

Angolan futures 2050

Beyond oil

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Quality education and a good standard of living remain out of reach for most Angolans, despite decades of rapid economic growth. The oil price-induced economic downturn beginning in 2014 exacerbated already high levels of severe poverty, particularly in the rural provinces. This report explores the impacts of different developmental agendas on Angola's growth trajectory. It reveals that improved water and sanitation infrastructure offer the best way to improve livelihoods and grow the economy over the long term.

Key findings

- ▶ Angola has one of the youngest and fastest-growing populations in the world, slowing down potential income growth.
- ▶ Nearly one-third of Angolan adults have not received any education and 70% of those in this category are women.
- ▶ Without immediate action, the number of Angolans living in poverty will continue to grow from the current estimate of 22 million for at least another decade.
- ▶ Improving the rate of access to safe water from the current estimate of 60% to 70% and the rate of access to improved sanitation from 40% to 75% by 2035 would reduce the number of children who suffer from malnourishment by one-third by 2035.
- ▶ Angola's high childhood malnutrition and maternal mortality rates can only be improved by rehabilitating and building water and sanitation infrastructure.
- ▶ Modestly increasing government cash transfers to communities in poverty would immediately reduce poverty and undernourishment.

Recommendations

- ▶ The Ministries of Health and of Construction and Public Works should provide clean water and sanitation facilities to all Angolans to reduce the country's high rates of malnutrition, maternal and infant mortality and diarrhoea-related deaths.
- ▶ The government should redirect some of its military spending towards infrastructure, education and health.
- ▶ The Ministry of Social Action, Family and the Promotion of Women, provincial and municipal governments and civil society organisations should foster broad-based support for girls' and women's right to healthcare – including reproductive healthcare – and education.
- ▶ The government needs to follow through with its commitment to diversifying the economy or risk another economic contraction when oil reserves run dry, possibly as early as 2030.
- ▶ To diversify the economy, the government needs to provide electricity for more Angolans and align itself with the global agenda to combat climate change, while the Ministry of Energy and Water, specifically the National Directorate of Electricity, must invest in Angola's vast renewable energy potential.
- ▶ The Ministry of Education, provincial and municipal governments and civil society should focus their attention first on improving lower-secondary education participation rates, then upper-secondary participation rates, vocational and tertiary participation rates.
- ▶ The government should implement recommendations from the International Monetary Fund to cut subsidies on jet fuel, diesel and other commodities while increasing cash transfers to the poor.
- ▶ To sustainably make Angola more food secure and improve rural livelihoods, the Ministries of Agriculture and Forestry, of Construction and Public Works and of Energy and Water should prioritise the expansion of cropland under irrigation.

Introduction

Until recently one of the fastest growing economies in Africa, Angola has long committed to diversifying its economy to achieve and sustain growth beyond oil. But the legacies of Angola's 27-year civil conflict, political turmoil from 2002 to 2008 and, more recently, poor economic growth following the collapse of oil prices in 2014 have hindered progress.

Despite substantial improvements since the end of the civil war in 2002, Angola's human development outcomes are low, even compared to the rest of Africa. On the United Nations Development Programme's Human Development Index,¹ Angola ranks 147th of 189 countries, suggesting that a long, healthy life, quality education and good standard of living are out of reach for most Angolans.² One out of three people in Angola experiences multidimensional poverty – a phenomenon largely driven by struggling education and health systems that most families cannot afford to participate in.

While Angola's rapid urbanisation rates and natural resources bode well for medium- and long-term economic prospects, the next several years are more uncertain. Crude oil prices have partially recovered since 2014, but the Angolan economy remains extremely vulnerable to the volatility of the oil market.

How will the unfolding trends, challenges and opportunities of the present bear upon Angola's future development? Its vast natural resources, ranging from large tracts of fertile land to immense hydropower

potential, can help Angola become a stable economy and a peaceful, inclusive society. But for these resources to translate into sustainable growth, the government must commit to prioritising human development – a departure from the economic mismanagement of decades past.

Purpose and scope

This report offers an integrated assessment of how Angola may develop to 2050 across a range of sectors including economics, energy, demographics, agriculture and health. It first examines an integrated forecast on Angola's long-term future. Termed the 'Current Path', this scenario represents a continuation of current domestic and international policy conditions. The Current Path is a dynamic scenario that moves beyond a linear extrapolation of historical dynamics and reflects unfolding phenomena, including climate change, stocks of water, fossil fuels and other natural resources as well as global demographic trends.

The report then presents five sectoral scenarios for Angola that illustrate the impact of ambitious but realistic policies to advance education and women's empowerment; water and sanitation infrastructure; agriculture; governance; and energy with a time horizon to 2050. These scenarios are complementary and the eventual choices on Angola's future development pathway will necessarily reflect a combination of certain dimensions of each scenario.

We use the International Futures (IFs) modelling platform (Box 1). IFs is a publicly available and open source tool that helps researchers and policymakers think

Box 1: The International Futures model and the Current Path scenario

IFs is an integrated assessment model that projects hundreds of variables across human, social and natural systems for 186 countries to the year 2100. It blends different modelling techniques to form a series of algorithms that endogenise relationships across key systems including demographics, health, agriculture, education, economics, infrastructure, energy and governance, amongst others. IFs uses historical data from 1960 (where available) to identify trends and produce a Current Path scenario from 2015 (the current base year). The Current Path is a dynamic scenario that represents a continuation of current policy choices and technological advancements and that assumes no major shocks or catastrophes. However, it moves beyond a linear extrapolation of past and current trends by leveraging our available knowledge about how systems interact to produce a dynamic forecast.

IFs is developed and maintained at the Frederick S Pardee Center for International Futures at the Josef Korbel School for International Studies, University of Denver. The IFs model and all supporting documentation and guidelines, including the basic assumptions of the model, are free, open source and available for download at www.ifs.du.edu.

strategically about and plan for the future. Critically examining how current and emerging trends may interact to shape the country's future is a necessary element of long-term planning.

Looking to the future must be a key component of President João Lourenço's broad agenda to shift Angola's future onto a sustainable pathway. At present, the Angolan government subscribes to multiple sectoral and medium-term development strategies and is developing 'Angola 2050' to guide the nation's developmental agenda.

Angola 2050 will update the Long-Term Strategy 2025 (ELP 2025), which comprises successive five-year plans. The most recent of these, the Plano de Desenvolvimento Nacional 2018-2022, or National Development Plan 2018-2022, focuses the government's attention on six priorities: human development and well-being; sustainable and inclusive economic development; basic infrastructure; peacebuilding, rule of law and democracy, good governance and decentralisation; harmonious development of territory; and international relations.³

Angola could overtake Morocco to become the third largest lower-middle-income African economy

But the oil shocks of 2008 and 2014 have rendered many of the ELP 2025 targets unattainable, and a government press release has admitted to the use of incomplete population data and problematic interpolation methods.⁴ This report was therefore developed to support the government's long-term planning efforts and complements the demographic and social projections provided by Angola's National Statistics Institute by providing integrated forecasts across multiple sectors.

There are constraints to using modelling platforms like IFs. Models are generally unable to foresee breakthrough technology, natural disasters and other wild cards. National-level data also inevitably gloss over differences between and within provinces, cities and communities. For example, Angola's national poverty rate of roughly 50% fails to capture the prevalence of poverty in the country's rural areas, where nine out of 10 people are poor.⁵ And while data on the Angolan economy are abundant and largely reliable, the same generally cannot

be said for measures of poverty and other indicators of human well-being, including education, the availability of basic services such as water and sanitation and agricultural productivity.

Note that all US\$ amounts are in 2019 dollars unless otherwise noted.⁶ Energy data are represented in million or billion barrels of oil equivalent (MBOE or BBOE).⁷ Finally, unless indicated otherwise, the term 'current' reflects the 2020 forecast taken from IFs.

Economic perspective

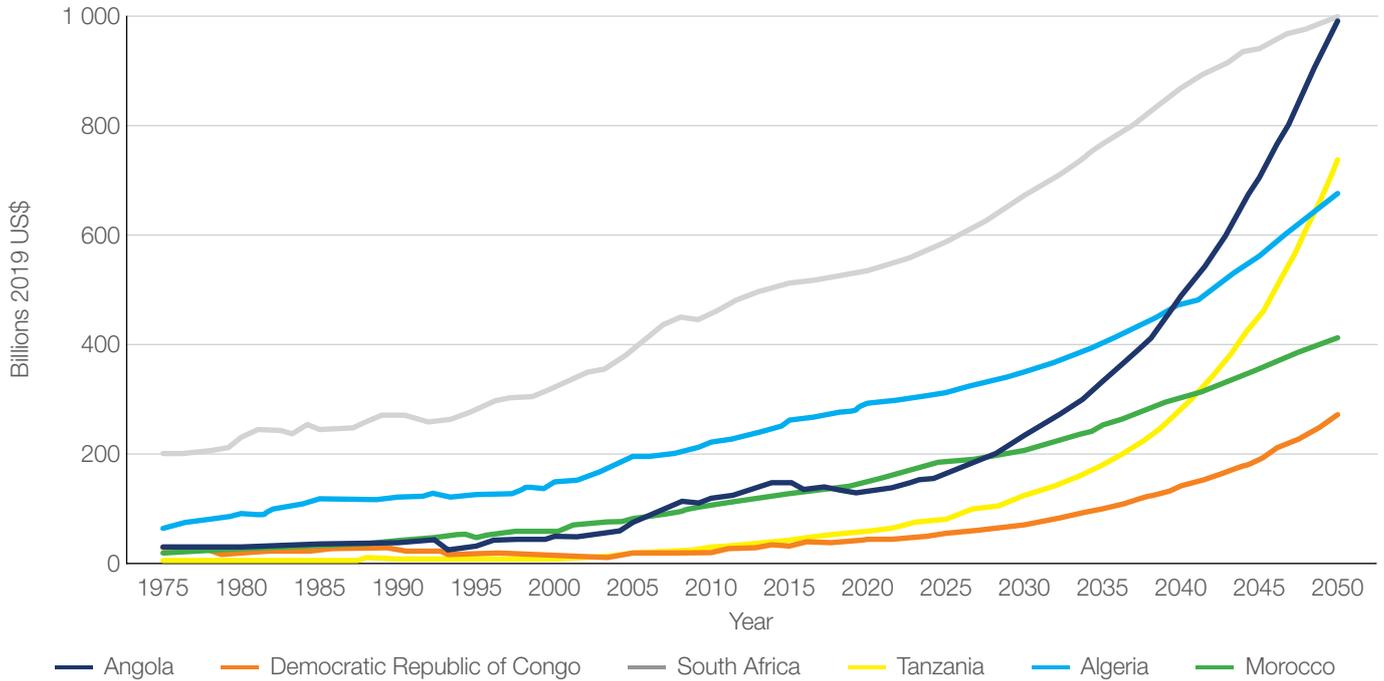
With an estimated gross domestic product (GDP) of nearly US\$140 billion in market exchange rates, Angola is the sixth largest economy in Africa, the fourth largest among lower-middle-income Africa and second only to South Africa in the Southern African Development Community (SADC). But the heft of the Angolan economy obscures its vulnerability to the volatile global oil market, which has wreaked havoc on its economy since the advent of large-scale shale oil production in the United States. In fact, the Angolan economy has recorded negative growth since 2016.⁸

Short-term economic forecasts are dismal: the Economist Intelligence Unit, for example, projects another year of recession, although it expects three years of growth to follow, based on the assumption that oil sector reform will attract investment in exploration.⁹ In October 2019, the International Monetary Fund (IMF) released its projected GDP growth rates for Angola at -0.3% in 2019, 1.2% in 2020 and 3.8% in 2024.¹⁰ Angola is also deeply indebted with a debt-to-GDP ratio of 91%, half of which is owed to China and guaranteed by oil. Managing debt will be paramount for Angola's long-term economic recovery.¹¹

Conversely, medium- to long-term economic prospects are optimistic, reflecting rapid future population growth and further urbanisation on top of an already large urban population – phenomena that tend to generate increased economic output and are closely linked to economic growth within IFs. On the Current Path, GDP will grow at a considerable average rate of 4.6% per annum between 2020 and 2030, by which year Angola's economy will have grown to US\$238 billion (Figure 1).

Angola is expected to overtake Morocco in the late 2020s to become the third largest lower-middle-income African economy. Around 2040, Angola is projected to overtake

Figure 1: GDP, four largest SADC economies plus Morocco and Algeria



Source: IFs version 7.45; initialising from IMF World Economic Outlook 2017 data

Algeria in economic size. By 2050, Angola’s economy is expected to have increased to over US\$994 billion – a nearly sevenfold increase from 2020 – making it the fourth largest economy in Africa behind Nigeria, Egypt and South Africa.

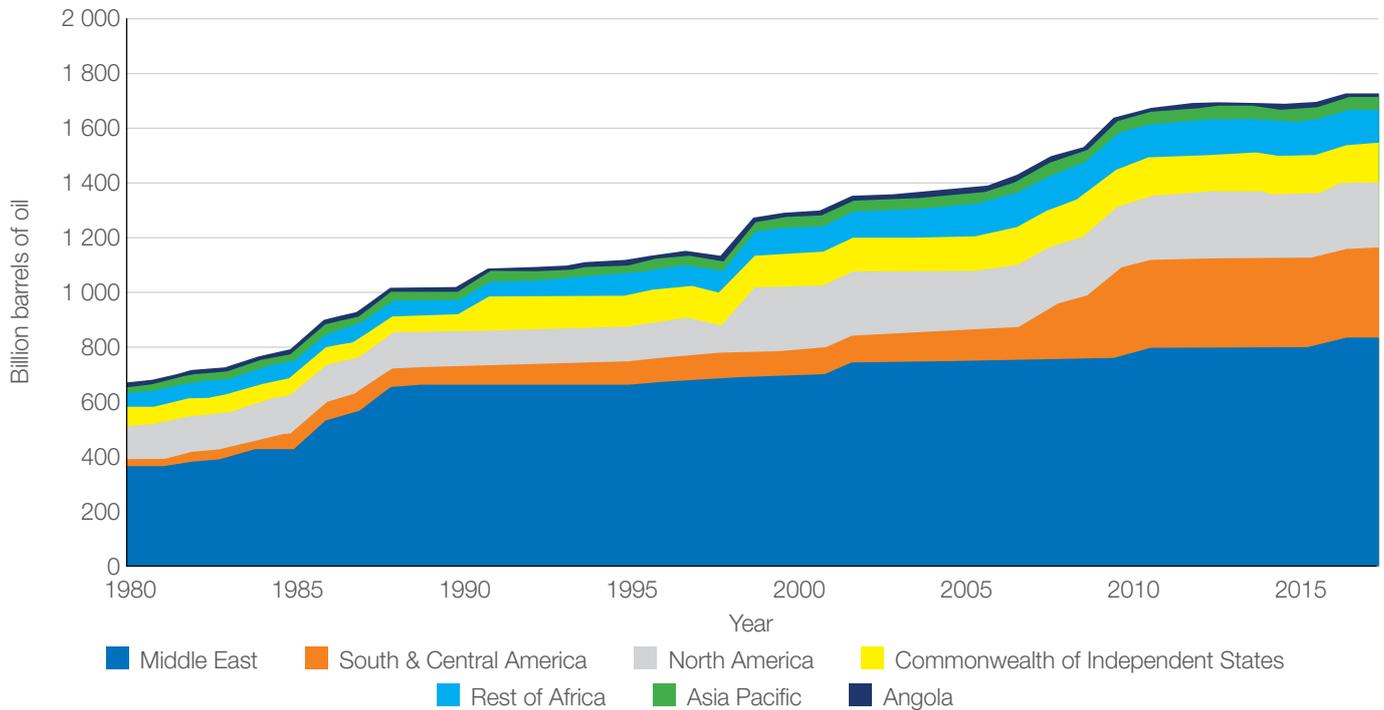
But Angola’s heavy reliance on crude oil exports does not bode well for the future. The 1.57 million barrels of oil per day that Angola sent abroad in 2017 accounted for more than 95% of export earnings, while diamonds contributed most of the remaining 5%.¹² Most of this oil is exported to China (Angola is the third largest crude oil supplier to China), India, the United States, South Africa and Spain.¹³ The sector contributed, on average, 21% of GDP¹⁴ and more than 65% of government revenues from 2012 to 2018.¹⁵

Although there have been recent investments in oil and gas exploration, Angola’s proven oil reserves are expected to run out by the early 2030s. If new reserves are discovered, whether they will be financially viable in an era of relative oil abundance is far from certain. And although unlikely, Angola may even lose the income from its most lucrative oil fields off Cabinda should the Democratic Republic of Congo (DRC) pursue its territorial claims in accordance with the provisions contained in the United Nations Convention on the Law of the Sea.¹⁶

By the end of 2018, Angola’s 8.4 billion barrels of proven oil reserves accounted for 6.7% of Africa’s proven reserves and 0.5% of global proven reserves (Figure 2).¹⁷ Oil production (including crude oil, condensates and natural gas liquids), three-quarters of which comes from offshore fields,¹⁸ has increased a mere 0.1% annually since 2007, from 1.66 million barrels per day (b/d) to 1.68 million b/d in 2018.¹⁹ Crude oil production alone is estimated at 1.37 million b/d, which is below capacity, owing to limited investment in oil field exploration until recently.²⁰ In 2019, crude oil exports declined from 2018 by 10.8%.²¹

Oil production is expected to decline further in 2020 due to the depletion of some wells and recent years of low investment in exploration, casting doubt on the government’s goal of increasing daily crude oil production to above 1.49 million b/d by 2022.²² However, several new oil projects are expected to come online by 2022 that could maintain or even slightly increase production.²³ Because Angola is producing below its 1.67 million b/d cap, the Organization of Petroleum Exporting Countries (OPEC) might lower its cap on Angola to 1.48 million b/d to help prop up oil prices.²⁴

Figure 2: Proven oil reserves, Angola and world regions



Source: British Petroleum Statistical Review of World Energy 2019 – all data, 1965-2018 [dataset]

In spite of its oil resources, Angola relies heavily on imported fuel, largely due to a lack of refineries.²⁵ But natural gas production has grown dramatically in recent years, from 337 billion cubic feet (BCF) (equivalent to 56.3 MBOE, or million barrels of oil equivalent) in 2007 to 413 BCF (69 MBOE) in 2016.²⁶ And Angola boasts vast reserves: in early 2018, Angola had 10.9 trillion cubic feet (1.82 BBOE, or billion barrels of oil equivalent) of proven natural gas reserves,²⁷ accounting for 2% of Africa’s proven reserves and 0.2% of global proven reserves.²⁸ In a reflection of the government’s intention to transition to a gas economy, Angola joined the Gas Exporting Countries Forum (GECF) as an observing member in November 2018.

The government set the goal of reaching daily production of LNG of no fewer than 98 000 barrels of oil equivalent by 2022, equating to nearly 36 MBOE per year.²⁹ Angola is close to reaching this goal, if it hasn’t surpassed it: in 2018, Angola exported 31 MBOE of LNG, marking a six-fold increase from 2016.³⁰

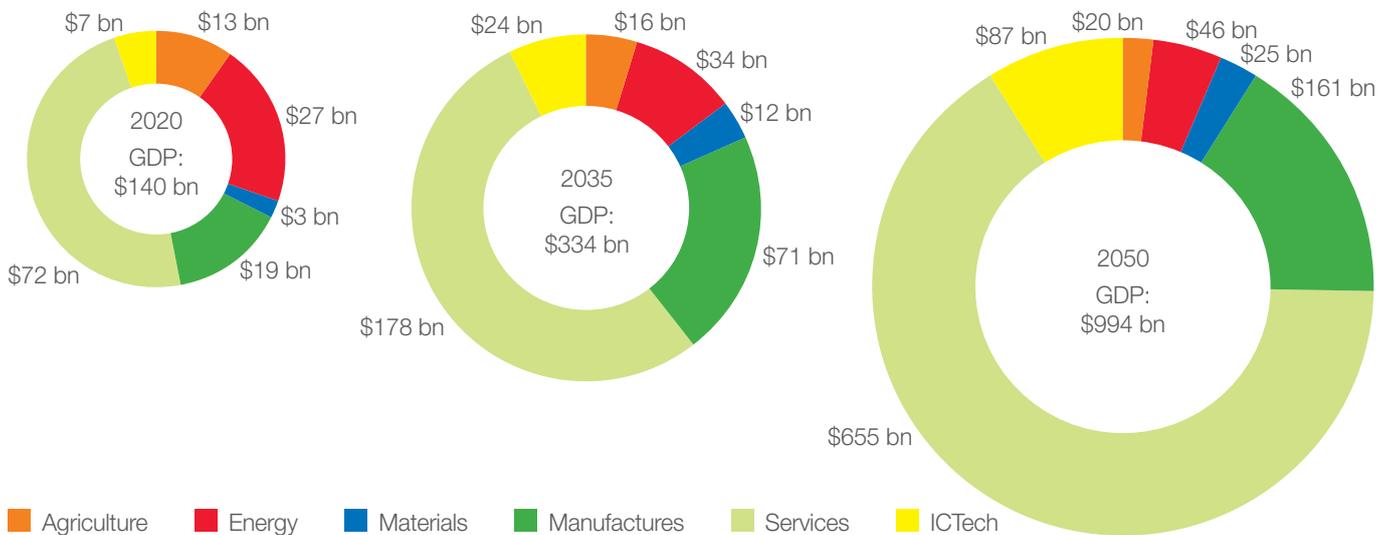
Liquefied natural gas (LNG) exports grew six-fold between 2016 and 2018, from roughly 30 BCF (five MBOE) in 2016

to 184 BCF (31 MBOE) in 2017.³¹ LNG exports went primarily to the Middle East and India, but also to China, Brazil and South Korea and to a lesser extent Japan, Argentina, the European Union, Africa and Singapore.³²

In addition, Angola is developing a US\$12 billion offshore project, Angola LNG, to exploit the roughly three BCF per day of associated natural gas that it produces. Angola LNG is expected to produce 5.2 million tonnes of LNG per year for export in a partnership with state-owned Sonangol, Chevron, BP, Eni and Total.³³

In response to low energy prices, Lourenço is restructuring the sector to manage oil price volatility, attract new investment and remove associates of former president Eduardo dos Santos accused of corruption. To this end, in 2018, the president revised taxes on gas and oil production and reformed licensing processes.³⁴ Key to its strategy to extend the life of its oil sector, in October 2019 Angola’s newly created National Oil, Gas and Biofuels Agency, which now manages oil and gas concession sales, announced a bid for 10 blocks of oil exploration in the Namibe and Benguela basins, the first out of a minimum of 55 to be tendered under its 2019-2025 bidding strategy.³⁵

Figure 3: Value added by sector for 2020, 2035 and 2050



Source: IFs version 7.45; initialising from World Development Indicators data
 Note: According to the Angolan National Bank, manufactures dropped to 4% of GDP in 2018

Recognising that hydrocarbons alone cannot sustain sufficient economic growth to improve the livelihoods of Angola’s growing population, the Angolan government has embraced the need to enhance other sectors such as agriculture, manufacturing and tourism as drivers of future growth.³⁶

Agriculture, which has historically contributed as much as 13% (1998) and as little as 5% (2008), comprised roughly 10% of GDP in 2017. The contribution of the services sector has ranged from 21% of GDP in 1999 to 49% in 2009 and has since remained in the 46-51% band. Manufacturing contributed less than 7% in 2017.³⁷

The value-added contributions of the services sector, manufacturing sector, information and communications technology (ICT) and materials sectors are projected to continue growing in both relative and absolute terms. Although the absolute contributions of agriculture and energy are also set to increase, their value added as a percent of GDP will decline (Figure 3).

The Angolan government has recognised the private sector as the engine of future growth. To that end, as well as to rationalise the public sector, the government has partnered with the World Bank to implement an expansive privatisation programme.³⁸

However, Angola is among the most difficult countries for businesses. The World Bank ranked Angola as 177th

among 190 economies in its Ease of Doing Business Index in 2020,³⁹ down four places from the previous year.⁴⁰ The index ranks countries based on the extent to which the regulatory environment is conducive to business operations and the protection of property rights.⁴¹

Meanwhile, the Fraser Institute’s Index of Economic Freedom ranked Angola the fifth least economically free country in the world in 2017, just above Algeria, Sudan, Libya and Venezuela. The Fraser Institute cited problems relating to the ‘legal system and property rights, sound money and freedom to trade internationally’ as the biggest issues. Even Mozambique is ranked nine places above Angola as the 14th least free economy globally.⁴²

To improve these dismal rankings, the government needs to carry out a raft of reforms across every sector of government to allow for a more facilitating domestic private sector and eventually attract the private sector from elsewhere. Business visa requirements are particularly onerous; even getting a tourist visa is close to a nightmare experience.

Informal sector

The onerous requirements of doing business in Angola are among the many barriers to formalising Angola’s informal economy, an extraordinarily resourceful sector that Angola’s National Statistics Institute estimates employs nearly three out of every four Angolan adults.⁴³

It permeates Angolan society: informal businesses pave roads, provide transportation and fuel, fish and agriculture services as well as undertake mining and vehicle repairs, among many other goods and services.⁴⁴ In fact, the non-governmental Development Workshop found that the provision of water is the largest sub-sector of Luanda's informal economy.⁴⁵ Although reliable data on informal economies are scarce, the sector is estimated to contribute more than 40% of GDP.⁴⁶

In the absence of a social net, formal work opportunities and effective service delivery, the informal sector is essential for survival and the provision of basic services such as water. Moreover, it often employs unskilled and undereducated individuals who wouldn't otherwise be able to work.

Indeed, the International Labour Organization (ILO) understands informal work to be employment but it certainly does not meet the threshold of 'decent work' which provides 'a fair income, security in the workplace and social protection for families'.⁴⁷ Many people in the informal sector live below or just above rates of extreme poverty and lack social protection systems. High levels of informality are generally costly for society, contribute little to the taxes that pay for public goods (e.g., roads) and constrain sustainable development. The government has historically constrained informal economic activities, evidenced by the forced closure of the Roque Santeiro market in 2010 and, in 2014, the heavy fining of informal traders and their customers.⁴⁸

In July 2018, the Minister of Economy and Planning, Pedro Luis da Fonseca, restated the long-standing goal of integrating the informal sector into the formal sector.⁴⁹ In line with this goal, every effort should be made to reform laws and regulations to lower barriers of entry into the formal sector. Community enterprise models can also play an important role in providing livelihood opportunities and basic services. Indeed, Luanda's extraordinary informal water supply network would not exist if the government fulfilled its basic infrastructure duties.

On the current trajectory, growth in Angola's labour force will far outstrip the supply of jobs, leaving many of the country's citizens destitute, frustrated and dependent on the informal sector to survive. As we examine in the next section, a large cohort of young people with improving levels of education who are either unemployed or eking

out survival in the informal sector could be a destabilising force. Young Angolans are increasingly connected with one another and the rest of the world through the internet and social media. If they are denied the opportunity to participate in the economy and earn a living, they may become restless and eventually agitate violently for change.

Demographic dynamics

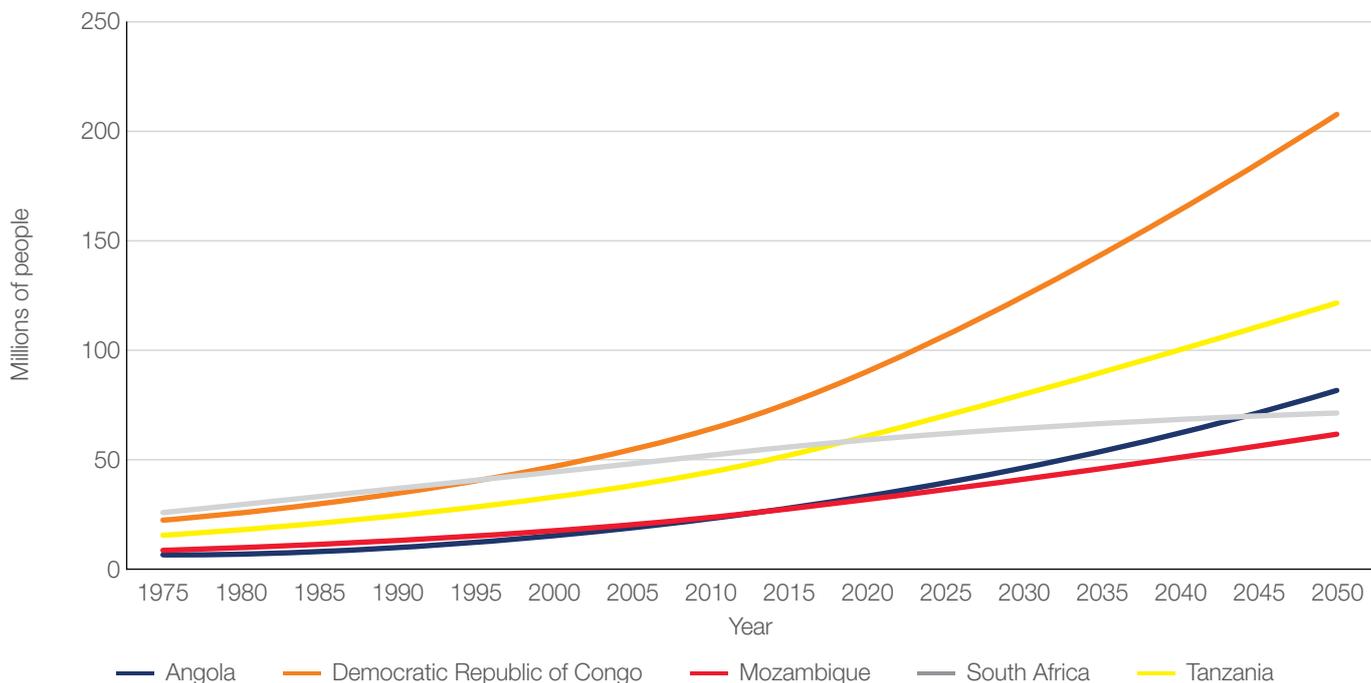
Angola's population of 32 million is among the top five youngest and fastest-growing populations in the world. Half of all Angolans are under 17 years of age. High fertility rates and improvements in life expectancy have driven rapid population growth over the last several decades.⁵⁰ The total fertility rate (the number of live births per 1 000 women) has been among the highest globally for over half a century; the current total fertility rate of 5.6 is the sixth highest globally (within SADC, only the DRC has a higher total fertility rate).⁵¹ Meanwhile, Angola's life expectancy has doubled since 1960, reaching 65 years in 2016.

Angola's population is among the five youngest and fastest-growing populations in the world

The share of women of childbearing age who use contraceptives has tripled since 1996, but remains at roughly 13% – one of the lowest rates in the world.⁵² Patterns of contraceptive use vary widely across the country; Angolan women who are educated and living in cities tend to face fewer barriers to accessing modern contraceptives and thus have fewer children.⁵³ Teenage girls who haven't gone to school are more than twice as likely to have begun childbearing than teenage girls who have received a secondary education.⁵⁴ There is also a significant unmet need for contraceptives: nearly four out of every 10 married or in-union women want to delay or stop childbearing but are not using contraceptives.⁵⁵

On the Current Path, sustained high fertility rates will continue to effect rapid population growth. Although Angola's total fertility rate is projected to decline slowly to roughly five by 2030 and 3.6 by 2050, it will remain among the top five globally.⁵⁶ The population is projected to grow on average 3.4% per annum out to

Figure 4: Population

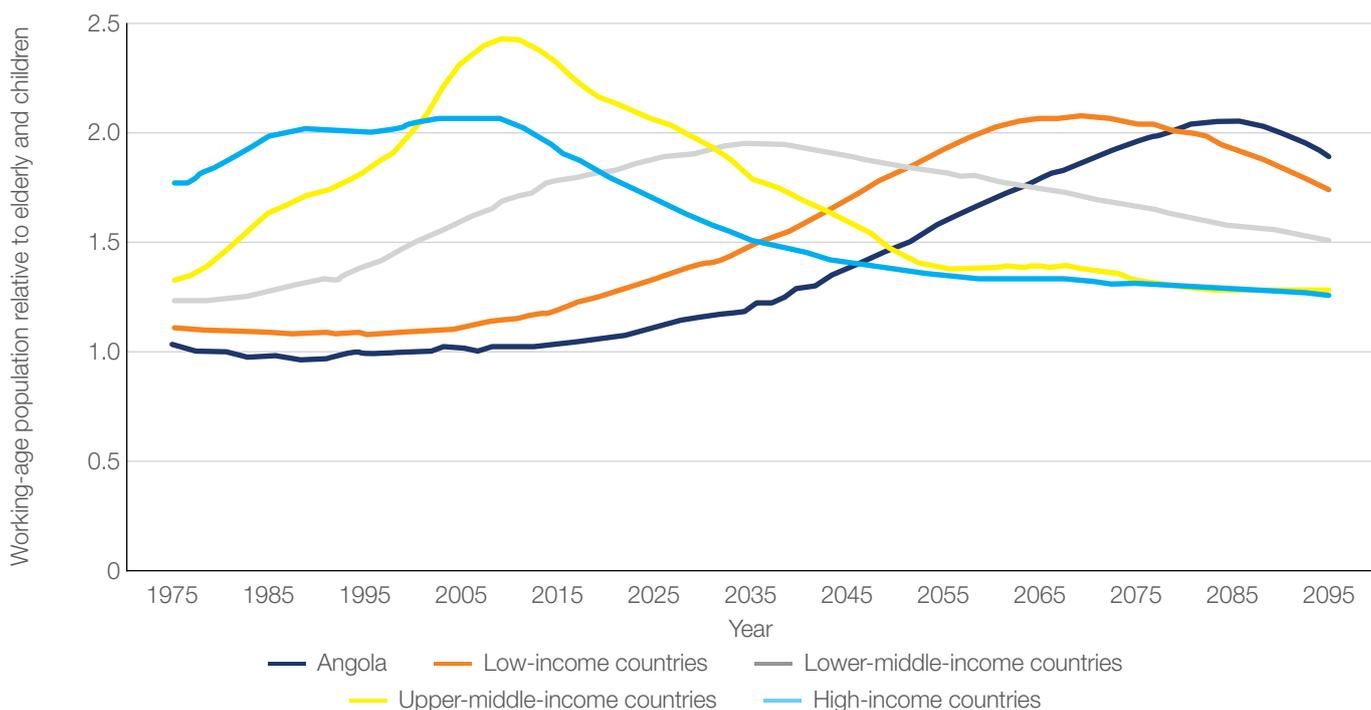


Source: IFs version 7.45; initialising from UN Population Division data

2030, at which point Niger and Uganda will be the only countries globally with faster growing populations. By 2050, Angola's population is

projected to reach 80 million – nearly eight million more people than South Africa's projected population for that year (Figure 4).⁵⁷

Figure 5: Demographic dividend



Source: IFs version 7.45; initialising from UN Population Division data

Similar to most sub-Saharan countries, Angola's population is almost equally divided between the working-age population, who are those between 15 and 64 years of age (16.3 million people) and dependants, who are those under 15 years of age and 65 years or older (15.6 million people) (Figure 5). For the entire forecast horizon to 2050, Angola's large youthful population will present a drag on growth and development.

Generally, developing countries experience a 'demographic dividend' – an economic boost – when the ratio of working-age people to dependants reaches 1.7 to one. Angola will only achieve that ratio during the second half of the century, implying that it will only then benefit from its most important economic asset, a large labour force (Figure 5).⁵⁸ Should Angola advance its dividend it could improve income growth more rapidly – a dynamic explored later in the report.

Poverty: a growing challenge

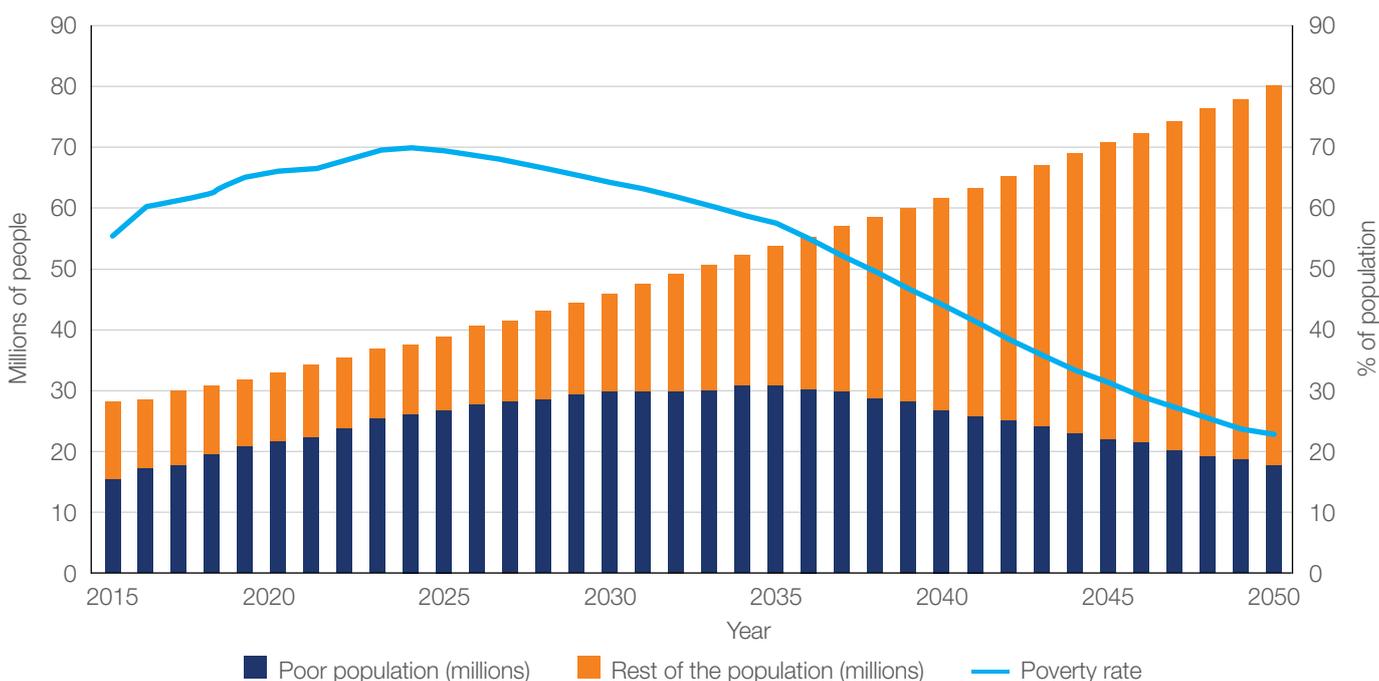
Despite years of oil-fuelled growth, poverty remains one of Angola's most pervasive challenges. The Multidimensional Poverty Index (MPI), which draws from 10 indicators measuring education, health and

standard of living, found that one out of two Angolans is poor, while one out of three is living in severe poverty.⁵⁹ According to the MPI, lack of access to education is the largest contributor to poverty, followed by poor nutrition.

The prevalence and severity of poverty is significantly worse in rural Angola, where nearly nine out of 10 Angolans are multidimensionally poor and nearly seven out of 10 are in severe poverty.⁶⁰ Here, people rely on subsistence agriculture for their livelihoods.⁶¹ Conversely, in urban areas, nearly one out of three Angolans is multidimensionally poor, while 13% are in severe poverty.⁶²

A larger share of Angolans is considered income poor: three out of every five Angolans (over 20 million people) are living under the extreme poverty line for lower-middle-income countries (US\$3.20 per day), while two out of five Angolans are living on less than US\$1.90 per day, the income level that is used to measure global progress towards the achievement of the United Nations' first Sustainable Development Goal to eliminate extreme poverty by 2030.⁶³ Angola's National Statistics Institute estimated a lower extreme poverty rate of 41% in November 2019.⁶⁴

Figure 6: Extreme poverty (US\$3.20/day), Angola



Source: IFs version 7.45; initialising from World Bank data

The lower-middle-income poverty rate is projected to peak in the mid-2020s and decline to just over 20% by mid-century. But, owing to rapid population growth, the number of extremely poor Angolans will continue growing for a decade after the poverty rate peaks. More than 17 million Angolans are projected to be extremely poor by mid-century – only three million fewer people than today (Figure 6).

Inequality exacerbates poverty in Angola and in many other developing countries. With a gini-coefficient of 0.51 in 2018, Angola is among the top 50 most unequal countries in the world.⁶⁵ The wealthiest one-fifth of the population earns nearly 60% of all income and significant disparities in health, education and other outcomes exist across Angola’s urban and rural areas.⁶⁶ A large portion of the population experiences extremely high living costs and socio-economic exclusion.⁶⁷

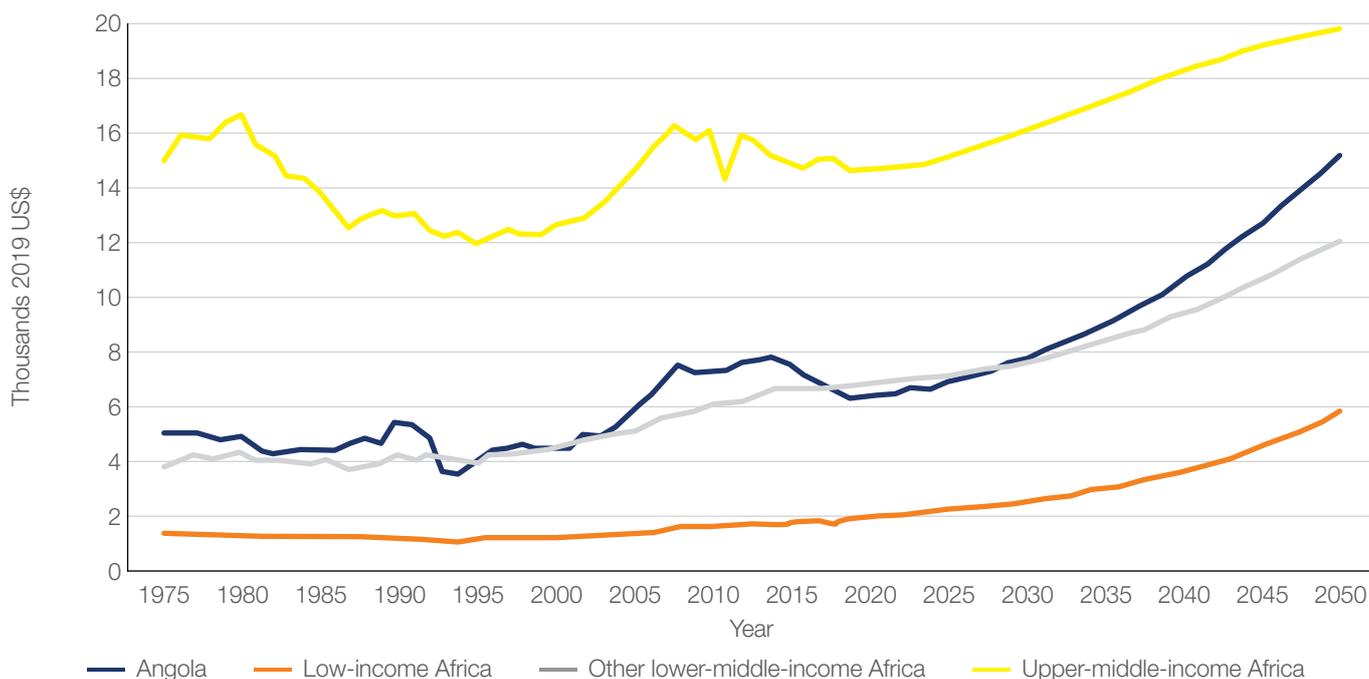
This story is repeated across sub-Saharan Africa, where high levels of inequality and poverty make it difficult for GDP growth to translate into improved incomes. In Angola, decades of conflict, central state control and limited capacity have eroded livelihoods: by the end of the conflict in 2002, real incomes were lower than they were at independence in 1975.

The emergence of a fragile peace and rising oil revenues thereafter helped Angola recover: from 2001 to 2010, the economy grew on average 8.8%. The economy continued to grow at a high average of 4.5% between 2011 and 2015 before contracting to almost –3% in 2016 as the US shale revolution took its toll.⁶⁸

Angola’s average incomes, measured using GDP per capita in purchasing power parity, consequently grew steadily from 2002 to peak at US\$7 760 in 2014. But throughout this period of rapid economic growth, more than half of Angolans were living under the lower-middle-income poverty line. In fact, the number of Angolans living in extreme poverty grew by nearly a third between 2000 and 2008.

Incomes have since declined to an estimated US\$6 260 in 2020, the 15th highest GDP per capita in Africa, comparable to those of the Republic of Congo (US\$6 150) and Nigeria (US\$6 110). On the Current Path, income growth in Angola is forecast to outpace the average for other lower-middle-income countries in Africa, reaching US\$7 650 in 2030, US\$10 430 in 2040 and US\$14 920 by 2050 (Figure 7).

Figure 7: GDP per capita, purchasing power parity



Source: IFs version 7.45; initialising from World Economic Outlook 2017 data

Raising incomes more rapidly than projected on the Current Path and preventing poverty from deepening will require pro-poor policies that protect the country's most vulnerable communities.

Education

One of the key drivers of poverty in Angola is deprivation of education.⁶⁹ With the country's literacy rate at 68%, an estimated 10 million Angolan adults are illiterate. Although this literacy rate is on par with the rest of lower-middle-income Africa, it is the 37th lowest rate in the world.⁷⁰ Literacy is critical for individual and community well being and economic development more broadly. Along with the rest of lower-middle-income Africa, Angola's literacy rate is expected to reach 98% by mid-century. And, although Angola has free and compulsory primary education, UNICEF estimates that 22% of children are not attending school,⁷¹ while 48% of students enrolled in primary school do not complete it.⁷²

In 2014 (the latest year of available data), the average adult above the age of 25 in Angola had completed four years of schooling. Nationally, nearly one-third of Angolan adults had not received any education, and in that category, 70% were women. A quarter of Angola's population 25 years and older had received an incomplete primary education; 15% had completed primary; 13% had completed lower secondary, while another 13% had also completed upper secondary; and, lastly, 2.6% had attained a bachelor's degree or equivalent (Figure 8).⁷³

These concerningly low levels of educational attainment reflect the challenges faced by Angola's education

system, particularly at the primary level. A lack of well-trained teachers and limited infrastructure undermine the quality of education, a problem fuelled by underspending on education.

In the National Development Plan 2018-2022, the government set several goals for educational attainment.⁷⁴ On the Current Path, Angola will achieve or nearly achieve most of them:

- Angola is expected to surpass the government's goal of reaching a net primary enrolment rate of 74.2% by 2022, with a forecasted rate of 85.6% by 2022.
- Angola is nearly set to achieve its goal of increasing the primary school completion rate from 50.2% in 2017 to 60.2% by 2022 on the Current Path, reaching a primary school survival rate (the most comparable variable available in IFs) of 59.7% by 2022.
- On the Current Path, Angola will only achieve a 70% adult literacy rate by 2022 – 2.8 percentage points below the government's goal.

Despite its very large pool of people who are either underemployed or unemployed, Angola faces a general skills deficit in the labour force, particularly in the construction and manufacturing sectors (such as electricians, welders, carpenters, heavy machine operators, etc). However, there has been an improvement in the expansion of the pool of workers with relevant skills since the end of the war.⁷⁵

Box 2: Education in IFs and key definitions

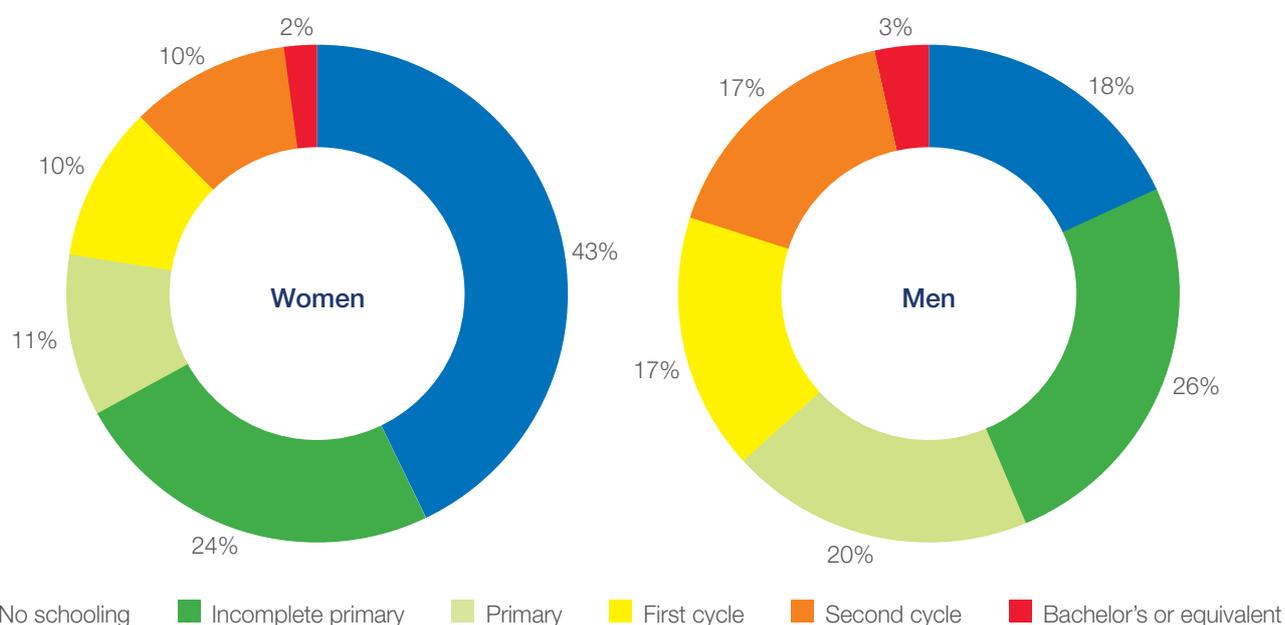
In IFs, education is conceptualised as a pipeline in which learners progress from primary to secondary and tertiary level. Completion of one level enables transition to the subsequent level.

Gross enrolment rate: The number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. The number can exceed 100% due to the inclusion of over-aged students because of late entrants or grade repetition.

Completion rate: The number of people who have completed a given level of education, expressed as a percentage of population aged three to five years above the intended age for the last grade in that level. It indicates how many children and adolescents enter school on time and progress through the education system without excessive delays.

Transition rate: The number of students admitted to the first grade of a higher level of education (such as lower secondary) in a given year, expressed as a percentage of the number of students enrolled in the final grade of the lower level of education in the previous year (such as primary in this example).⁷⁶

Figure 8: Education attainment among population aged 25 and older, 2014 (latest data)



Source: UNESCO Institute for Statistics

Table 1 compares educational participation in Angola with that of its African income peers and the continental average for 2016, the latest year for which reliable data are available.

Angola's gross primary enrolment rate of 113% is above those of its income peers and the continental average, which can possibly be attributed to the provision of free compulsory primary education and high repetition rates. However, only an estimated three out of five children complete primary school by the

time they are three to five years older than the official age of entry into Grade 6.

A number of issues contribute to Angola's low primary completion rate, including delayed entry, high dropout rates, high repetition rates, and/or high rates of late completion. Inadequate transport, water, sanitation and electricity infrastructure, overcrowded classrooms, overwhelmed teachers and lack of supplies may also contribute to low completion rates. For girls, staying at home to help with domestic tasks

Table 1: Education flow rates, 2016 (percent of age group)

Country/region	Primary		First Cycle (Lower secondary)		Second Cycle (Upper secondary)		Tertiary	
	Enrol	Complete*	Enrol	Graduate	Enrol	Graduate	Enrol	Graduate
Angola	113%	60%**	72%	23%	27%	17%	9%	7%
Other lower-middle-income Africa	100%	85%	73%	58%	53%	48%	17%	9%
Africa	101%	78%	64%	48%	41%	35%	13%	7%

Source: IFS version 7.45; initialising from UNESCO Institute for Statistics data

* Completion rate is used rather than graduation rate because graduation rates are not available for primary education in IFS.

** This value is for 2015, the latest year for which UNESCO has data for Angola for this series.

may be a particular challenge to completing primary education on time.

Angola's lower secondary gross enrolment rate of 72% is higher than the African average and more or less on par with the rest of lower-middle-income Africa.

These findings suggest that Angola's education system is unable to provide lower secondary education to potential students. Reasons are that secondary schools are based in regional capital cities; learners who are required to move to attend secondary school are unlikely to do so. Moreover, secondary education is not free.

As a result, Angola also has low tertiary school participation rates. An estimated 9% of the school-age population for tertiary education enrolled in 2016. In the rest of lower-middle-income Africa, this figure was estimated at 17%; in Africa, at 13%. Indeed, Angola's low levels of enrolment in and completion of secondary school makes attending tertiary school unattainable for most Angolans.

Fewer females than males enrol in and complete all levels of education, particularly at primary and tertiary levels

On the Current Path, the primary completion rate will improve to 96% by 2030 and above 98% by 2050. The lower-secondary graduation rate is set to experience a commensurate increase from the current estimate of 23% to 71% by mid-century. The upper-secondary graduation rate is expected to increase from 17% to 60% and tertiary graduation rates from 7% to 20% by mid-century.

Fewer females than males enrol in and complete all levels of education, particularly at primary and tertiary levels. In fact, regarding gender parity in net primary enrolment, Angola is among the bottom 25 countries globally. Consequently, women aged 15 and older have around 2.3 fewer years of education than men. On the Current Path, this number will reduce to 1.5 years by mid-century. On the Current Path, Angola will only achieve gender parity at primary school enrolment level after mid-century. Numerous studies have shown the tangible benefits of educating girls.⁷⁷ Apart from equipping them with knowledge, information and better opportunities to participate in economic productivity, education delays the age of first marriage and lowers total fertility rates.

Whereas the discussion has thus far emphasised the amount of education provided, the quality of education is arguably more important than the number of learners who progress from one level to the next.⁷⁸ Given the numerous issues confronting Angola's education system, Angolan families with sufficient financial resources often send their children to study abroad, possibly to the detriment of Angola's education system. The top five destinations are Brazil, Portugal, the US, Namibia and South Africa.⁷⁹

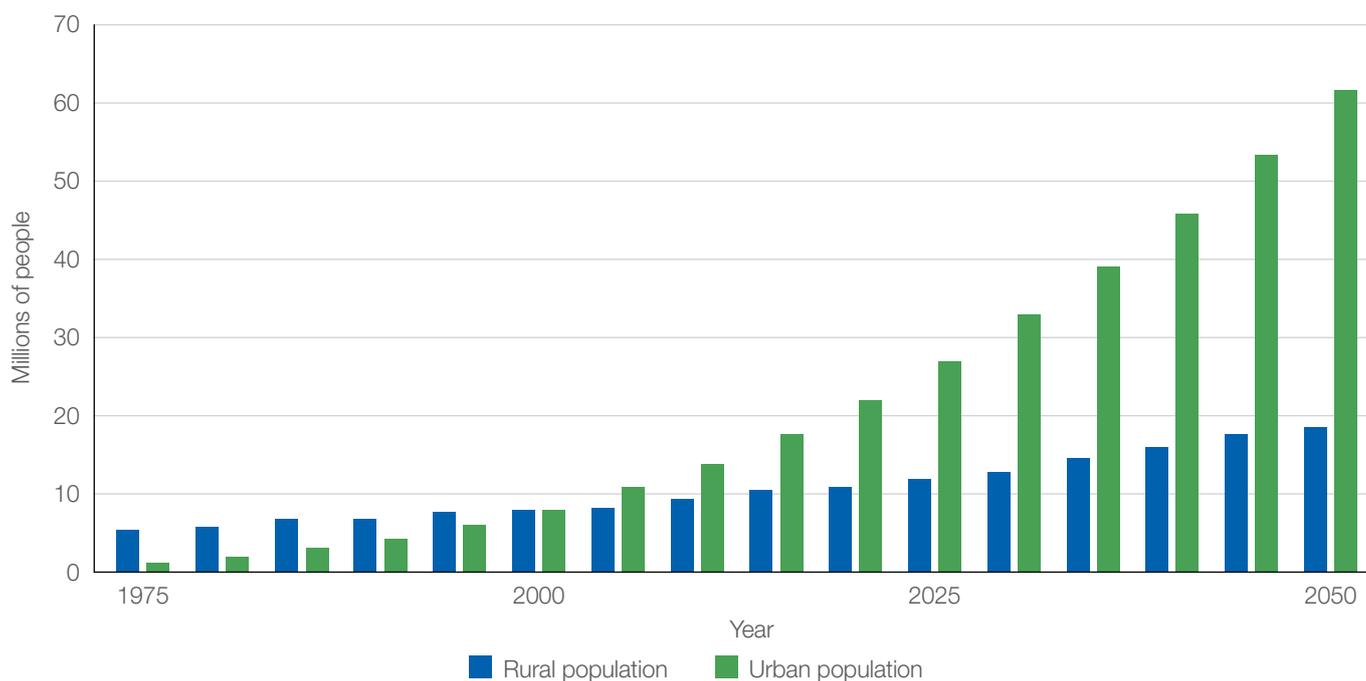
Improving the quality and quantity of education in Angola will require increased expenditure on education. From 2013 to 2015, the amount spent on education decreased from 3.5% of GDP to 2.6%⁸⁰ – roughly 2.2 percentage points lower than the average for the rest of lower-middle-income Africa. To improve participation rates and, in turn, Angolans' ability to live healthy and productive lives, the Ministry of Education needs first to prioritise improving the quality of primary school education and completion rates, then turn its attention to secondary and tertiary schooling. Girls and women must be at the centre of this agenda, given their low levels of educational attainment compared to their male counterparts.

Angola's ailing basic infrastructure

Infrastructure, such as the provision of safe water, water-borne sewage, access to electricity and roads, is critical to healthy and productive communities and cities. The civil war devastated much of Angola's infrastructure and until very recently, little attention has been paid to rehabilitation outside of Luanda. At present, Angola's basic infrastructure does not meet the needs of the country's growing and urbanising population.⁸¹

Nearly seven out of every 10 Angolans reside in urban areas (equivalent to almost 22 million of its 32.8 million people) and Angola continues to urbanise rapidly.⁸² In fact, Angola is significantly more urbanised than other countries at similar levels of development. On the Current Path, 37 million out of a total of 52 million people (71%) will be in cities by 2035; by 2050, nearly 80% of Angolans will likely be considered urban (Figure 9). The reasons for rapid urban growth in Angola were not the attraction of urban jobs, but the flight of rural populations from the war. The result, surrounding Luanda, for example, are massive slums housing millions of poverty-stricken refugees from far-away rural areas.

Figure 9: Urban and rural populations



Source: IFs version 7.45; initialising from UN Population Division: World Urbanization Prospects: the 2018 Revision data

Large urban populations and rapid rates of urban population growth and urbanisation are associated with many challenges, such as the prevalence of large slums, but these also offer opportunities in terms of lower costs in the provision of health, education and other basic services. It is significantly cheaper to provide these bulk services in urban than in rural settings although it would have been much better if Angola had built this infrastructure ahead of an arriving population.

In addition, Angola stands to benefit from other well-known effects of urbanisation such as the agglomeration effect that raises the productivity of workers and business through better resource sharing, job matching and greater access to infrastructure.⁸³ Already urban populations, even those in slums, evidence significantly better health outcomes than rural populations.⁸⁴

Capitalising on the potential of a large urban population will, however, require forward-looking strategies that commit much larger budgets to capital expenditure, better governance and stronger institutions, and more accountability including exploring the advantages of the devolution of authority to cities. With an estimated quarter of its total population in a single city, Luanda,⁸⁵ Angola also desperately needs to invest in secondary

cities, connecting these to an integrated national development plan.

Water and sanitation

Little recent progress has been made in increasing the availability of improved, or ‘safe’, sources of water. Since 2000 (the earliest data available), the rate of access to safe water has increased by only five percentage points to the current estimate of 60%. This rate is far below the average for lower-middle-income Africa (84%).

Over this same period, the rate of access to safe water in low-income Africa increased five times as quickly, achieving a 25-percentage point increase (45% to 70%). In fact, the majority of Angola’s peri-urban population (estimated to be half of Luanda’s population) ‘still rel[ies] on informal mechanisms for water supply... [which] is expensive and of poor quality...’⁸⁶

At present, 13 million Angolans lack access to safe water. Although the Current Path projects improvement in the safe water access rate, the number of people without access to safe water is set to continue growing until the 2040s, peaking at over 18 million people.

Box 3: Improved water and sanitation

The World Health Organization defines improved, or ‘safe’, **drinking water** sources as ‘those that have the potential to deliver safe water by nature of their design and construction, and include: piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, and packaged or delivered water.’⁸⁷ **Improved sanitation facilities**, meanwhile, are defined as ‘those designed to hygienically separate excreta from human contact.’⁸⁸

At present, 13 million Angolans lack access to safe water. Although the Current Path projects improvement in the safe water access rate, the number of people without access to safe water is set to continue growing until the 2040s, peaking at over 18 million people.

In the National Development Plan 2018-2022, the government expressed its goal to increase the urban and rural safe water access rates to 85% and 76% by 2022, respectively.⁸⁹ On the Current Path, Angola will only achieve a 60% national safe water rate by that year.

Meanwhile, an estimated two out of five Angolans have access to an improved sanitation facility, which, although a higher rate than in low-income Africa, is approximately seven percentage points below the average for the rest of lower-middle-income Africa. This translates into 18 million people lacking access to an improved sanitation facility in Angola.

Over the next three decades, the improved sanitation access rate in Angola is projected to increase at roughly the same pace as in the rest of lower-middle-income Africa, and thus remain slightly behind its income peers. On the Current Path, the number of people who lack access will increase by nearly 50% over 2018 levels by 2050.

Energy and electricity

Just over three out of every 10 Angolans are estimated to have access to electricity,⁹⁰ with a stark difference between urban and rural areas. As little as 8% of the rural population has access to electricity, while roughly 43% of the urban population has access.⁹¹ Because the government struggles to generate and distribute uninterrupted electricity, residents and businesses rely heavily on petrol or diesel generators.

Angola’s current installed electricity generation capacity is estimated at 5.01 gigawatts (GW)⁹² and

multiple major projects are set to increase capacity in the coming years. The Soyo gas combined cycle plant (750 MW) and the Laúca hydroelectric project (2.1 GW) should, for example, increase installed capacity to 6.3 GW.

Without additional effort, Angola will not reach its goal of increasing the national electricity access rate to 50% by 2022 and 60% by 2025.⁹³ On the Current Path, Angola’s national electricity access rate will increase to 37% by 2022; 51% by 2030; 68% by 2040 and 82% by 2050, with rural rates substantially below those in urban areas but convergence increasing over the time horizon.

In the National Development Plan 2018-2022, the government set the goal of reaching 500 MW installed renewable energy capacity by 2022 to reduce dependence on the oil sector and shift towards renewable sources of energy for domestic consumption.⁹⁴

Total installed capacity consists of 64% hydropower, 12% natural gas and 24% other fossil fuels.⁹⁵ The government has planned to reach 9.9 GW capacity by 2025.⁹⁶

As the Angolan population grows and its economy intensifies, Angola will require more energy for domestic use. Energy demand is projected to increase sharply from a current 103 MBOE to 270 MBOE in 2035 and more than 660 MBOE in 2050.

The renewable energy sector has the potential to meet this growing demand. In addition to a potential of 18 GW in hydropower, Angola has potential for 3.9 GW of wind power and 16.3 GW of solar power.⁹⁷ Neither is well suited to provide baseload capacity, however, and Angola will inevitably need to pursue a mix of renewables and fossil fuel sources to meet its energy requirements.

Renewables are particularly well-suited for use as part of micro- and mini-grids not connected to the national grid to meet rural demand. To this end, the government aims to develop off-grid, small-scale projects that use both renewable technologies and fossil fuels.⁹⁸

For example, in June 2019, Italian company Ente Nazionale Idrocarburi (ENI) and Sonangol joined forces to create Solenova, a joint venture to develop renewable energy projects. Solenova's first project will be a 50 MW photovoltaic solar power plant to power southern Angola. Three months later, the Angolan Minister of Energy and Water announced plans to use the private sector to install 30 000 solar photovoltaic off-grid systems in rural areas to produce 600 MW of electricity by 2022 in an initiative that would meet its National Development Plan 2018-2022 goal.⁹⁹

These are encouraging developments: indeed, Angola's renewable energy potential is among the most significant opportunities available to the country. Moving forward, accelerating the transition away from hydrocarbons and towards renewables will be an indispensable component of a self-sufficient and economically stable Angola.

Roads

Angola has invested heavily in rehabilitating its roads since the end of the civil war, but poor road maintenance appears to remain a challenge, although there is little data regarding Angola's transport infrastructure.

In general, roads in Angola's coastal regions are in better condition than those in the inland regions. There are reportedly very few active weighbridges and widespread public concern over the safety of bridges and roads and insufficient regulation and inspection, hindering further expansion of the road transport industry.¹⁰⁰ In 2018, Angola ranked 159th of 167 countries globally on the World Bank's Logistics Performance Index, partly due to the poor conditions of trade- and transport-related infrastructure.¹⁰¹

In 2018, Angola ranked 159th of 167 countries on the World Bank's Logistics Performance Index

Angola's road network reportedly totals 76 000 km, marking an improvement over the 2011 estimate of 62 560 km¹⁰² and better than the 72 323 km reported in the 1970s.¹⁰³ Available data suggest that an estimated 10% of Angola's roads were paved between 1975 and 2001, which then improved to 16% in 2013 and 24% in 2018.¹⁰⁴

Forecasts for the future development of Angola's roads are positive. However, given the extent of the damage of Angola's civil war on its transport infrastructure, even these optimistic projections leave much to be desired. By 2022, Angola's road network is projected to grow by 7 500 km between 2018 and 2022, which, although lower than the government's



24% OF ANGOLA'S ROADS WERE
PAVED IN 2018

goal, is significant. Along the Current Path forecast, IFs expects Angola's road network to increase by over one-third to more than 100 000 km by 2030, nearly 120 000 km by 2035 and to over 180 000 km by 2050.

The quality of Angola's road network will also improve significantly on the Current Path, but at a slightly slower pace than in the rest of lower-middle-income Africa. As Angola continues to build new roads, the share of all roads that are paved is also projected to increase from the current estimate of 24% to nearly 50% by 2035 and over 60% by mid-century. In the National Development Plan 2018-2022, the government articulated its goal to pave an additional 4 000 km of primary network roads; 4 183 km of secondary network roads; and 1 700 km of urban roads by 2022,¹⁰⁵ totalling 9 883 km.

Assessing the comparative importance of transport infrastructure to other types of infrastructure, such as water, sanitation and hygiene (WASH), is a difficult exercise. Both types are fundamental to a modern, productive society. But the scenarios presented later in the report suggest that WASH should be the government's priority as it seeks to boost development.

Health

Health outcomes in Angola have generally improved in recent decades. Life expectancy has improved dramatically from just 39 years in 1975 to more than 64 years – roughly on par with low- and other lower-middle-income Africa – and is expected to improve to above 73 years by mid-century. Infant mortality, although still high compared to other lower-middle-income African countries, has dropped significantly to just over 51 deaths per 1 000 live births.¹⁰⁶

But grave health challenges persist. Angola has a high maternal mortality ratio of roughly 452 deaths per 100 000 births, comparable to Eritrea and Mozambique,¹⁰⁷ suggesting that health services for women and children are incapable of responding to their needs. Child mortality rates are also high, although estimates vary significantly between sources owing to differing methodologies and paucity of data.¹⁰⁸ The Institute for Health Metrics and Evaluation (IHME) estimated in 2017 that, at birth, children have a 6.5% chance of dying before their fifth birthday.¹⁰⁹ The

UN Inter-Agency Group for Child Mortality Estimation offered a significantly higher estimate of 16.4% in 2012,¹¹⁰ while Wang et al estimated 9% in 2013.¹¹¹ Meanwhile, the World Bank estimated in 2018 that 38% of children under five were malnourished – a nine-percentage point increase since 2007 – and that nearly half of all women were anaemic.¹¹²

Angola's maternal mortality ratio is projected to decline to approximately 200 deaths per 100 000 live births by 2050. On the Current Path, the infant mortality rate will fall to 38 deaths per 1 000 live births by 2035 and approximately 23 by 2050.¹¹³ At that point, the infant mortality rate in Angola should be similar to average rates for lower-middle-income countries in Africa. Maternal education is strongly correlated with reductions in child mortality, underscoring the urgent need for greater investment in schooling for girls and women, especially in primary and secondary school.¹¹⁴

In 2018, 38% of children in Angola were malnourished and nearly half of all women were anaemic

A broader review of mortality reveals that communicable diseases are responsible for the majority of deaths in Angola. Among the total population, communicable diseases such as respiratory infections, malaria, diarrhoea and HIV/AIDS are the leading causes of death.

Among children, however, malaria is the leading cause of death. Although malaria deaths decreased by 80% in eight provinces between 2008 and 2014 due in part to the US President's Malaria Initiative, little progress in preventing malaria deaths has been made since.¹¹⁵ Diarrhoea follows as the second leading cause of death among children, indicating a pervasive lack of clean water and proper sanitation facilities and an ineffective public health system.¹¹⁶ Lower respiratory diseases (primarily bronchitis and pneumonia) are responsible for a high number of deaths, especially among the young and elderly, largely due to household air pollution caused by cooking indoors, using coal as fuel.

HIV/AIDS-related deaths and new HIV infections are also rising: the number of HIV/AIDS-related deaths has tripled since 2010, reaching 330 000 people in 2018.¹¹⁷

However, non-communicable diseases such as cancer and diabetes will eventually replace communicable diseases as the leading cause of death. Over the past several decades, Angolans have been, on average, living longer lives, inevitably translating into a growing burden of chronic non-communicable diseases. On the Current Path, the burden of non-communicable diseases will overtake that of communicable diseases in the late-2030s. Until then and for several years after, this double burden of disease (i.e. communicable and non-communicable) will require substantial investments in the health sector, as managing both is complex and expensive.

Presently, cardiovascular diseases, cancer, digestive and respiratory diseases are the leading non-communicable causes of death. Existing research on cancer suggests that lack of early detection and treatment resources are responsible for Angola's high number of cancer deaths.¹¹⁸

Health expenditure per capita has been decreasing for the last several years. As a share of GDP, health expenditure has fallen from a peak of 5.5% in 2001 to 2.9% in 2016¹¹⁹ – a concerning trend in light of Angola's poor health outcomes. Absent increased spending on the health sector, improving Angolans' access to adequate healthcare facilities and services – particularly in rural areas – will remain a formidable task.

Agriculture: a sustainable opportunity

Angola is the third-largest sub-Saharan African country and has large swathes of arable land. However, the agricultural sector – once among the most productive on the continent¹²⁰ – performs far below its potential and offers a substantial opportunity for sustainable development.¹²¹ The government estimates that between 60% and 75% of the population depends on subsistence agriculture for income and food.¹²²

To harness its agricultural potential, Angola should equip smallholder farmers with the tools that they need to sustainably improve crop yields. At present, 95% of the roughly five million hectares of cropland that cover 4% of the country is used by families for small-scale and subsistence farming,¹²³ while commercial farming cultivates long-term crops such as maize and coffee in the remaining 5%.¹²⁴ Of this cropland, only 2% is equipped for irrigation (88 793 hectares), while 0.2% is actually irrigated (11 600 hectares).

Partially as a result of insufficient irrigation and other technology, Angola's yields of cassava, maize, millet, sorghum and other crops are significantly lower than those of other lower-middle-income African countries (e.g., Kenya, Ghana and Zambia), but data are lacking. In 2005, the UN's Food and Agriculture Organization (FAO) estimated Angola's average cereal yield (millet, sorghum, maize and rice) at 1.6 metric tons per hectare.¹²⁵ The latest reliable estimate of crop production is 17.8 million metric tons in 2015.¹²⁶

Since around 1980, Angola has depended on crop imports to meet between 10% and 15% of domestic food demand. Crop import dependence is a key element of food insecurity; countries highly dependent on crop imports, especially of crops that can be grown domestically, are vulnerable to international commodity price shocks. Low- and lower-middle-income Africa, on average, depend less on crop imports than Angola – a dynamic projected to continue over the forecast horizon. On the Current Path, Angola's dependence on crop imports to meet domestic food demand will rise sharply to over 30% by 2025 and nearly 60% by 2050 owing to rapid population growth and poor domestic crop production.¹²⁷

In the National Development Plan 2018-2022, the government set the goal to, by 2022, increase cereal production by 105% over 2017 levels.¹²⁸ On the Current Path, crop production will increase only by 10% over 2017 levels by 2022.

Developing the agricultural sector faces a number of barriers, key among them being the lack of land tenure security among subsistence farmers and the enduring threat of landmines, climate change and deforestation.¹²⁹ Without security of tenure, small-scale farmers cannot access credit to invest in better seeds, implements and facilities that could improve yields.

Meanwhile, tens of thousands of Angolans are victims of mines, and although the number of unexploded ordnance accidents has been declining, 37 cases and nine fatalities were reported in the first half of 2019. More than 1 000 minefields remain, but funding has declined significantly, making it difficult to meet the goal of freeing the country from mines by 2025.¹³⁰

Angola also needs to sustainably manage the forests that cover half of the country. Sustainable management of forests and other ecosystems will be critical to helping adapt to and mitigate climate change. Angola is the most densely forested country in the Zambezi river basin¹³¹ and unusually diverse: 'It occupies only 4% of the terrestrial area of Africa, yet it possesses the highest diversity of biomes and is second only to mega-diverse South Africa in terms of the number of ecoregions found within its borders.'¹³²

As the climate continues to warm, Angola's water and food resources, infrastructure and human settlements will be increasingly threatened. Climate change projections vary across the country. At the national level, annual rainfall is projected to decrease by roughly 1% from 1990 levels by 2050. Generally, the northern areas will become warmer and experience a slight decrease in rain, while the southern areas will become hotter more quickly and suffer a more dramatic decrease in rain.

Conversely, the central coastal region is expected to experience a slow increase in rainfall.¹³³ Floods and droughts will also continue to intensify and become more frequent, causing further soil degradation and endangering vulnerable communities.

Like the rest of southern Africa and other arid climates, Angola is feeling climate change's effects primarily through food and water insecurity. In fact, Angola is one of seven countries globally that will inevitably suffer decreased yields of key crops (cassava, maize, sorghum, rice, wheat and millet) by 2030 because of climate change.¹³⁴

Trends in governance

President Lourenço inherited a government bureaucracy that performs poorly on most governance indicators, a

party that is generally suspicious if not hostile to businesses and comfortable with its reliance on income from oil and a closed economy that discourages engagement in agriculture or indeed in small business. The main thrust of his administration thus far is restoring the credibility of the People's Movement for the Liberation of Angola (MPLA) after decades of central state control and massive corruption under former president Dos Santos, his family and associates.

In the National Development Plan 2018-2022, the government set the goal of improving their ranking on the Ibrahim Index of African Governance by 20 positions over 2016 by 2022.¹³⁵ In 2018, the index gave Angola an overall governance score of 38.3 out of a potential 100 and ranked the country a poor 45th of Africa's 55 countries. In 2016, Angola received a score of 37.9.¹³⁶

The World Bank's Worldwide Governance Indicators project agrees with this assessment, finding that the government of Angola is ineffective and has failed to create a regulatory environment conducive to private sector development (Box 4). In fact, Angola has historically scored below even the average for low-income countries in Africa on both indices. On the Current Path, government effectiveness and regulatory quality will remain poor.

Typical of resource dependent countries, Angola's oil wealth has led to rent-seeking and corruption. Reports on conspicuous consumption¹³⁷ abound as do tales of the extent to which a small elite has appropriated the country's wealth. According to Transparency International's (TI) corruption perception index, in 2018 Angola was ranked the 16th most corrupt country in the world and lower than

Box 4: Governance indicators

Government effectiveness and **regulatory quality** are measures from the World Bank's Worldwide Governance Indicators project. Government effectiveness measures 'perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.' Meanwhile, regulatory quality captures perceptions of the ability of government to create and implement policies and regulations that promote the development of the private sector. Greater government effectiveness and regulatory quality link forward to improved information and communication technology and enhanced social capital.

Corruption is captured through Transparency International, which ranks countries based on perceptions of public sector corruption.

the average for low-income African countries.¹³⁸ Moreover, the Financial Action Task Force only removed Angola from its money-laundering blacklist in 2016.¹³⁹

A recent TI report applauded Lourenço's anti-corruption drive.¹⁴⁰ However, challenges remain amid accusations of ongoing corruption, uneven prosecutions and pushback from the former first family and their allies.¹⁴¹ The institutions responsible for prosecuting corruption in Angola remain inefficient. Emerging from a distinctly autocratic and authoritarian background, government affairs and even parliamentary oversight remain opaque.¹⁴²

Government revenues (excluding aid) account for a quarter of GDP – significantly higher than in other lower-middle income African countries (17%). This high ratio suggests Angola has significant government capacity, although much of that is historically due to income from oil. In low-income African countries, government revenues account for 10% of GDP; in upper-middle-income Africa, 36%. Reduced dependence on oil, diversity in its economy and improved public financial management systems would help to boost revenues.¹⁴³

Two other indices provide further insights in analysing some of the structural features of the regime type in Angola. The first is the Polity IV composite index from the Center for Systemic Peace, which categorises states according to their regime characteristics.¹⁴⁴

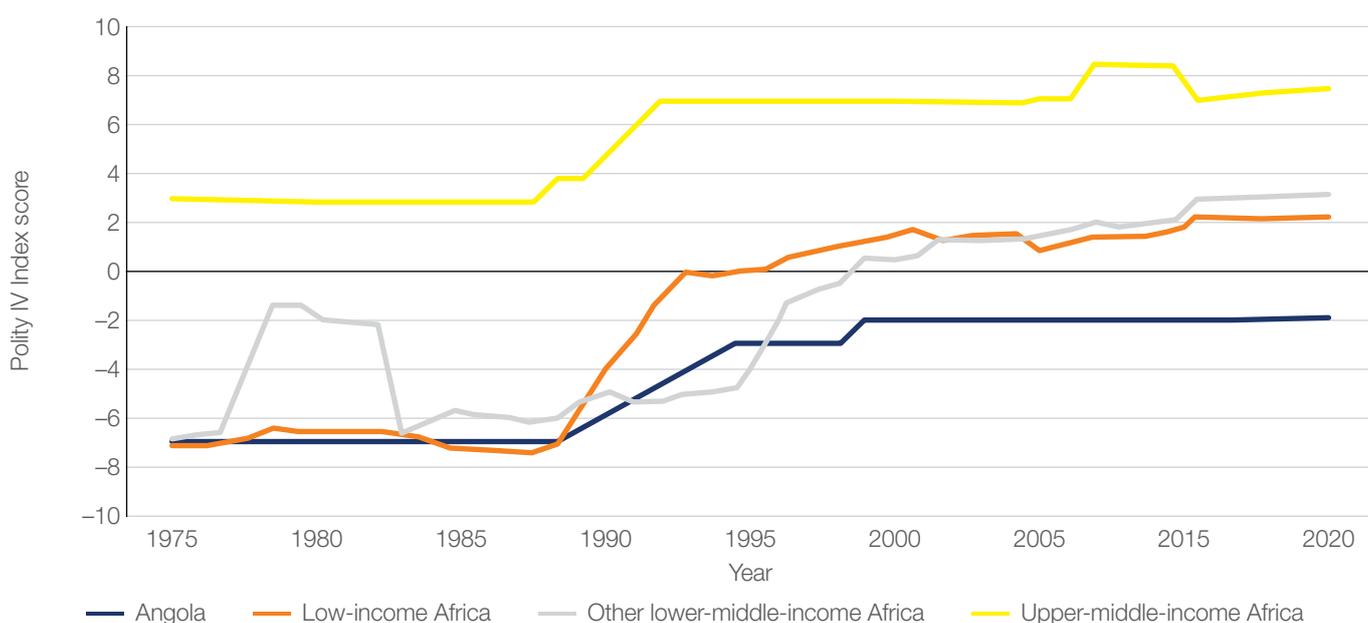
The index ranks Angola as an anocracy¹⁴⁵ with a score of –2 in 2017 and 2018 on a scale of –10 (hereditary monarchy) to +10 (consolidated multiparty democracy). Anocratic regimes display elements of a democracy (e.g., regular elections) that coexist with autocratic behaviour and institutions (e.g., limited legislative oversight).

According to Persson and Rothstein, 'hybrid regimes are comparatively more clientelistic and corrupt than both full-fledged democracies and outright dictatorships ... and tend not only to perform worse than consolidated democracies but also than authoritarian regimes on a large variety of public goods indicators, including population health, education, access to clean water and sanitation, as well as to basic infrastructure such as roads and electricity.'¹⁴⁶

Angola is significantly more authoritarian than the average for other lower-middle-income countries in Africa, implying that pressure for democratisation is set to intensify over time. And as Angola transitions from a less authoritarian governance model to a more democratic one, which would reflect in a score of +5 or higher on the Polity Index, it is likely to experience an initial period of greater instability.

Another way to assess levels of democracy is to distinguish between substantive (liberal)¹⁴⁷ vs electoral (nominal¹⁴⁸) democracy. According to the Varieties of Democracy (V-Dem) project,¹⁴⁹ which measures the

Figure 10: Polity IV Index score



Source: IFS version 7.45; initialising from Polity IV 2017 data

quality and character of democracies around the world, Angola's electoral democracy score has improved over the last few decades. But the gap between electoral and liberal democracy in Angola has actually increased over time, reflecting the extent to which Angola's elections lack legitimacy and how many of its core political institutions often exist independently in name only.

Angola's liberal democracy has modestly improved since 2008 and the smooth transition into Lourenço's administration and sense of greater openness and the promise of the development of institutional checks might help to sustain the positive momentum.¹⁵⁰

These considerations make it all the more remarkable that Angola has made steady economic and political progress rather than slipped back into conflict. But improving the livelihoods of Angola's poor, uneducated and unemployed youth will be an added challenge for a country struggling with dwindling revenues and high inflation rates. The youth bulge in Angola – defined as the population between 15 and 29 relative to the total adult population – is significantly higher than in the rest of lower-middle-income Africa (Figure 11). On the Current Path, Angola's youth bulge will remain among the highest in Africa out to the forecast horizon. This high ratio generally implies a heightened risk for high levels of social turbulence.¹⁵¹

Expenditure priorities

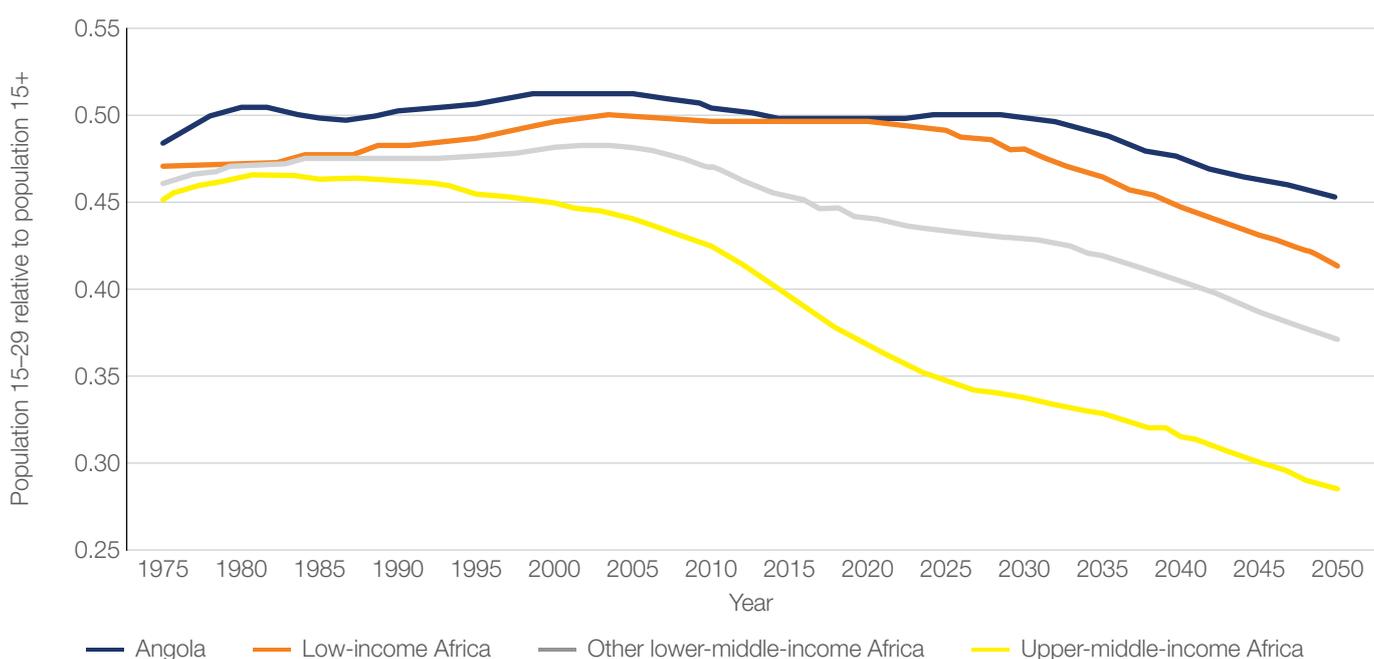
Compared to other lower-middle-income countries in Africa, Angola spends over three times more of its GDP on the military and a significantly smaller share on core infrastructure (e.g., roads and sanitation)¹⁵² (Figure 12). Angola also prioritises health over education. Clearly the economic squeeze since 2014 has forced the government to generally cut back on expenditure, most of which is inevitably in capital expenditure items rather than on salaries and recurring expenses. Moreover, government consumption in Angola (as a percent of GDP) is almost five percentage points higher than that of its peers.

The analysis indicates considerable opportunity, if it were politically possible, to redirect expenditure away from the military and towards the urgent need for water and sanitation facilities and other basic infrastructure and education.

Alternative futures

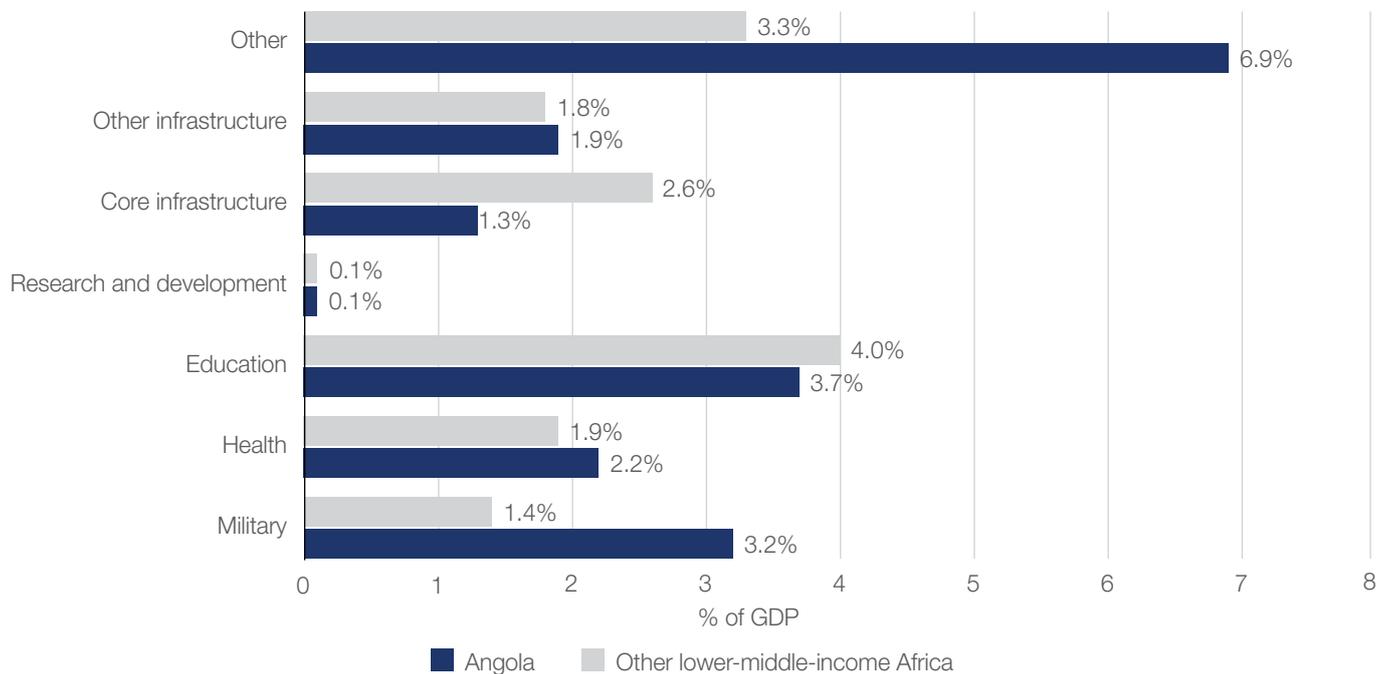
The following sections draw from the preceding analyses to explore the impacts and trade-offs of five sectoral scenarios on Angolan development out to 2050. Each scenario represents a set of policy interventions that

Figure 11: Youth bulge



Source: IFs version 7.45; initialising from UN Population Division data

Figure 12: Government expenditure, % of GDP, 2020



Source: World Development Indicators

address Angola’s key developmental challenges and opportunities. Rather than presenting stark policy choices, the scenarios offer a range of interventions that may be combined in the pursuit of national development priorities.

Renewables & Subsidy Reform

Angola is working with the IMF and the World Bank to cut fossil fuel subsidies, which the chairman of the country’s tax authority publicly described as ‘unsustainable repeat expenditure.’¹⁵³ In fact, Angola was among only eight sub-Saharan African countries that provided more than US\$1 billion (in 2015 current dollars) in fossil fuel subsidies in 2015.¹⁵⁴ To be implemented by the World Bank and the IMF between 2019-2021, the programme aims to raise the price of jet fuel and electricity and transportation tariffs.¹⁵⁵ It also provides for increased cash transfers to Angola’s poor communities to protect them from the impacts of the subsidy reform and aims to reach one million poor households by mid-2020.¹⁵⁶

This programme aligns with the global effort to transition towards clean energy. Beyond comprising a significant public finance burden, the ‘pervasive and substantial’ underpricing of fossil fuels globally is undercutting efforts to reduce greenhouse gas emissions.¹⁵⁷

The Renewables & Subsidy Reform scenario explores the kind of development Angola could expect if this programme were successful by modelling reduced fossil fuel subsidies, increased cash transfers to the poor and an accelerated transition to renewable energy sources.

In this scenario, yearly cash transfers to poor communities are increased to 9.6% of GDP (US\$14.3 billion) by 2022 and 10% (over US\$100 billion) by mid-century. Some of these funds go to Angola’s estimated 159 000 war veterans, who currently receive ‘only a small pension of 23 000 kwanzas (60 euros, \$67) per month.’¹⁵⁸ This translates into an additional US\$4.2 billion per year on average going to Angola’s most vulnerable populations for the next decade; an additional US\$6.4 billion from 2030 to 2040; and an additional US\$8.3 billion from 2040 to 2050. In cumulative terms, this equates to an extra US\$160.2 billion going into the hands of the economically vulnerable by mid-century.

If the cash transfers modelled in Renewables & Subsidy Reform were distributed equally among those living below the lower-middle-income poverty line, each person would receive, on average, a yearly payment of US\$790 over the next decade; US\$1 830 from 2030 to 2040; and US\$6 450 from 2040 to 2050.

Renewables & Subsidy Reform also increases hydropower production at roughly twice the rate projected on the Current Path over the next three decades, translating into an increase from the current estimate of five MBOE to 25 MBOE by 2040 and 68 MBOE just before mid-century. This is an ambitious but reasonable goal: between 2005 and 2015, Angola tripled its hydro energy production. Energy production from Angola's other renewable sources, including biogas, wind and potentially solar, also increases approximately twice as quickly as on the Current Path, rising from an estimated one MBOE today to nine MBOE by 2035 and then takes off rapidly to exceed 800 MBOE by 2050. By 2050, half of all energy production – rather than one third, as projected on the Current Path – is sourced from renewables.

Improved Governance

Angola already appears to be on the path towards more transparent, open and inclusive governance. But corruption and poor governance remain among its most enduring challenges. Without continued substantive democratic accountability, Angola's large and growing youth bulge may transform into a destabilising force that compromises the relative stability that the country now enjoys.

Angola already appears to be on the path towards more transparent, open and inclusive governance

More specifically, Improved Governance emulates greater government effectiveness and improved regulatory quality, as measured by the governance measures used in IFs (Box 3). By the mid-2040s, Angola scores better on both indicators than the average for the rest of lower-middle-income Africa. By mid-century, Angola's score on these measures nearly reaches the average for upper-middle-income Africa.

Perceptions of corruption are also improved in Improved Governance. On the TI Index, Improved Governance raises Angola's score from 1.9 in 2019 (out of a possible 10) to 3.8 by mid-century – on par with upper-middle-income Africa's projected score for that year and half a point higher than Angola's projected score on the Current Path.

Finally, the scenario emulates more rapid democratisation than on the Current Path by improving Angola's score on the Polity IV Index to above 0 (the index runs from -10 to +10) – the threshold between a more autocratic regime and a more democratic regime – by the mid-2030s. On the Current Path, Angola is not projected to pass this threshold until after mid-century. However, even with this significant increase, Angola remains squarely in the range of -5 and +5, between which regimes are considered to be anocracies and prone to instability.

Education & Family Planning

A society will not progress unless everyone – especially women and girls – can access education, healthcare and family planning. In Angola, women have far fewer educational opportunities than men and often face numerous barriers to family planning services and resources.

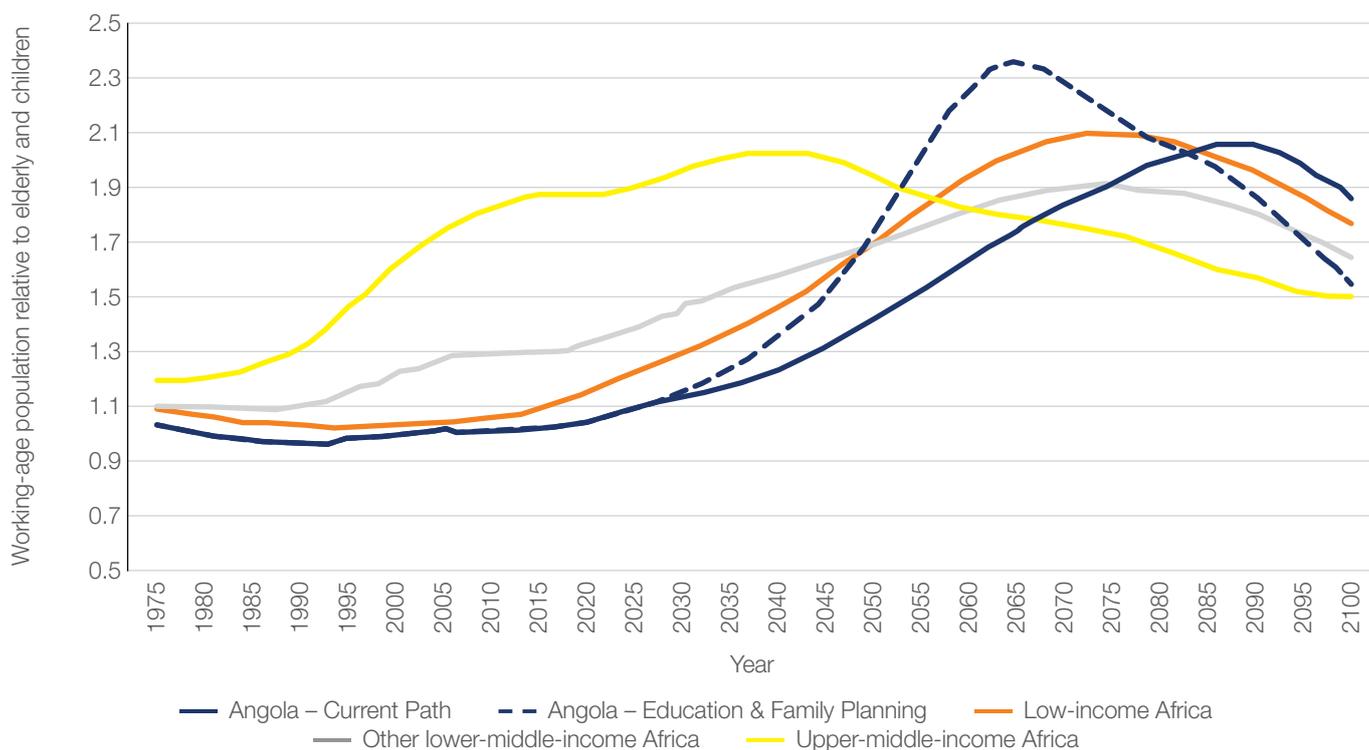
Many political, economic and social factors constrain the ability of Angola's education system to provide high quality education, lowering Angolans' quality of life and the opportunity to access meaningful employment. As was explored earlier in the report, deprivation of education is the most powerful driver of poverty in Angola.

In the Education & Family Planning scenario, Angola implements a coordinated policy push to improve educational outcomes, with a specific focus on lowering the barriers women face in improving their livelihoods. This includes improving gender parity across all levels of education and increasing the availability and use of modern contraceptives.

Education & Family Planning models improve entry, progression and graduation through primary, secondary and tertiary school between 2020 and 2030, with special attention to women's and girls' educational participation. The scenario also improves the quality of primary and secondary school to better prepare students for higher education and increases the share of upper secondary students who attend vocational school.

Lastly, the scenario increases the portion of women who use contraceptives: by 2040, half of all women of childbearing age use contraceptives, compared to only one out of every three women on the Current Path. This increase fulfils the unmet need for contraceptives

Figure 13. Demographic dividend



Source: IFs version 7.45; initialising from UN Population Division data

reviewed earlier in the report, which indicated that 38% of married Angolan women between 25 and 49 want to use contraceptives but do not.¹⁵⁹ By 2050, over 70% of women use contraceptives in Education & Family Planning.

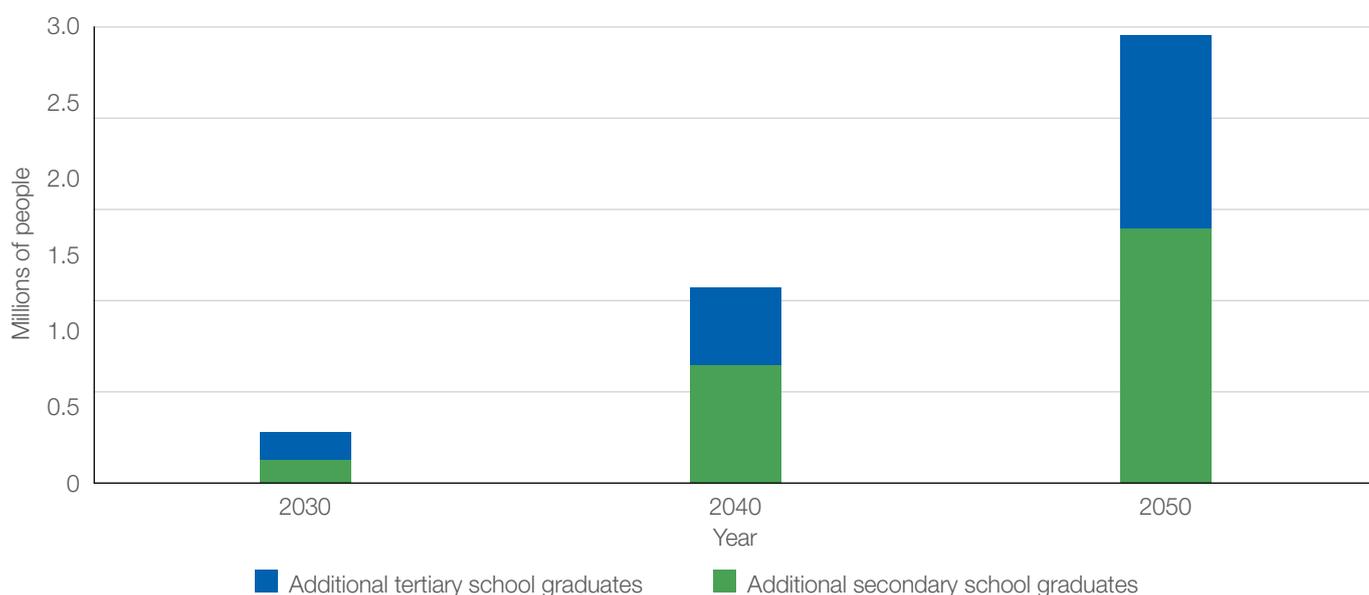
Angola’s total fertility rate consequently drops to 2.3 children per woman by mid-century – roughly 20 years earlier than on the Current Path. By 2050, Angola’s total population reaches 72 million, rather than the 80 million projected on the Current Path. Moreover, the country’s demographic dividend peaks at approximately 2.4 working-age people for every one dependant around the mid-2060s – higher than upper-middle-income Africa’s projected 2040 peak of two workers for every one dependant (Figure 13).

Consequently, gender parity is reached in primary school enrolment by 2040 – 20 years earlier than on the Current Path. Gender parity in lower and upper secondary school enrolment is reached by 2028 and 2035, respectively. On the Current Path, Angola does not reach gender parity on either of these indicators until after 2040.

By 2030, roughly 130 000 more adults will have completed secondary education than on the Current Path; by 2050, an additional 1.4 million would have secondary education. Attainment of tertiary also improves: by 2030, an additional 150 000 adults will have completed tertiary studies, and by 2050, an additional one million (Figure 14). By 2050, there will be over one million fewer Angolans who have not received any education. Meanwhile, the average adult between 20 and 29 years of age will have attained an extra year of education over the Current Path forecast by the mid-2040s.

Angola could achieve the developmental outcomes of this scenario by prioritising education and women’s empowerment on the national development agenda. This is a challenging task. The cultural norms that shape a society’s attitude towards girls’ and women’s fundamental rights to education and reproductive healthcare are often slow-moving and deeply rooted. That so many married Angolan women want to use contraceptives but do not suggests that they cannot afford them or that they are being prevented from using them by social pressure.

Figure 14: Additional secondary and tertiary school graduates in Education & Family Planning scenario



Source: IFs version 7.45; data from Barro-Lee

Water, Sanitation & Hygiene

Poor water, sanitation and hygiene (WASH) infrastructure in Angola constrains development and makes it difficult, if not impossible, for most Angolans to live healthy, prosperous lives. Although other types of infrastructure such as roads and electricity are also lacking, this scenario prioritises WASH given its importance for human development and because water and sanitation are basic human rights.

In this scenario, Angola's rate of access to safe water increases from the current estimate of 56% of the population to 72% by 2035 and 100% by 2050. On the Current Path, this rate improves much more slowly to only 78% by mid-century. This improvement means that by 2035, three million fewer people than is currently projected lack access to a safe source of water. By mid-century, fewer than 800 000 people lack access to clean water in this scenario, compared to over 17 million people (18% of the population) on the Current Path.

The share of the population with access to improved sanitation improves from an estimated 42% in 2020 to 75% by 2035 and nearly 100% by 2050 – 27 percentage points higher than is projected on the Current Path for that year. This translates into 12.4 million fewer people living without access to

improved sanitation by 2035 than is projected for that year; by 2050, 22 million fewer people.

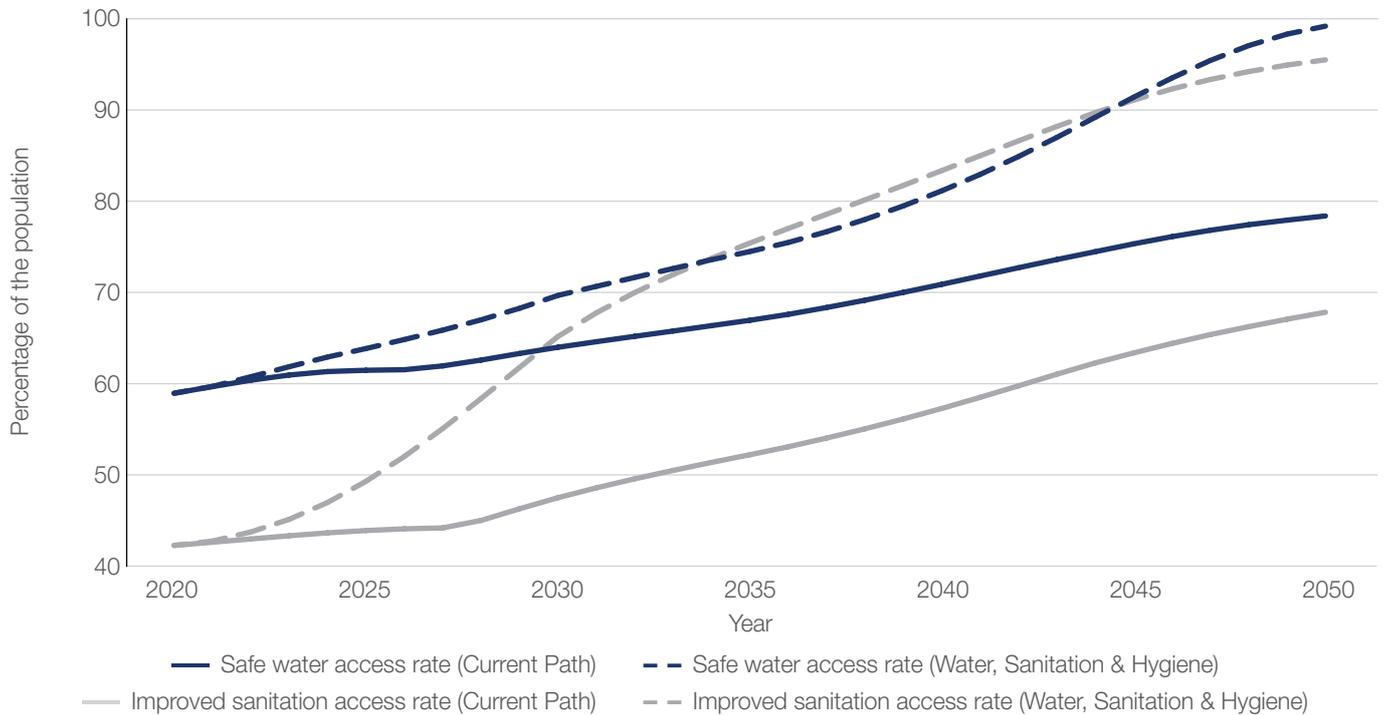
A previous section in this report noted that Angola spends a significantly larger share of GDP on its military than other lower-middle-income African countries do on average and that the major sector that suffers from underspending is on basic infrastructure such as WASH. To account for the costs of the improvements, this scenario includes a gradual decrease in military spending from an estimated 3.2% of GDP in 2020 to 2.6% of GDP by 2025 (rather than 3.1%) and remains relatively steady thereafter.

Cultivating Angola

Angola was once self-sufficient in all crops except wheat, and the fourth largest coffee exporter in the world. But the country's agricultural sector now performs far below its potential and food insecurity is among the country's most pressing problems. Agriculture is vital to the economy and most Angolans depend on agriculture for food or income.

In this scenario, Angola equips more of its roughly five million hectares of cropland for irrigation. Specifically, the area of land equipped for irrigation is increased from the current estimate of 88 800 hectares (a mere 0.15% of all agricultural land) to 240 000 hectares by 2035 and

Figure 15: Safe water and improved sanitation access rates



Source: IFs version 7.45; initialising from World Health Organization/UNICEF Joint Monitoring Programme data

450 000 hectares by mid-century. (A reminder: at present, only 11 600 hectares are actually irrigated.)

To account for the costs, investment in agriculture increases from the current estimate of US\$834 million to US\$1.4 billion by 2035 and US\$2.2 billion by 2050, compared to the Current Path forecast of US\$1.9 billion for that year.

Crop production increases from an estimated 18 million metric tons in 2020 to approximately 23 million metric tons by 2035 and 33 million metric tons by mid-century – 3 million metric tons higher than the Current Path forecast for that year. This scenario includes an increase in calories available to the population, thereby prioritising national food requirements over exports.

Comparing scenario impacts

Of all of the scenarios, Education & Family Planning has the most dramatic impact on GDP per capita over the short and long term in part because of the slower growth in Angola’s population size in this scenario. Figure 16 shows that in Education & Family Planning, GDP per capita is US\$220 larger by 2035 and, by 2050, is US\$2 190 larger than projected on the Current Path.

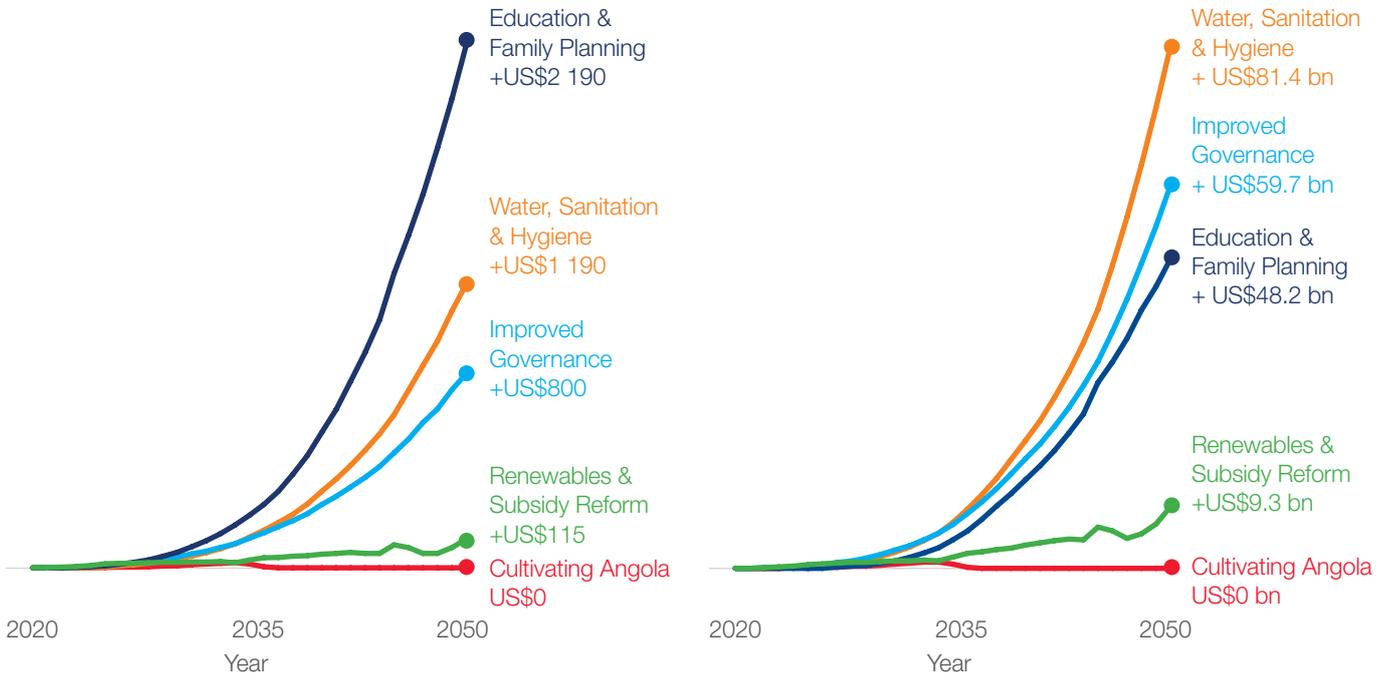
However, the Angolan economy receives the largest boost in Water, Sanitation & Hygiene. In this scenario, GDP is US\$81.4 billion larger than the Current Path projection by 2050. The Improved Governance and Education & Family Planning scenarios also grow GDP, but to a lesser degree.

Renewables & Subsidy Reform and Cultivating Angola, meanwhile, have a negligible impact (Figure 16).

The number of Angolans who are extremely poor grows in all five scenarios, reflected in the initial increase from 13.6 million extremely poor people in 2020 to peak at 17.8 million in 2028. Even with immediate economic growth and subsidies for vulnerable populations, the momentum behind Angola’s rapid population growth will continue to increase absolute poverty.

In the short term, Renewables & Subsidy Reform has the most dramatic effect on the number of Angolans who are extremely poor. By 2030, 1.3 million fewer people than currently projected will be extremely poor owing to the additional cash transfers modelled in this scenario – a result that accords with the growing literature on the success of cash transfer programmes

Figure 16: Additional GDP per capita (left) and additional GDP (right)



to combat poverty. Renewables & Subsidy Reform is also the only scenario that reduces inequality, but the improvement is modest.

The story is different in the long term. Over the next 30 years, Education & Family Planning reduces the number of Angolans living in extreme poverty more than any other scenario. By mid-century, 3.1 million Angolans

will be extremely poor – 2.8 million fewer people than projected on the Current Path (Figure 17). But the poverty rate doesn’t change substantially in this scenario. Rather, this reduction is due to the fact that Angola’s population is smaller in Education & Family Planning.

The Education & Family Planning and Renewables & Subsidy Reform scenarios also reduce the number of

Figure 17: Extreme poverty (US\$1.90 per day) in each scenario

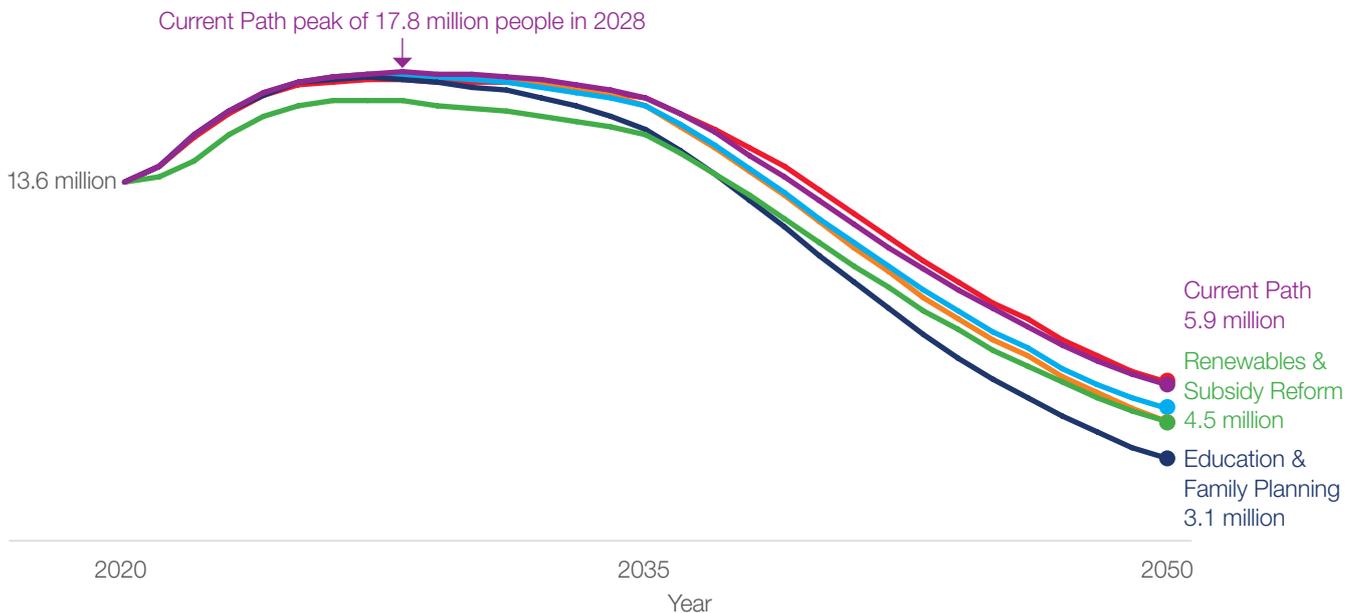
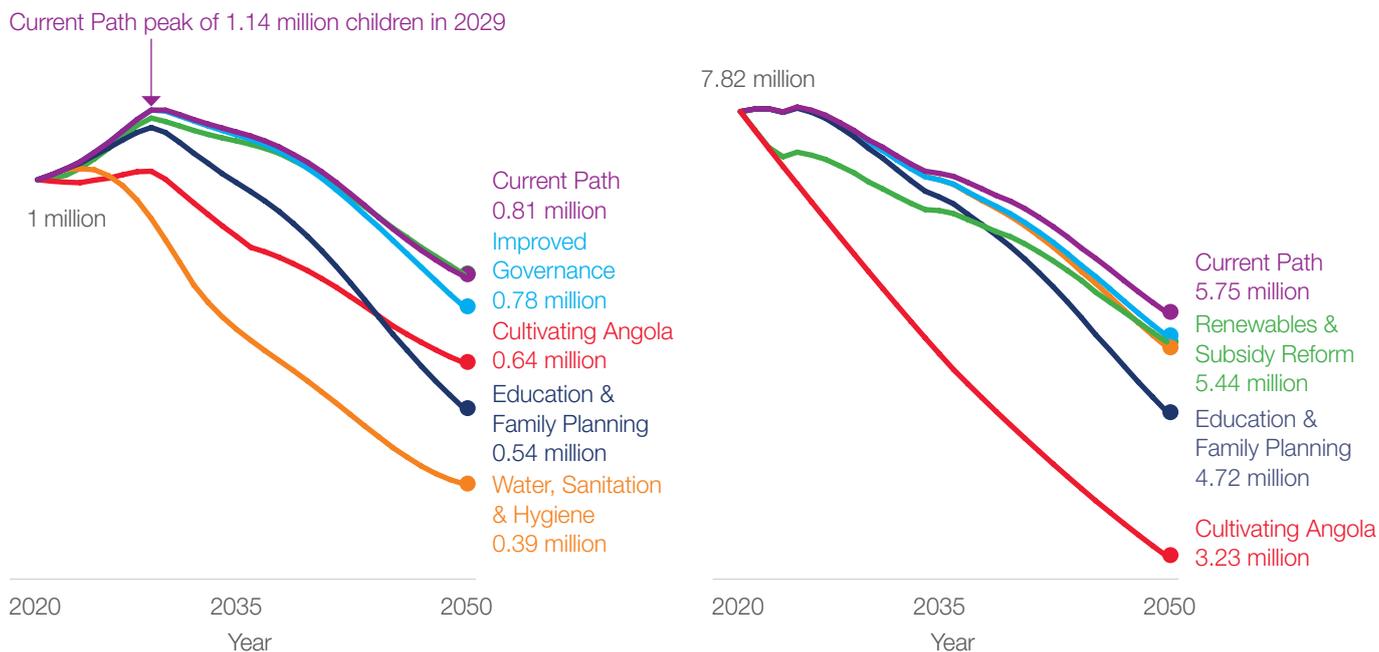


Figure 18: Differences in childhood malnutrition (left) and undernourishment in total population (right)



Angolans who are undernourished – but not nearly as much as in the Cultivating Angola scenario. The dramatic improvement in the production and distribution of crops modelled in Cultivating Angola immediately improves Angolans’ nutritional status.

In the Cultivating Angola scenario, the number of people suffering from hunger falls to just over five million within 15 years, while on the Current Path, more than seven million people would still be undernourished. By 2050, 3.23 million Angolans are undernourished in Cultivating Angola, compared to 5.75 million on the Current Path. An important reason for this large difference is that much of the additional agricultural production is orientated towards domestic consumption rather than exports.

However, malnutrition among children under five years old is more directly influenced by the lack of access to safe water and sanitation, characteristics common among poor communities. This relationship is confirmed by the Water, Sanitation & Hygiene scenario, in which child malnutrition is nearly eliminated by mid-century (the rate, or the share of the child population affected by malnutrition, falls from an estimated 17% in 2020 to 4% by 2050 (Figure 18)). The number of children suffering from malnutrition halves within 30 years. This impressive outcome

underscores the importance of WASH infrastructure to health and wellbeing, especially among children.

The cash transfers to poor communities modelled in Renewables & Subsidy Reform immediately reduce the number of children who are malnourished, highlighting that poverty, lack of WASH infrastructure and childhood malnutrition are closely interrelated in Angola.

Education & Family Planning also dramatically reduces the malnourished child population – a result due to a decrease in the total number of children, as this scenario does not reduce the childhood malnutrition rate.

Cultivating Angola, meanwhile, has the second most significant effect on the child malnutrition rate after Water, Sanitation & Hygiene. In this scenario, it reduces the rate to 10% by 2035 and 6% by 2050, translating into 640 000 children by 2050 (Figure 18).

Education & Family Planning is the only scenario that reduces Angola’s high maternal mortality ratio. Within 15 years, it falls to 254 deaths per 1 000 live births, compared to 287 deaths on the Current Path. By 2050, it falls to 10 deaths per 1 000 live births in Education & Family Planning – a mere one-twelfth (roughly) of the ratio of 118 deaths projected on the Current Path and roughly on par with the current ratios of Singapore, Lithuania and Portugal.

Recommendations

This report has shed light on some of the strategies the government of Angola may pursue to improve human development. The Current Path shows that severe poverty, food insecurity, rapid population growth, low levels of infrastructure – particularly water and sanitation – and poor health outcomes will continue to challenge Angola as it strives towards inclusive, sustainable growth. Crude oil exports have provided an unstable economic foundation on which to work towards this goal, while the legacies of war continue to undermine development.

The overarching finding is that investing in basic infrastructure such as WASH is the most effective way to improve the country's short- and long-term development trajectory. The Water, Sanitation & Hygiene scenario shows that a reasonable increase in government spending on WASH infrastructure renders widespread health and economic benefits. By mid-century, childhood malnutrition would be virtually eliminated and the economy would generate a cumulative US\$573.7 billion more than currently projected – a far larger sum than in any other scenario.

Meanwhile, a development agenda that prioritises girls' and women's access to education and healthcare – particularly reproductive healthcare – offers the fastest way to boost incomes, reduce Angola's high maternal mortality rate and decrease the number of people who are living in poverty and/or who are undernourished. Education & Family Planning also requires a broader cultural shift toward empowering girls and women with control over their reproductive health and equal access to education.

Achieving the Education & Family Planning scenario requires that the government focus on improving lower secondary education participation rates, followed by upper-secondary participation rates. Once the bottlenecks at these levels have been overcome, average levels of education will improve and the government will, eventually, be able to shift its attention to tertiary education.

Implementing cash grants to the poor is the fastest way to alleviate extreme poverty and reduce inequality. The Renewables & Subsidy scenario requires that the government follow through with its plan to cut subsidies on jet fuel, diesel and other commodities. This policy path would grant momentum to the national shift towards renewable energy – a change that would help to diversify the economy away from oil and align Angola with the global effort to reduce dependence on fossil fuels and ameliorate the impact of climate change. Prospects for the renewable energy sector look bright, with several hydroelectricity schemes under development and growing traction for the solar industry.¹⁶⁰

Irrigating more of Angola's cropland offers the best way to dramatically reduce the child malnourishment and improve national food security. As the population continues to grow, so too will Angola's dependence on imported food.

All Angolans must be lifted out of deprivation and granted equal opportunities for prosperous, healthy lives if the nation is to achieve its ambitious goals. The economic gains of the early 2000s did not translate into better livelihoods for most Angolans. Ensuring that future wealth is inclusive and equitable will require governance to become more democratic, transparent and accountable.

Acknowledgements

We thank the following colleagues for their contributions to this report: Professor Alves da Rocha (Centro de Estudos e Investigação Científica da Universidade Católica de Angola), Gen. Brig. (Ret.) Manuel Correia Barros, Sérgio Calundungo, Celso Dala (Escola Nacional de Administração e Políticas Públicas), Eric Klisman (Escola Nacional de Administração e Políticas Públicas), Francisco Miguel Paulo (Centro de Estudos e Investigação Científica da Universidade Católica de Angola) and Carlos Vaz (Centro de Estudos e Investigação Científica da Universidade Católica de Angola).

Annex

Current Path adjustment

This report uses IFs version 7.45 with an updated SeriesGDP2011 from IFs v 7.46.

Table A1: Current Path adjustment

Parameter	Adjustment	Notes/Benchmark
Crop yields (Ylm)	Set to 0.6 in 2015; increase to 0.7 by 2050	Fixes an initialisation issue.

Project data file

The IFs model keeps historical data series in a master database file. The data in this file are taken from standard multi-country sources such as the World Bank's World Development Indicators and the Food and Agriculture Organization's FAOSTAT database.

For this project we created a project data file that overrides selected data in the IFsHistSeries.mdb as indicated in the table below.

Table A2: Project data

Series	Definition	Alternative/updated source/reasoning
AGCropProductionFAO	Total crop production	Replaces incorrect FAO data with an estimate from Universidade Catolica de Angola, Centro de Estudos e Investigação Científica.
EdPriCompletionFemale%/Male%/Total%	Primary completion rate	Updates IFs UIS series with UIS data.
EdPriEnrollGrossMalePcnt/FemalePcnt/TotalPcnt	Gross primary enrolment rate	See above.
EdSecLowerEnrollGross%Female/Male/Total	Gross lower-secondary enrolment rate	See above.
EdSecUpperEnrollGross%Female/Male/Total	Gross upper secondary enrolment rate	See above.
EdSecUpperGradRateAllFem/Mal/Tot	Upper secondary graduation rate	See above.
EdYearsAge25	Upper secondary graduation rate	See above.
EnReserGasBP	Proven natural gas reserves	Updates IFs with latest data from Oil & Gas Journal.

Series	Definition	Alternative/updated source/reasoning
EnReserOilBP	Proven oil reserves	Updates IFs with latest data from BP's Statistical Review of World Energy.
RoadsPaved%	Paved roads as share of all roads (%)	Updates IFs with estimates from multiple sources, including FAO, World Bank, African Development Bank and the government of Angola.
RoadsTotalNetwork	Total road network (km)	See above.
Vaddag% (WDI code: nv.agr.totl.zs)	Agriculture, value added, % of GDP	IFs was missing post-2001 data for Angola. WDI has 2001-2017 data for Angola, which matches BNA's National Accounts.
VaddMan% (WDI code: nv.ind.manf.zs)	Manufactures, value added, % of GDP	See above.
VaddInd% (WDI code: nv.ind.totl.zs)	Industry, value added, % of GDP	See above.
VaddSer%	Services, value added, % of GDP	See above.
EnElecTotalCapacityEIA	Total electricity installed capacity	IFs data on total electricity generation capacity did not account for recent developments. The US Commercial Service estimated Angola's installed capacity at 5.01 GW in 2016.

Scenario interventions

All adjustments made from 2020 unless noted otherwise.

Table A3: Education & Family Planning scenario interventions

Parameter	Adjustment	Notes/Benchmark
Contraceptive use rate (contrusm)	Increase to 1.5 by 2030, increase to 1.8 by 2050	<p>Angola's contraceptive use rate more than tripled between 1996 and 2015.</p> <p>In 2016, 38% (2.5m) married/in-union Angolan women between 25 and 49 wanted to use contraceptives but do not.¹⁶¹</p> <p>On the Current Path, the contraceptive rate rises from 11% in 2020 to 28% in 2040 and 38% in 2050. In this scenario, it rises twice as quickly, to 48% by 2040 and 74% by 2050. TFR consequently falls to 3.6 by 2040 and 2.3 by 2050, compared to 4.3 and 3.6 on the Current Path.</p> <p>In 1995, Ethiopia and Angola's TFR was roughly 7. By 2015, Ethiopia's TFR reduced by 38% to 4.3, while Angola's was 5.8.</p> <p>In Ethiopia, the contraceptive use rate more than doubled from 1990 to 2000 and doubled again from 2000 to 2005. From 1985 to 2015, Ethiopia reduced its TFR from 7.4 to 4.3 – a 42% decrease. From 1980 to 2015, Botswana reduced its TFR by 54% (6.2 to 2.9). Zimbabwe achieved a 46% decrease between 1970 and 2000.</p>
Primary survival (edprisum) (females)	Increase to 1.2 by 2030 and hold	On the Current Path, Angola's primary survival rate reaches 90% by 2050 – between the average projected rates for low-income Africa and other lower-middle-income Africa. This intervention brings Angola's primary survival rate up to 100% by 2050, on par with upper-middle-income Africa.
Primary survival (edprisum) (males)	Increase to 1.15 by 2030 and hold	See above.
Lower secondary transition (edseclowrstranm) (females)	Increase to 1.2 by 2030 and hold	On the Current Path, the female primary transition rate to lower secondary increases from 88% in 2020 to 93% by 2050. This intervention brings up this transition rate to 100% by 2026.
Lower secondary transition (edseclowrstranm) (males)	Increase to 1.15 by 2030 and hold	See above.
Lower secondary graduation (edseclowrgram) (females)	Increase to 1.2 by 2030 and hold	On the Current Path, the female lower secondary graduation rate reaches 73% by 2050, just below the average projected rate for other lower-middle-income Africa. This intervention brings up the female lower secondary graduation rate to 92% by 2050, just above upper-middle-income Africa.
Lower secondary graduation (edseclowrgram) (males)	Increase to 1.15 by 2030 and hold	On the Current Path, the male lower secondary graduation rate only reaches 72% by 2050, just below the average projected rate for other lower-middle-income Africa. This intervention results brings up Angola's lower secondary graduation rate to 86% by 2050, which is four percentage points above the projected rate for upper-middle-income Africa.

Parameter	Adjustment	Notes/Benchmark
Upper secondary transition (edsecupprtram) (females)	Increase to 1.2 by 2030 and hold	On the Current Path, the female upper secondary transition rate, currently estimated at 86%, only improves by three percentage points by 2050 and remains on par with low-income Africa. This intervention improves this rate to 100% by 2028, just above the projected average rate for upper-middle-income Africa.
Upper secondary transition (edsecupprtram) (males)	Increase to 1.15 by 2030 and hold	See above.
Upper secondary graduation (edsecupprgram) (females)	Increase to 1.2 by 2030 and hold	On the Current Path, Angola's female upper secondary graduation rate improves from the current estimate of 21% to 62% by 2050, just below the projected average rate of other lower-middle-income Africa. This intervention improves this graduation rate to 80% by 2050, in line with upper-middle-income Africa's projected rate.
Upper secondary graduation (edsecupprgram) (males)	Increase to 1.15 by 2030 and hold	Angola's male upper secondary graduation rate increases from 24% today to 59% by 2050 on the Current Path. This intervention improves this forecast to 71% by mid-century, on par with the projected average rate for upper-middle-income Africa.
Tertiary graduation (edtergradm)	Increase to 1.2 by 2030 and hold	On the Current Path, Angola's tertiary graduation rate increases from the current estimate of 4.% to 10% by 2050, in line with other lower-middle-income Africa. This intervention brings up this forecast to 12.4% by 2050, just above upper-middle-income Africa.
Primary education quality (edpriallqualm)	Increase to 1.1 by 2030 and hold	This intervention improves the quality of primary education in Angola to the average level of other lower-middle-income Africa by 2050. On the Current Path, Angola stays at the level of low-income Africa.
Secondary education quality (edsecallqualm)	Increase to 1.1 by 2030 and hold	This intervention improves the quality of secondary education in Angola to the average level of upper-middle-income Africa by 2050, while on the Current Path Angola stays at the level of other lower-middle-income Africa throughout the forecast horizon.
Upper secondary, vocational share	Increase to 1 by 2040 and hold	This intervention cannot be benchmarked in this scenario.

Table A4: Water, Sanitation & Hygiene scenario interventions

Parameter	Adjustment	Notes/Benchmark
Safe water access rate (watsafem) (Unimproved)	Decrease to 0.8 by 2030 and hold	The safe water access rate increases from 59% in 2020 to 99% by 2050, marking a 75% increase over 30 years. On the Current Path, it reaches only 78% by 2050. From 2000-2019, Kenya improved its safe water access rate from 53% to 70% (a 32% increase). Nigeria experienced an increase from 52% to 79% over the same period (52% increase), while Tanzania improved from 40% to 67% (68% increase).
Improved sanitation access rate (sanitationm) (improved)	Increase to 1.5 by 2025 and hold	Angola increased its improved sanitation access rate by nearly 60% between 2000 and 2010 (from 21% to 33%). In this scenario, it increases from 42% in 2020 to 95% by 2050 (marking a 74% between 2020 and 2035 and another 30% over the next 15 years). On the Current Path, the rate only increases to 67% by mid-century. From 2000 to 2015, Cambodia increased its access rate from 12% to 50% (more than a tripling). Burkina Faso doubled its access rate over the same period. Meanwhile, Rwanda improved from 44% to 62% (a 41% increase).
Reduce military spending (GDSM, military)	Decrease to 0.8 by 2030 and 0.7 by 2050	This intervention decreases government spending on the military from an estimated 3.2% of GDP in 2020 to 2.6% of GDP by 2025 (rather than 3.1%) and remains relatively steady thereafter.

Table A5: Cultivating Angola scenario interventions

Parameter	Adjustment	Notes/Benchmark
Calorie demand per capita	Increase to 1.15 by 2035 and hold	This intervention improves calories available per capita from the current estimate of 2 580 calories to roughly 3 100 by 2035 and 3 350 by 2050—between the projected number of available calories for upper-middle-income Africa and OECD countries. On the Current Path, calories available per capita only increase to roughly 3 000 by 2050. From 2005 to 2015, Angola increased calories available per capita by 21% (1 901 to 2 298). Algeria increased calories available per capita by 12.5% between 1984 and 1985 (2 195 to 2 469); Burkina Faso, by 14% between 2005 and 2015 (2 296 to 2 623).
Land equipped for irrigation (landirareaequipm)	Increase to 1.25 by 2030, hold until 2032; decrease to 1.1 by 2050	Land equipped for irrigation doubles by the early 2030s to 176 000 hectares, doubles again by 2040 and reaches 450 000 hectares by mid-century, or 12% of maximum irrigable land. Land actually irrigated increases from 11 700 hectares to 18 600 hectares by 2030, 48 000 hectares by 2040 and 60 000 hectares by 2050. At present, Angola has five million hectares of cropland. From 2006 to 2010, Ethiopia, coming off of a similarly low base, increased its equipped area from 197 000 hectares to 687 000 hectares – a 250% increase in 4 years. Kenya achieved a 50% increase in equipped area between 1992 and 2003. Australia doubled its equipped area between 1982 and 1992.
Investment in agriculture (aginvm)	Increase to 1.2 by 2025 and hold	This intervention increases investment in agricultural technologies (GMOs, etc) from the current estimate of US\$732 million (2011\$) to US\$2 billion (2011\$ by 2050, compared to US\$1.6 billion on the Current Path (2011\$).

Table A6: Renewables & Subsidy Reform scenario interventions

Parameter	Adjustment	Notes/Benchmark
Energy production from hydro resources (enpm, hydro)	Increase to 2 by 2050	<p>Angola's hydropower potential is 'among the highest in Africa'.¹⁶² Hydro energy production already rises dramatically in the Current Path, increasing seven-fold from 2020 to 2050. In this scenario, it increases from 5.6 MBOE in 2020 to 75 MBOE in 2050.</p> <p>Angola nearly tripled its hydro energy production 2005-2015 (from 1.4 MBOE to 3.2 MBOE).</p> <p>From 1971-2001, China increased its hydro production from 14 MBOE to 175 MBOE (an 1 150% increase). (Granted, China is one of the largest hydroelectricity producers in the world.)</p>
Energy production from other renewable resources (enpm, OtherRenew)	Increase to 2 by 2050	<p>Angola has significant wind, solar and geothermal potential. On the Current Path, energy from 'other renewables' rises from 1.1 MBOE in 2020 to 463 MBOE by mid-century. In this scenario, it rises to 810 MBOE by 2050 – roughly equivalent to IFs estimate of China's other renewable capacity in 2019.</p> <p>In this scenario, Angola would be the 12th largest producer of 'other renewable' energy in the world in 2050; on the Current Path, Angola is the 19th largest producer by 2050.</p> <p>From 1992 to 2014, China increased its 'other renewable' energy production from 1 MBOE to 358 MBOE.</p>
Rate of technical advance in renewable energy (etechadv)	Set to 0.01. ('high')	This intervention cannot be benchmarked in this scenario.
Transfers to skilled population (govhtranm, skilled)	Decrease to 0.5 by 2025 and hold	This intervention decreases subsidies on commodities typically targeting the middle class and wealthy (e.g., fuel and jet fuel). These items are heavily subsidised in Angola, and the government has announced plans to reduce or remove these subsidies.
Transfers to unskilled population (govhtranm, unskilled)	Increase to 1.2 by 2023 and hold until 2030; decrease to 1.1 by 2050	Increases cash transfers to the poor (i.e. welfare transfers) from the current estimate of 7.9% of GDP to 9.6% by 2022 and slowly to 10% by 2050. On the Current Path, welfare transfers decline as a 5 of GDP until the mid-20s0s before rising to 9.3% by 2050.

Table A7: Improved Governance scenario interventions

Parameter	Adjustment	Notes/Benchmark
Governance regulatory quality (govregqualm)	Increase to 1.1 by 2030 and hold	All of the governance interventions for this scenario bring Angola above the average forecast for other lower-middle-income Africa by 2050.
Governance effectiveness (goveffectm)	Increase to 1.1 by 2030 and hold	See above.
Corruption (corruptm)	Increase to 1.1 by 2030 and hold	See above.
Democracy (democm)	Increase to 1.2 by 2030 and hold	See above.

Notes

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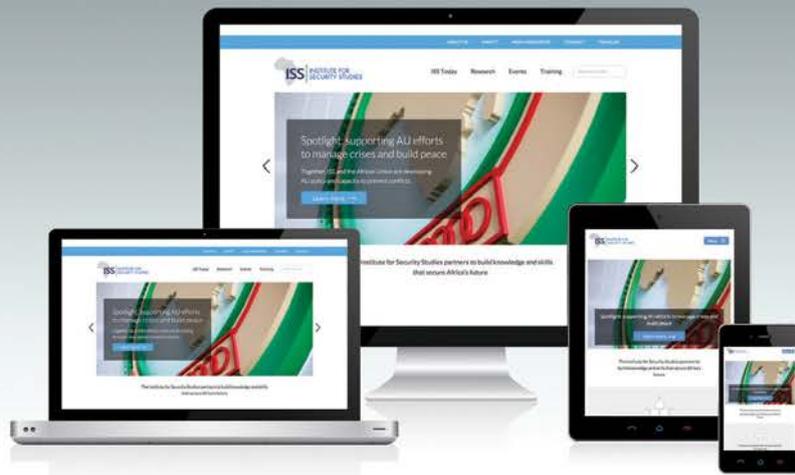
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- 148 The V-Dem codebook provides the following clarification of its electoral democracy index: 'The electoral principle of democracy seeks to embody the core value of making rulers responsive to citizens, achieved through electoral competition for the electorate's approval under circumstances when suffrage is extensive; political and civil society organizations can operate freely; elections are clean and not marred by fraud or systematic irregularities; and elections affect the composition of the chief executive of the country. In between elections, there is freedom of expression and an independent media capable of presenting alternative views on matters of political relevance. In the V-Dem conceptual scheme, electoral democracy is understood as an essential element of any other conception of representative democracy — liberal, participatory, deliberative, egalitarian, or some other.' (39).
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