability highly dependent on underground aquifers, especially during droughts.

The challenge of water availability is compounded by accessibility. For example, the Ohangwena II aquifer is estimated to contain 5 billion m^3 of drinking water. However, intra-regional water transportation is not technically or politically straightforward.

Efficient national water management will therefore become critical to future economic growth and development.



Source: Creating Resilient and Inclusive Markets, IFC, 2022

Temperature

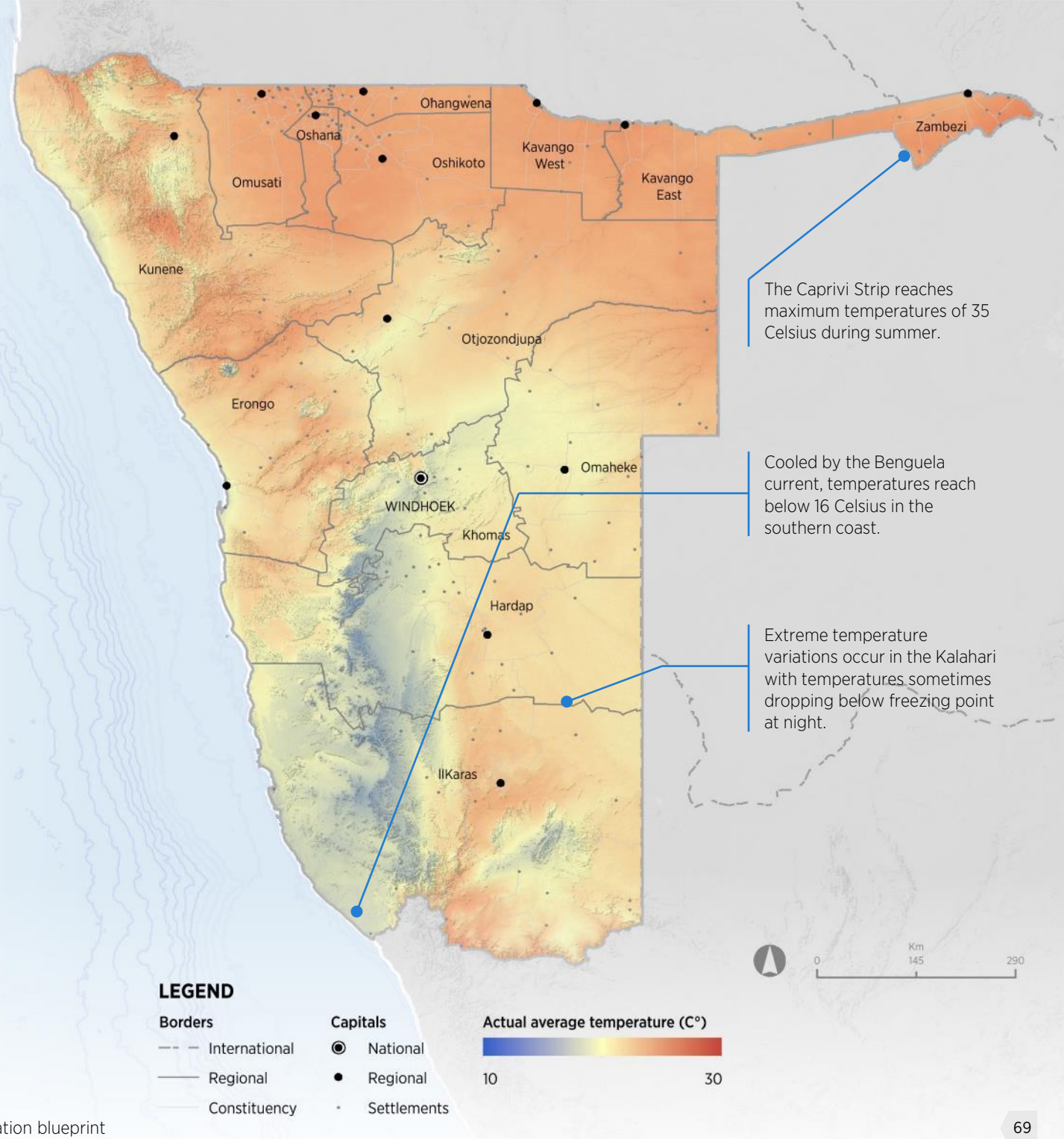
Namibia is characterised by hot and dry climatic conditions, with considerable differences across regions.

Namibia is generally hot with mean annual temperatures ranging from 14C to 24C, however maximum temperatures are limited by the overall elevation of the country.

Temperatures are highest in the northern regions, whereas the southwest coastal region is typically cooled by the Benguela current that bring cold air to the western shores.

Wide temperature ranges characterise the Central Plateau and the Kalahari, with daily temperature ranges of up to 30C. Average temperatures range from 30C in the summer to 10C in the winter.

While the trend remains a concern for the future, high temperature is not a primary obstacle to development by comparison to aridity and water availability,.



Solar radiation

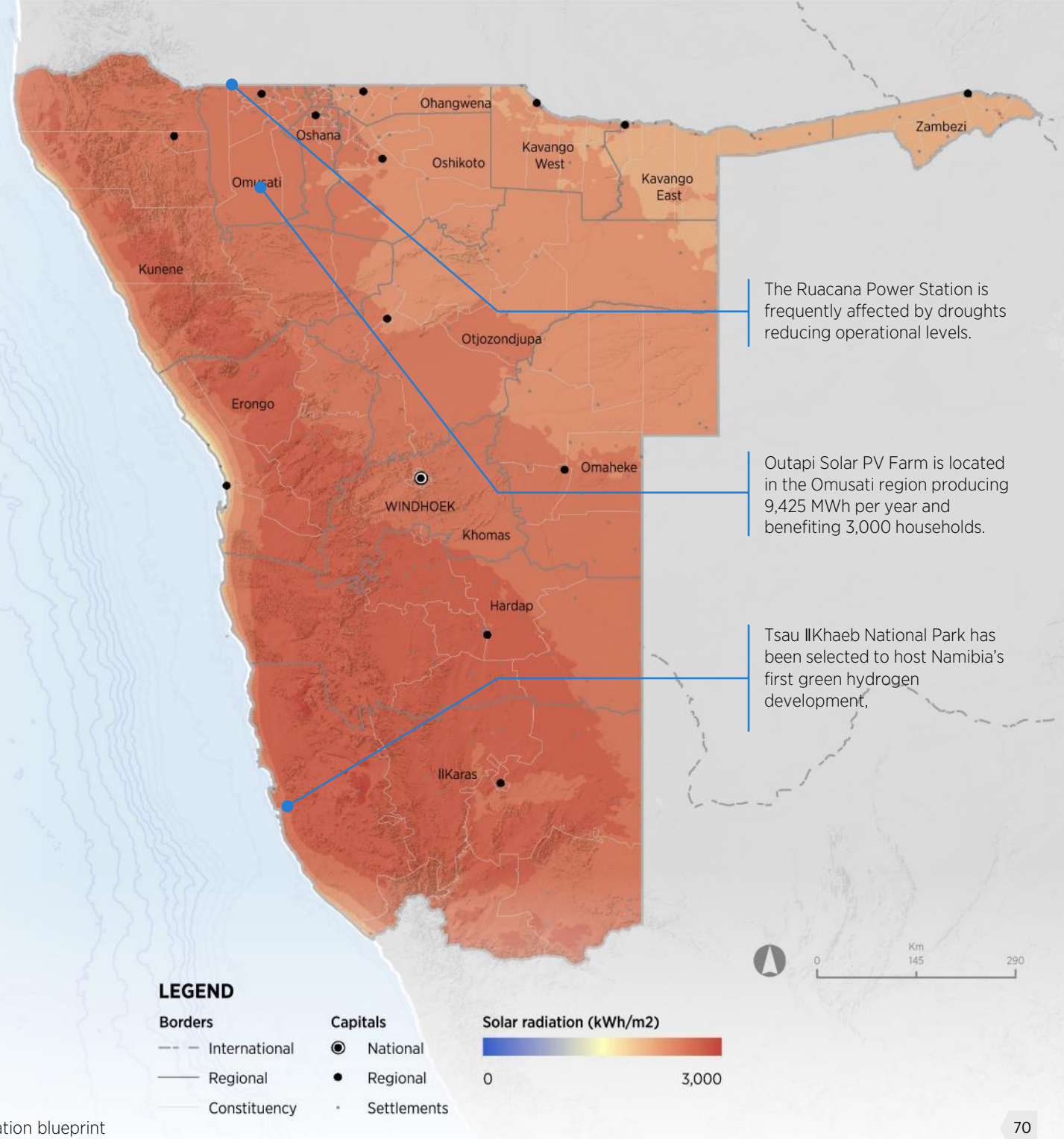
Namibia has vast untapped solar energy that has transformative potential for the energy system.

Solar radiation is a pivotal source for renewable energy development, moving away from traditional energy sources and promoting a sustainable future.

Solar radiation levels across Namibia reach nearly 3,000-Kilowatt hours per m^2 over large areas. The solar potential in Namibia is one of the highest in the world, with the highest levels stretching down the west of the country.

Namibia's solar potential offers long-term energy security that can reverse the present reliance on energy imports and increase energy exports, positioning Namibia as a key energy player in Africa.

The solar power potential further creates green hydrogen generation possibilities. This has received considerable backing by the Namibian government, adopting several committees to support development of hydrogen sites across the country.



Wind speed

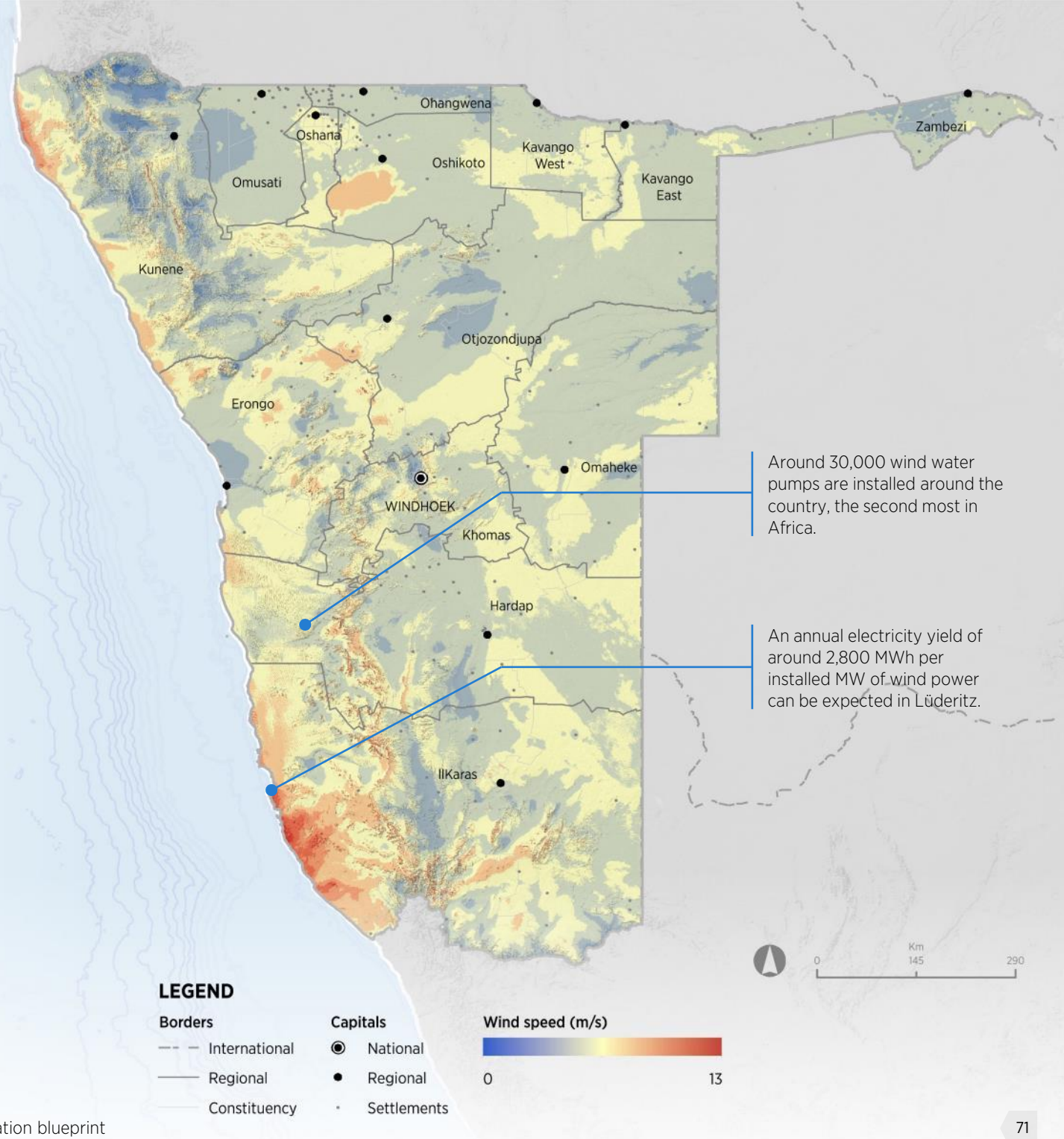
Significant wind speeds presents opportunities for renewable wind energy development.

A combination of solar and wind potential makes Namibia well positioned for renewable energy generation.

Significant areas of Namibia have wind speeds above 5m/s, the threshold for wind turbines to be economically viable. Several areas, particularly the southwest of the country, having an annual average of 7m/s, considered excellent for wind power generation.

The highest wind speed occurs around the town of Lüderitz and southwards, reaching speeds of 13m/s. The majority of the 1500km coastline is well positioned for wind energy development.

The development of wind as a source of renewable energy is currently being promoted by the government with the Diaz Wind Farm in Lüderitz being a key project.



Soils

A wide variation of soil types largely determines agricultural land use across the country.

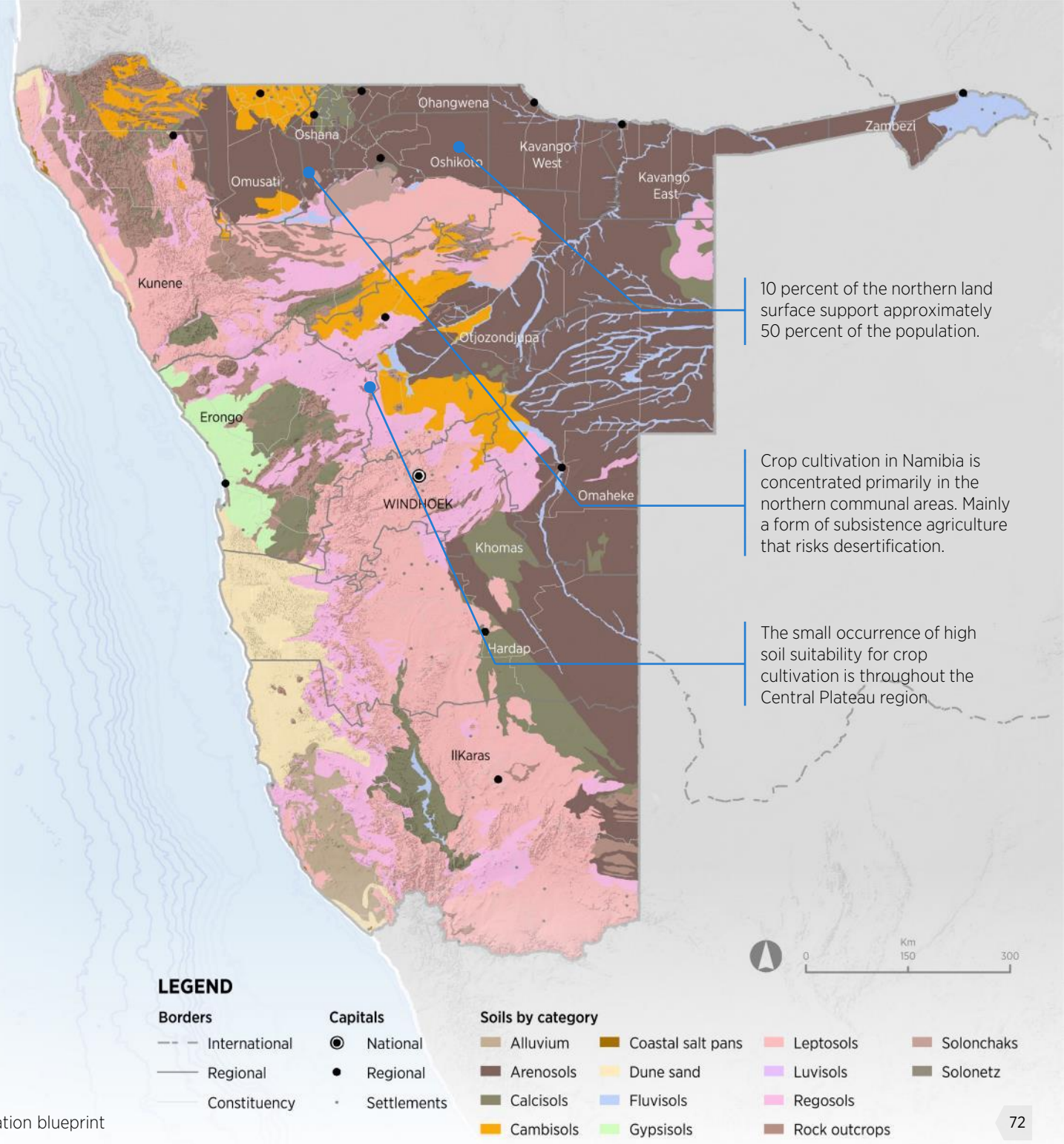
Soils are a crucial factor in determining the farming potential of land. Namibia has a diverse range of soils across its varying landscape that largely determine agricultural use of land – but soil fertility is generally low.

Inherently poor soil quality combined with the country's climate, aridity and low precipitation, limits Namibia's suitability for crop cultivation.

The majority of Namibia is covered by arenosols in the north and east, and leptosols in the centre and northwest. Both soils are unattractive for agriculture due to low water-holding capacities.

However, pockets of camibisols and luvisols are sporadically found across the country and used for agricultural land due to high mineral content.

In the far southwest diamond mining region Alluvium soil is predominant, with diamonds recovered from deposits of sand, gravel and clay.



Biomes

Namibia consists of five biomes but is dominated by the Savanna with grassland and dispersed trees.

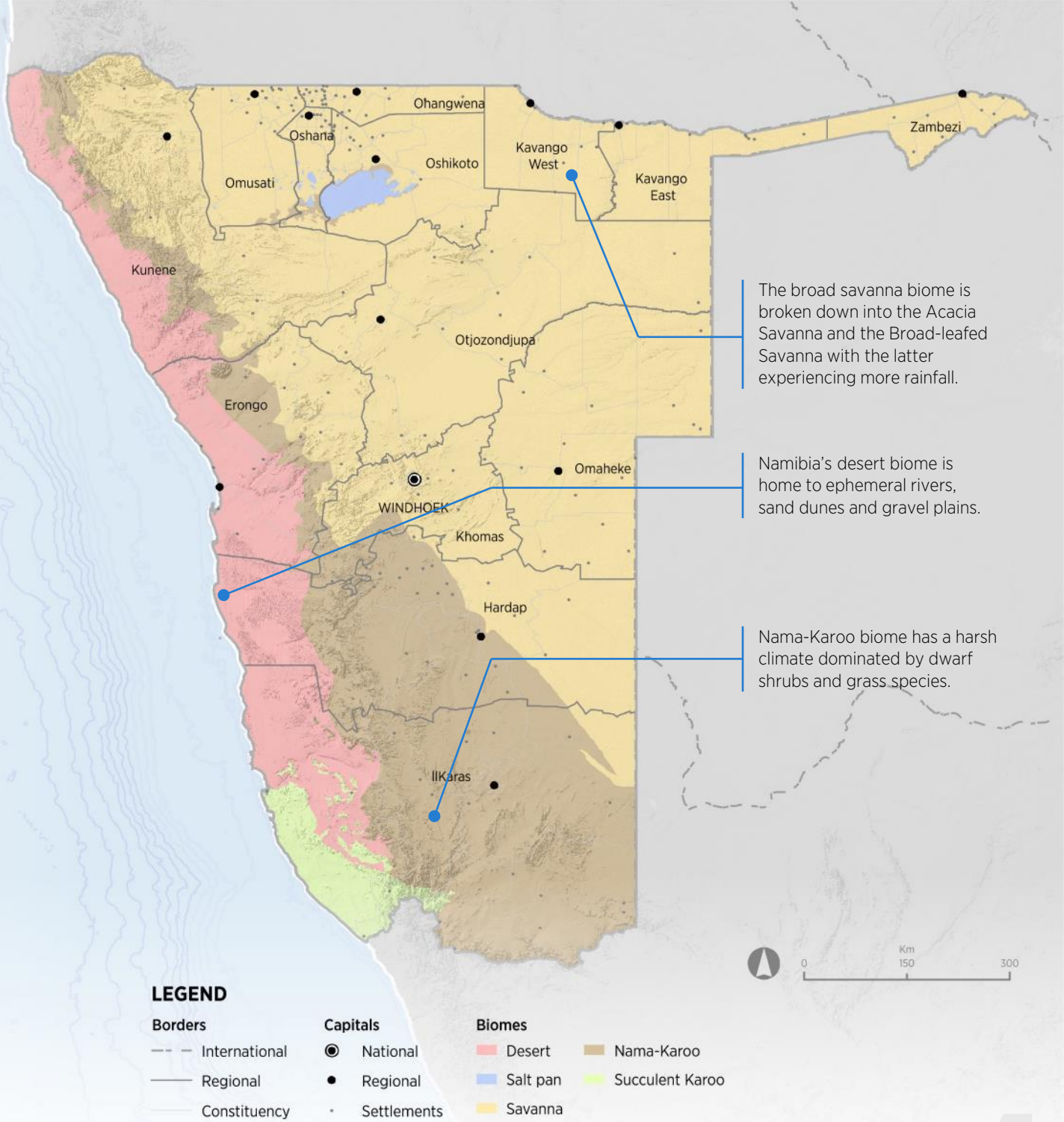
Biomes are large areas characterised by their vegetation, soil, climate, and wildlife. There are five key distinctive biomes in Namibia, with the savanna the predominant biome.

The savanna covering the northeast half of the country is a grassy woodland with a scattered covering of trees. The biome supports a high concentration of species and contains the catchments of most ephemeral rivers in the country.

The desert biome along the coast is characterised by low rainfall and sparse vegetation, mainly consisting of annual grasses and dwarf shrubs.

The Karoo biomes experience only a slight increase in rainfall compared to the desert, and experiences large temperature variations. The succulent karoo is still classed as a biodiversity hotspot.

The Etosha salt pan is found in the north of the country. Due to its saline nature, it is unable to support much life.



Land use and land cover

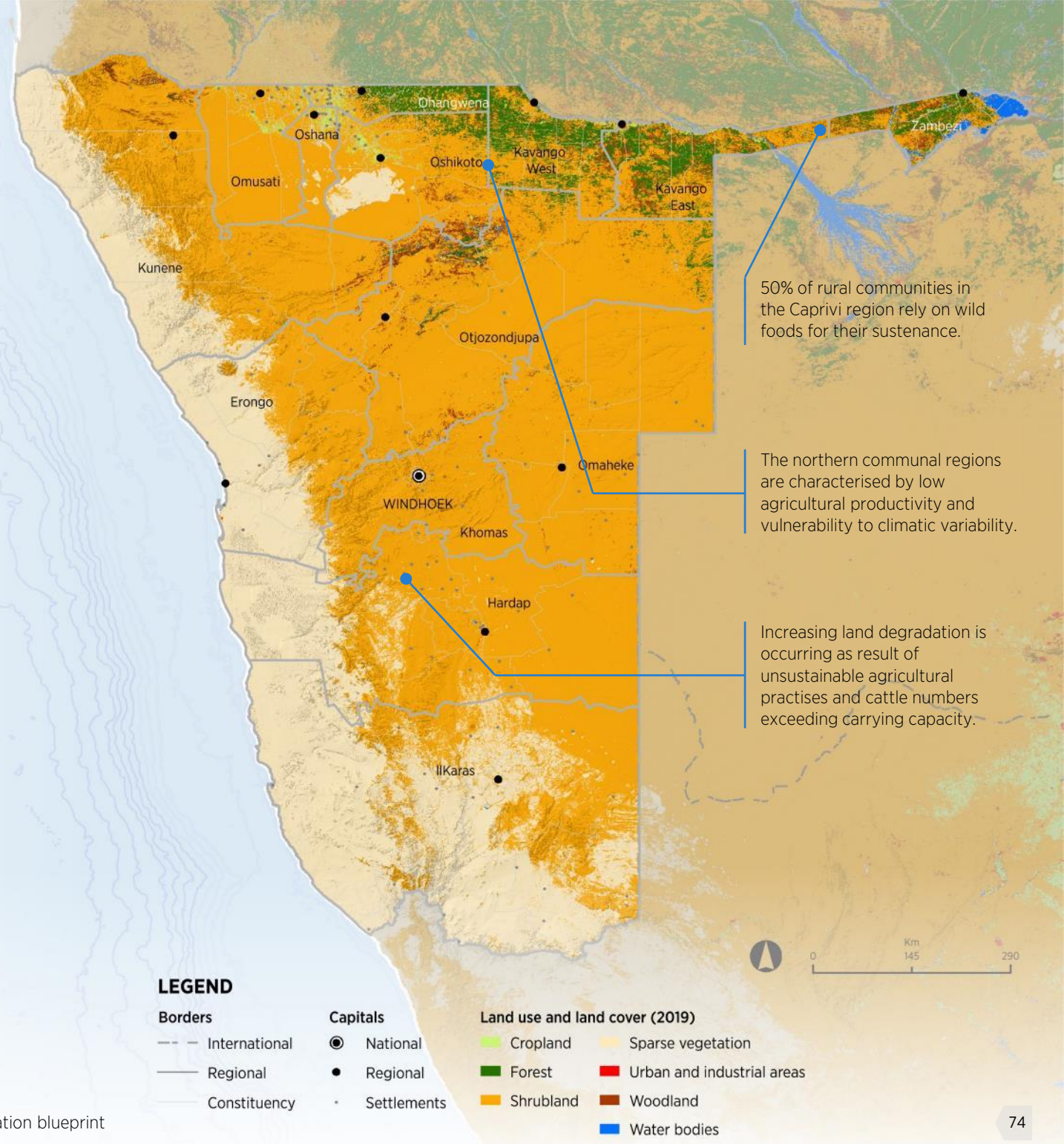
The land in is primarily covered by shrubland, with cropland and some forests concentrated in the north.

Land cover in Namibia largely consists of shrubland, with sparse vegetation covering the western coast and south. The north has greater variation, with forests, woodland and cropland.

Although the country has limited arable land, a large proportion of the population are dependent on agriculture (two-thirds of agriculture consists of livestock farming, which is better suited to the natural conditions).

Agriculture is divided between commercial farming and subsistence farming in the populous north. The main crops are millet, sorghum, corn, and peanuts.

Thanks to the existing forest cover, the rural communities in the Kavango-Caprivi region rely on wild foods for their sustenance. The existing forests are also beneficial for soil stabilisation.



Environmentally sensitive areas

Namibia's coastal region dominates natural and environmentally sensitive areas.

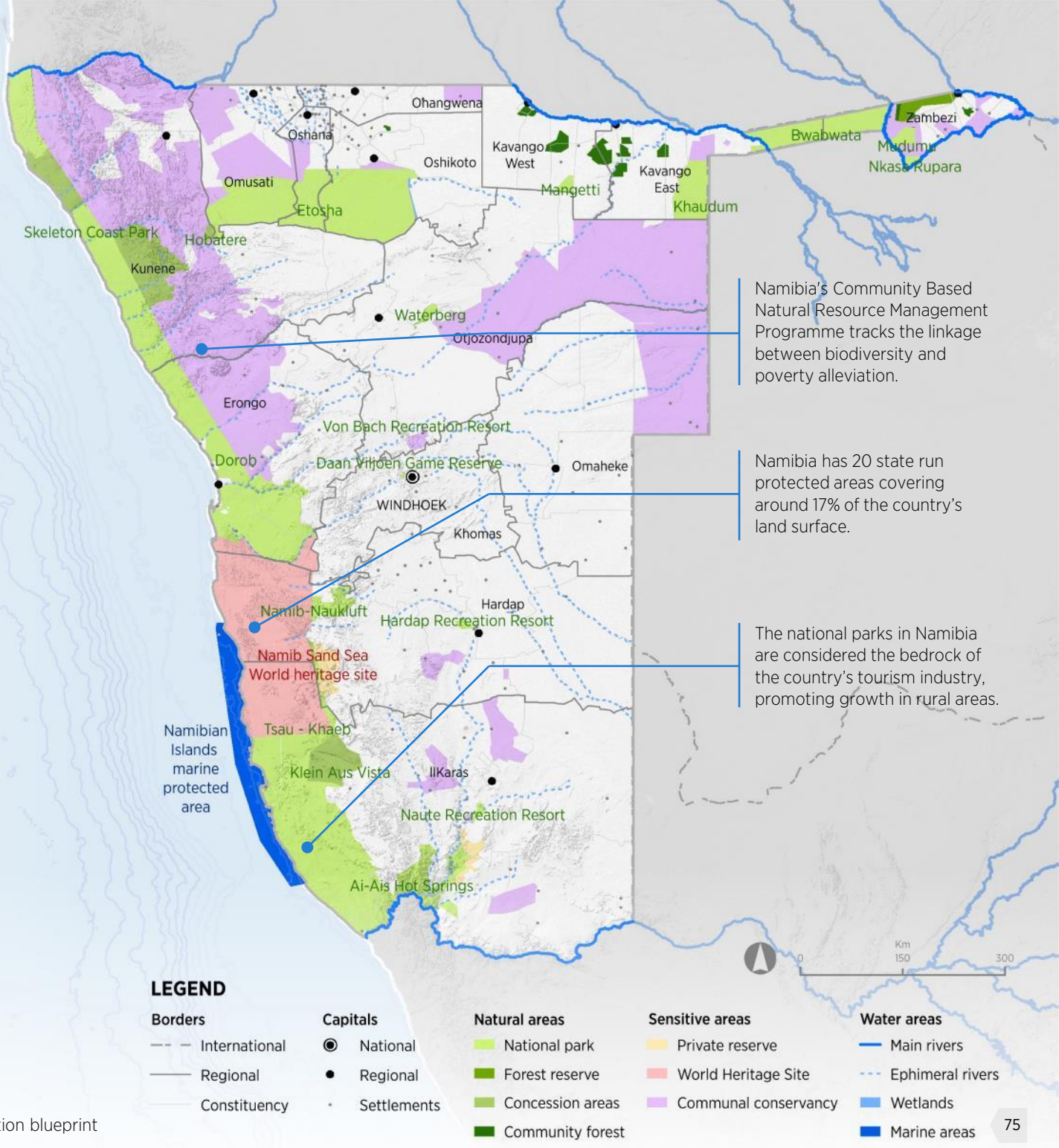
The environmental areas of Namibia are crucial for wildlife management and tourism. Virtually all the dry western coast is under a form of environmental management.

The coastal stretch is also home to the country's only World Heritage Site, The Namib Sand Sea. The most populous regions fall outside of environmental protection. There are few considerable settlements in the western coast, whilst the largest population centres are not in environmental sensitive areas.

Communal conservation is a unique method of environmental management. Located primarily in the northern regions, local communities are empowered to manage and conserve natural resources within their local context. This is of growing importance to the tourism sector.

There is some overlap between solar potential along the western coast and environmentally sensitive areas, which will demand competent environmental management.

Source: GIZ



Transport infrastructure

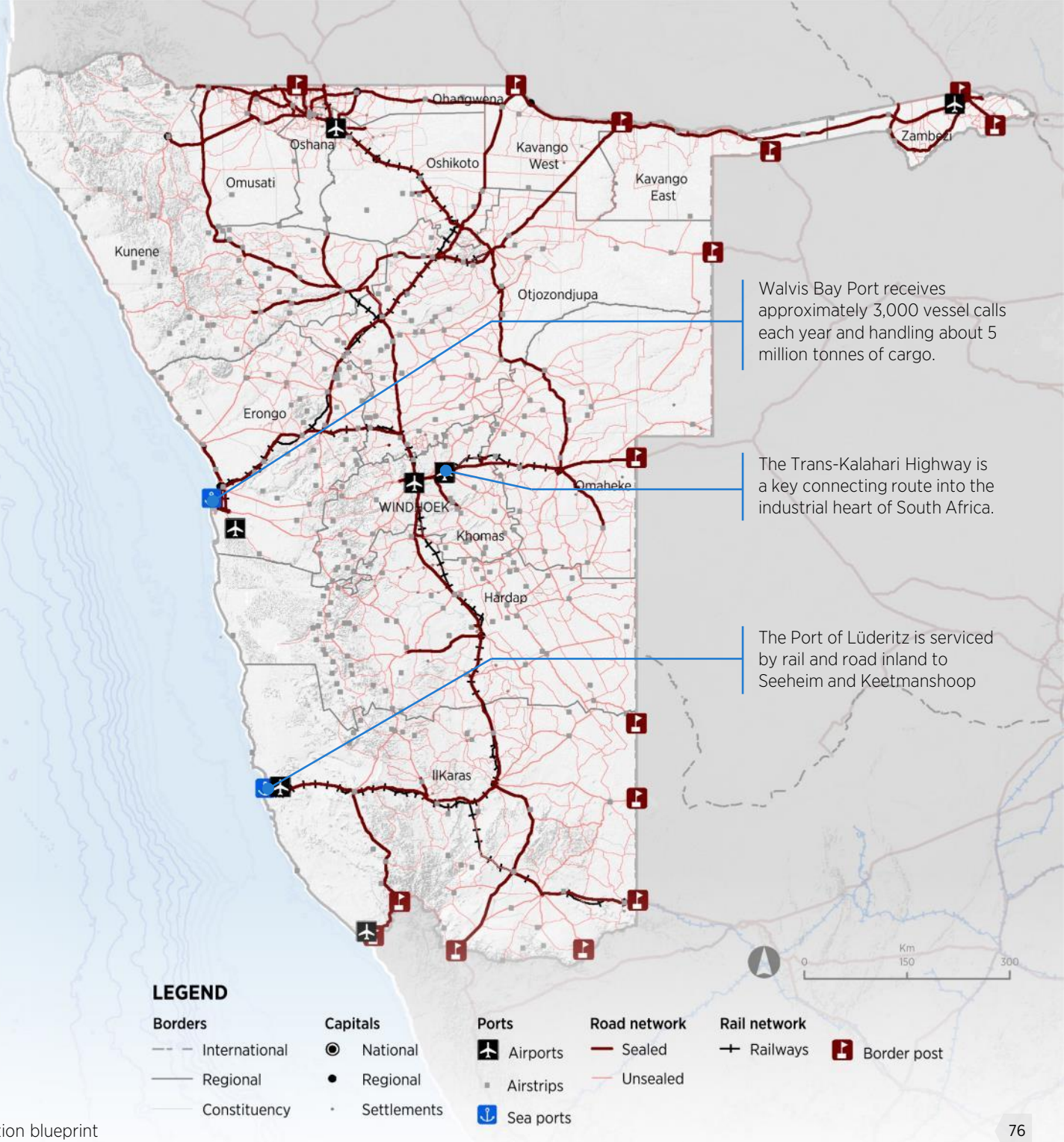
A well-connected transport network that provides pivotal coastal access to landlocked neighbouring countries.

Namibia has a well-established road network connecting most towns and communities. The road infrastructure is also pivotal in connecting Namibia with its neighbouring countries, with the Caprivi Highway connecting the landlocked countries of Botswana, Zambia, and Zimbabwe to Walvis Bay.

The Walvis Bay Corridors comprise four corridors connecting nearby countries with Walvis Bay and Lüderitz ports, providing trade routes to Europe and North America. Namibia's development is well supported by its coastal location and infrastructure.

Walvis Bay is an important logistical port, providing facilities for the import and export of cargo for Namibia and the southern African region. Additionally, Lüderitz serves mining operations although it is too shallow to support many modern ships.

There are regular flights between Namibia and other Sub-Saharan countries. Hosea Kutako International Airport also provides direct flights to Africa, Europe, and the Middle East. Additionally, a rail network, running north to south, connects the ports to the rest of the country.



Access to energy

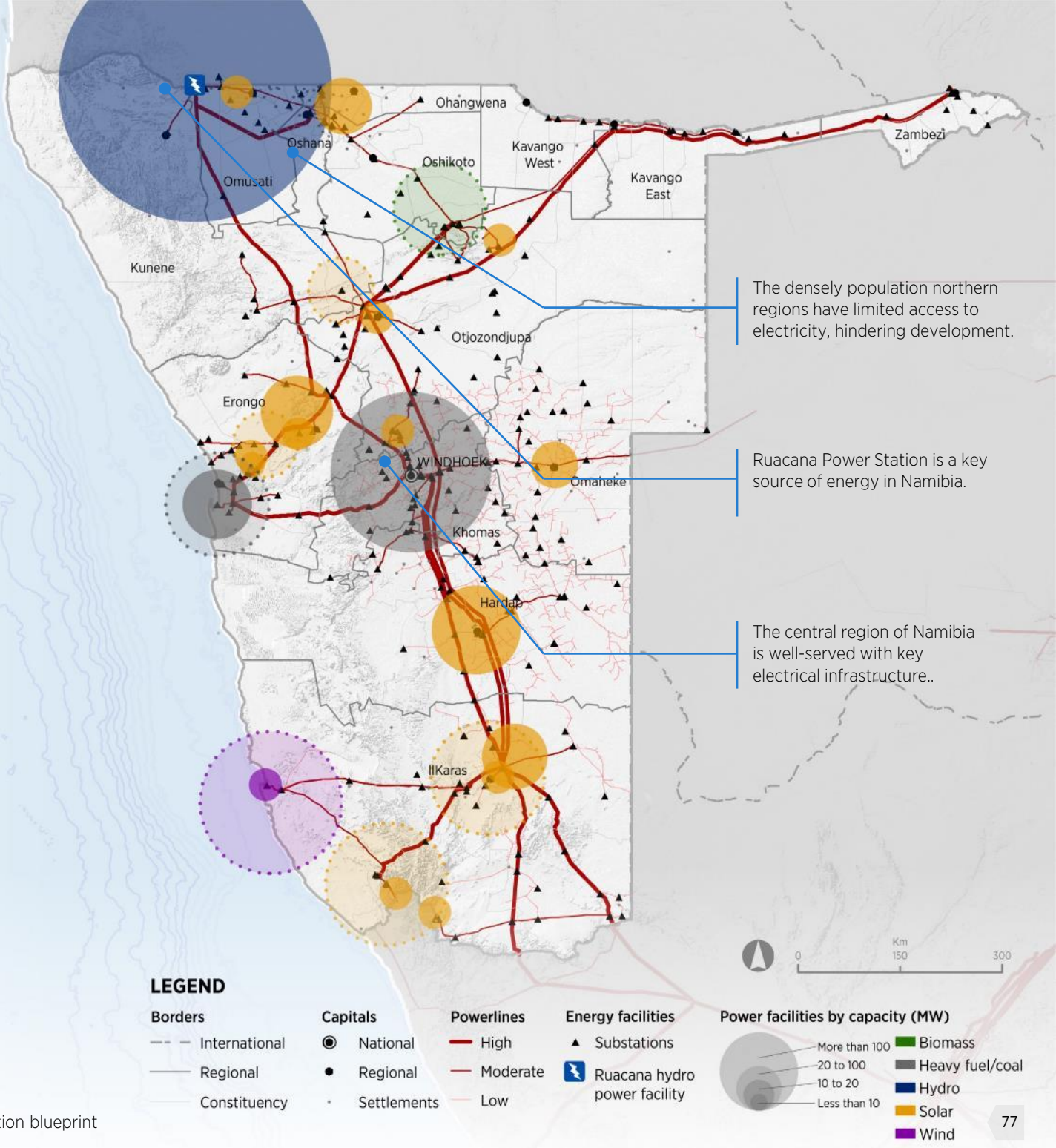
Access to energy remains a constraint, with the populous northern regions having limited access.

Whilst some key population settlements have strong access to energy, access remains a prevalent challenge and key constraint to development. Access to electricity (% of population) was reported at 56% in 2020.

Sparse, low population density make electrification difficult, with only 35% of the rural population having access to electricity. The promotion of off-grid, renewable solutions is a key development objective being undertaken by donors and governments.

Namibia's energy is driven by a mixture of sources, from hydropower at the Ruacana Power Station, to imported energy in the form of thermal (mainly coal) and solar power. The present combination of energy sources is a challenge to Namibia's energy security.

Namibia has made enormous progress to attract independent power producers, opening the electricity market to domestic and international investors.



Access to telecommunications

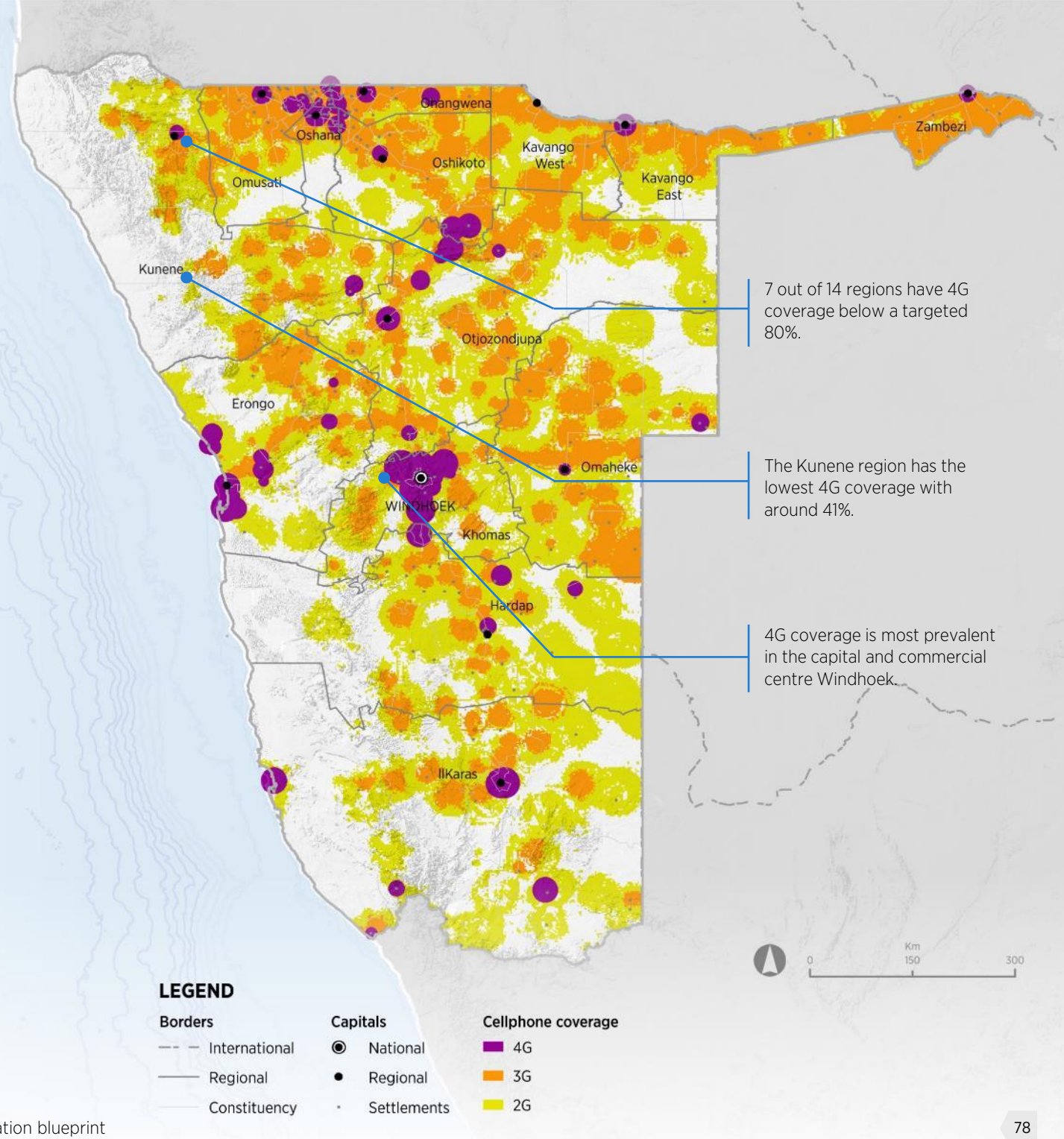
Namibia's telecommunication infrastructure development is not supported by affordable pricing.

Telecommunications coverage is far reaching across most of the Namibian population, but this is not matched by digital technology adoption by the population.

While urban areas are well serviced with modern 4G technology, rural communities are limited to 3G and even 2G in places. This further highlights the urban-rural divide within the country.

Compared to other African countries the telecommunications market is well-developed, but costs remain high with limited competition, reflecting a lack of private economic diversity.

Among 100 countries in the inclusive internet index, Namibia ranks 89th in terms of affordability (cost of access relative to income). This is an indication of Namibia's costly telecommunication, constraining adoption and the associated benefits of telecommunication use.



Source: World Bank Systematic Country Diagnostic 2021

Access to water

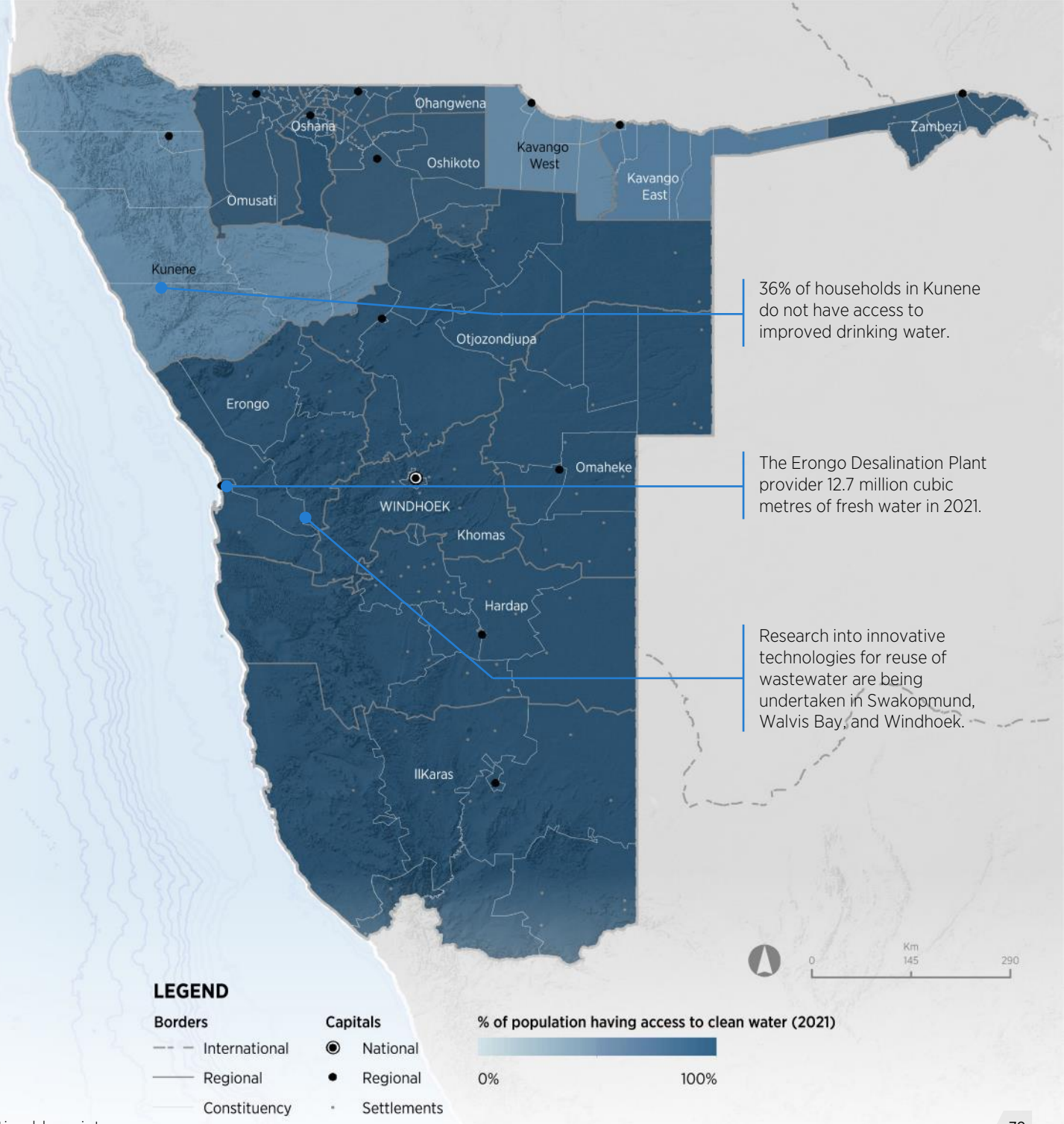
Urban regions have adequate access to water, but disparities remain with rural regions.

Namibia's extreme aridity makes access to water a significant concern for the country. Although Namibia has made strides with clean water largely accessible, disparities with rural regions remain.

While the wealthier Khomas region has near universal access to clean water, poorer regions such as Kunene and Kavango West have little over 50% access.

Namibian's multidimensional poverty index report highlighted that only 0.5% of the urban population are unable to access to drinking water. This contrasts to 21% of the population in rural areas.

The sparsity of the Namibian population exacerbates the urban rural disparities in water accessibility. In particular the distance between water sources and rural settlements requires costly infrastructure investment for adequate supply.



Source: IFC

Access to sanitation facilities

Lack of sanitation facilities reflects poverty levels and reinforces the north-south divide.

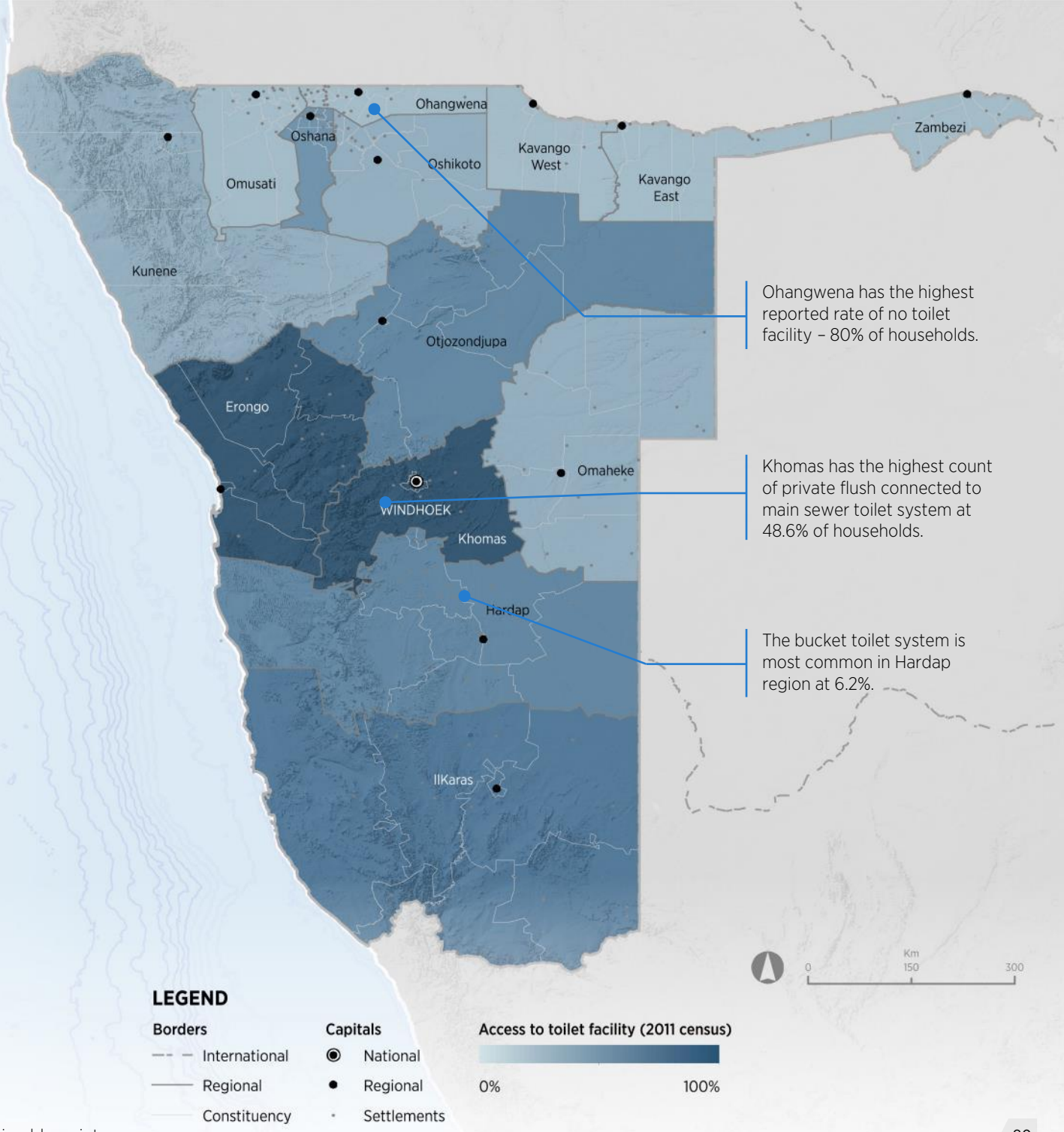
Compared to the efforts made to improve access to safe water, Namibia lags in the provision of adequate sanitation. For example, the UN has declared a "sanitation crisis" in the country.

Overall, it is reported that 49% of households in Namibia have no toilet facility, limiting the promotion of public health and the prevention of the spread of disease.

298 schools have no toilet facilities, while over 50% of child deaths are related to lack of water, sanitation, or hygiene.

Lack of toilet facilities is more prevalent across the northern regions of the country, aligning closely with poverty levels. Rural regions lack toilet facilities with three out of four households having no facility.

Flushing toilets are more common in urban areas, with 69% of urban households having a form of flush facility. The relatively wealthy Erongo and Khomas regions, have near universal access to toilet facilities.



Source: IFC

Access to health

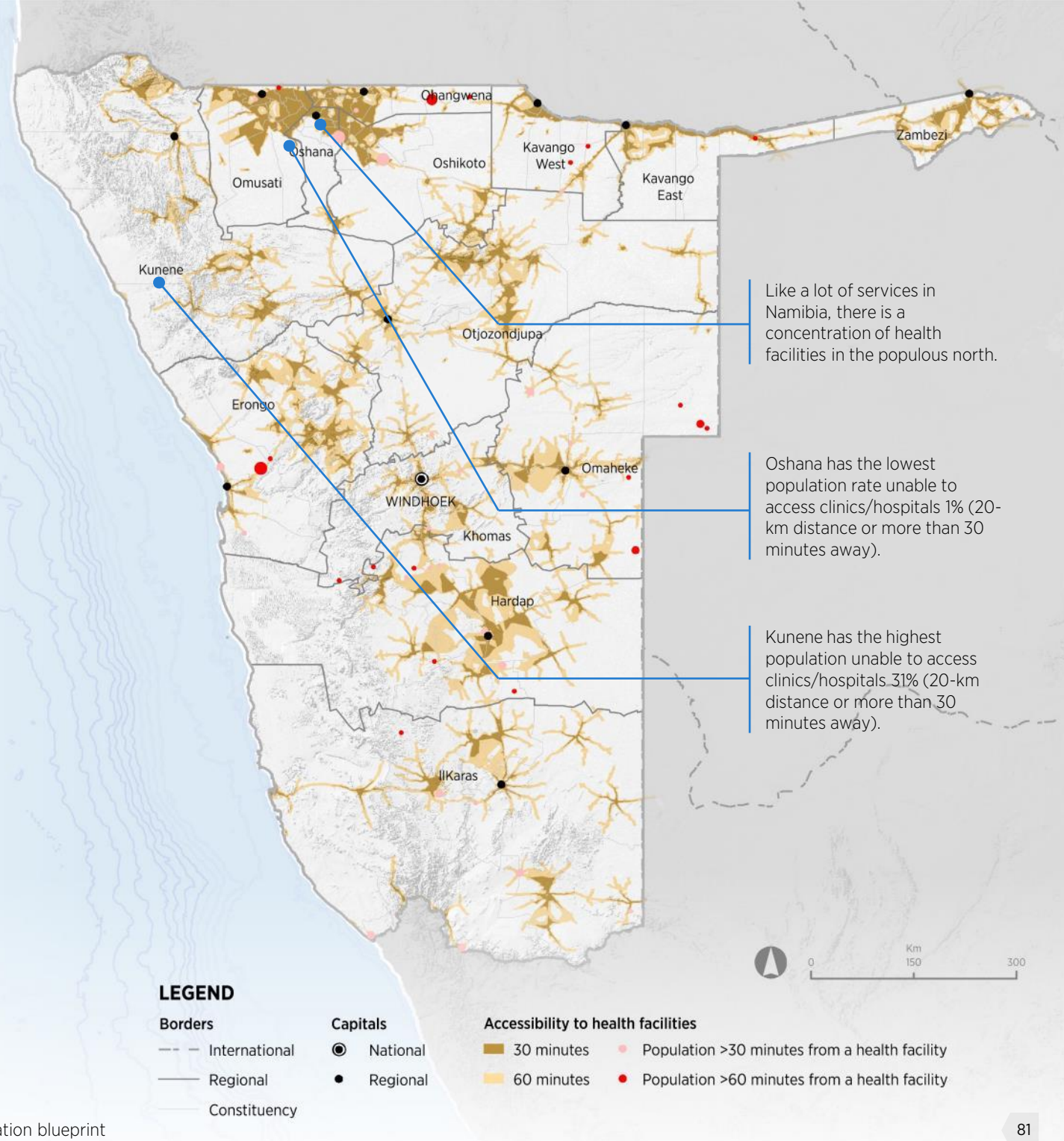
High quality and accessible healthcare in urban areas, but challenges remain with access in rural areas.

Namibia has 343 hospitals and clinics, as well as 1,150 smaller service points. Healthcare facilities in the country are sophisticated but not always affordable to the poorer part of the population.

More than 70% of the population live within six miles of a health facility, and facilities are concentrated in key cities and towns. Certain services are only available from private medical centres, putting them out of reach for the majority of Namibia's citizens.

Disparity remains between urban and rural regions. While 90% of urban households are within six miles to health facilities, the figure falls to only 56% of households in rural areas. Healthcare access remains a development constraint that requires further government action.

Further distinctions are evident due to the high-income inequality in Namibia. 18% of the population are serviced by private healthcare, contrasting to 82% served by public healthcare.



Source: GIZ

Primary education

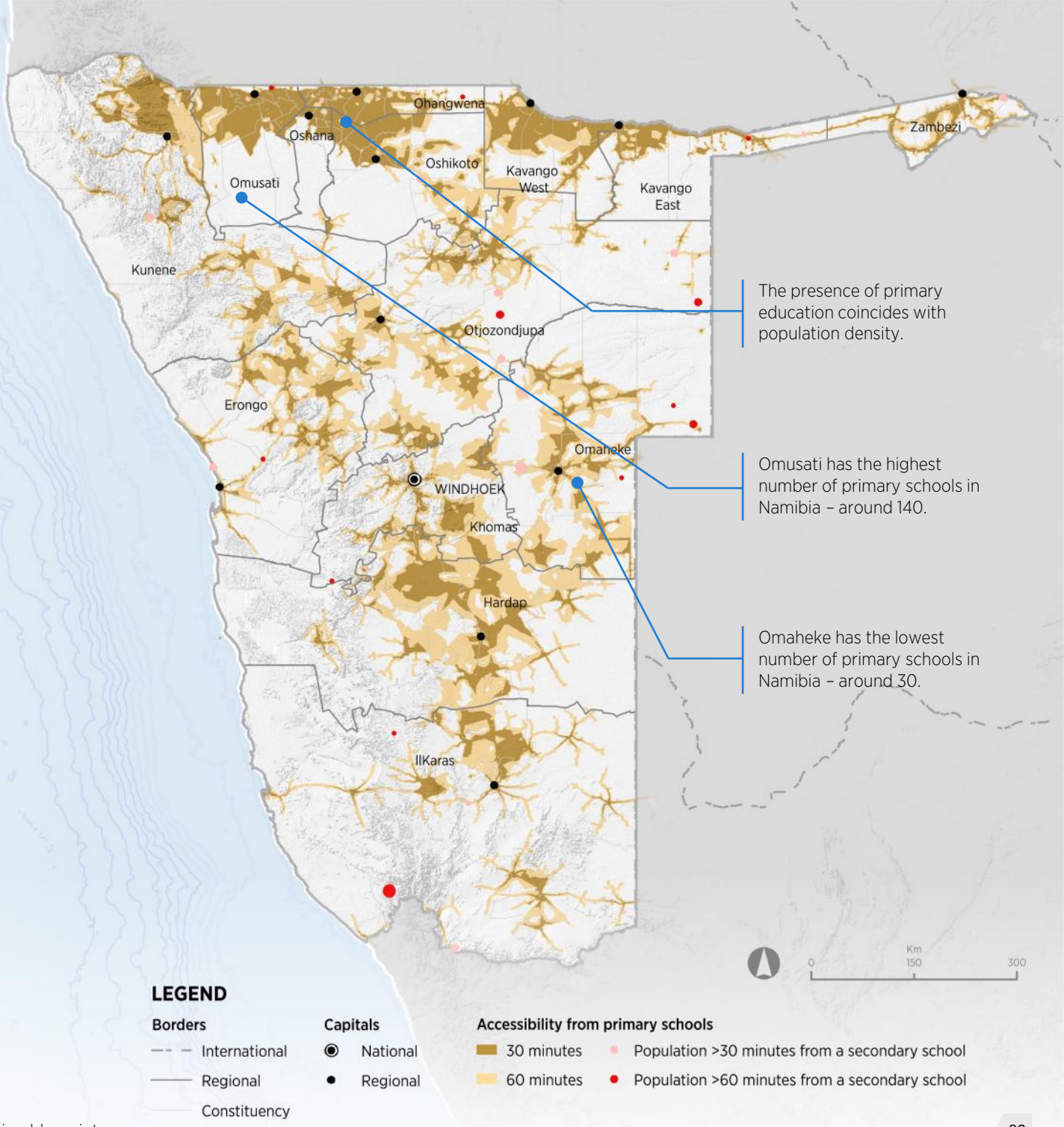
Access to primary education is widely available, with some exceptions in rural regions.

Education has received considerable government backing since independence. Namibia has a relatively strong education system, with free and compulsory primary education starting at the age of six.

A recent government programme has aimed to give children (aged 5 to 6) from poor backgrounds access to pre-primary education, indicative of strong government action.

Schools' presence coincides with the population density, with most primary schools in the north. Primary education is near universal, with 97% attendance, resulting in one of highest literacy rates in sub-Saharan Africa (91.5%).

Not surprisingly, however, primary education enrolment is higher in urban areas than rural. The poorer northern regions experience the lowest performers, whilst the highest performers are in the wealthier regions of Khomas and Erongo.



Secondary education

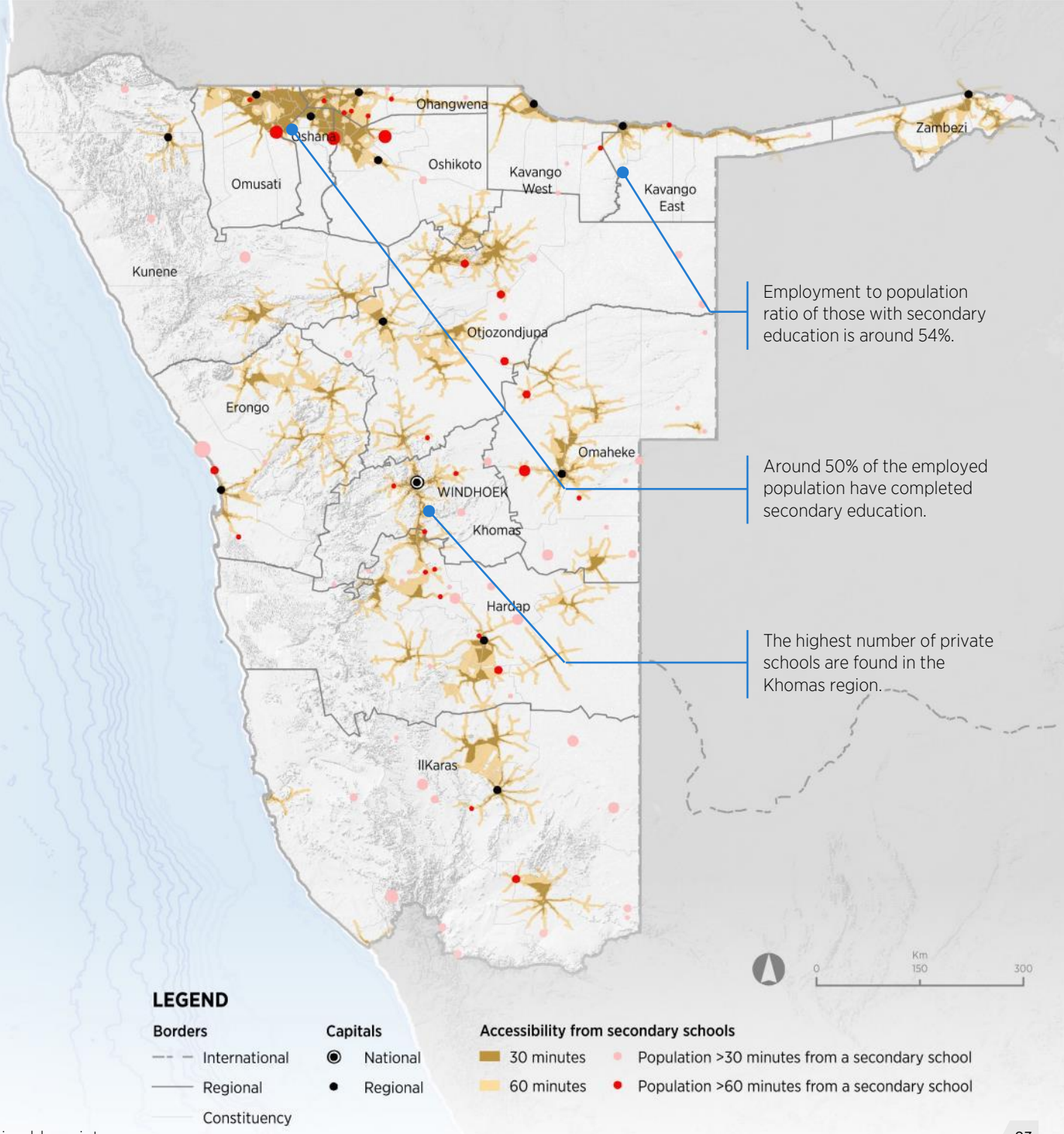
Strong access to secondary school, but educational outcomes remain insufficient and a mismatch with the labour market.

As with primary education, secondary education has received high backing from the Namibian government. Secondary enrolment has risen over the decades and there have been vast reductions in illiteracy in the working population.

There are persistent challenges around learning outcomes, related to early drop out rates and poor teaching standards. These challenges are again more prevalent in rural areas.

The facility standards are also a challenge to education in Namibia, especially in disadvantaged regions. For example, electrification of schools in the Kavango and Oshikoto regions lag significantly.

Secondary education currently offers limited avenues to achieve technical education, which is limiting employability for those not progress to further education.



Source: World Bank Systematic Country Diagnostic 2021

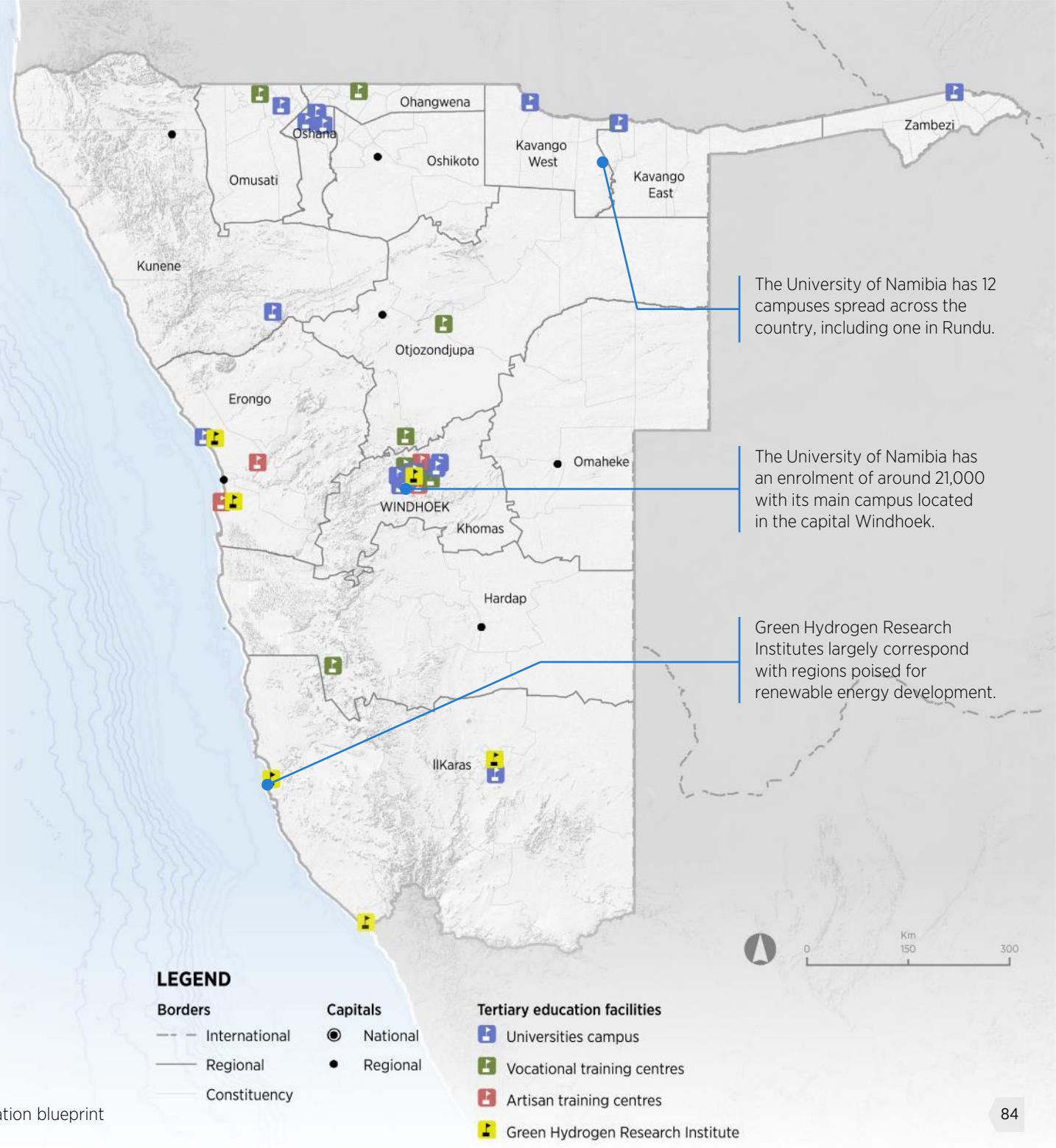
Tertiary education

Enrolment in tertiary education is increasing, but taught skills poorly match the economy's needs.

Namibia has two general public universities and one private university, all based in Windhoek with regional campuses. In addition, Technical and Vocational Education and Training (TVET) is characterised by several specialised institutions, a mix of public and private institutions.

Tertiary education is limited but growing consistently. Between 2012 and 2016 the number enrolled into tertiary education increased by 30%, reaching an enrolment rate equivalent to South Africa (21%).

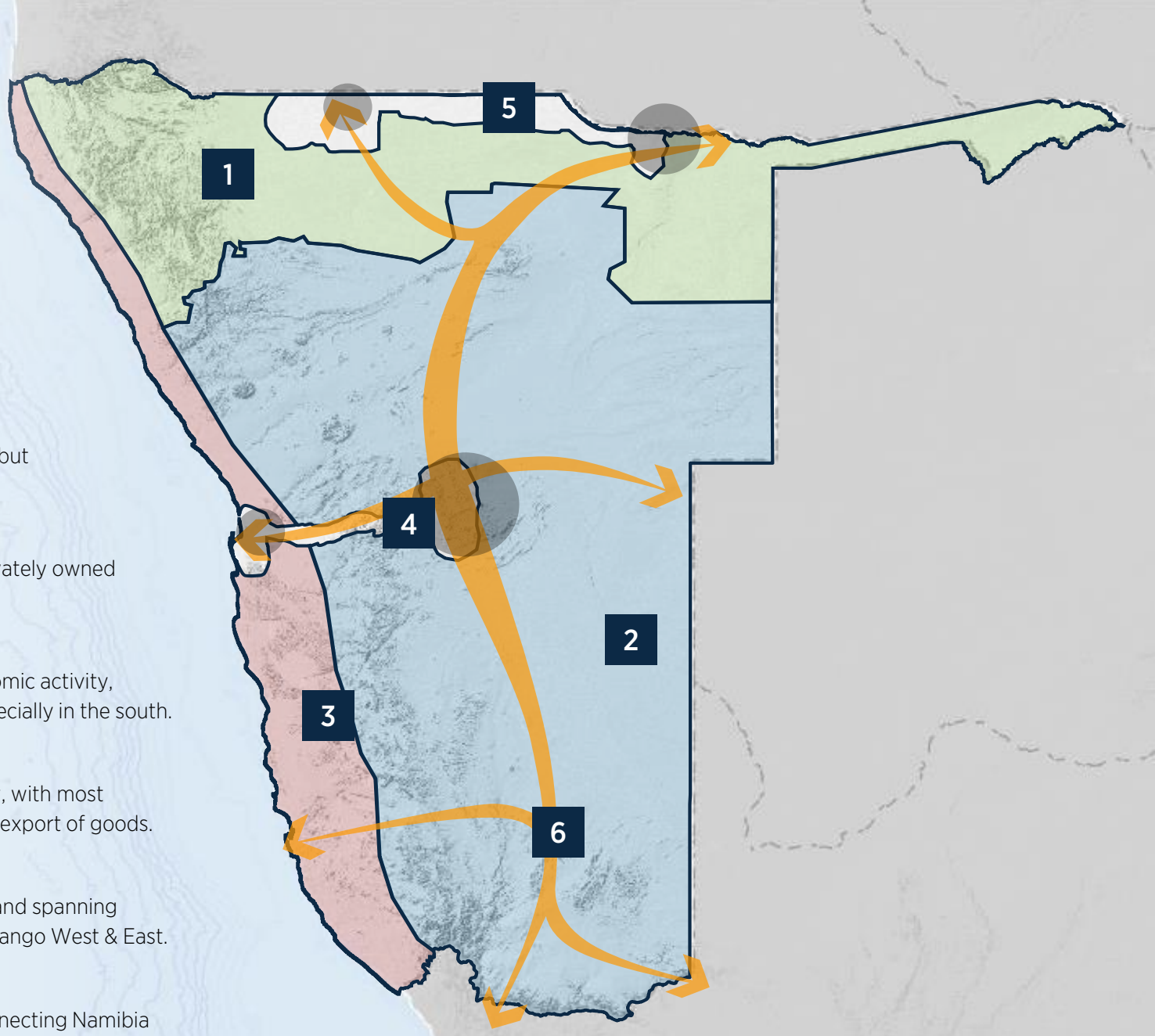
However, the majority of graduates transition into the public sector, which reflects Namibia's public sector dominance.



Source: World Bank Systematic Country Diagnostic 2021

Spatial diagnostic

To understand development opportunities and constraints, Namibia can be categorised into 5 distinct zones.



1 Comparatively lush north
Communal lands reliant on substance agriculture but suffering from poor public service delivery.

2 Sparse central and southern regions
South of the Veterinary Cordon Fence, land is privately owned and predominately used for livestock grazing.

3 Arid coastal strip
Barren and arid Atlantic coastline with little economic activity, although with high wind and solar potential – especially in the south.

4 Central economic corridor
Main economic hubs of Windhoek and Walvis Bay, with most industry, services and facilities for the import and export of goods.

5 Densely populated northern strip
Half of Namibia's population lives on 1/6th of the land spanning Omusati, Oshana, Ohangwena, Oshikoto, and Kavango West & East.

6 Central logistical arteries
Trans-African highways traverse the country, connecting Namibia and its landlocked neighbours to international markets.

Emerging insights

In conclusion, the baseline paints a clear spatial picture of Namibia today. Key circumstances across multiple dimensions of analysis both define development constraints and shape economic opportunities.

DIMENSION	KEY TAKEAWAY
Demographic	At only 3m, Namibia's population is small and sparsely distributed. There are only a handful of major towns, led by Windhoek. The recent rapid urbanisation, which has been faster than Namibia's peers, is set to continue.
Living standards	Namibia is one of Africa's few upper-middle income countries – but growth has stagnated, and poverty remains significant. Inequality is very high and heavily constrains living standards outside of urban centres.
Physical analysis	Landscapes are defined by extreme aridity and low precipitation. The Great Escarpment splits the country into a barren coastal strip and more elevated Central Plateau where the vast majority of the population live and work.
Biophysical analysis	Namibia has low soil fertility throughout, with most of the country poorly suited for high-productivity agriculture. Land cover patterns match topography – with shrubland savanna covering the north and east of the country.
Economic infrastructure	In line with relatively high incomes, Namibia has good economic infrastructure. It plays an important role in connecting land-locked neighbours to export routes, but relies heavily on imported electricity.
Social infrastructure	Health and education coverage is good, with high attendance rates at school – but secondary education outcomes in particular are poor, especially in comparison with other southern and eastern African countries.

2 Structural economic features

Namibia's economic performance

Following rapid economic growth post-independence, the Namibian economy has performed below potential since 2015.

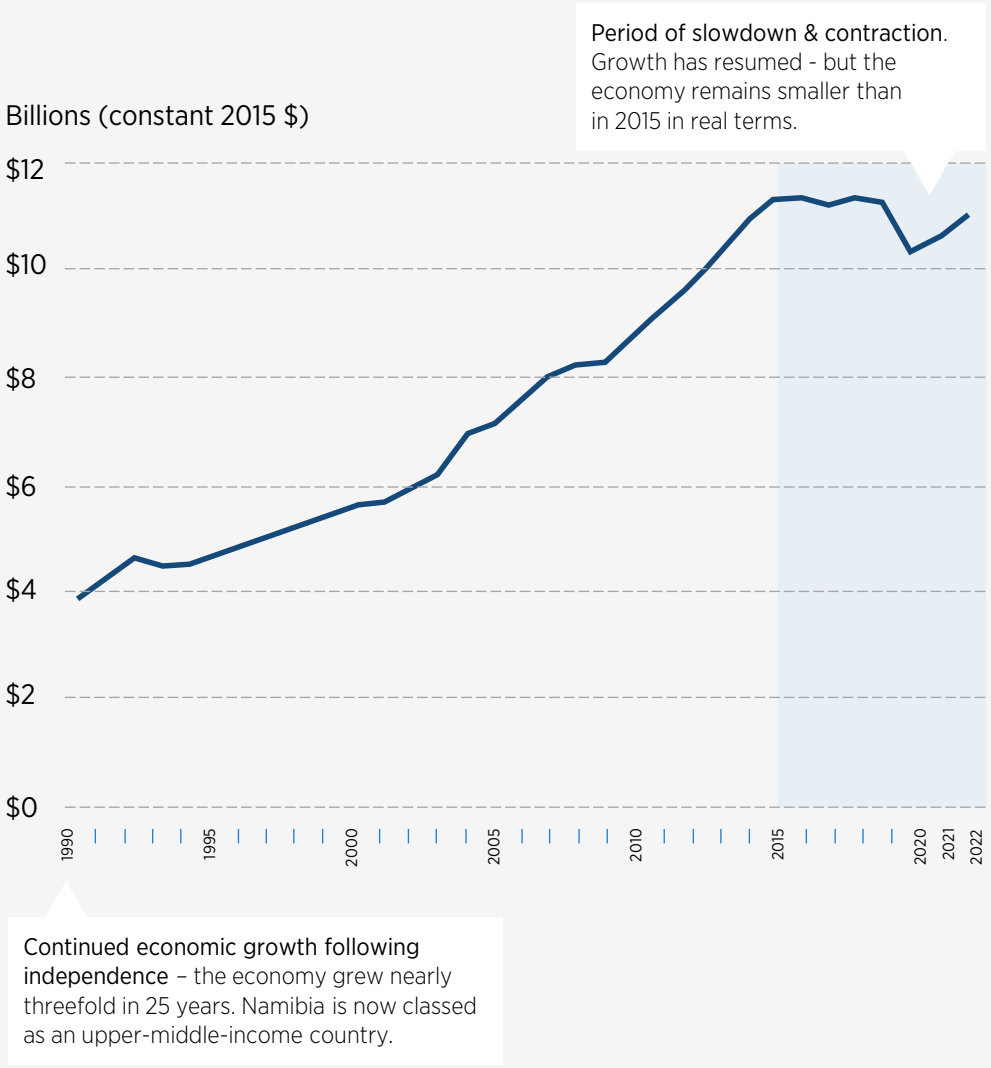
Since gaining independence from South Africa in 1990, Namibia has experienced two and half decades of sustained economic growth. This expansion catapulted Namibia into the ranks of upper-middle-income countries (GDP per capita reached $4,900 in 2022).

Capital accumulation – primarily through private investment in mining and public investment in infrastructure - has been the main driver of growth.

Notably, however, the role of Human Capital and Productivity in growth has been negligible (see next slide). As a result, growth decelerated. The economy has performed below potential since 2015, contracting during the Covid pandemic in 2019 and 2020.

Growth has resumed. However, an extended period of sluggish growth has prompted economic analysts to suggest that Namibia may be stuck in a so-called "middle-income trap", struggling to compete in labour-intensive industries due to relatively high wages, but also in higher value-add activities while overall productivity remains low.

GROSS DOMESTIC PRODUCT, 1990 TO 2022



Source: World Bank

Economic productivity

Productivity is declining, hampering growth and contributing to unemployment, poverty and inequality.

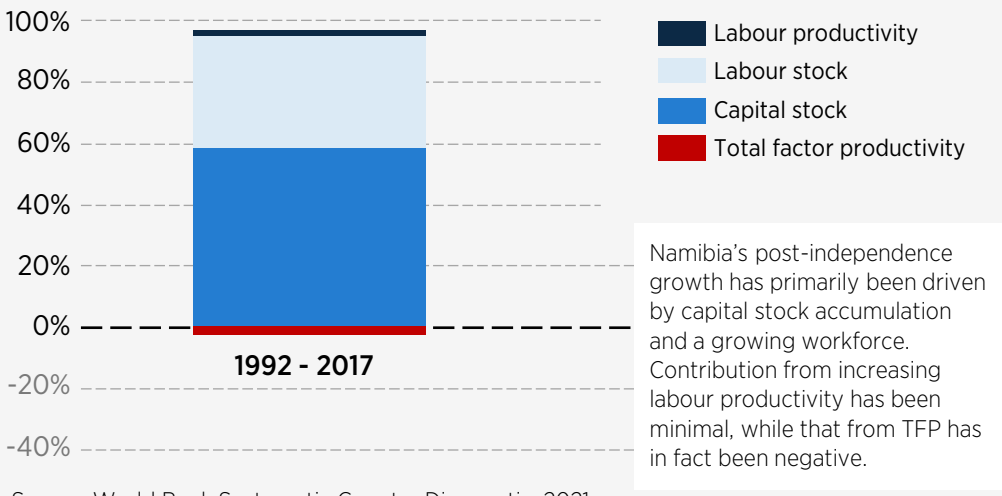
Namibia's economic growth was driven by capital accumulation and labour. However, the contribution to growth by total factor productivity (TFP) was mostly negative. Achieving higher sustainable growth rates will require Namibia to implement structural reforms raising TFP growth over the medium term.

Productivity is almost 40% below the trend line established by peer countries. Low labour productivity in relation to the country's GDP is particularly challenging in sectors where informality is high. The informal sector represents about 41% of employment, contributing to income insecurity and vulnerability.

Despite increased human capital investment, educational outcomes have remained low, resulting in widespread skills mismatches. Shortages of skilled labour limit the capacity to apply knowledge and innovation in many value adding economic sectors.

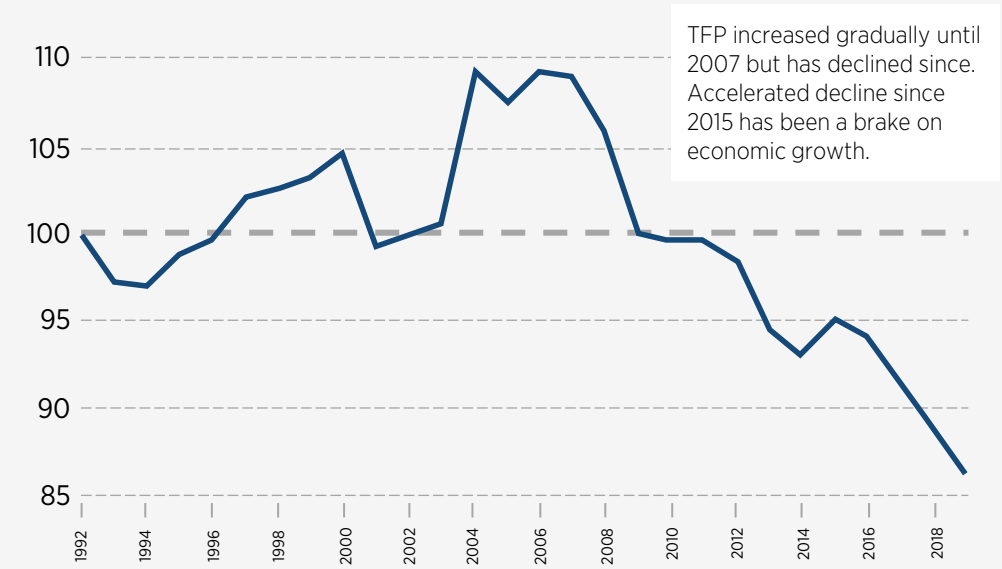
Namibia is a technology frontrunner in Africa. However, services are highly geographically concentrated. Despite improving access to services, costs remains high. The domestic technical skills are not high enough to drive the digital transformation initiatives that the country aspires to roll out.

FACTOR OF PRODUCTION AVERAGE CONTRIBUTION TO GDP GROWTH



Source: World Bank Systematic Country Diagnostic, 2021

TOTAL FACTOR PRODUCTIVITY (1992 = 100)



Source: Federal Reserve Economic Data

Economic structure

Mineral extraction is central to Namibia's economy, but the public sector remains the single largest economic sector.

Namibia is heavily dependent on the mining sector, accounting for nearly 50% of exports and generating 25% of government revenue. Other parts of the economy are dependent on mining, for example manufacturing (11.3%) is dominated by the processing of minerals.

The revenue generated by mining has largely been invested into public services. As a result, Namibia has an expanding public sector, with more than 50% of government expenditure allocated to social sectors (education, health, welfare).

Agriculture, forestry and fishing accounts for 9.5% of GDP. Only 1% of Namibia is suitable for arable farming, thus livestock is prominent. Namibia is home to some of the richest fishing grounds in the world and is the fastest-growing sector of the economy.

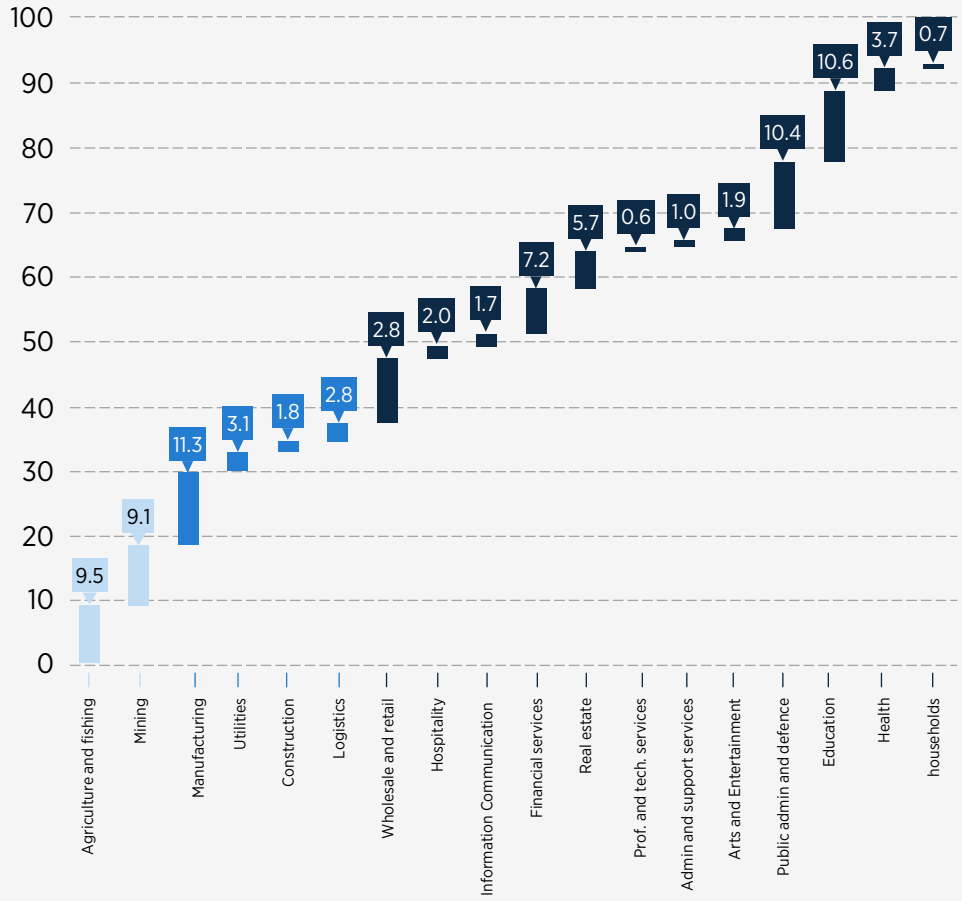
Tourism is a major contributor (11%) to GDP. The country is one prime international tourism destinations in Africa, featuring its extensive wildlife.

GROSS DOMESTIC PRODUCT, BY ECONOMIC SECTOR (2021)

The primary sector is the foundation for the rest of the economy; paying tax, generating export, and creating demand revenue for industry and services.

The secondary sector is the smallest contributor to GDP. Manufacturing is predominately the semi-processing of primary sector products.

Other than tourism, **the tertiary sector** is driven by public sector expenditure, characterized by limited value add and relatively inefficient investment.



Source: NSA

Note: Total does not sum to 100% due to omission of taxes & subsidies

Employment structure

Employment concentrated in low skill sectors, with agriculture overrepresented and mining underrepresented.

While the primary sector accounts for a quarter of total labour force, mining only represents a small proportion. Most people are engaged in a low productivity agricultural sector, mostly subsistence and informal (Overall, >40% of the population is employed in the informal sector).

Since independence, demand for primary sector output has declined in relative terms, while the tertiary sector has expanded. This trend has accompanied rapid rural-to-urban migration. Job creation has not been enough to compensate, leading to a high unemployment rate of 33.4%, mostly people with lower education levels.

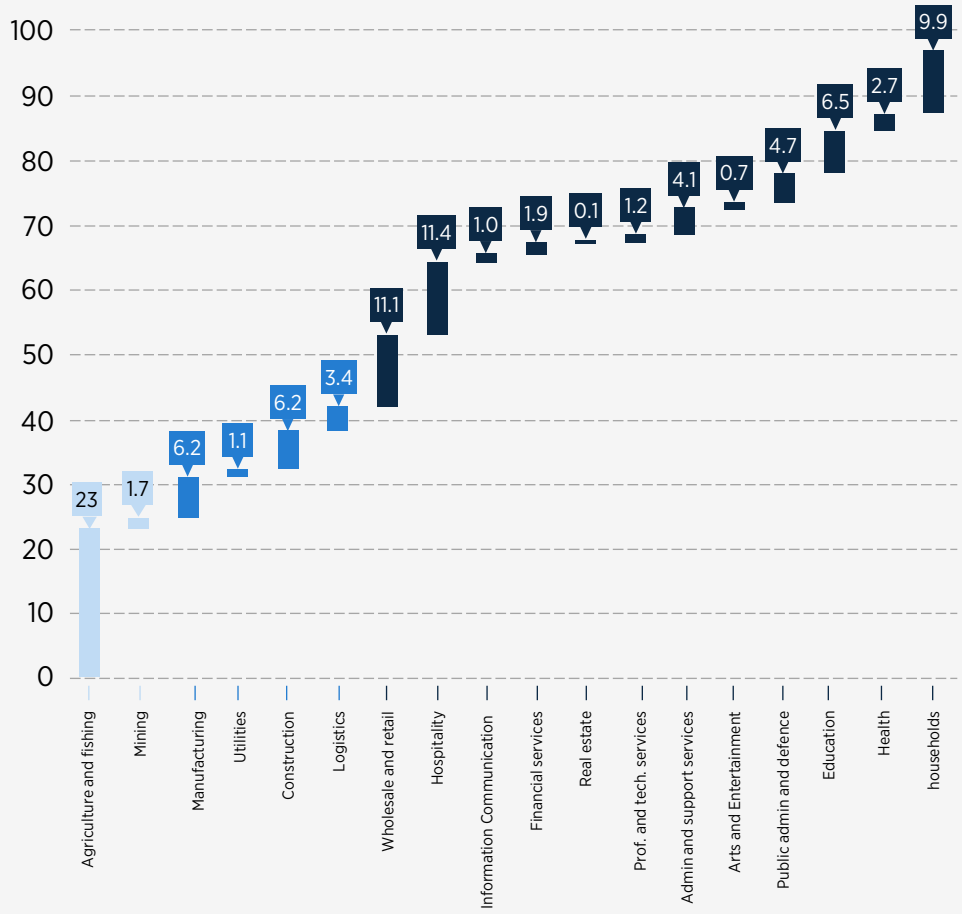
Across various sub-sectors (hospitality, retail, arts and entertainment etc), tourism contributes significantly more employment than it does GDP. On the other hand, real estate and financial services, employ a smaller percentage (0.1% and 1.9%) than their contribution to GDP (5.7% and 7.1%).

EMPLOYMENT, BY ECONOMIC SECTOR (2018)

The primary sector employs ¼ of the labour force, mostly low-skilled subsistence farming, Mining offers well-paid but few jobs.

The secondary sector is sector is a small contributor to Namibian employment, mostly through construction and manufacturing.

Retail and hospitality contributes most jobs outside of agriculture. The public administration is the largest single employer



Source: Labour Force Survey, 2018 Note: Total ≠ 100% due to omission of 'Other' category

REPUBLIC OF NAMIBIA