Turning vision into reality
Namibia's long-term development outlook

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Summary

Using the International Futures (IFs) forecasting system, this paper first presents a plausible long-term population forecast for Namibia. This forecast is then used to assess key targets from the National Development Plan (NDP4) and Vision 2030, Namibia's long-term development strategy. The paper then plots three scenarios to chart Namibia's potential progress. Under the Current Path scenario, the economy continues to grow, but many targets remain out of reach. The Infrastructure Access scenario maps a future where Namibia invests heavily in infrastructure development, but this translates into less investment in other vital sectors. Finally, the Leave No Namibian Out scenario sees overall increases in human development and economic growth, along with a slight reduction in inequality by 2030, but deep-seated structural challenges remain.

IN 2004, THE GOVERNMENT of Namibia released its first integrated long-term strategy for the development of the country, Vision 2030. The National Planning Commission (NPC) has published two National Development Plans (NDPs) since 2004 to take the country closer to reaching Vision 2030. The last NDP, NDP4, was released in May 2012 and covers the period 2012/13 to 2016/17.[1] The three overarching goals of the NDP4 are to achieve high and sustained economic growth, employment creation and decreased income inequality. The NPC submits bi-annual progress reports to assess progress towards achieving the NDP4 goals and targets.

This paper will use the International Futures (IFs) forecasting system to assess whether or not Namibia is on track to meet key goals of the NDP4 and Vision 2030. IFs is large-scale, long-term, highly integrated modelling software housed at the Frederick S. Pardee Center for International Futures at the Josef Korbel School of International Studies at the University of Denver.[2] The model forecasts hundreds of variables for 186 countries to the year 2100 using more than 3 000 historical series and algorithms based on insights found in academic literature and its own statistical analysis.[3]

After a background section to provide a brief overview of the most salient aspects of the Namibian social, political and economic context, the paper presents a plausible long-term population forecast for Namibia. A plausible population forecast is an important input in assessing long-term development goals. As populations grow, all other systems must grow to keep pace with development.

The next section uses IFs to evaluate a number of key development targets from the NDP4 and Vision 2030. This is not meant to be a comprehensive evaluation of the targets of the NDP4 and Vision 2030 – the paper evaluates selected targets relating to economic development, poverty, health and infrastructure.

Table 1: Selected targets and indicators from Vision 2030 compared with the Current Path scenario of the International Futures model (2030)

	Vision 2030	International Futures (2030)
GDP (avg. growth rate)	6.2%	5%
GDP per capita (avg. growth rate)	4.4%	2.2%
Infant mortality	10	21.8
Life expectancy	68 (male) 70 (female)	70 (male) 77 (female)
Total fertility rate	2.0	2.6
Population	3.5 million	3.2 million
Water	Universal access	95%
Sanitation	Universal access	52%

Source: Vision 2030 and IFs v 7.15.

The paper then presents a brief analysis of the four components of multifactor productivity (MFP), as defined in the IFs model, to identify the most important constraint on long-term economic growth: physical capital. Three scenarios are then used to show the long-term trade-offs of increased traditional infrastructure access rates.

In the **Current Path** scenario, government policy continues along current trajectories – low levels of access to basic services such as electricity, sanitation and transportation mean that physical capital remains a constraint on economic growth, human development, and a contributing factor to malnutrition.

In the **Infrastructure Access** scenario, high levels of investment in traditional infrastructure allow high access to basic services by 2030. The negative impact of physical capital on economic growth is decreased, gross domestic product (GDP) per capita increases, poverty is reduced and malnutrition decreases. Increased investment in infrastructure detracts from spending on other areas of development such as education, however. In Infrastructure Access, enrolment and graduation rates for each level of education decrease relative to the Current Path.

Leave No Namibian Out is a scenario where investments in basic infrastructure are accompanied by continued high levels of government investment in education as well as improvements in government effectiveness and the implementation of social grants. Levels of access to basic services still increase in this scenario, as well as levels of attained education. Human capital continues to contribute positively to the overall Namibian economy, GDP per capita increases, poverty declines and malnutrition decreases. Increasing investments on both infrastructure and education, however, mean a reduction in spending on health, military, and research and development. While Leave No Namibian Out sees overall improvements in human development and economic growth, many of the deep-seated structural challenges, such as inequality and extreme poverty, remain.

21%

OF NAMIBIANS ARE CLASSIFIED AS LIVING IN EXTREME POVERTY IN 2015 BY THE WORLD BANK

Background

Namibia – a vast, parched and resource-rich country – gained independence from South Africa in 1990. In 1994, shortly before the African National Congress assumed power in neighbouring South Africa, the former occupying country handed Walvis Bay and the Penguin Islands to its previous colony, restoring its territorial integrity.
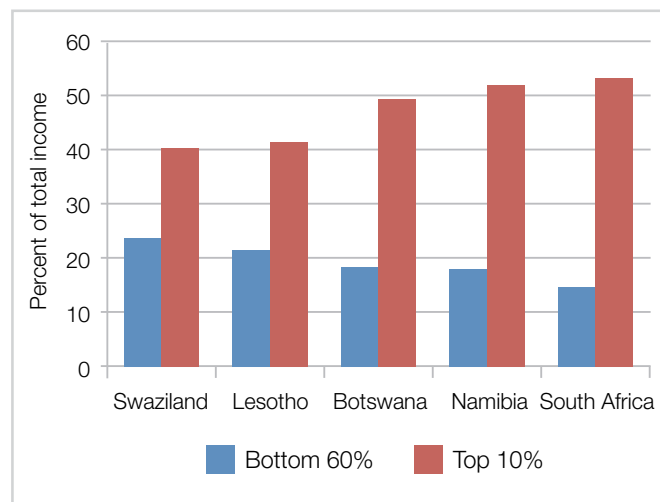
Namibia regularly ranks among the top African countries in categories for good governance. For example, in the 2015 Ibrahim Index of African Governance, Namibia is ranked at fifth position on the quality of overall governance out of the 54 countries that were included in the study, with an overall score of 70.4 out of a possible 100. On the four broad sub-categories of the index, Namibia scores highest in participation and human rights but lowest on sustainable economic opportunity.[4,5]

With the exception of a short-lived effort at secession in the former Caprivi Strip (now the Zambezi Region) in 1999, Namibia has enjoyed political, economic and social stability since independence. The South West Africa People's Organization (SWAPO) has been in power since independence in 1990 and continues to govern with a substantial majority. SWAPO again gained a resounding victory during the most recent elections for president and the national assembly in November 2014. A review of responses from the Afrobarometer opinion survey project in Namibia confirms that the commitment to democracy and associated attributes such as free speech is strong and growing.[6]

> Together with neighbours Botswana and South Africa, Namibia is one of the most unequal countries globally

Based on its average income levels, Namibia is classified as one of the 53 upper-middle-income countries in the world but is also one of the most unequal countries in the world.[7] Average data on Namibia – such as income per capita, access to water, sanitation, roads and electricity – can therefore be misleading. Access to services, infrastructure and income is skewed across urban/rural divides, geographically between regions, ethnically and racially. Over half of Namibia's income is concentrated in the top 10% of the population.[8] Together with neighbours Botswana and South Africa, Namibia is one of the most unequal countries globally.

Figure 1: Income disparity among selected countries

Source: World Development Indicators, http://wdi.worldbank.org/table/2.9# (accessed 27 September 2015).

The income disparities between the lowest 60% and highest 10% of populations of some of the more unequal countries in the region are presented in Figure 1.

Using the standard global poverty line of $1.25 income per person per day in 2005 purchasing power parity (PPP), around 21% of Namibia's population can be classified as living in extreme poverty in 2015 as defined by the World Bank. The comparable figures for neighbouring Botswana, Lesotho, Swaziland and South Africa are 12%, 65%, 44% and 10% respectively.[9] Like most of its neighbours, Namibia has a dual economy with the largest part of its population engaged in subsistence agriculture and herding and, at the other end of the spectrum, a small relatively modern market sector. Although arable land accounts for only 1% of Namibia, nearly half of its population is employed in agriculture and susceptible to the vagaries of the weather and the deleterious impact of climate change.[10]

The Human Development Index (HDI) provides a useful lens through which to view Namibia in a comparative perspective. The HDI is a measure of average achievement in key dimensions of human development: education, life expectancy, and per capita income. In its 2015 report, the United Nations Development Programme classified Namibia as a country with medium human development (with a score of 0.624).[11] Namibia ranks 127th on the global list, a few places below its neighbour South Africa (at 118), and below Botswana (at 109). Swaziland, Angola and Lesotho all rank much lower than Namibia.

A somewhat more disconcerting picture emerges when viewing the Inequality-adjusted HDI (IHDI), which now takes into account how the average achievements of a country on health, education and income are distributed among its population.

The United Nations Development Programme does this by discounting each dimension's average value according to its level of inequality.[12] Using the IHDI, Namibia is rated 22 places lower – a downgrading more severe than Botswana.

Due to the structure of its economy and scarce water resources, Namibia is particularly vulnerable to external economic and ecological shocks. This is because demand for all major production sectors – namely mining, tourism, livestock and meat production, and fisheries – are cyclical, seasonal, or unpredictable.[13]

Shortly after independence the Namibian government established the NPC.[14] Various departments also released long-term planning documents, the first being the 1992 White Paper on Industrial Development with its five-year policy framework to 1997. These were subsequently updated by an industrial policy that set out principles and broad parameters to 2030 and an implementation and strategic framework in the NDP4.

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In 1998, the government adopted its Poverty Reduction Strategy and its associated Action Plan, and four years later it released the related National Rural Development Policy. The aim of the Poverty Reduction Strategy is to, 'promote systematic and coordinated development planning, and respond to the plethora of development challenges facing rural populations.'[15] The central objective of the Rural Development Policy, which was developed in furtherance of the Decentralisation Policy, is, 'to promote service delivery within the decentralised levels of governance – regions and constituencies.'[16]

To drive economic growth and, importantly, create jobs and thus address poverty, the government has prioritised the agricultural, education, health and housing sectors for public investments.

Population

According to the 2011 census, the third since independence, Namibia had a population of 2 113 077 people in 2011, 57% of whom live in rural areas. The total fertility rate (TFR) was 3.6 children per woman, and the crude death rate was 10.7 per 1 000 persons.[17]

This data is generally in line with the latest data from the United Nations Population Division's (UNPD) global datasets. The 2015 revision of World Population Prospects (WPP) from the UNPD has Namibia's 2011 population at 2.240 million people and a TFR of 3.6.[18] The 2014 revision to World Urbanization Prospects has 54.3% of the Namibian population living in rural areas.[19]

The crude death rate reported by the UNPD is significantly lower than that in the 2011 census, however. The UNPD reports a crude death rate of 8.9 for the 2005–2010 period and 7.3 for the 2010–2015 period.[20] The difference in crude death rate between

57%

OF NAMIBIANS LIVE IN RURAL AREAS ACCORDING TO THE 2011 CENSUS

the UNPD and the NSA's census heavily impacts estimates of life expectancy and infant mortality rates, important components of population forecasts (more below).

IFs, which uses mainly UNPD data in the population module, estimates the Namibian population to be 2.223 million in 2011, with 62% living in rural areas. IFs uses a crude death rate of 7.5 and a TFR of 3.6 in 2011.[21] While the total population and TFR data used in IFs matches the 2011 census quite well, the crude death rate in IFs is significantly lower than the figures reported in the 2011 Namibian census. National census data and data from international organisations such as the United Nations (UN) and the World Bank differ for reasons that usually relate to data standardisation across countries. Since IFs is a global model, it prioritises datasets that have already been standardised across countries.[22]
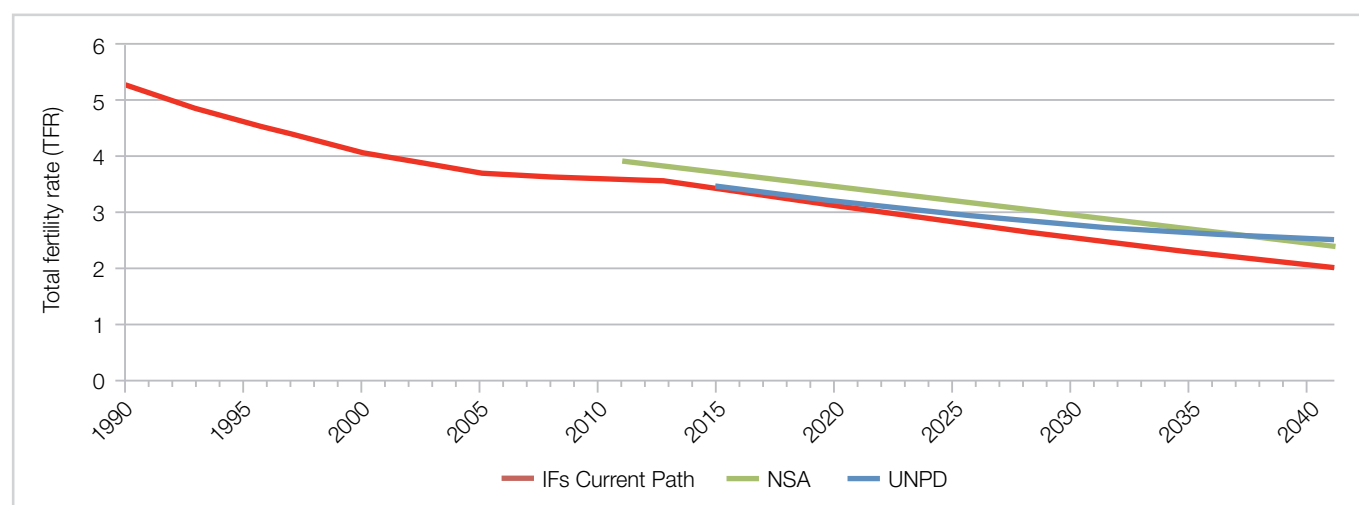
Realising the importance of population in development planning, the NSA has completed a population forecast to 2041, published in September 2014, using data from the 2011 census.[23] Both the NSA model and the IFs model use cohort component analysis to forecast population – population is broken down into separate age-sex cohorts, and fertility and mortality rates are forecast separately for each cohort. There are three components of population forecasts: fertility, mortality and migration. Each is discussed separately below.

Fertility

TFR is the average number of children a woman is estimated to have in her lifetime. Current estimates of fertility rates in Namibia vary. The 2011 Namibian census estimated a TFR of 3.6. The 2015 revision of the UNPD's WPP report also reports 3.6, but the 2012 WPP and the World Bank's World Development Indicators estimated that TFR was 3.2 in 2011.
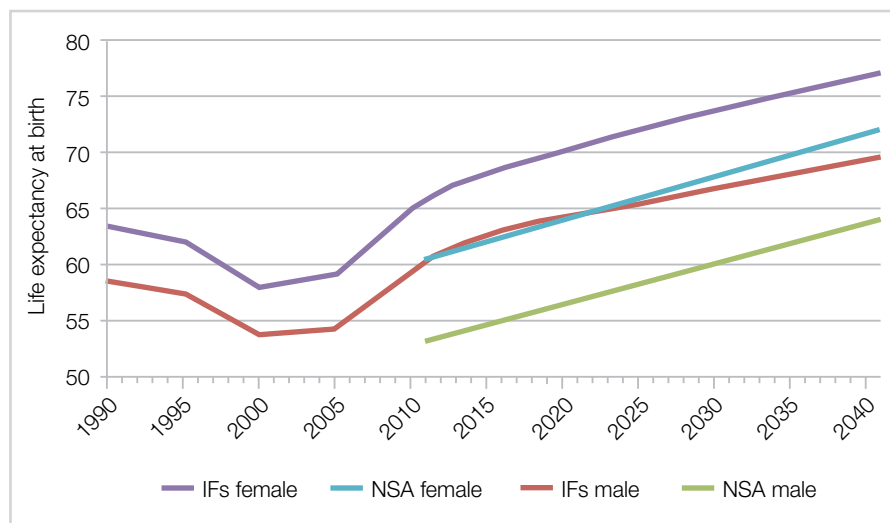
In its population forecast, the NSA uses the 3.6 figure from the 2011 census and then increases this to 3.9 because, 'It is normally assumed that reported TFR from a census or surveys is usually underreported due to recall errors by mothers in reporting the number of children born.'[24]

Figure 2: Total fertility rates as forecast in IFs, in the NSA population forecast, and the UNPD WPP

Source: Historical data and UNPD forecast from UNPD 2015 revision to WPP. IFs forecast from IFs version 7.15 (uses UNPD historical data). NSA forecast from NSA Population Forecast 2014).

Figure 3: Life expectancy as forecast in IFs and the NSA population forecast

Source: Historical data from UNPD 2015 revision to the WPP. IFs forecast from IFs version 7.15. NSA forecast from NSA Population forecast, 2014.

The NSA forecast is that the TFR will decrease to 2.4 by 2041. This relies on the assumption that the TFR will decrease linearly based off an extrapolation from the 2001 and 2011 census data.

IFs uses TFR data from the 2015 revision to the UNPD's WPP report.[25] The demographic module of IFs then forecasts TFR endogenously, using historical data and three main variables: years of formal education attained by adults, rate of use of modern contraception, and infant mortality.[26] The education variable represents long-term development and social evolution. Infant mortality and use of modern contraception represent short-term changes. Due to increasing levels of education, prevalence of modern contraception and decreasing infant mortality, IFs forecasts that the TFR will decrease from 3.6 children (in 2011) to 2.6 by 2030 and fall below the 2.1 children per woman replacement figure by 2041.

Mortality

A second component of population forecasts is mortality.

For the NSA population forecast, death rates for each age-sex cohort were calculated using data from the 2011 census. These death rates can be translated into a measure of survival chances, which are then used to estimate life expectancy at birth. To forecast mortality, 'life expectancy at birth by sex is assumed to follow a fixed logistic pattern of improvement in line with world historical trends.'[27]

According to the 2011 Namibian census there were 22 668 reported deaths in Namibia in the 12 months prior to the census. This translates to a crude death rate of 10.7, significantly higher than the data from the UNPD.[28] The UNPD estimates a crude death rate of 8.9 for the 2005-2010 period and 7.3 for the 2010-2015 period.[29] Since the NSA used the 2011 census crude death rate to estimate life expectancy at birth, the life expectancy used in the NSA population forecast is considerably lower than the estimated life expectancy from the UNPD.

IFs takes life expectancy data from the UNPD's WPP and crude death rate data from the World Bank's World Development Indicators.[30] The health module of IFs then

22 668

THE NUMBER OF DEATHS
REPORTED IN NAMIBIA IN
THE 12 MONTHS PRIOR TO
THE 2011 CENSUS

forecasts mortality rates for each age-sex cohort. The health module divides mortality into three main types: communicable diseases, non-communicable diseases, and injuries. These mortality types are further broken down into 15 sub-types. The health module forecasts mortality rates using work done for the World Health Organization's Global Burden of Disease project. This methodology uses three main distal drivers: income, education and technology. In addition, in iteration with other modules in IFs, such as infrastructure and the environment, more proximate drivers are also used.

IFs forecasts that life expectancy for men will be 66.8 in 2030 and 73.8 for women (see Figure 3).

Migration

Both the NSA and IFs assume zero net migration over the time horizon to 2041. This is in line with the recent historical trend.
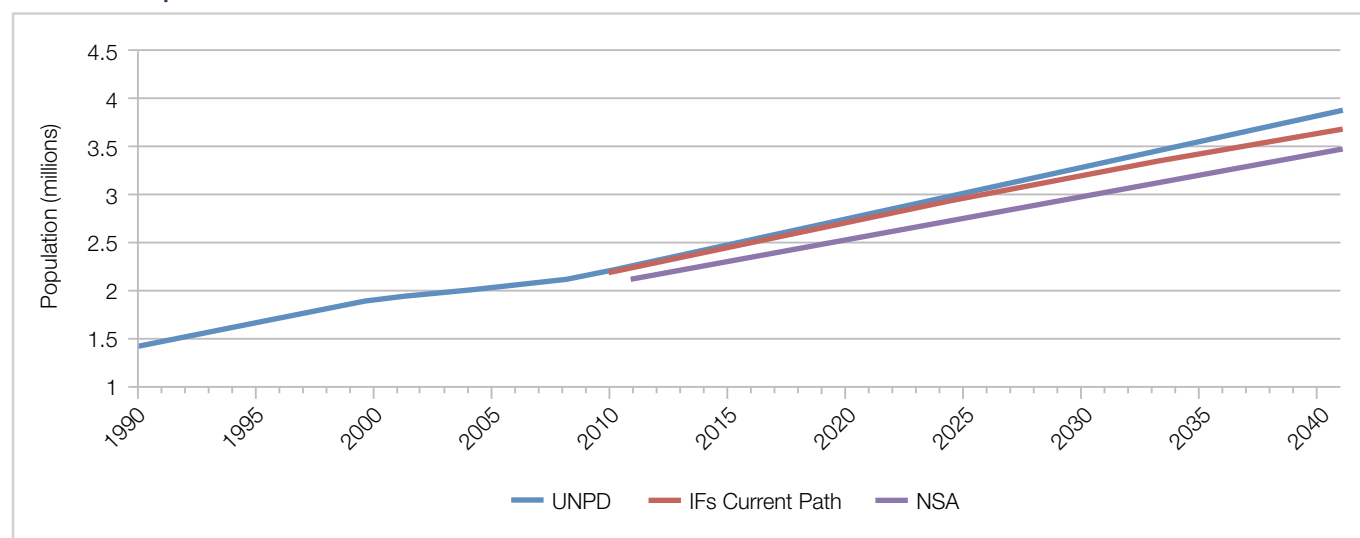
Population conclusion

IFs forecasts a population of 3.2 million by 2030 and 3.66 million people by 2041; the NSA forecasts 3.44 million, and the UNPD forecasts 3.86 by 2030 (see Figure 4).

The different in initial data and model assumptions mean that the demographic structure is significantly different between the two models (see Figure 5).

Due to the more rapidly decreasing fertility rate in IFs, the portion of the population less than 15 years of age will decrease from 37% in 2011 to 31% in 2030 and 26% by 2041. The NSA forecasts that it will only go down to 33.7% by 2041. Due to the longer life expectancies in IFs, the ratio of the population 65+ to working age population (dependency ratio) will increase from 5.9% in 2010 to 11.2% in 2041 in IFs. The NSA forecasts that this will stat relatively constant.

The NSA forecasts that 67% of the population will live in urban areas by 2041. The IFs forecast is lower; it predicts that just 51% will live in urban areas by then. IFs estimates that 933 000 Namibians (in 2014) live in urban areas and that this will grow to nearly 1.9 million by 2041.

Figure 4: Total population in million as forecasted by the IFs model, the NSA's model and the United Nations Population Division
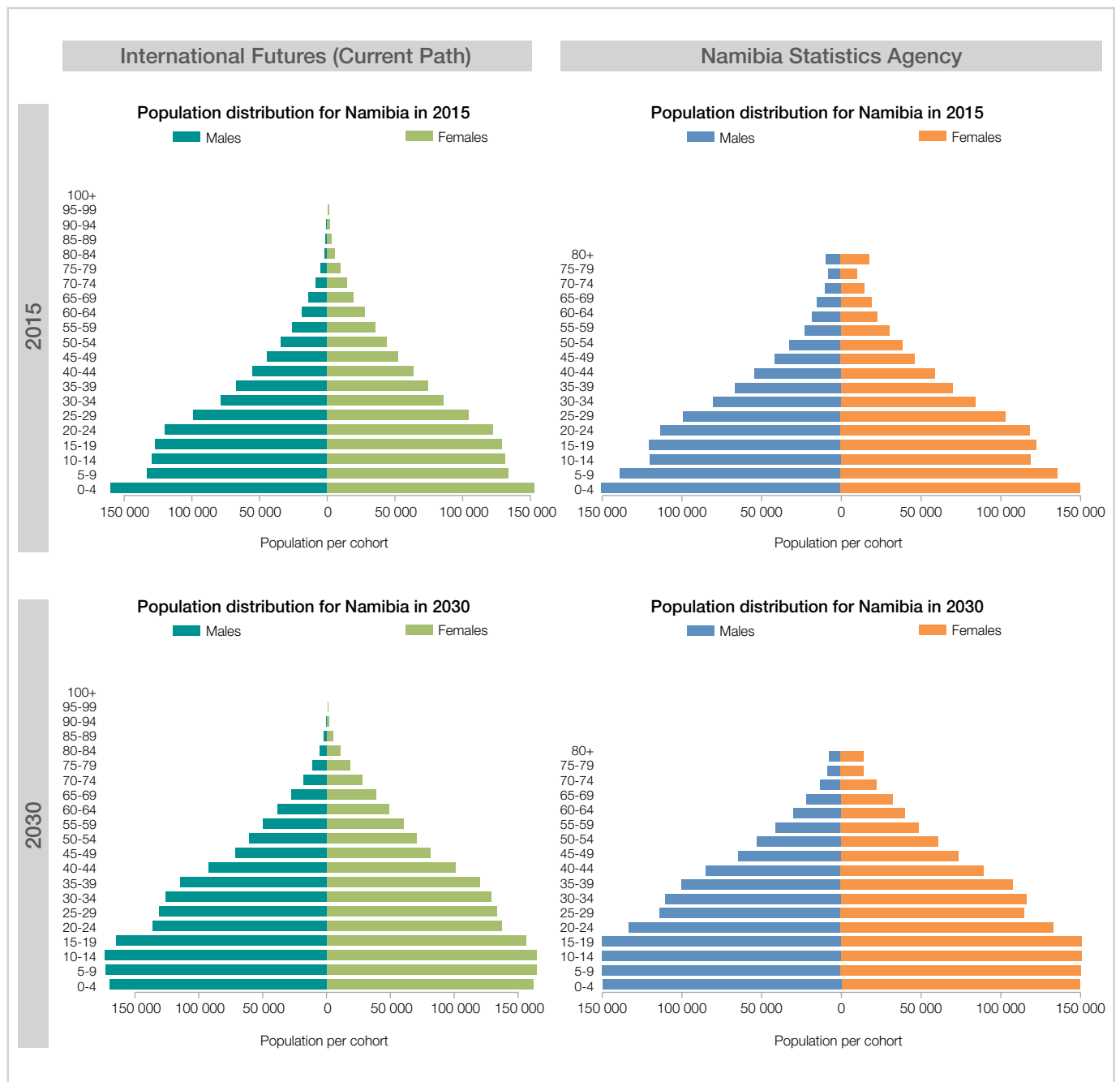

Source: Historical data from the 2012 revision of the UNPD's WPP. UNPD forecast from the 2015 revision of the WPP. IFs forecast from IFs version 7.15. NSA forecast from NSA Population Forecast 2014.

A reliable demographic forecast is a first step in setting aggressive but reasonable development targets although it is important to recognise that interventions made in the economic, health and education sectors will impact on population forecasts.
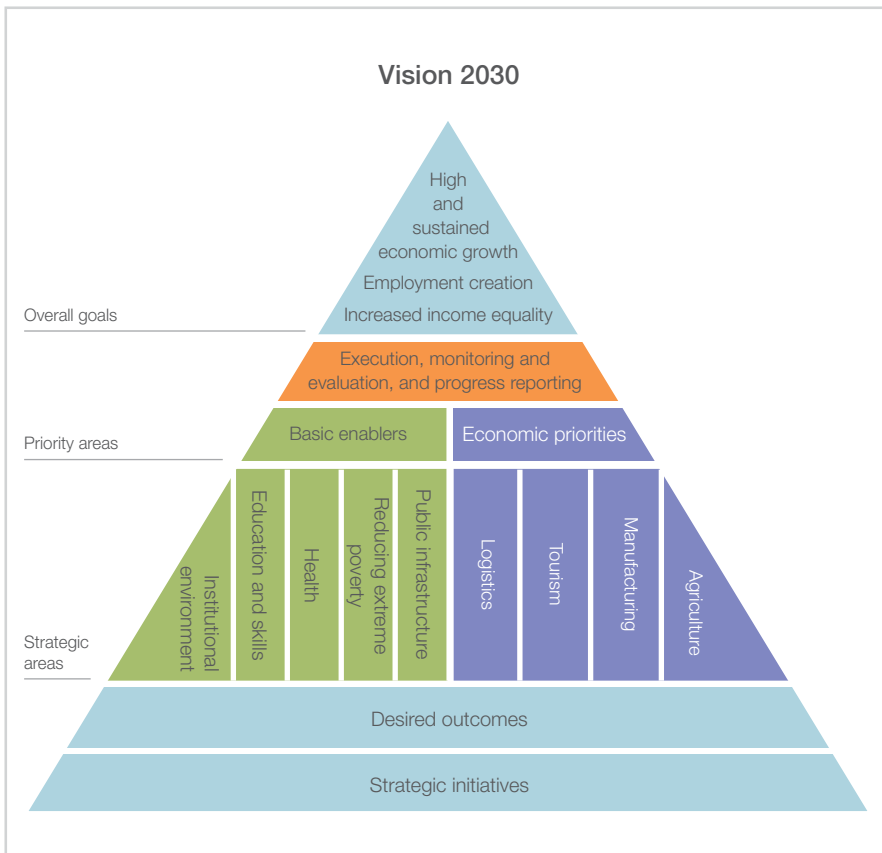
Evaluating development targets

The three overarching goals of the NDP4 are: high and sustained economic growth, increased income inequality, and employment creation. To reach these goals, the NDP4 has identified five basic enablers necessary for sustained economic growth and four economic priority sectors (see Figure 6).

Figure 5: Namibia's age and gender cohort comparing IFs with NSA: 2015 compared with 2030

Source: IFs v7.15 and NSA Namibian Population Projections 2014.

Figure 6: Structure of the NDP4

Source: Fourth National Development Plan, NDP4.

This section presents the IFs Current Path forecast, which includes the population forecast described above, to evaluate selected development targets as set out by NDP4 and Vision 2030. This is not meant to be a comprehensive evaluation of all targets; that would require further research and analysis. The author has chosen to evaluate selected quantifiably verifiable targets that correspond well with variables forecast in the IFs model.

The IFs Current Path forecast is dynamic and endogenously generated by IFs, not a linear forecast based on past trends.[31]

Economic development

Vision 2030 sets a GDP growth rate target of 6.2% and a GDP per capita growth rate target of 4.4%.[32] Since independence in 1990, GDP (at market exchange rate) annual growth rates in Namibia averaged 4.3%, and GDP per capita (at PPP) growth rates have averaged 1.8%.[33] The Vision 2030 GDP growth target is therefore an aggressive 1.9 percentage points above the historical average, and the GDP per capita growth rate an even more ambitious 2.6 percentage points higher, implying that a host of policies and measures will be required to achieve this level of improvement. IFs forecasts that GDP will grow at 5% until 2030 and GDP per capita (PPP) will grow at 2.2%. Thus, Namibia is unlikely to reach these targets.

The NDP4 states that by 2017, Namibia will be the most competitive economy in the SADC region, according to the standards set by the World Economic Forum.[34] The forum defines competitiveness as, 'the set of institutions, policies and factors

4.3%

THE AVERAGE ANNUAL GDP GROWTH RATE IN NAMIBIA SINCE 1990

that determine the level of productivity of a country'[35] and categorises Namibia as an 'efficiency-driven economy' that primarily depends upon six of 12 World Economic Forum pillars to improve its competitiveness, namely:

- Higher education and training

- An efficient goods market

- Labour market efficiency

- Development of its financial market

- Technological readiness

- Market size[36]

The World Economic Forum's Global Competitiveness Index for 2015/16 ranks Namibia at 85th globally (up from 88th position in 2014/15), 36 places behind South Africa and 14 places behind Botswana but ahead of Lesotho and Swaziland. The SADC country that achieves the highest scores is the island state of Mauritius at 46th position.[37] Moving Namibia up from 85 to 46th position ahead of Mauritius would appear to be a herculean task in just two years.

Health

The NDP4 sets health targets in terms of extended life expectancy. The initial data used to set these targets differs from that used in IFs (explained above).

Vision 2030 sets targets for reducing infant mortality, increasing life expectancy and reducing the TFR. Vision 2030 aims to lower infant mortality to 10 deaths per 1 000 live births, increase life expectancy to 68 years for men and 70 years for women and lower TFR to 2.0. Using the data available at the time, Vision 2030 forecast that the Namibian population would be 3.5 million by 2030 and used that figure to guide the implementation of Vision 2030.[38] The NSA forecasts that the Namibian population will be just under 3 million by 2030. IFs forecasts a population of 3.2 million by 2030, and the UNPD forecast a population of 3.3.

Estimated at 33.5 deaths per 1 000 live births in 2014, infant mortality rates in Namibia are low by regional standards but higher than would be expected given its GDP per capita. In SADC, only Botswana, Mauritius and Seychelles do better than Namibia, all countries with significantly higher levels of GDP per capita. Since Namibia already does relatively well on rates of infant mortality, further improvements will require significant improvements in the associated drivers.

IFs currently forecasts that infant mortality in Namibia will decrease to 21.8 per 1 000 live births by 2030, more than double the Vision 2030 target. IFs estimates that an average of 26.6 out of 1 000 infants died of communicable diseases during their first year in 2014 (78% of all infant deaths). One of the largest drivers of child deaths due to communicable diseases is lack of adequate access to potable water and basic sanitation facilities (more below).[39]

Due to higher death rates in the 2011 census compared to the data used in IFs (explained above), the life expectancy used in the NSA population forecast is considerably lower than that used in IFs.

According to the IFs forecasts of higher initial life expectancy, Namibia is on track to meet the life expectancy targets of Vision 2030. While the initial fertility rate is much

85

NAMIBIA'S RANKING ON THE WORLD ECONOMIC FORUM'S GLOBAL COMPETITIVENESS INDEX FOR 2015/16

lower in IFs than in the NSA population forecast, IFs still forecasts a TFR of 2.55 by 2030, well above the Vision 2030 TFR target of two children per woman.[40]

Poverty

The NDP4 poverty target is that, 'By 2017, the proportion of severely poor individuals has dropped from 15.8% in 2009/10 to below 10%.'[41]

The NPC uses two national poverty lines. Persons with an annual per adult equivalent expenditure that is below N$3 330.48 (US$1.26 per person per day in 2011 United States (US) dollar values) are categorised as severely poor. Persons below a second, upper bound poverty line, N$4 535.52 (US$1.68 per person per day in 2011 US dollar values), are categorised as poor.[42] To calculate poverty, the NSA first estimated the cost of basic food needs for the healthy survival of a typical household that translated into the severe poverty line. An estimate of the value of a bundle of non-food items consistent with the spending of the poor is then added to this line to determine the upper bound poverty line.[43]
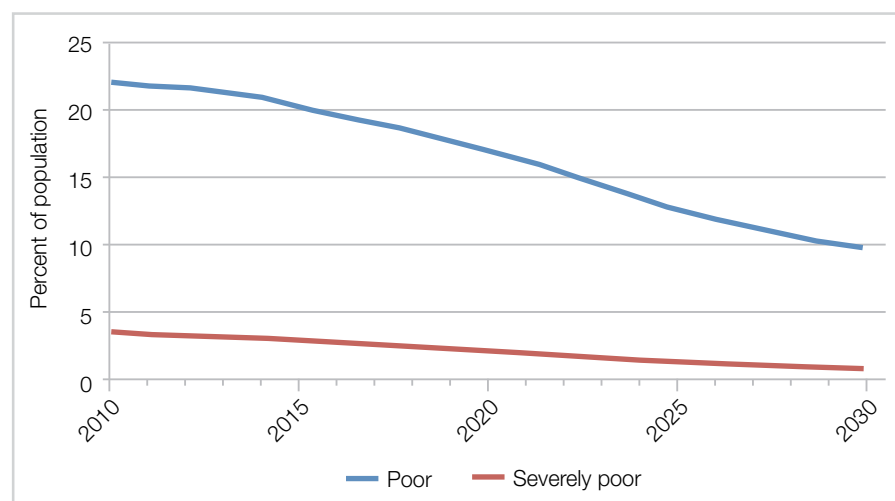
In the period from the population census of 2001 to that of 2011, the NPC calculates that poverty levels have declined by 11 percentage points nationally to 26.9%, although unevenly across the country. Severe poverty declined by 9 percentage points over the same time horizon.[44]

Poverty in Namibia has a distinct rural bias. Thus the lowest incidences of poverty (in Khomas and Erongo around Windhoek and Walvis Bay respectively) reflect the fact that these regions have the highest urban populations with relatively more employment opportunities. Poverty levels in the north of the country are higher than in the south, with the Kavango Region in the northeast having more than half of its population classified as poor.[45]

Global poverty rates cannot be directly compared with national level poverty rates, which are derived using country specific poverty lines estimated in local currencies.[46]

The IFs Current Path forecast indicates that the portion of the Namibian population living on less than N$18.18 a day (the Namibian upper bound poverty line in 2014 N$ for 'poor people') decreases from 20% in 2015 to just below 10% by 2030.[47]
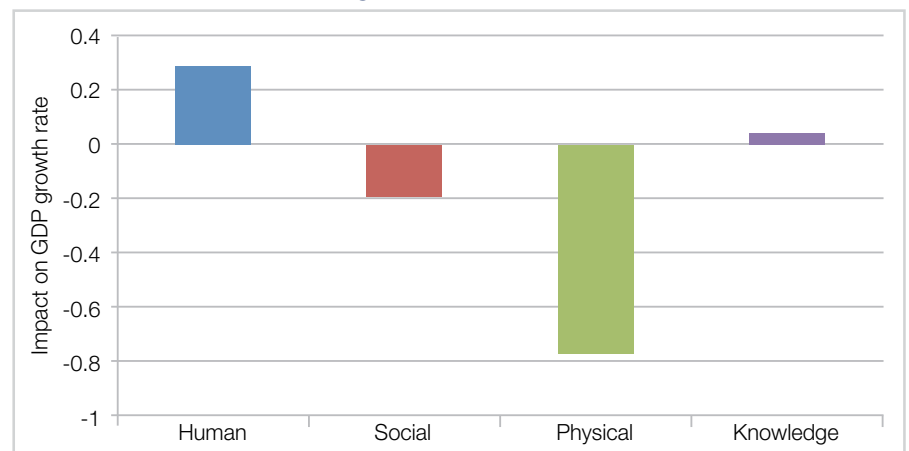
Figure 7: Percent of Namibia's population that is poor and severely poor

Source: IFs v7.15 using World Bank Development Indicators data.

POVERTY LEVELS IN THE NORTH OF NAMIBIA ARE HIGHER THAN IN THE SOUTH

Figure 8: Components of multifactor productivity and their contributions towards Namibian growth

Source: IFs v7.15, forecast for 2015.

Under the Current Path scenario Namibia would therefore not meet the Sustainable Development Goals target of eliminating extreme poverty by 2030 without a significant additional effort.[48]

Infrastructure

The NDP4 sets four infrastructure targets for 2017 in the sectors of: transport, energy, water, housing and information communications technology. Likewise, Vision 2030 acknowledges the importance of physical infrastructure for long-term development and sets targets for each of these sub-categories.

Namibia has met the Millennium Development Goal of reducing by half the proportion of the population without safe drinking water.[49] Only 67% of the Namibian population had access to safe drinking water in 1990 compared to over 90% today. Namibia is on track to come close to universal access to improved water facilities by 2030.

Universal access to improved sanitation facilities, however, remains a challenge. The 2015 update to the World Health Organization and UN Children's Fund joint Monitoring Programme for Water Supply and Sanitation found that 48% of the Namibian population practises open defecation, and Namibia has made 'limited or no progress' towards the sanitation Millennium Development Goal target.[50] The IFs Current Path forecasts that only 52% of the Namibian population will have access to improved sanitation facilities by 2030.

In addition to low levels of access to water and sanitation, Namibia also faces a water scarcity problem. Namibia is one of the driest countries in the world, and due to urbanisation, rising incomes and industrialisation, water demand is expected to increase.[51]

Forecasting economic growth

The IFs model uses a Cobb-Douglas production function to forecast economic growth. The function uses sector specific labour and capital exponents to calculate value added by each sector over time.[52] In addition, IFs includes an endogenous formulation to estimate the Solow residual. Besides capital and labour, the Solow residual is a third component to economic growth models that economists began including in the Cobb-Douglas function to represent growth in technology that contributes to

90%

OF NAMIBIANS HAVE ACCESS TO SAFE DRINKING WATER

economic growth. The Solow residual is forecast in IFs using a multifactor productivity (MFP) formulation.

IFs breaks MFP into four categories: human capital, social capital, physical capital and knowledge capital. Each of these four categories contributes, either positively or negatively, to economic growth. Thus MFP takes into account variables across developmental sectors, allowing the model to be more responsive to a wide range of interventions over a long time horizon.

Looking across the main MFP categories, physical capital is the largest constraint on Namibian economic growth at present. This is due to the relative underperformance of Namibia on traditional infrastructure indicators, namely, electricity, sanitation and transportation. Human capital represents the largest positive contribution towards Namibian growth, largely due to high government investment on education (see Figure 8).

While Namibia has a strong core infrastructure and performs well on some physical infrastructure indices, poor levels of access to basic infrastructure represent a large constraint on growth. Table 2 shows the categories of traditional infrastructure: electricity, water and sanitation, and transportation, as well as their sub-indices.

Some of these indicators are not necessarily indicative of underdevelopment. Namibia has a low level of roads per land area, but that is because Namibia is a massive country with a small population. Namibia also imports roughly half of its electricity from South Africa. This is why generation capacity per person in Namibia is low. Likewise, electricity transmission loss is high in Namibia because transmission loss is calculated as loss divided by electricity produced. Since little electricity is produced in Namibia, this indicator is misleading.

That being said, given its level of GDP per capita (PPP), Namibia should be performing much better on many of these indices. While relying on South Africa for electricity is not necessarily a problem, less than half of the Namibian population, and only 17% of the rural population, have access to electricity.[53] Given the level of GDP per capita, IFs would expect 73% of the population to have access to electricity.

Table 2: Traditional infrastructure indices and sub-indices for Namibia

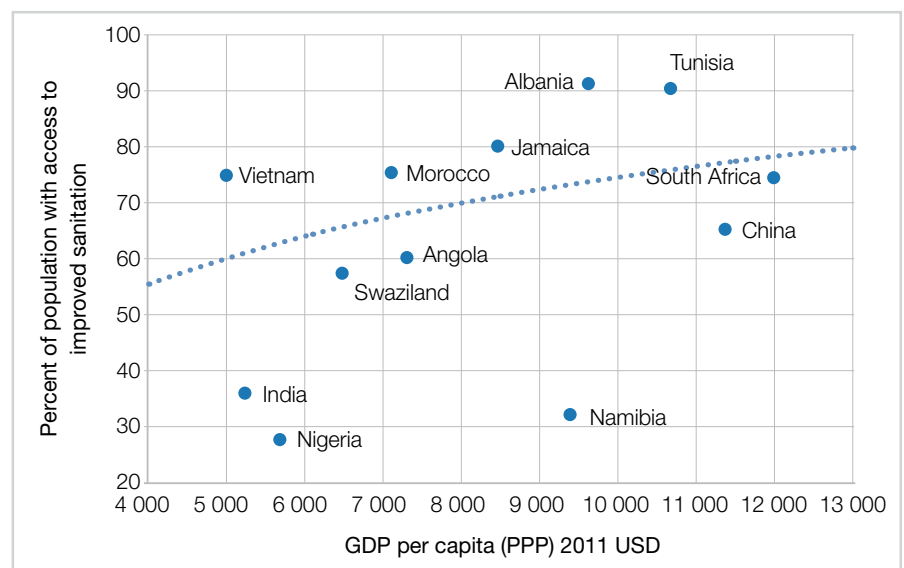| Traditional infrastructure	Sub-index	Value
Electricity	Generation per capita	-0.3021
	Electricity (access)	-0.3862
	Transmission loss	-1.1032
	Elec. share of energy demand	0.9129
Water and sanitation	Water (access)	-0.008
	Sanitation (access)	-1.0312
	Wastewater treated (access)	-0.6181
Transportation	Roads per capita	1.5925
	Roads per land area	-1.1913
	Road access (rural)	-0.1309
	Road paved	-0.9615

Source: IFs v7.15, forecast for 2015. The value is an endogenous IFs calculation.

Namibia also performs poorly on water and sanitation indicators. Only 32% of the Namibian population has access to improved sanitation facilities. Given the GDP per capita, IFs would expect this to be 73% (see Figure 9).

Low levels of access to water and sanitation facilities can influence the spread of communicable diseases. Diarrhoea and other communicable diseases can contribute to malnutrition, as the body is not able to fully utilise the food. Malnutrition can also contribute to the susceptibility of communicable diseases, creating a vicious feedback loop, especially among children (see Figure 10).[54]

Low levels of access to improved sanitation facilities is one reason why malnourishment, undernourishment and stunting rates are high among the Namibian population – 13.2% of children under five are malnourished in Namibia, 37% of the population is undernourished, and 23% of Namibian children are stunted.[55] Given the GDP per capita, IFs would expect only 16.3% of the population to be undernourished (see Figure 11).

Figure 9: Access to improved sanitation facilities versus GDP per capita at purchasing power parity (in 2011 US dollar values)

Source: IFs version 7.15. Sanitation access data from WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation. GDP per capita data from WDI and various other sources aggregated within IFs.

Namibia has a low level of road infrastructure in terms of roads per land area but a high level of road infrastructure in terms of roads per capita. Only 15% of the roads in Namibia are paved, however, a potential contributor to a high road traffic death rate.[56]
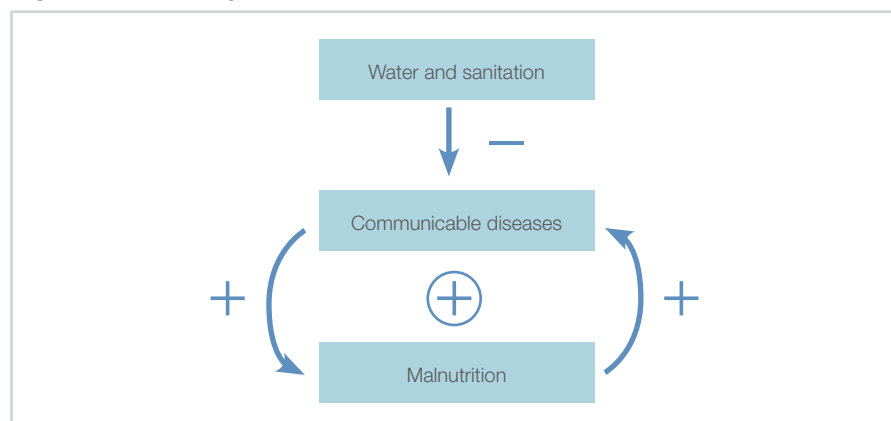
In terms of rural access to roads, Namibia performs poorly given its GDP per capita. The World Bank has created the Rural Access Index to 'focus on the critical role of access and mobility in the reduction of poverty in developing countries.' According to that research, the percent of the Namibian rural population who live within 2 km of an all-weather road was estimated to be 57% in 2001. While this is higher than the average among African countries, given Namibia's GDP per capita, one would expect this to be higher.

Of the four components of MFP, human capital makes the largest positive contribution to economic growth in Namibia (see Figure 8). This is largely due to the above average

ONLY 15% OF THE ROADS IN NAMIBIA ARE PAVED

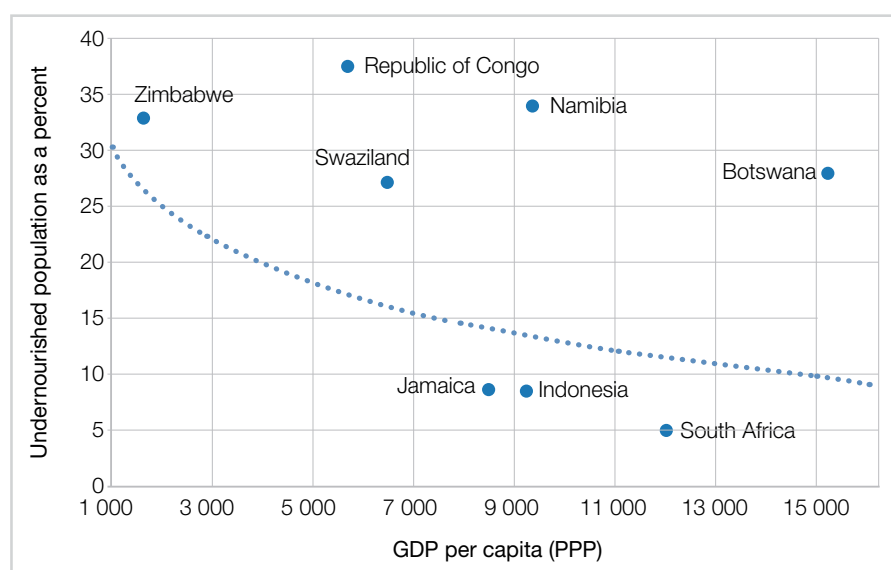## Figure 10: The way access to water and sanitation affects malnutrition

Source: Author's conceptualisation of system dynamics within IFs.

government investment in education. In the 2015/16 budget, 23% of government expenditures went towards education, compared to the world average of 14%.[57] That being said, attained levels of education in Namibia are lower than expected. In 2014, the average Namibian adult has attained 6.17 years of formal education. Given the GDP per capita, IFs expects this to be about eight.

Relatively good performance on health indicators also contributes to Namibia's human capital. The infant mortality rate in Namibia is 33 per 1 000 live births, the lowest of all SADC countries besides Seychelles and Mauritius.[58] Likewise, the life expectancy in Namibia is 64 years, the highest in SADC countries besides Seychelles, Mauritius and Madagascar.[59]

Despite the possible constraints that physical capital places on growth, due to a growing youthful population and the concomitant increase in its labour force, Namibia has an opportunity. Human capital is currently, and could remain, the largest positive

Figure 11: Undernourished people as a percent of total population versus GDP per capita

Source: IFs version 7.15. Undernourished data from World Bank World Development Indicators (WDI), 2011. GDP per capita data from WDI and various other sources, aggregated within IFs, 2013.

contributing factor to the economy. Capitalising on this dividend requires investments in both physical and human capital.

Scenarios

With these constraints and opportunities in mind, this section presents three scenarios to frame the uncertainty regarding development decisions.

Current Path

The Current Path is a future without any substantial changes in the Namibian government's current policy and implementation path. The economy continues to grow, and progress is made in many areas of human development, but many of the targets of Vision 2030 remain out of reach.

In Current Path, the economy grows at an average 5% until 2030, thus already slightly above the historical average. The Namibian economy will, as a result, more than double in market exchange rate and almost double in PPP terms between 2014 and 2030.

At this growth rate, GDP per capita (PPP) increases from 9 300 USD to 13 000 by 2030 with an average growth rate of 2.2%.[60] When comparing GDP per capita between Namibia, Botswana, Lesotho and Swaziland, the Current Path forecast is that per capita income would increase by 142%, 149%, 171% and 121% respectively from 2014 to 2030 (see Figure 12).

> Although the economy continues to grow under the Current Path, many of the targets of Vision 2030 remain out of reach

Under the Current Path scenario Namibia is therefore not on track to meet its general GDP growth target or its target for GDP per capita growth. Growth is, of course, not an end in itself, but a means to the achievement of various developmental targets that are generally captured by the HDI in a composite manner, as discussed elsewhere in this paper.

The infant mortality rate decreases from 33 today to 21.8 by 2030 in Current Path, and the average Namibian born in 2030 can expect to live for 70.3 years.[61] Decades of investment in education translate into a well-educated population, and by 2030 the average adult Namibian will have attained 8.2 years of schooling, compared with just 6.7 today.
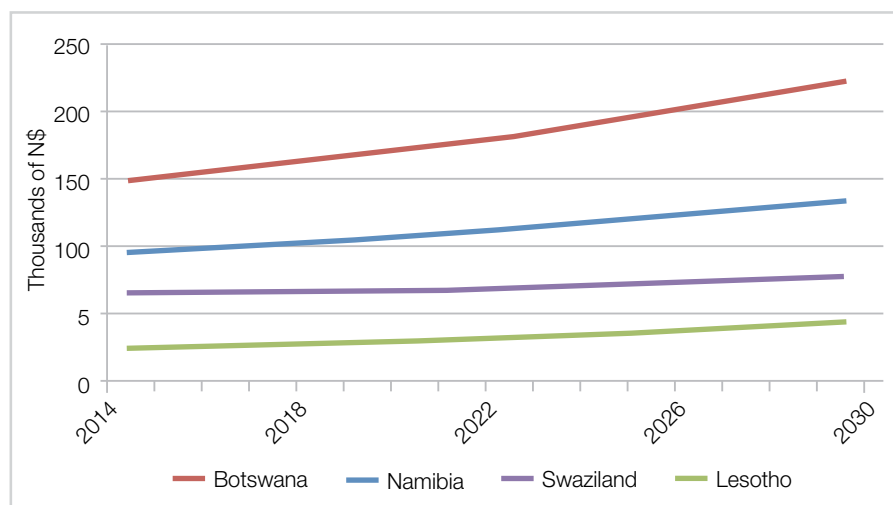
Increasing access to traditional infrastructure services, especially in rural communities, remains a challenge. Nearly 28% of Namibians will still lack access to electricity by 2030, although 96% will have access to clean water. Nearly half the population (48%) will still lack access to improved sanitation facilities by 2030, and only 18% will be connected to wastewater facilities.[62] Further, over a third of the rural Namibian population will still not have access to an all-weather road by 2030.

Lack of access to basic services under Current Path means that physical capital remains the largest constraint to the Namibian economy and a hindrance to progress in human development. In addition to constraining economic growth, low levels of

5%

THE AVERAGE GROWTH OF NAMIBIA'S ECONOMY UNDER THE 'CURRENT PATH' SCENARIO

Figure 12: GDP per capita at purchasing power parity for Namibia, Botswana, Lesotho and Swaziland

Source: IFs v7.15.

access to basic services have health implications. Poor services mean that over 10% of Namibian children and 23% of the total population remain malnourished in 2030 under the Current Path scenario.

Infrastructure Access Scenario

To explore the effects of increasing access to traditional infrastructure services, the Infrastructure Access scenario is a future where the Namibian government invests heavily in traditional infrastructure development and access to basic services. In the associated scenario created in IFs, increased investments are made in access to water, sanitation, electricity and rural roads.

To achieve this, government expenditures on infrastructure as a percentage of GDP must increase from current levels of about 2.3% to 5.4% by 2026 before returning to 2% by 2030. This investment translates into universal access to improved water facilities and 89% access to improved sanitation facilities by 2030.

Figure 13 shows the increase in the portion of the population with access to improved sanitation facilities. Access increases to 89% by 2030 in the Infrastructure Access scenario compared to just 52% in the Current Path. To achieve this, an additional 442 000 sanitation connections will have to be made over the next 15 years.[63]

In this scenario, 91% of the population has access to electricity by 2030, compared to 72% in the Current Path. In addition, 81% of the rural population will live within 2 km of an all-season road by 2030, compared with just 65% in the Current Path.
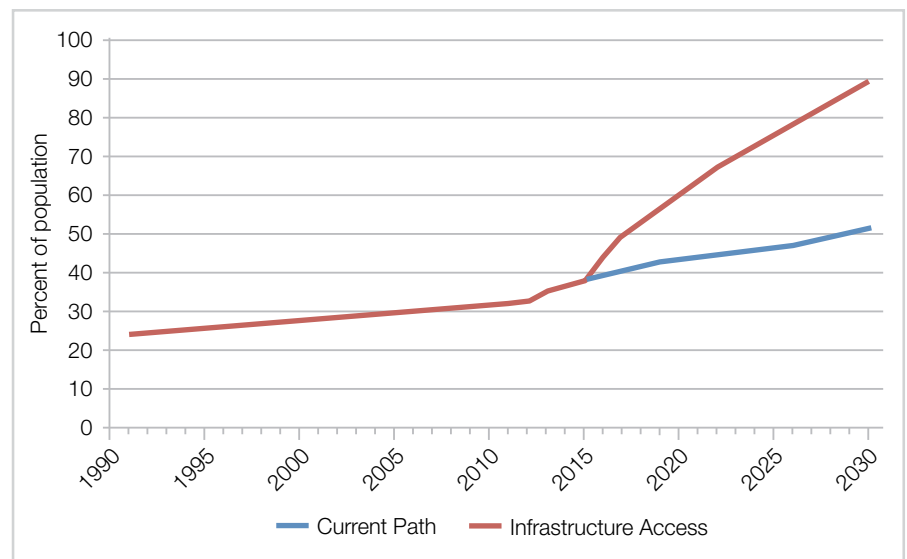
Better access to basic public services also has many health benefits. In the Infrastructure Access scenario, the percentage of children that are malnourished drops from 10.4% in 2030 in the Current Path to 6.8%. This means over 12 000 fewer children will be malnourished in 2030 in this scenario compared to the Current Path.

In addition, the stunting rate drops from 15% in the Current Path in 2030 to 13.9% in the Infrastructure Access scenario. Infant mortality decreases from 21.8 deaths per thousand births to 19.6 by 2030. Access to electricity means that indoor solid fuel use is almost eliminated by 2030, leading to a reduction in the negative effects of indoor smoke inhalation and deadly shack fires, a major problem in informal settlements.

28%

OF NAMIBIANS STILL WON'T HAVE ACCESS TO ELECTRICITY BY 2030 UNDER 'CURRENT PATH'

Figure 13: Percent of the population with access to improved sanitation facilities

Source: IFs v 7.15. Historical data from WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation.

Improvement on health indices has demographic implications as well. Life expectancy is increased from 70.3 to 70.7 in 2030. Reduced infant mortality also leads to a slight reduction in the TFR.

Despite the many benefits of investments in infrastructure, many of the goals of Vision 2030 remain out of reach. Vision 2030 sets a target of reducing infant mortality to below 10 deaths per 1 000 births by 2030 for example. The Infrastructure Access scenario only reduces this to 19.6. The economy grows faster but only achieves an average growth rate of 5.1% over the period 2015 to 2030.

Increasing access to traditional infrastructure has many benefits, but some of the largest challenges facing Namibia remain in this scenario. While increased levels of access to improved sanitation facilities decrease the portion of children that are malnourished, it does little to decrease undernutrition in the adult population. It takes time for healthy children to become healthy adults, and the long-term effects of improved water and sanitation on the health of a population will largely occur after 2030. Additionally, poor access to basic services is only one driver of undernutrition; low levels of calories per capita is another major driver. One possible avenue for future research is the effect of an increase in agricultural production on undernutrition.
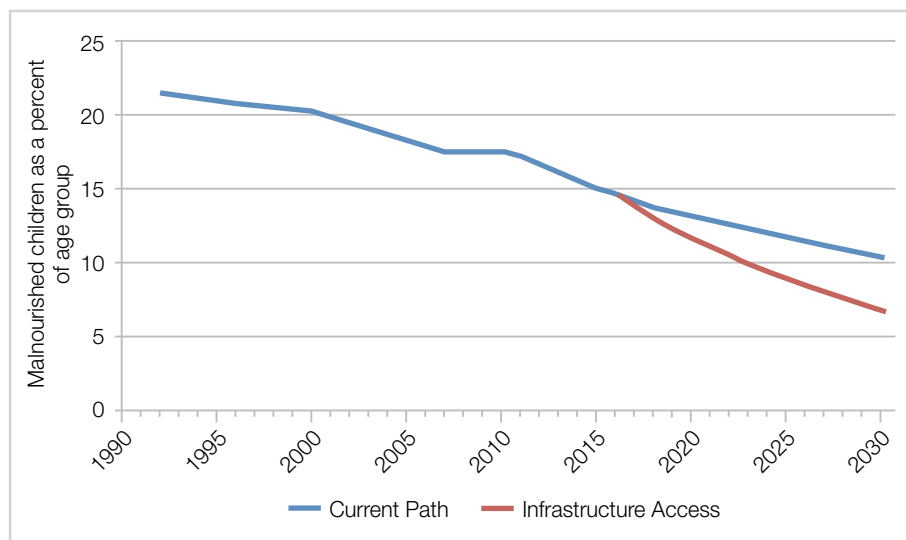
Another reason for the less than spectacular effects of the Infrastructure Access scenario is the trade-offs inherent in increasing government expenditures on infrastructure to 5.4% by 2026; while spending on education, one of the government's key priorities, is reduced.

As stated above, while Namibia's level of attained education is less than one would expect, human capital is the largest positive contributor to MFP, largely due to government expenditures on education (see Figure 8). Over 23% of government expenditures in Namibia will go towards education in 2015/2016. In the Infrastructure Access scenario, IFs reduces this to 21% by 2026 to provide room for the additional spending on infrastructure. Expenditures in other sectors such as military, health and research and development, are all also reduced. The reduction in education spending,

91%

OF NAMIBIANS WILL HAVE ACCESS TO ELECTRICITY BY 2030 ACCORDING TO THE 'INFRASTRUCTURE ACCESS' SCENARIO

Figure 14: Malnourished children as a percent of age group

Source: IFs v 7.15. Historical data from World Bank's World Development Indicators (WDI).

however, has a direct impact on human capital. Instead of being the largest positive contribution to MFP, in the Infrastructure Access scenario, human capital eventually becomes a net negative contribution towards economic growth.

This reduction in spending translates into lower enrolment and graduation rates for all education levels compared to the Current Path. This means Namibia is even further away from achieving its education goals by 2030. Instead of the average years of education for the adult population increasing to 8.2 by 2030, in the Infrastructure Access scenario this is reduced to 8.1. While investments in infrastructure have positive economic, social and health benefits, the reduction in spending on education reduces the positive contribution of human capital.

> The long-term effects of improved water and sanitation on Namibia's population health will largely occur after 2030

Figure 15 shows government expenditures on infrastructure compared to total government expenditures in both the Current Path and the Infrastructure Access scenario. In the Current Path, infrastructure investment remains a small portion of total government expenditures (solid red line). In the Infrastructure Access scenario, infrastructure investment increases to 5.4% by 2026 (dashed red line). This increased investment on infrastructure translates into less investment in all other sectors: military, health, education, research and development and other. Note the decrease in government expenditures on everything except infrastructure in the Current Path (solid blue line) compared to the Infrastructure Access scenario (dashed blue line).

Leave No Namibian Out[64]

To illustrate the effects of investing in infrastructure while not neglecting all other aspects of human development, this paper presents a third scenario, the Leave No Namibian Out scenario. In this scenario, investments in traditional infrastructure such as electricity, water and sanitation and transportation are slightly reduced and
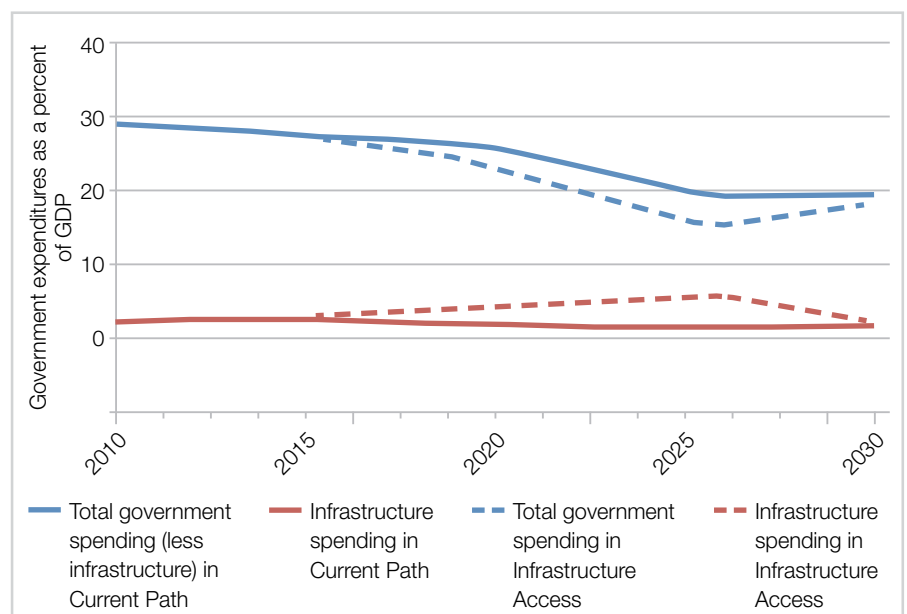
EDUCATION IS ONE OF THE NAMIBIAN GOVERNMENT'S KEY PRIORITIES

accompanied by maintained high investments in education. The result is the combined benefits of improved physical capital with the sustained positive contribution to the economy of human capital.

In addition to maintained high levels of investment on education, Leave No Namibian Out includes two other interventions: a slight increase in government effectiveness and cash transfers to the poorest Namibians. These interventions are meant to partially address some of the deep-seated developmental constraints facing Namibia – poverty and inequality – while also pursuing the ambition of improving Namibia's World Economic Forum competitiveness ranking.

Figure 15: Government expenditures on infrastructure compared with all other spending

Source: IFs v 7.15.

In the Leave No Namibian Out scenario, education spending follows the spending pattern of the Current Path rather than dropping to 5.3% by 2026 in the Infrastructure Access scenario. This means infrastructure spending increases from 2.3% in 2015 to 4.9% in 2026 rather than 5.4% in the Infrastructure Access scenario.
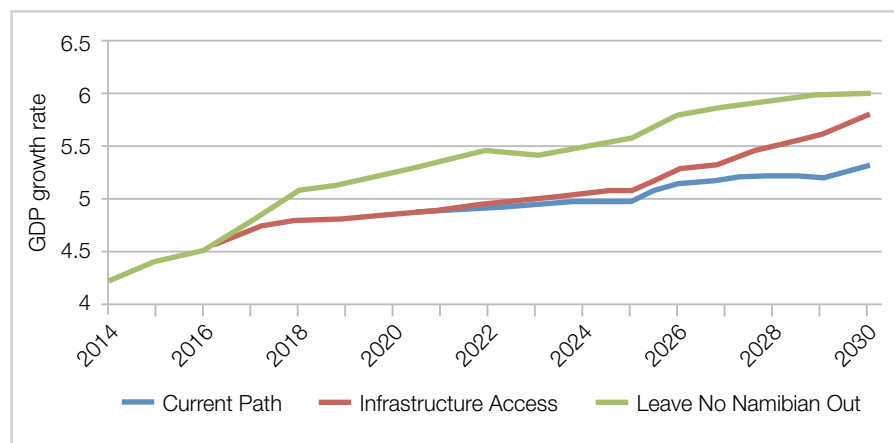
In the Leave No Namibian Out scenario the Namibian economy is 6.7% larger in 2030 than in the Current Path and 5.1% larger than in the Infrastructure Access scenario. GDP per capita (PPP) is 4.8% larger than in the Current Path and 3.7% larger than in the Infrastructure Access scenario.

Average years of education attained by the adult population increases to 8.3 by 2030, compared to 8.2 in the Current Path and 8.1 in Infrastructure Access. Increased levels of attained education drive the fertility rate lower than in the Current Path, to 2.48 by 2030 compared to 2.55 in the Current Path. Increased levels of education also reduce infant mortality to 19 compared to 19.6 in the Infrastructure Access scenario and 21.8 in the Current Path.

Education also drives social variables. Increased levels of attained education improves the strength of democracy and freedom, both economically and in terms of political and civil liberties.[65]

POVERTY AND INEQUALITY REMAIN DEEP-SEATED DEVELOPMENT CONSTRAINTS IN NAMIBIA

Figure 16: GDP growth rates in all three scenarios

Source: IFs v 7.15.

Increased investment in education takes spending away from other sectors, however. Despite the lower relative levels of infrastructure investment in Leave No Namibian Out compared to Infrastructure Access, access rates are still as high as in the Infrastructure Access scenario due to increased government effectiveness. Increased spending on education and infrastructure however, detract from spending on all other sectors such as health, military, and research and development.

Despite the gains made from investments in both infrastructure and education, some of the largest problems facing Namibian development remain in all of these scenarios: poverty, inequality and undernutrition. There is no simple solution to human development, and tackling these problems requires a broad range of interventions and careful political balance between the associated choices.

In all of these scenarios, poverty levels and inequality as measured by the Gini coefficient remains high. The Leave No Namibian Out scenario sees a slight reduction in inequality by 2030, however, due to the provision of social grants to the poorest Namibians.[66]

Conclusion and recommendations

While Namibia has a growing labour force and relatively high levels of human capital, physical capital is the largest constraint on growth and the greatest barrier to achieving Vision 2030. Namibia performs poorly on many development indicators related to infrastructure, especially rural access to traditional infrastructure such as sanitation, electricity and roads. Low levels of access to basic public services have negative human, health and economic effects.

Achieving the infrastructure access targets of Vision 2030 will require large increases in infrastructure investments. In the Infrastructure Access scenario, government investment on infrastructure increases to 5.4% of GDP by 2026, and access to improved water and sanitation facilities, electricity and roads are all increased. There are trade-offs from investing so heavily in infrastructure, however – government expenditures on all other sectors decrease. A relative reduction in education spending will negatively impact long-term human capital in Namibia.

In the Leave No Namibian Out scenario, investments are made in both infrastructure and education, the government is more effective, and some policies, such as social

INCREASED LEVELS OF EDUCATION IMPROVES DEMOCRACY IN THE 'LEAVE NO NAMIBIAN OUT' SCENARIO

grants, are put in place to alleviate deep-seated poverty. Increased investment on infrastructure while maintaining above average levels of spending on education will contribute positively to the economy as well as increase the overall health and development of Namibians. However, in this scenario, spending on other sectors – military, health, and research and development – is reduced significantly relative to the Current Path.

Many of the targets from Vision 2030 are not met in any of these scenarios. Economic growth never reaches 6.2%, nor does GDP per capita growth reach 4.4%. Infant mortality does not decrease to 10 per 1 000 live births by 2030 in any of the scenarios. Extreme poverty is not eradicated in Namibia by 2030 in any of these scenarios.[67] Even in the Leave No Namibian Out scenario, 9.3% of the Namibian population lives in extreme poverty in 2030. Likewise, in all of these scenarios inequality remains high.

There is no simple solution to the structural challenges facing Namibian development

There is no simple solution in addressing the structural challenges facing Namibian development. Development sectors are integrated, and efforts made towards one target can conflict with efforts made towards another target. While access to basic services is a challenge that needs to be addressed, pursuing it so blindly could reduce spending on other sectors and make education targets harder to achieve. Maintaining high levels of education spending while pursuing infrastructure access will increase both human and physical capital and contribute to overall human development. Yet the structural problem of inequality remains.

Avenues of future possible research

• Poverty and inequality remain intractable problems in all these scenarios. More research and analysis could consider alternative interventions to alleviate deep-seated poverty.[68]

• All of these scenarios assume no policy interventions on the revenue base. More research could examine ways of raising revenue through taxes to mitigate the trade-offs inherent in long-term development decisions.

• While higher level of access to improved water and sanitation facilities have positive health implications and can lead to a reduction in malnutrition among children, future research could explore alternative ways of decreasing undernutrition among the adult population through agricultural initiatives.

Table 3: Infrastructure Access scenario

Parameter interventions used to create IFs scenarios:

Parameter name	Description	Intervention
sanitnoconseter	Sanitation, no connection, standard error target	Decrease to -0.5 from 2016 to 2030
watsafenoconsetar	Safe water, no connection, standard error target	Decrease to -0.5 from 2016 to 2030
Infraelecaccsetar	Electricity access standard error target	Increase to 0.5 from 2016 to 2030
Infraroadraisetar	Rural road access standard error target	Increase to 0.5 from 2016 to 2030
Ensolfuelsetar	Solid fuel use standard error target	Decrease to -0.5 from 2016 to 2030

Table 4: Leave No Namibian Out scenario

This scenario contains all of the intervention in Infrastructure Access with the following additions:

Parameter name	Description	Intervention
Edpriintngr	Education, primary, net intake rate, annual growth rate (total) – percent	Increase to 2.2 from 2017 to 2031
Edprisurgr	Education, primary, survival rate, annual growth rate (Total) –Percent	Increase to 1.2 from 2017 to 2030
	Electricity access standard error target	Increase to 0.5 from 2016 to 2030
Edseclowrtrangr	Education, lower secondary, general, transition rate, annual growth (Total) – Percent	Increase to 1 from 2017 to 2030
Edsecupprtrangr	Education, upper secondary, general, transition rate, annual growth (Total) – Percent	Increase to 0.5 from 2017 to 2030
Edsecupprsurvgr	Education, upper secondary, general, survival rate, annual growth (Total) – Percent	Increase to 0.3 from 2017 to 2030
Edprigndreqintm	Education primary, gender parity time for intake – Years	Increase to 10 from 2017 to 2030
Edprigndreqsur	Education primary, gender parity time for survival – Years	Increase to 10 from 2017 to 2030
Edseclowrgndreqsurv	Education lower sec, gender parity time goal for survival – Years	Increase to 13 from 2017 to 2030
Edseclowrgndreqtran	Education lower sec, gender parity time for transition – Years	Increase to 13 from 2017 to 2030
Edsecupprgndreqsurv	Education upper sec, gender parity time goal for survival – Years	Increase to 20 from 2017 to 2030
Edsecupprgndreqtran	Education upper sec, gender parity time for transition – Years	Increase to 20 from 2017 to 2030
Edseclowrsurvgr	Education, lower secondary, general, survival rate, annual growth (Total) – percent	Increase to 0.8 from 2017 to 2030
Govhhtrnwelm	Government to household welfare transfers (unskilled)	Increase to 1.5 from 2017 to 2021 then remain at 1.5
Gdsm	Government expenditures by destination multiplier (education)	Increase to 1.5 from 2016 to 2025 then decrease to 1 from 2025 to 2030
Goveffectm	Government effectiveness (quality) multiplier	Increase to 1.15 from 2016 to 2030

Notes

1   Office of the President, National Planning Commission, Fourth National Development Plan (NDP4) 2012/12 – 2016/17 < http://www.npc.gov.na/?page_id=202>

2   See the Pardee Center's website, www.pardee.du.edu.

3   The International Futures system consists of 11 main modules: population, economics, energy, agriculture, infrastructure, health, education, socio-political, international political, technology and the environment. Each module is tightly connected with the other modules, creating dynamic relationships among variables across the entire system.

4   The 2015 Ibrahim Index of African Governance is composed of results for the 2014 year. See www. moibrahimfoundation.org/data-portal.

5   Former Namibian president Hifikepunye Pohamba won the 2014 Ibrahim Prize for Achievement in African Leadership in recognition of his efforts to improve the livelihoods and welfare of Namibians as well as respecting Namibia's constitutional requirements related to term limits.

6   Afrobarometer, www.afrobarometer.org/online-data-analysis/analyse-online, accessed 2 October 2015.

7   According to the latest United Nations Human Development Report, the Gini coefficient in Namibia in 2013 was 63.9. United Nations Development Programme, Human Development Report. < http://hdr. undp.org/en/content/income-gini-coefficient>. According to the Namibia Statistics Agency's National Household Income and Expenditure Survey (NHIES), Gini has come down from 0.70 in 1993/1994 to 0.63 in 2003/2004 and then to 0.58 in the 2009/2010 NHIES.

8   The World Bank, World Development Indicators: Distribution of Income or Consumption, http://wdi. worldbank.org/table/2.9, accessed 24 September 2015.

9   Unless indicated otherwise, data is from the International Futures forecasting system version 7.15. During October 2015 the World Bank is expected to release a new poverty line in 2011 prices, expectedly around US$1.90.

10   World Bank, Arable land (% of land area), available at http://data.worldbank.org/indicator/AG.LND. ARBL.ZS, accessed 24 September 2015.

11   See www.hdr.undp.org/en/content/human-development-index-hdi. Data on the HDI is available at www.hdr.undp.org/en/data, accessed 27 September 2015.

12   Inequality-adjusted Human Development Index (IHDI), www.hdr.undp.org/en/content/inequality-adjusted-human-development-index-ihdi, accessed 27 September 2015.

13   The World Bank, *Namibia Overview,* www.worldbank.org/en/country/namibia/overview, updated 23 September 2015, accessed 24 September 2015.

14   National Planning Commission Act of 1994, repealed and replaced by the National Planning Act No 2 of 2013.

15   National Planning Department, *Namibia Poverty Mapping,* Windhoek, no date, www.npc.gov.na, accessed 24 September 2015, 9.

16   Ibid.

17   Namibia Statistics Agency, Namibia 2011 Population and Housing Census Main Report, 42.

18   United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2015 Revision,* http://esa.un.org/unpd/wpp/DataQuery, accessed 25 September 2015.

19   United Nations, Department of Economic and Social Affairs, Population Division, *World Urbanization Prospects: The 2014 Revision,* http://esa.un.org/unpd/wup, accessed 29 September 2015.

20 United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2015 Revision,* http://esa.un.org/unpd/wpp/DataQuery, accessed 25 September 2015.

21 The International Futures forecast begins in 2010, so the 2011 data is actually a forecast. The crude death rate of 7.5 matches well with the UNPD data but actually comes from the World Bank's World Development Indicators.

22 The 2015 revision to the UN's World Population Prospects report uses the 2011 Namibian census in its data estimates.

23 Namibia Population Projections, 2014, www.cms.my.na/assets/documents/ p19dn4fhgp14t5ns24g4p6r1c401.pdf.

24 Ibid.

25 International Futures uses the United Nations Development Programme medium-fertility variant to initialise its forecast.

26 For detailed information on fertility forecasts in International Futures, see www.du.edu/ifs/help/ understand/demography/equations/fertility.html.

27 Namibia Population Projections, 2014, www.cms.my.na/assets/documents/ p19dn4fhgp14t5ns24g4p6r1c401.pdf.

28 Namibia Statistics Agency, 2011 census, 42.

29 2015 Revision to the World Population Prospects.

30 World Bank, World DataBank, World Development Indicators, http://databank.worldbank.org/data/ reports.aspx?source=2&type=metadata&series=SP.DYN.LE00.IN. The UN population prospects derives its Namibian life expectancy data from 'estimates of infant and child mortality by assuming that the age pattern of mortality conforms to the west model of the Coale-Demeny Model Life Tables. Official estimates from statistics Namibia were also considered. The demographic impact of AIDS has been factored into the mortality estimates.' http://esa.un.org/wpp/sources/country.aspx. For more information on the United Nations methodology see, *United Nations Human Development Reports: Namibia,* www.hdr.undp.org/en/countries/profiles/NAM, and *Human Development Report 2014 Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience: Namibia,* www.hdr. undp.org/sites/all/themes/hdr_theme/country-notes/NAM.pdf.

31 The Frederick S. Pardee Center for International Futures explains the Base Case in International Futures as a representation of 'a continuation of our current development path; it's a picture of where the world seems to be going if nothing drastic happens—no major policy changes, no significant unforeseen disasters, no technological game changers. It plausibly describes how the world would develop if the same general trends and policy choices observed since the end of the Cold War continued without interruption.' See more at: www.pardee.du.edu/news/what-base-case-forecast#sthash.WD47LGcs.dpuf.

32 Vision 2030, 63, www.gov.na/vision-2030. Does not specify whether GDP per capita is to be calculated using a market exchange rate or purchasing power parity. Nor does it specify whether the target is meant to be calculated using a compound annual growth rate or an arithmetic average annual growth rate.

33 Using an arithmetic average annual growth rate. In 2013 Namibia achieved a 5.1% growth rate and in 2014 a slightly less robust 4.5% growth rate, well below the NDP4 target of 6.4% for that year, www. tradingeconomics.com/namibia/gdp-growth-annual, accessed 26 September 2015

34 This is Desired Outcome 1 (DO1) in the latest National Development Plan, NDP4.

35 World Economic Forum, *Global Competitiveness Report 2015-2016,* 4, www.weforum.org/reports/ global-competitiveness-report-2015-20156, accessed 2 October 2015.

36 The other pillars are institutions, infrastructure, macroeconomic environment, health and primary education, business sophistication and innovation.

37 World Economic Forum, *Global Competitiveness Report 2015-2016,* www.weforum.org/reports/ global-competitiveness-report-2015-2016, accessed 20 September 2015, 13. See Office of the President, National Planning Commission 2014/2015 Annual Report, 60-62.

38 Vision 2030, People's quality of life, 45, www.gov.na/documents/10181/12976/Chapter_4.pdf/ d9a834c8-a220-4b53-aaa1-113dd9eba2f1

39 World Health Organization, *Water-related diseases,* www.who.int/water_sanitation_health/diseases/ malnutrition/en/.

40 The 'replacement rate' or the fertility rate that corresponds to a population growth rate of zero is generally considered to be 2.1.

41 Desired Outcome 4 (DO4) of the latest National Development Plan, NDP4, 61.

42 All 2011 values. Namibian dollar was converted at an average 2011 exchange rate of 7.25128 to the United States dollar, www.oanda.com/currency/average. National Planning Department, *Namibia Poverty Mapping,* no date, 10, www.npc.gov.na/, accessed 24 September 2015.

43 Namibia Poverty Mapping, Republic of Namibia National Planning Commission, npc.goz.na <http://npc.goz.na>, accessed 24 September 2015.

44 The report combines two sources of data: the Namibia Household Income and Expenditure Survey (NHIES) and the Namibia Population and Housing Census. The estimation process is also based on the generalised assumption that characteristics of poor individuals or households in the sample survey (NHIES) define the poor individuals and/or households in the entire population. National Planning Department, *Namibia Poverty Mapping,* no date, www.npc.gov.na/, accessed 24 September 2015, 10-13.

45 Ibid.

46 United Nations Statistics Division, Millennium Development Goals Indicators, http://mdgs.un.org/unsd/mdg/Metadata.aspx?IndicatorId=0&SeriesId=580, accessed 27 September 2015.

47 Using a log-normal formulation to calculate poverty levels, N$18.18 per day is the Namibian poor poverty line.

48 The World Bank will shortly announce its new poverty line in 2011 prices. If this is, as expected, set at US$1.92 then 12% of Namibians will still be classified as extremely poor by 2030 in the Current Path scenario.

49 United Nations Children's Fund and World Health Organization, *Progress on Sanitation and Drinking Water: 2015 update and MDG assessment,* www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf, accessed 27 September 2015.

50 United Nations Children's Fund and World Health Organization, *Progress on Sanitation and Drinking Water: 2015 update and MDG assessment,* 68, www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf, accessed 27 September 2015.

51 The African Futures Project (AFP) has been working on the water sub-module of the International Futures forecasting system and in September 2014 published a research paper on long-term water scarcity in South Africa. The AFP continues to research and model water scarcity, and an update to that paper will be published in early 2016. S Hedden and J Cilliers, *Parched Prospects: South Africa's emerging water crisis,* African Futures Paper 11, September 2014, www.issafrica.org/publications/papers/parched-prospects-the-emerging-water-crisis-in-south-africa

52 For a detailed description of the production function in International Futures see www.du.edu/ifs/help/understand/economics/equations/gsmarket/productionbasic.html

53 World DataBank, World Development Indicators, http://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS, accessed 27 September 2015.

54 For more information of the relationships between water and sanitation, communicable diseases and malnutrition, see the World Health Organization, www.who.int/water_sanitation_health/diseases/malnutrition/en/

55 All data from World Bank World Development Indicators, 2013 data (most recent available). Stunting refers to children whose height for their age is more than two standard deviations away from the median for the international reference population. Malnourishment refers to children whose weight is more than two standard deviations below the median for the international reference population. Undernourishment refers to when food intake is insufficient to meet dietary energy requirements continuously.

56 The World Health Organization estimated in 2010 that the road traffic death rate in Namibia is 25 per 1 000 people, the 20th highest in the world, www.who.int/gho/road_safety/mortality/traffic_deaths_rates/en/, accessed 27 September 2015.

57 The world average is for 2011. World Bank, World Development Indicators, http://data.worldbank.org/indicator/SE.XPD.TOTL.GB.ZS

58 World Development Indicators, http://data.worldbank.org/indicator/SP.DYN.IMRT.IN, accessed 27 September 2015, and International Futures, http://ifs.du.edu, accessed 27 September 2015. Both Seychelles and Mauritius have infant mortality rates of 12 per 1 000 live births.

59 International Futures version 7.15 using data from the World Bank's World Development Indicators. Life expectancy in Seychelles and Mauritius is 74 years and 65 years in Madagascar. Life expectancy data for 2013 is the latest available from the World Development Indicators, http://data.worldbank.org/indicator/SP.DYN.LE00.IN, accessed 27 September 2015.

60 GDP growth rate and GDP per capita growth rate calculated using an arithmetic annual average.

61 66.8 years for men and 73.8 years for women.

62 International Futures uses the World Health Organization's Joint Monitoring Programme (JMP) for Water Supply and Sanitation (WSS) framework to forecast a sanitation ladder of levels of access: 'Unimproved sanitation access refers to facilities that do not ensure hygienic separation of human

excreta from human contact. This includes open defecation, pit latrines without slab or platform, hanging latrines, bucket latrines or shared facilities.' For a full description of the sanitation ladder, see the World Health Organization/United Nations Children's Fund JMP for WSS, www.wssinfo.org/definitions-methods/watsan-ladder/. For a full description of how International Futures forecasts water access, see the International Futures help system, www.du.edu/ifs/help.

63   International Futures estimates that, under assumptions of average household size, there are currently 182 000 sanitation connections in Namibia. To reach a 89% access level by 2030, there will need to be 624 000 connections.

64   This name comes from the phrase used by President Hage G Geingob in his 21 April 2015 state of the nation address.

65   Democracy is forecast in International Futures using the Polity IV scores, and freedom is taken from Freedom House.

66   Gini forecasts in International Futures are in early versions and are still rather crude, www.du.edu/ifs/help/understand/sociopolitical/equations/income.html, accessed 27 September 2015.

67   This is not an explicit target in Vision 2030, though it is a Sustainable Development Goal.

68   See S Turner, J Cilliers and B Hughes, *Reasonable Goals for Reducing Poverty in Africa,* www.issafrica.org/futures/papers/reasonable-goals-for-reducing-poverty-in-africa-targets-for-the-post-mdgs-and-agenda-2063, accessed 27 September 2015.

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The Institute for Security Studies is an African organisation that aims to enhance human security on the continent. It does independent and authoritative research, provides expert policy analysis and advice, and delivers practical training and technical assistance.

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