

Race to sustainability?

Egypt's challenges and opportunities to 2050

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Egypt is breaching the boundaries of sustainable development with its rapid population growth and increasing water scarcity. These two factors will test all aspects of the country's economic development. This report presents Egypt's challenges and opportunities on its current development trajectory followed by a set of seven sectoral interventions that could set the country on a path of inclusive and sustainable development to 2050.

Key findings

- ▶ By 2050, Egypt is projected to have a population of nearly 150 million.
- ▶ Inadequate female participation in the labour market is one of the key factors contributing to the high total fertility rate, particularly in rural areas.
- ▶ Cairo is the fastest growing city in the world and rapid urban population growth will strain the provision of basic services like water and sanitation.
- ▶ Egypt is projected to experience a critical water shortage by 2025, a crisis likely to be exacerbated by the controversy over the Grand Ethiopian Renaissance Dam and upstream condition of the Nile, especially during drought.
- ▶ Economic growth has been slow because of poor governance, patronage politics, and a large informal sector.
- ▶ Egypt's economy has stabilised since the tumultuous events of 2011 and recent macroeconomic reforms have promoted resilience even amid the COVID-19 pandemic.
- ▶ Egypt faces a high burden of non-communicable diseases and this will increasingly strain the health system. Poor working conditions for its medical personnel have also instigated the emigration of many of its trained doctors to the detriment of the country's public healthcare system.
- ▶ Educational outcomes are generally good, but bottlenecks have emerged at secondary and higher education levels.
- ▶ Although Egypt has increased agricultural production, over 40% of food needs are met by imports, mostly wheat.

Recommendations

- ▶ Egypt should promote inclusive family planning practices as a shared responsibility between men and women, increase access to modern contraceptives and reduce barriers to the participation of women in the economy.
- ▶ Egypt should prioritise better management and efficient use of its water resources, particularly in the agricultural sector, which consumes over 80% of its freshwater resources.
- ▶ Enforcement of labour laws and standards could facilitate greater female participation in the economy, promote greater benefits for workers, reduce the size of the informal economy and increase tax revenues for the government.
- ▶ Egypt should continue with its economic reform agenda to promote competition and boost productivity to curb issues like unemployment.
- ▶ Egypt should promote greater food security by farming crops in which it has a comparative advantage and efficiently producing crops like wheat that support its food subsidy programme.
- ▶ The government needs to promote awareness and invest in a horizontal health system with greater capacity to deal with non-communicable diseases.
- ▶ Egypt needs to encourage greater investment in renewable energy sources to meet the rising demand and to adapt to the impact of climate change.
- ▶ The country should promote good governance and civil liberties to reduce the risk of instability given its relatively large youth bulge amid economic challenges.

Introduction

Egypt is Africa's third largest economy and is classified by the World Bank as a lower-middle-income country. It has seen significant progress in many human development indicators but still experiences a number of challenges. According to the 2020 Human Development Report, Egypt ranked at a lowly 116th out of 189 states.¹

In 2019, Egypt's population surpassed the 100 million mark, most of which is concentrated in cities, along the fertile soils of the Nile valley and in the delta that constitutes about 4% of its total arable land area. Cairo is reportedly the fastest growing city in the world. The rapid population and urban expansion will further strain the provision and access to basic services like water and sanitation, especially to the 10 million to 12 million Egyptians living in informal settlements in cities.

The country is projected to experience a critical water shortage by 2025. This is a particularly troubling development as Ethiopia recently started filling the massive Grand Ethiopian Renaissance Dam (GERD) on the upper reaches of the Blue Nile on which Egypt depends for its water supply.²

Egypt's economy has largely stabilised since the tumultuous events of 2011. Recent macroeconomic reforms have also promoted resilience even amid the COVID-19 pandemic. The size of the economy in 2019 was approximately US\$348.8 billion, making it the third largest economy in Africa after Nigeria and South Africa. Gross domestic product (GDP) per capita in 2019 stood at about US\$11 816 (2017 US\$ at purchasing power parity, or PPP) and by 2050 it is projected to increase to about US\$19 910.

Despite reduced labour force participation, relatively high unemployment rates and challenges in key sectors like tourism, manufacturing, transportation (particularly revenues from the Suez Canal) and oil and gas industries, the economy is expected to rebound to about 5.8% GDP growth between 2021 and 2022. This is an improvement from 3.6% in 2019/20,³ and as COVID-19 vaccines are rolled out.

Egypt has also made great efforts to alleviate poverty in addition to providing subsidies on basic commodities. The country first started testing conditional cash transfer programmes in 2009, a process that was

interrupted by the Arab Spring uprising of 2011.

Since 2015, the government has allocated significant expenditure in budgetary allocations for subsidies, grants and social benefits, which have played an important role in poverty reduction.

Despite this effort, almost a quarter of Egypt's population (22.8 million) survive on less than US\$3.20 a day (the poverty level for lower-middle-income countries),⁴ thus earning or consuming less than they need to achieve adequate nutrition, shelter and other basic necessities.

Educational outcomes are generally good, but bottlenecks have emerged at secondary and higher education levels. The country has a 0.49 score (the index ranges between 0 and 1) in the Human Capital Index of 2020 – a score slightly lower than the Middle East and North Africa's average at 0.51 but slightly higher than that of sub-Saharan Africa (0.40).

Egypt has seen significant progress in many human development indicators but still faces several challenges

The government has plans to reform the education system by improving teaching and learning conditions and better regulating and designing higher learning to meet the needs of the labour market.

The health system in Egypt is set to get a boost with the introduction of the Universal Health Insurance System to facilitate access to primary universal healthcare in the country. However, Egypt already suffers from a high prevalence of non-communicable diseases. Inadequate health facilities and poor working conditions for its medical personnel have also instigated the emigration of many of its trained doctors to the detriment of the country's public healthcare system.

Although Egypt has increased agricultural production, the sector needs major reform to focus and incentivise production of goods in which Egypt has a comparative advantage, like vegetables and fruits. Over 40% of food needs are met by imports, mostly wheat, which is the primary raw material facilitating Egypt's food subsidy scheme.

In light of its huge population, shrinking agricultural land, water scarcity and other effects of climate change, Egypt remains food insecure and vulnerable to international price shocks and disruptions in supply chains.

Overall, achieving prosperity and development envisioned in Egypt's Vision 2030 and beyond is unsustainable, if not impossible, without adequate water supply. Resolving upstream water supply issues regarding the Nile and the GERD, as well as better water management within the country, is critical if Egypt is to meet its national needs and goals.

Purpose and scope

This report presents an integrated analysis of Egypt's likely future development trajectory (also known as the Current Path) to 2050 in line with its strategic vision plan (Cairo 2050). The study primarily uses the International Futures (IFs) forecasting platform and

complements the analysis with other data sources and qualitative research.

The analysis is then supplemented with scenarios that present the impact of alternative policy orientations that Egypt could prioritise for more rapid sustainable development.

All GDP and GDP per capita figures in this report are converted into 2017 US\$ (from 2011 US\$), unless indicated otherwise.

Background

Egypt gained independence from the United Kingdom following the 1952 revolution by the 'Free Officers' led by General Gamal Abdel Nasser. Nasser ruled the country until 1970, followed by Anwar Sadat, whose assassination in 1981 gave way to Hosni Mubarak's regime.⁵

Box 1: International Futures modelling platform (IFs) and Current Path

The IFs modelling platform is a global long-term forecasting tool that integrates human, social and physical development systems that can be grouped into 12 sub-components: demography, economy, government finance, education, health, agriculture, environment, energy, infrastructure, technology, governance and international politics.

The IFs tool draws from multiple modelling methods and established academic theoretical research to form a series of relationships in global systems and to generate its forecasts.

IFs is developed and hosted by the Frederick S. Pardee Center for International Futures at the Josef Korbel School of International Studies, University of Denver. The model is an open-source tool and can be downloaded for free at www.pardee.du.edu. This project uses IFs version 7.63 for its analysis.

The IFs Current Path is a dynamic scenario that imitates the continuation of current policies and environmental conditions. The Current Path is therefore in congruence with historical patterns and reproduces a series of non-linear dynamic

forecasts endogenised in relationships across crucial global systems. The Current Path assumes no unprecedented shocks like radical policy changes or natural catastrophes in the system. It serves as a good starting point to begin understanding how future trends might play out and upon which to build alternative scenarios.

The IFs system allows for the adjustment of the Current Path with data that better reflects prevailing conditions or circumstances in any of these countries. The adjustments made in the IFs Current Path for this project are reflected in the annex.

The data series in IFs comes from a range of international sources like the World Bank, World Health Organization and various United Nations bodies like the Food and Agriculture Organization and United Nations Population Fund, etc.

Because IFs produces forecasts that move beyond a linear extrapolation, its forecasts have historically been comparable to the data that is ultimately released by international organisations.

Box 2: Comparison groups

To create comparisons across countries and regions, we use the World Bank's classification of economies into low-income, lower-middle-income, upper-middle-income and high-income groups for the 2021/2 fiscal year.⁶

The World Bank classifies Egypt as one of 23 lower-middle-income economies in Africa. The other lower-middle-income countries in North Africa are Tunisia, Mauritania, Morocco and Algeria.

However, Egypt straddles various identities that go beyond income-based comparisons. It is part of both

the African region and the Middle East and North Africa (MENA) region, and shares characteristics with both. For this reason we tend to use the global lower-middle-income group of countries for comparative purposes in addition to regions such as sub-Saharan Africa, where appropriate.

When Egypt is compared with country groups, it is excluded from that group to maintain the accuracy of the comparison, hence the use of 'other' (e.g., 'other lower-middle-income').

The Arab Spring of December 2010 eventually forced Mubarak to resign in February 2011. Grievances such as corruption, poverty and political oppression saw thousands of protesters in downtown Cairo and countrywide organise demonstrations. The Supreme Council of the Armed Forces eventually intervened, imposed martial law, suspended the Constitution and dissolved the People's Assembly. A transitional body held the fort for six months in preparation for fresh elections.⁷

President Sisi has reduced social turbulence but has also shrunk the democratic space in Egypt

The process towards fresh elections was characterised by a series of controversial events until, in June 2012, Mohamed Morsi was declared president. His reign was turbulent and short-lived. In June 2013, the military temporarily suspended (and amended) the Constitution and relieved Morsi of the presidency.⁸

In May 2014, Abdel Fattah Al-Sisi, a former general in the armed forces and minister of defence, resigned from the military to run in the race and was declared winner. The elections were controversial, including his landslide win against his only opponent, leftist Hamdeen Sabahi.⁹

President Sisi has sought to restore law and order and has embarked on a broad range of economic reforms. His style of leadership has reduced the social turbulence

that characterised the last decade but has also shrunk the democratic space in Egypt.¹⁰ Controversial elections in 2018 saw him retain the presidency with 97% of the vote.¹¹

In 2019, further constitutional amendments were undertaken, and have cemented the role of the military in politics and public life. Also, the presidential term limit was extended to six years, but reaffirmed the two-term limit. (Although one of the amendments in this section allows Sisi, already in his second term, to run for a third six-year term in 2024.) The position of vice-president was reconstituted. The president also appoints judges and one third of the members of the new upper chamber (i.e., the senate).¹²

The security situation has remained fragile, however, especially in the Sinai Peninsula, despite large security efforts.¹³

Nonetheless, the Government of Egypt (GoE) under Sisi has taken steps to restructure the economy, assisted by an International Monetary Fund (IMF)-induced reform package. It has passed laws to attract investment, introduced tax reforms, embarked on various austerity measures to rein in government expenditure, and on numerous large infrastructure projects to boost economic activity in the country.

Although the macroeconomic indicators have improved, the country still suffers from the impact of fiscal and monetary instability and is bogged down by the range of reform it has to pursue to unlock growth. Currency depreciation, inflation and budget deficits remain a

challenge. Additionally, austerity measures such as cuts in subsidies and reduced spending on education and health pose challenges given Egypt's rapid population growth, high levels of poverty, and unemployment.¹⁴

Sisi has placed a premium on economic growth¹⁵ but the economy suffers under the inordinate role of the military in all aspects of life, monopolies/lack of competition and state control of the economy. The result is an inevitable cycle of protests and hard-handed reaction.¹⁶

Even though Egypt is divided into 27 governorates, the administrative structure is centralised with governors and other executive officials being appointed by the president and thus serving at his discretion. Decentralisation is thus limited to administrative functions without the devolution of any real decision-making powers as envisaged in the Constitution.

Instead the country is strongly hierarchical with the presidency at the helm. Revenue collection, for example, is centralised, with over 90% of the revenue collected by the central government.¹⁷

According to the Polity IV index of regime type hosted by the Center for Systemic Peace, Egypt ranks as an anocracy or mixed regime. In 2017, the country scored -4 on the Polity IV composite index on a score ranging from -10 (a hereditary monarchy) to +10 (a consolidated multiparty democracy).¹⁸ Mixed regimes are inherently

more unstable than a full autocracy or democracy because they have a combination of democratic and authoritarian components, reflecting weak institutions and personality politics that result in zero sum outcomes.¹⁹

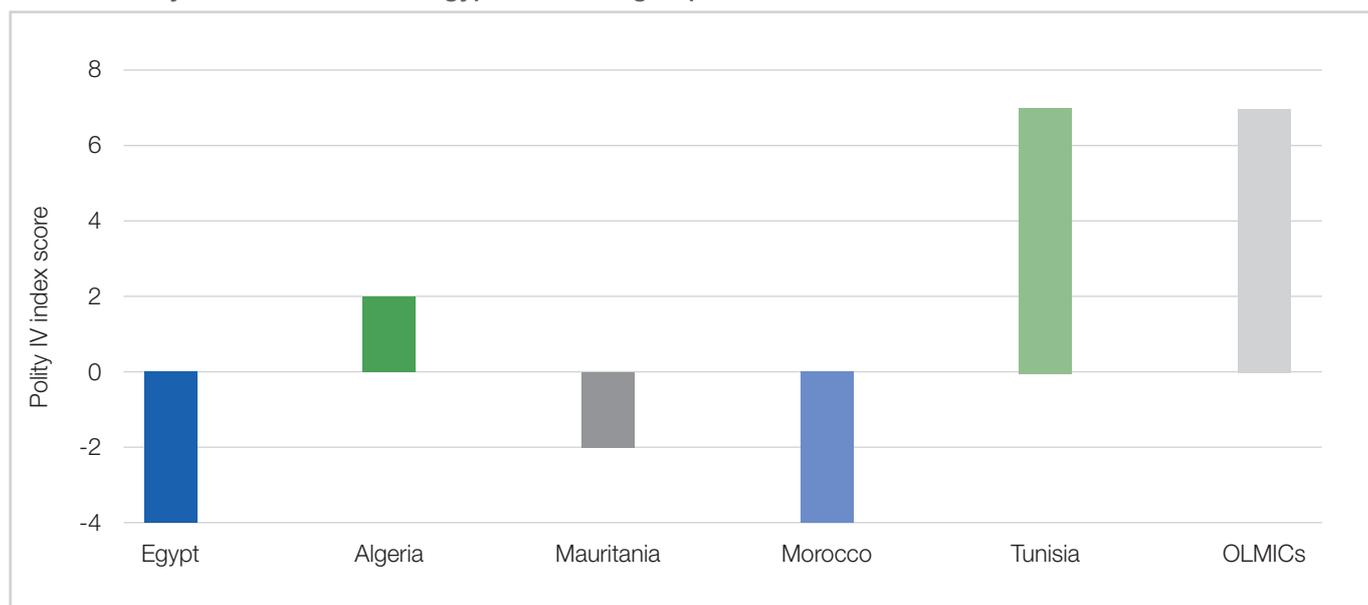
Compared to its North African neighbours, Egypt is more corrupt than Tunisia, Morocco and Algeria

Chart 1 below compares Egypt, other North African countries and the average of other lower-middle-income countries (OLMICs) on the Polity IV index. Egypt's score ranks close to Morocco and is significantly below the average for OLMICs.

When it comes to corruption, Egypt ranks 117th out of 180 countries with a score of 33 out of 100, according to Transparency International's 2020 Corruption Perceptions Index. Compared to its North African neighbours, Egypt is more corrupt than Tunisia, Morocco and Algeria.²⁰

Baksheesh (meaning payment – such as a tip or bribe – to expedite service) remains a huge challenge to the economy and investment. A poor legal framework and abuse of office by public officials make enforcement quite difficult even within the existing legislation which criminalises corruption under Egyptian law.²¹

Chart 1: Polity IV index for 2017 – Egypt and other groups



Source: Polity IV data

Today Egyptians generally associate the 2011/12 revolution with political instability and economic downturn,²² and achieving social equity and the general welfare of the population is their overriding priority. The level of trust in the government's political and administrative system is low, and the government's inability to deliver on major socio-economic issues for the population is slowly making its supporters passive and emboldening the stance of those opposed to the regime.²³

The following sections will analyse how Egypt's governance and public policy choices have thus far influenced development sectors in population, education, health, basic infrastructure and agriculture.

Population

Most of Egypt's population lives in the urban agglomerations of Cairo and Alexandria, and rural areas along the Nile. The population density along the Nile is among the highest globally at more than 2 000 people per square kilometre. Other small communities are spread throughout the desert around the oases and historic trade routes.

Egypt's population is currently estimated at 102.5 million, and by 2050, the country will have approximately 150 million people. This represents a 45.5% increase in

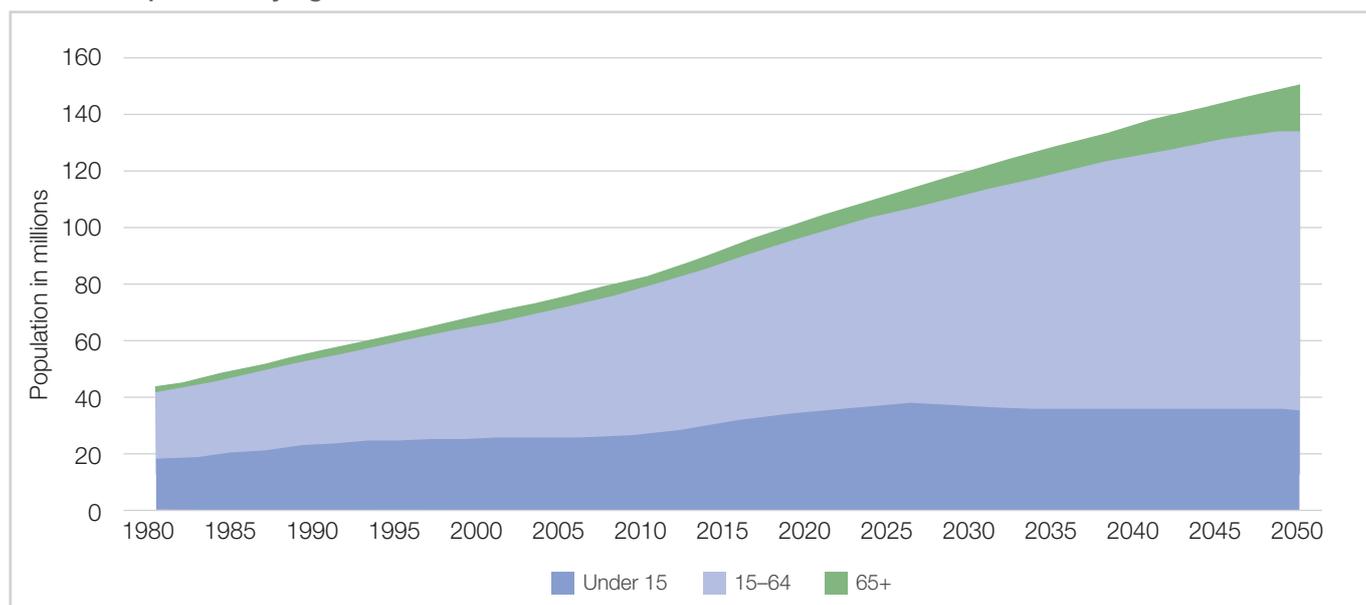
the total number of people over the next 30 years. The country had an average population growth rate of 2.1% between 2010 and 2020, and is projected to average 1.3% between 2021 and 2050.

The population under 15 years old has been on an upward trend since 2008 and in 2020 accounted for nearly 34% of the population (34.7 million people). The proportion of this youthful and dependent population is expected to gradually decline to constitute 23% of the population, although the absolute number of people will remain fairly unchanged at 34.4 million by 2050.

The population aged between 15 and 29 years accounted for 24.5% of the population (25.2 million people) in 2020, and by 2050 will have slightly declined to account for about 23% of the population (34.9 million people). This relatively large youth bulge can increase the likelihood of instability if their needs are not accommodated.

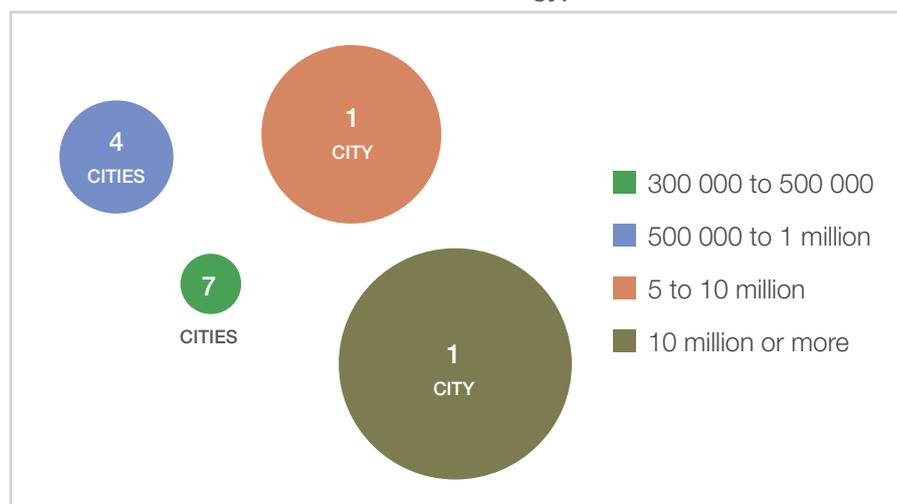
About 36% of the population (37 million people) are aged between 30 and 64 years and by 2050 will account for nearly 43% (63.8 million) of Egypt's total population. The ratio of people aged 65 years and over is relatively small at 5.5%. But by 2050 it will account for 10.8% of the population (16.1 million people) – double the current rate – and represent about 10.5 million more people in this age cohort than in 2020. Chart 2 summarises the population cohorts in Egypt to 2050.

Chart 2: Population by age cohorts



Source: IFs v 7.63, historical data from UN Population Division (UNPD)

Chart 3: Urbanisation and settlements in Egyptian cities 2018



Source: UN DESA, Population Division (2018). World Urbanization Prospects: The 2018 Revision, custom data acquired via website

Most of the population live in rural (57%) rather than urban centres (43%), but the urban population is expected to outnumber the rural population by 2041, with 69 million people²⁴ living in areas categorised as urban.

Only 13 of Egypt's cities have a population of more than 300 000. Eleven of them have inhabitants of under 500 000, while the two largest cities, Alexandria and Cairo, have five million and 20 million people respectively. By 2030, Cairo is projected to have 25 million people.²⁵

Egypt currently has an annual urban growth of 2%, meaning that Egyptian cities need to accommodate nearly one million additional people every year. Cairo alone saw 500 000 new inhabitants in 2017, making it the fastest growing city in the world.

In the Greater Cairo region, nearly two thirds of the population live in informal settlements characterised by poor urban planning and low levels of access to water and sewage amid increasing droughts because of climate change. As a result, Cairo is considered to be one of the most threatened cities globally, especially because Egypt is forecast to experience a critical water shortage by 2025.²⁶

The continued rapid increase in Egypt's population is a result of two things. First, high total fertility rates (TFR) in many parts of the country, particularly in the poorest governorates, are significantly higher than the national average of 3.2 children per woman of childbearing age. Most of these governorates are in rural Upper Egypt and informal settlements in cities.

A study by the United Nations (UN) Population Fund found that in 2018, fertility rates reached 2.75 in urban governorates, compared to 3.52 to 3.93 for both Upper Egypt and border governorates, respectively.²⁷

Although the national TFR has been declining from the 1990s rate of five children per woman, it is still well above the rate needed to reach population

25 million

CAIRO'S ESTIMATED
POPULATION BY 2030

stabilisation. In fact, between 2008 and 2014, Egypt's TFR increased from three to 3.5 per woman.²⁸ On the Current Path, Egypt is forecast to only achieve the replacement level of 2.1 children per woman by 2043.

Second is the phenomenon of population momentum since a large proportion of women are in their childbearing years. In Egypt, the total number of births is bound to increase even though the total number of children per woman of childbearing age is falling.²⁹

Before 2000 contraception use had the largest suppressing effect on fertility. However, since then there has been no change in the impact of either the average age of marriage or contraception on fertility.

Findings suggest that access to labour market opportunities for well-educated women between 20 and 29 years could postpone the decision to have children.³⁰

The barriers to greater employment for women in Egypt include high cost of childcare and poor enforcement of anti-discriminatory laws.³¹ In fact, many firms don't employ women because they don't want to give benefits like maternity leave and comply with legal frameworks

that require an employer to have childcare when there are more than 90 female employees.³²

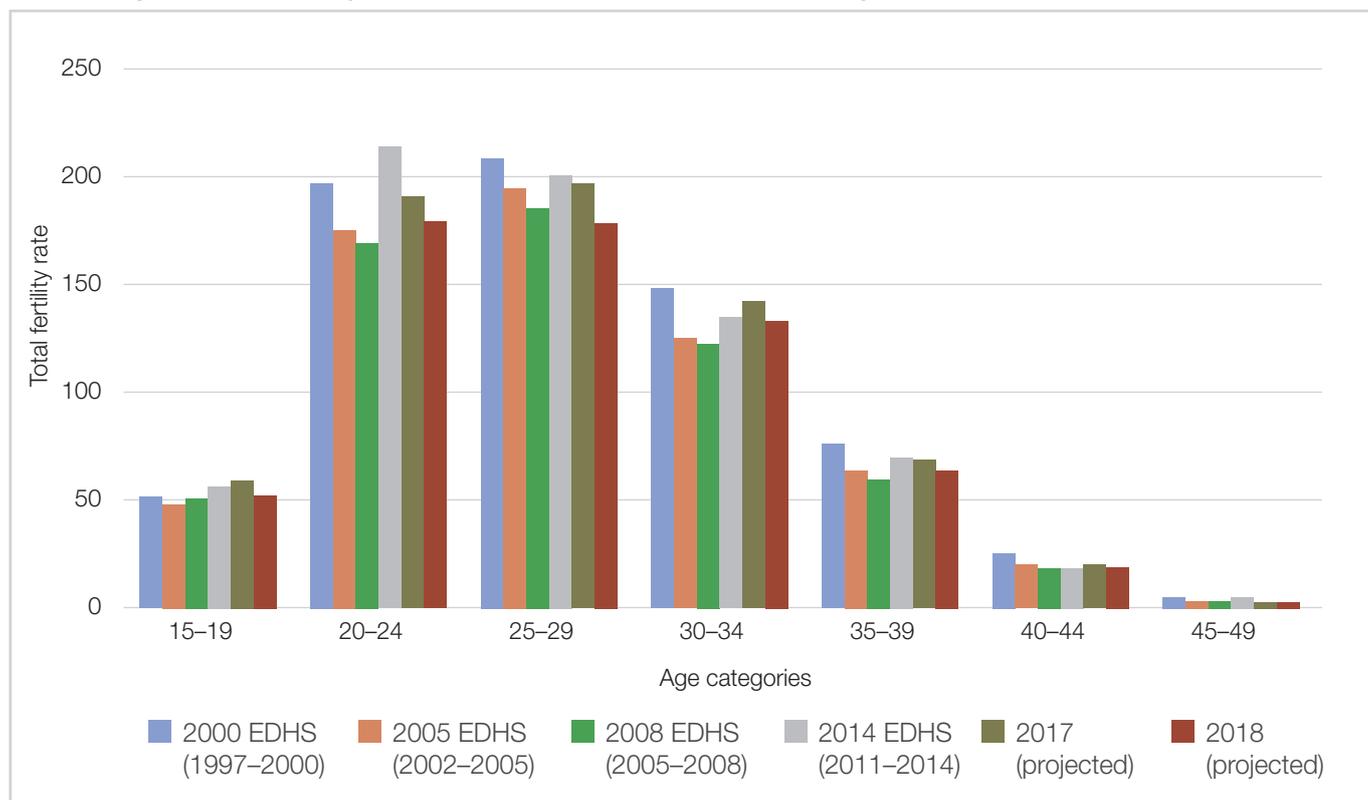
A 2012 study estimated that if female employment rates were to match male employment rates in Egypt, the gross domestic product would increase by 34%.³³

Rapid population growth undermines quality of life in terms of health, nutrition and employment

Even after Egypt reaches the replacement level in 2043, population growth will continue for a number of years, albeit much slower. IFs projects that between 2043 and 2050, Egypt's population will increase by about nine million people.

Rapid population growth as a result of high fertility rates and population momentum will have costly repercussions for Egypt's economy and human development prospects. It inevitably contributes to the deterioration of quality of life in terms of health, nutrition,

Chart 4: Age-specific fertility rates (per 1 000 women) and total fertility rate for 2008–2018



Source:³⁴ 1. Egypt Demographic Health Surveys³⁵ 2. 2017 and 2018 are author's³⁶ calculations

access to employment and other basic yet scarce commodities such as water for which Egypt already experiences stress.

Although Egypt has a strong family planning programme and lower rates of unmet contraceptive needs than most countries on the continent and in the MENA region, a considerable portion of Egyptian women still do not use or have access to modern contraception.

In 2014, unmet need for family planning was 12.6% and contraceptive use was 59%. In 2018, the overall prevalence rates of unmet need for family planning and contraceptive use in rural areas were estimated at 11.2% and 69.5% respectively. The total demand for family planning was 80.7%.³⁷

Socio-economic factors are some of the reasons cited for women having unmet needs for family planning.³⁸ Some of the risk factors for unmet family planning needs include the perception that more than three children are ideal, lack of female empowerment with husbands still being the main decision makers and disapproving of family planning, and inadequate labour market opportunities for women.³⁹

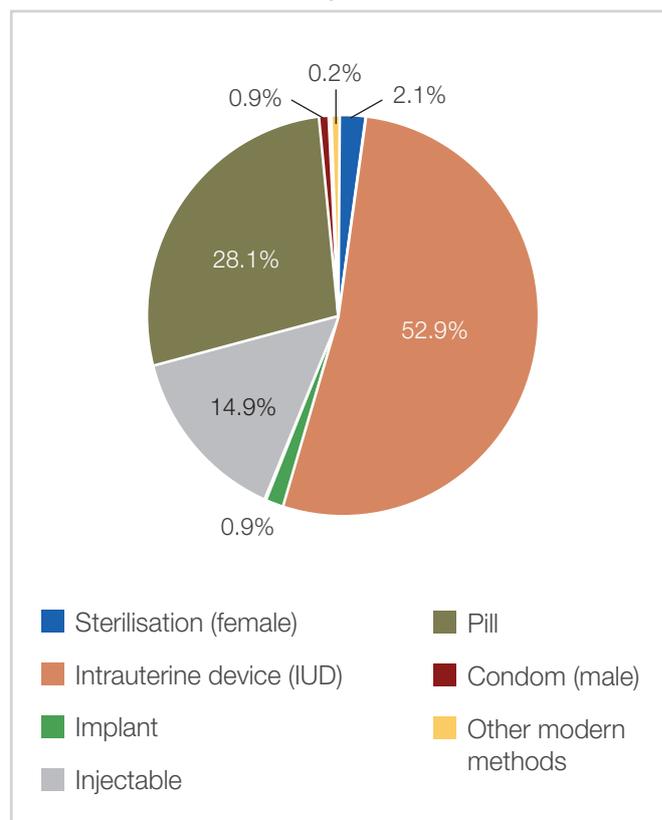
For at least the next two decades most families will have limited disposable income to save or invest

Finding the direct and indirect reasons hampering women from using modern contraception could help decision makers to address the challenge of overpopulation in the country and between regions.⁴⁰ Projections estimate that if use of modern contraception were to rise to 74.4% by 2030, TFR would decline to 2.1 children per woman by 2030.⁴¹

Enabling women to make decisions on their reproductive health issues and preferences could reduce population growth by reducing unwanted pregnancies, increasing the age of women at first birth and spacing between births. However, the onus of family planning should not lie only with women.

Chart 5 showing the mix of modern contraceptive use in Egypt indicates that methods such as sterilisation are only undertaken by women. Shared effort on family

Chart 5: Modern contraceptive mix, 2020



Source: DHS 2014 – Family Planning 2020 (FP 2020; Egypt)⁴²

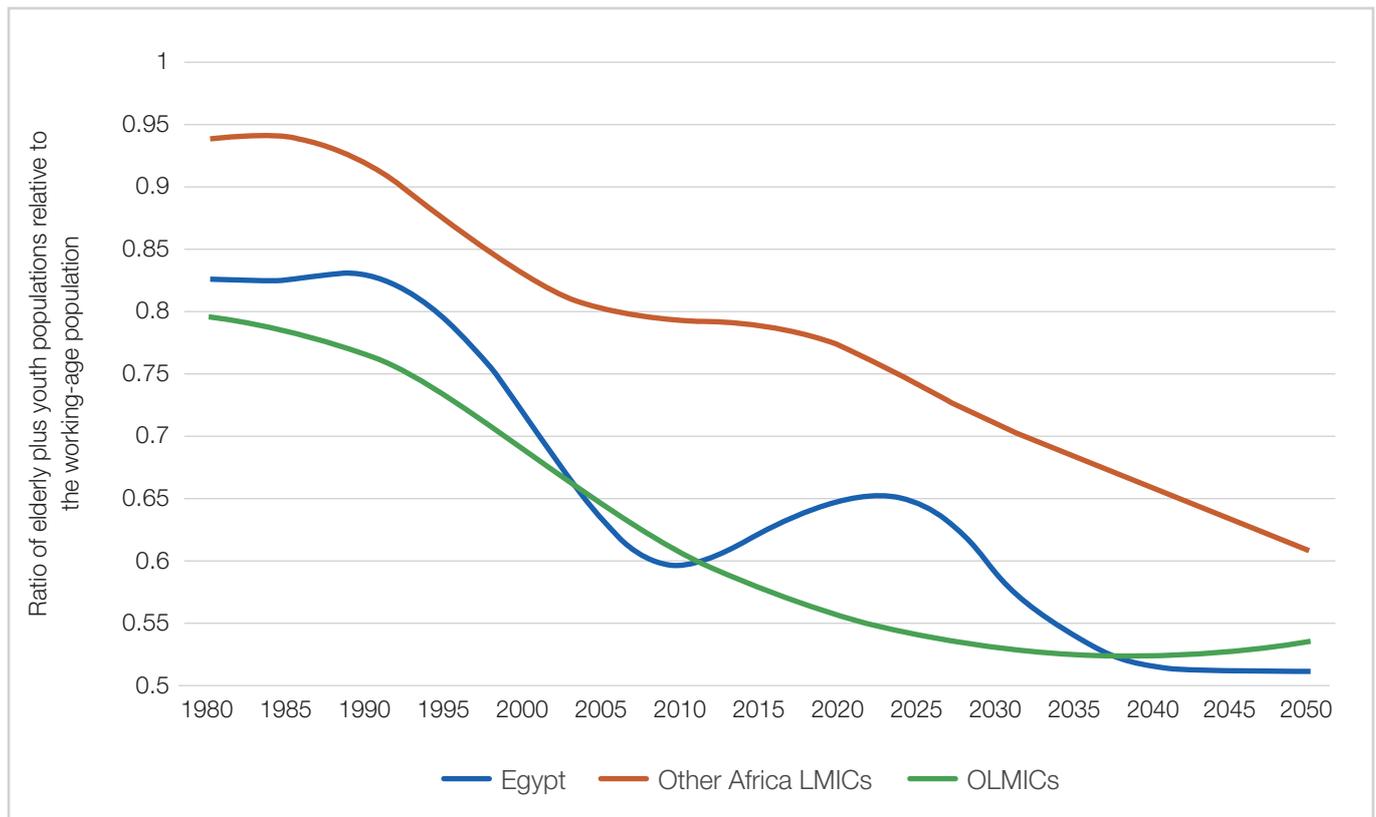
planning between men and women would probably result in healthier families and lessen the pressure on environmental and public services for the country.

Slowing down population growth would particularly reduce the number of child dependents (under 15 years old) and burden on the working-age population (people aged 15–65 years old). Currently, the dependency ratio in Egypt is 0.65 – meaning that for every 100 working people there are 65 dependents, which is better than the average for OLMICs in Africa and globally, but is still high.

The IFs forecast shows the dependency ratio will slightly decline, and by 2040 Egypt will have a dependency ratio comparable to the OLMICs average. By 2050, Egypt's dependency ratio will be lower (0.51) than the OLMICs average at 0.53.

For at least the next two decades, Egypt's working-age population will be encumbered with the responsibility of providing basic needs for its relatively large portion of dependents. This means that most families have limited disposable income to save or invest in themselves and the economy.

Chart 6: Dependency ratio



Source: IFs v 7.63, historical data from UNPD

Decreasing the rate of population growth can thus have positive socio-economic benefits in the form of a demographic dividend. This is defined as the economic growth that can result from shifts in a country's population age structure when the working-age population is greater than the dependent population.

Increased fertility is partly due to the poor labour market situation for women and the Arab Spring unrest

A demographic dividend or bonus (reliant on a healthy, and appropriately educated, population) can spur economic growth and create more job opportunities, thus reducing unemployment. In the long term it can reduce the pressure on public services and provision of basic services such as education, health and water.

Egypt experienced its first demographic dividend in 2010 when it reached a peak ratio of around 1.68 people of working age per dependent. This was slightly

lower than the average peak of other North African countries at 1.97, and nearly 40% lower than the ratio experienced by China (2.7) and other Asian Tigers in the same period.

Egypt's prospects for another demographic dividend has, however, been on the decline since 2011 and IFs projects that the country will achieve its next demographic bonus only from 2030 and peak at 1.92, and remain steady through 2050.

The decline in prospects for a demographic dividend is associated with Egypt's fertility rate, which increased quite significantly between 2008 and 2014. The trend in increased fertility rates can in part be explained by the poor labour market situation for women⁴³ and the unrest that accompanied the Arab Spring.⁴⁴ If Egypt invests in quality healthcare, appropriate education and job creation, and manages to improve stability, it will benefit more from its favourable demographic structure in the long term.

Current population projections show that Egypt will continue to have a relatively high rate of population

growth. Although family planning efforts have been successful in the past and Egypt has actually reduced its TFR, more needs to be done to ensure that the unmet need for contraception and choice of contraception, particularly among women, is met. Providing greater economic opportunities for women and reframing the population growth rate narrative as a shared responsibility between men and women could also hasten positive change in the country's quest to reduce population growth.

The government of Egypt should continue to make a push on its family planning prioritisation programme⁴⁵ if the country is to achieve other socio-economic development objectives related to its 2050 vision for the country.

Economy

Although the process of economic liberalisation in Egypt (*infitāh*) began in the early 1970s, most important sectors of the Egyptian economy remain under government control. However, concerted efforts since the 1980s to create a more resilient economy have gradually paid off. These include reduced defence expenditure and increased financing towards infrastructure projects, the development of the natural gas industry and greater foreign trade.⁴⁶ By the late 1990s, Egypt was recording marked improvement in its per capita income, a trend likely to continue over the next 29 years.

The oil and gas industry has been a huge contributor to more rapid economic growth owing to discoveries of large oil fields and the establishment of a robust oil and gas industry with dynamic legislation. In fact, by the 1990s, the country was a strategic oil producer based on fields in four areas – the Gulf of Suez, Western Desert, Eastern Desert and Sinai.

By 1998, Egypt was producing 866 000 barrels of crude oil per day. Between 1999 and 2010, the total number of discoveries had reached 489, 311 of which indicated reserves of crude oil.⁴⁷ As of 2020, production of crude oil exceeded 65 000 barrels per day.⁴⁸ Egypt's total proven reserves of 4.4 billion barrels of oil (BBOE) are expected to last the country 14 years at the 2016 rate of consumption. Proven gas reserves stand at 77 trillion cubic feet or 13 714.3 BBOE as of 2017 and are

expected to last the country another 38 years at current consumption levels.⁴⁹

By 2011, the sector was growing at unprecedented levels. It constituted nearly 70% of Egypt's foreign direct investment and contributed 16% of GDP, yet most Egyptians experienced shortages in gas, power and cooking fuel owing to inefficient and inadequate generation capacity amid rapidly rising demand.⁵⁰

Although the contribution of the hydrocarbon industry has not dominated Egypt's GDP, it has been valuable as a foreign exchange earner. Despite significant production in the sector, Egypt became a net importer of both oil and gas in 2012. In fact, the low international oil and gas prices in recent years have upended the expectations of improved balance of payment and the anticipated positive economic results. This shows the extent to which Egypt is still relatively dependent on the oil and gas industry.

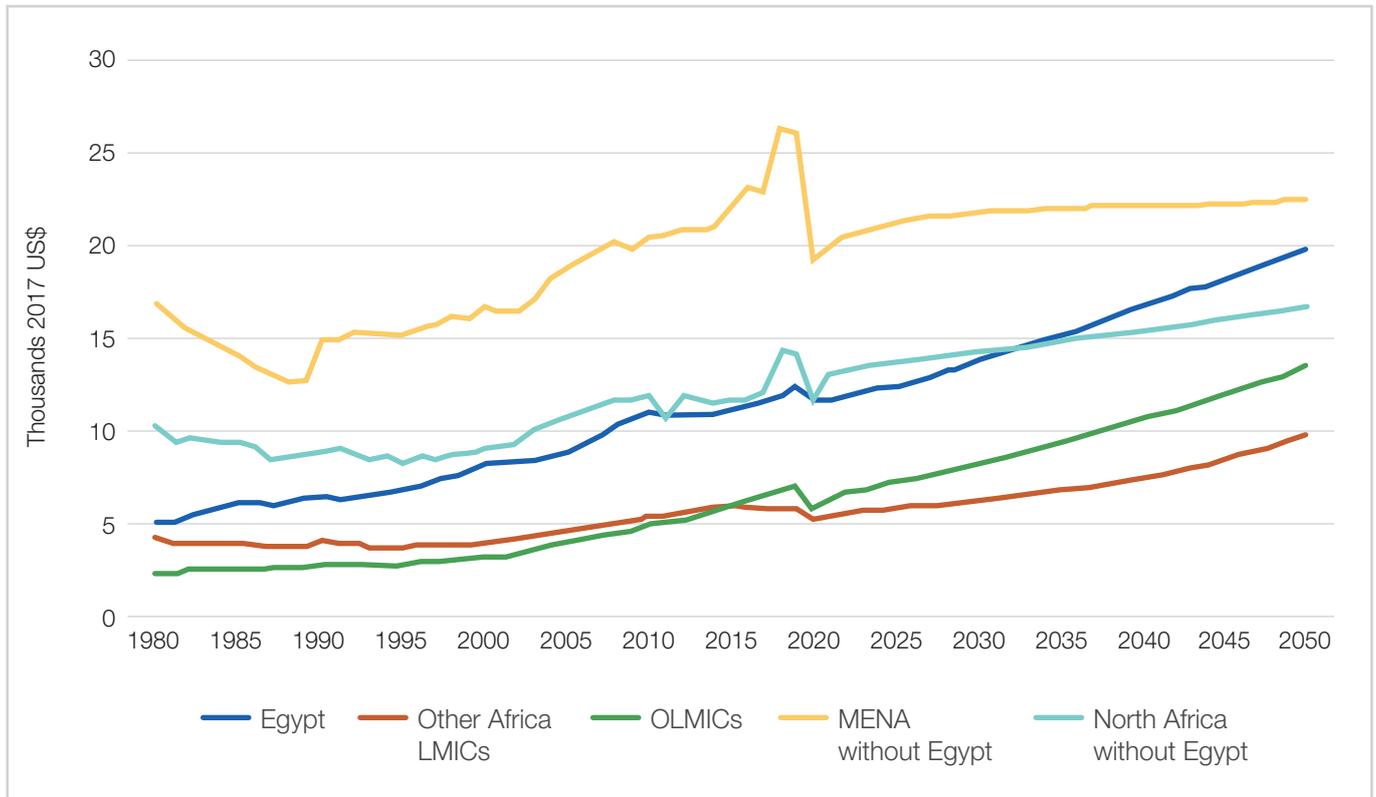
In addition, because the sector is capital-intensive it has contributed little to job creation. Consequently, Egypt's high growth rates have been accompanied by a commensurate increase in unemployment – against a requirement for at least 600 000 additional jobs annually.⁵¹

Egypt's high growth rates have been accompanied by a commensurate increase in unemployment

In a 2019 report, the IMF estimated that Egypt needed to create about 3.5 million jobs over the next five years to benefit from the potential of a demographic dividend and the required level of economic productivity.⁵² In contrast, the precautionary measures to contain COVID-19 have resulted in a significant increase in unemployment since 2020, as reflected in the drop of per capita income in Chart 7.⁵³

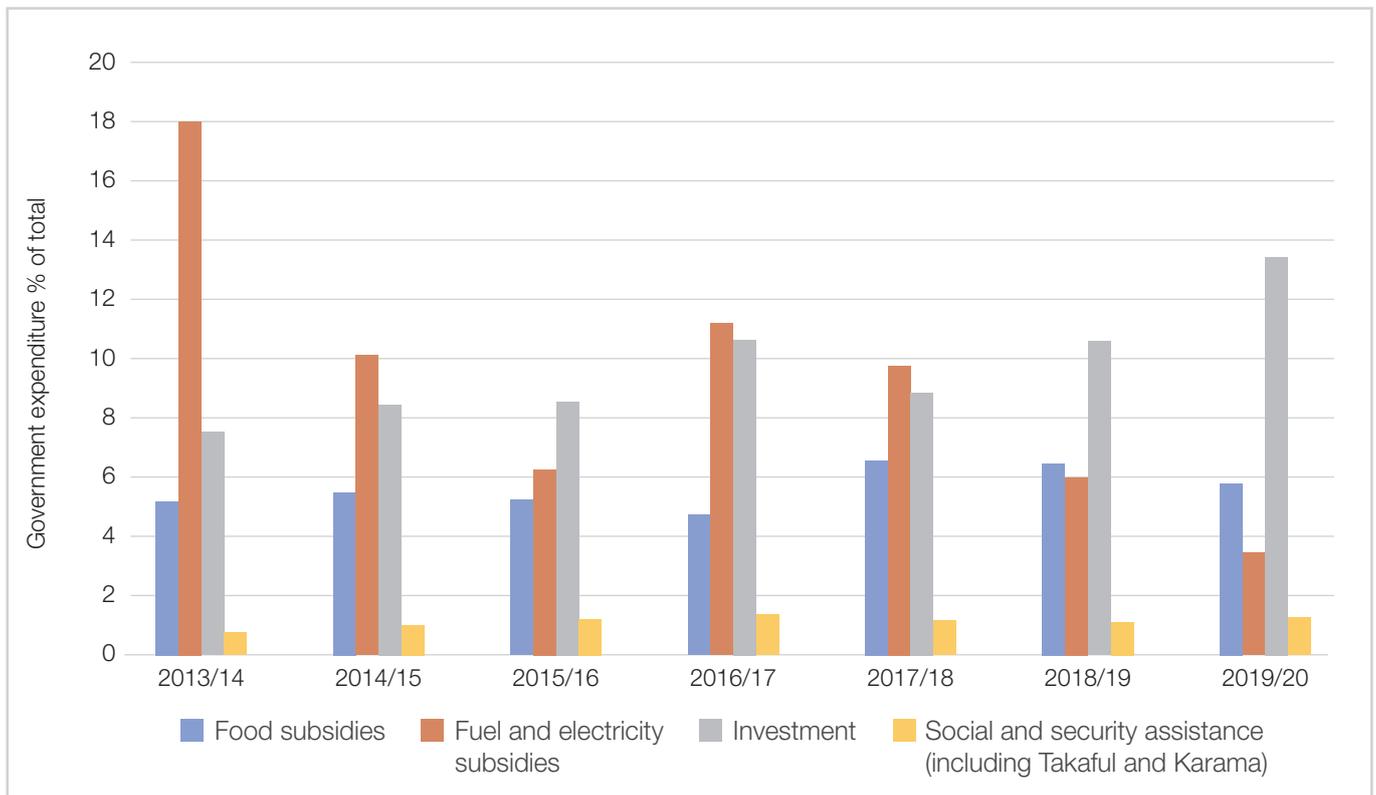
Despite the projected positive trajectory in per capita income, the country's economic prospects remain modest and living standards are generally low. The government has however scaled up its social safety programmes to ensure that its large vulnerable population does not slide into extreme poverty.

Chart 7: GDP per capita (PPP), Egypt, other North African countries and OLMICs



Source: IFs v 7.63, historical data from World Development Indicators (WDI), IMF

Chart 8: Government expenditure on social protection



Source: US Agency for International Development (USAID)/International Food Policy Research Institute (IFPRI)⁵⁴ – original source: Ministry of Finance 2020

Box 3: Subsidies and transfers in Egypt

In the first half of the fiscal year 2020/21, the Egyptian budget on subsidies, grants and social benefits rose by 32% to reach E£100 billion per annum, according to Minister of Finance Mohamed Maait.⁵⁵ Energy (fuel and electricity) and food are the two main items subsidised by the Egyptian government. Subsidies are the lifeline of most Egyptians but cost up to a third of the government's budget.

Energy

As part of an economic overhaul backed by the IMF to ease pressure on public finances, the Government of Egypt slashed projected fuel spending by about half for the FY 2020–2021 from E£52.9 billion in the previous financial year to E£28.1 billion. Prior subsidy cuts, the drop in global oil prices and price hikes for electricity companies have allowed the government to cut fuel subsidies, while reducing energy prices for manufacturers to help them get through the coronavirus downturn.⁵⁶

Food

The food subsidy system has been integral in supporting millions of economically vulnerable Egyptians. The Tamween ration card system benefits around 70 million people, while the bread subsidy

(baladi) benefits 83 million people. Together they account for approximately 5.7% of the government's budget, compared to an estimated 1.2% for other social security assistance, including the Takaful and Karama social cash transfer programme. Efforts to reform the food subsidy system have been difficult because millions of people in the country depend on state-subsidised bread to survive.⁵⁷ Thus, reforms have mostly been concentrated on fuel and electricity.

Cash transfers

Egypt has been providing cash to poor households through its first conditional cash transfer programme, Takaful and Karama, inaugurated in 2015.⁵⁸ By international standards, it is well targeted and has successfully increased consumption goods and services by households by about 8% compared to households not participating in the programme.⁵⁹

Overall, social protection is an important element in Egypt's efforts to improve the welfare of its extremely poor and vulnerable. However, there's little evidence that the Takaful and Karama transfers have increased asset ownership or income generated to beneficiaries. This may partly be explained by the short time horizon of the analysis period and the challenging economic situation of 2016/17, and now COVID-19.⁶⁰

Egypt's long-standing challenges have been further compounded by the coronavirus pandemic. Due to slowed economic activity, the pandemic has worsened the high unemployment rate (from 7.7% in 2019 to 9.6% in 2020) especially in the formal sector, created a wider budget deficit, elevated debt-to-GDP ratio (projected at 90.2% of GDP in 2020 from 84.2% in 2019),⁶¹ and a drop in foreign reserves, tourism, Suez Canal revenues and merchandise exports.⁶²

Despite the negative economic repercussions of COVID-19, Egypt's growth has maintained a reduced but positive outlook unlike many countries globally that have recorded negative growth rates. In fact, in June 2021, the government announced that the country's external debt had declined slightly for the first time in years.⁶³

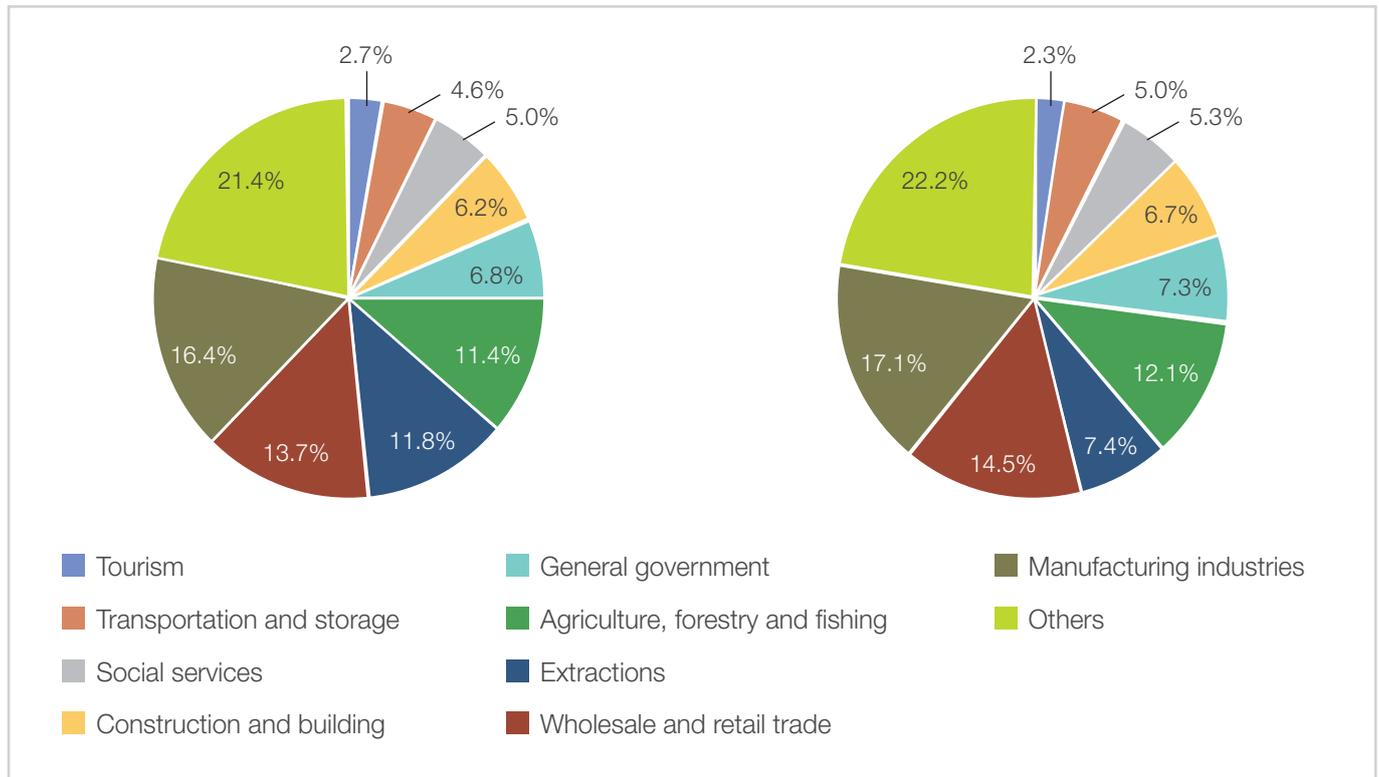
Nonetheless, the country faces many economic vulnerabilities, particularly on issues related to subsidies and social protection programmes, improvement of job creation mechanisms, the business development environment and provision of equitable health services.

Sectoral contribution to GDP

The size of Egypt's economy was estimated at about US\$348.8 billion in 2019 and US\$361.2 billion in 2020 (2017 US\$). IFs estimates that by 2030, the economy will be approximately 53% larger at about US\$562 billion and by 2050 reach nearly US\$1.33 trillion, 3.5 times more than in 2020.

The service industry comprises the largest sector at about 50% of GDP and is forecast to continue to

Chart 9: GDP breakdown by economic activity (FY 2019 and 2020)



Source: Egypt Economic Report 2020⁶⁴ (from the Central Bank of Egypt)

contribute the largest share to Egypt’s GDP. It employs nearly half of the population and is dominated by telecommunications and tourism.

The service surplus revenue has declined from US\$13 billion to US\$9 billion (a 31.2% drop) due to the coronavirus pandemic. The tourism sector has borne the brunt of this decline with reductions of up to 54.9% in travel receipts between January and June 2020, and upwards of US\$7.7 billion in 2020.⁶⁵

Manufacturing makes the second largest contribution to Egypt’s GDP at about 17.1%. It is followed by the agriculture sector at about 12.1% of GDP. Agriculture’s contribution to the economy is projected to decline in the forecast horizon to roughly 3.6% by 2050 as Egypt’s economy shifts to higher value-added sectors.

According to IFs classification of sectors, information and communications technology (ICT) currently contributes about 7.6% to GDP and by 2050 will contribute about 9% of GDP. The energy sector contributes a meagre 4.7% of GDP and by 2050 will contribute only about 2% of GDP. Finally, materials contribute about 1.8% of GDP and will increase slightly to 3.3% of GDP by 2050.

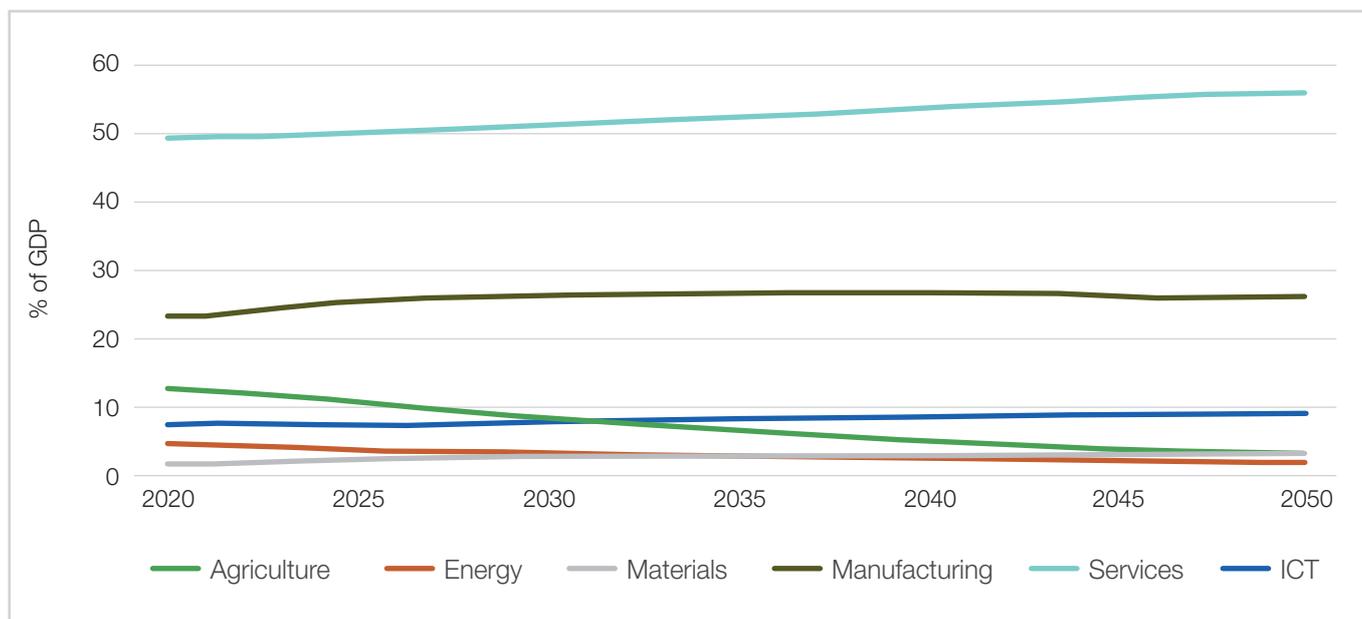
Egypt also has a huge informal sector that is estimated to constitute over 50% of GDP.⁶⁶ Because it is not as oil-rich as most Gulf countries, Egypt relies heavily on the informal economy and remittances from abroad (mostly from the Gulf nations).

Egyptian workers crave stability and job security, but most jobs lack written contracts or social insurance

The informal sector is estimated to provide about 68–70% of new jobs and increases by 1% every year relative to the formal economy.⁶⁷ A World Bank analysis shows that Egyptian workers crave stability and job security, but most jobs lack any written contracts or social insurance. Most workers indicate that they are willing to work for even 20% lower wages in the formal private sector given the job security that comes with formal sector employment as opposed to employment in the informal economy.⁶⁸

The informal sector challenge is two-fold: the country has many small unproductive firms that are not capable of

Chart 10: Forecast of sectoral contribution to GDP



Source: IFs v 7.63, historical data from WDI

offering formal employment to absorb the huge working population in Egypt. But the large firms don't offer formal jobs either. Only about half of employees in such firms have contracts and social insurance.⁶⁹ In fact, Egypt ranks in the top 10 worst countries for working people at position five (out of 149 countries) in the International Trade Union Confederation's (ITUC) Global Rights Index report of 2021.⁷⁰

Together with its large youth bulge, the survivalist employment in the informal economy could be a key driver for socio-economic unrest. In addition, reduction in worker remittances from the Gulf states owing to geopolitical and economic issues could also increase the risk of instability.⁷¹

In the short and medium terms, social programmes are essential for the poverty reduction strategy

The expansion of the informal economy in Egypt and much of the Arab world is generally a manifestation of the economic and social marginalisation suffered by a majority of the population.⁷² Because informality is also associated with low levels of development and standards of life, Egypt should incentivise the formalisation of the

economy by reducing the associated costs and hurdles, especially for small firms.⁷³

Poverty and inequality

Most of the poor and vulnerable population live in the governorates of Upper Egypt. The Government of Egypt is committed to its Haya Karima (Decent Life) initiative to accelerate poverty reduction, particularly in rural areas. As such, poverty at the national poverty threshold (££736 per capita per month or US\$3.80 per day in 2011 US\$⁷⁴) declined to 29.7% in 2020 down from 32.5% in 2018.⁷⁵

2018 data in IFs, on the US\$1.90 extreme poverty threshold, shows that about 3.8% of the population were destitute and this represented roughly 3.8 million people in that year. On the US\$3.20 extreme poverty level used for lower-middle-income countries, approximately 22% of the population live in extreme poverty, equivalent to nearly 23 million people. This means a larger portion of Egyptians live just below the US\$3.20 extreme poverty line.

Owing to the effects of the pandemic and challenges related to a rapid population increase in Egypt, IFs projects that poverty will increase slightly only to return to its pre-COVID-19 rate in 2028 and then steadily decline afterwards. Therefore, in the short and medium terms, targeted social programmes are an essential component in the poverty reduction strategy.

Aside from income poverty, Egypt also experiences multidimensional poverty. Although Egypt's position has improved in the Global Multidimensional Poverty Index of 2020, it still has gaps in nutrition, school attendance, years of schooling, housing and even sanitation. Roughly 6.1% of the population are categorised as vulnerable and 0.6% are in severe poverty, with these figures disproportionately affecting those in rural areas.⁷⁶

According to UNCTAD, Egypt was the largest recipient of foreign direct investment in Africa in 2019

When it comes to income inequality, studies indicate that the level of inequality in the country is probably underestimated, and if left unaddressed could fuel social unrest and instability.⁷⁷ This is particularly so because the size of Egypt's youth bulge (percent of the population aged 15 to 29 relative to the adult population), which is currently declining, is set to increase from 2024 for another 15 years.

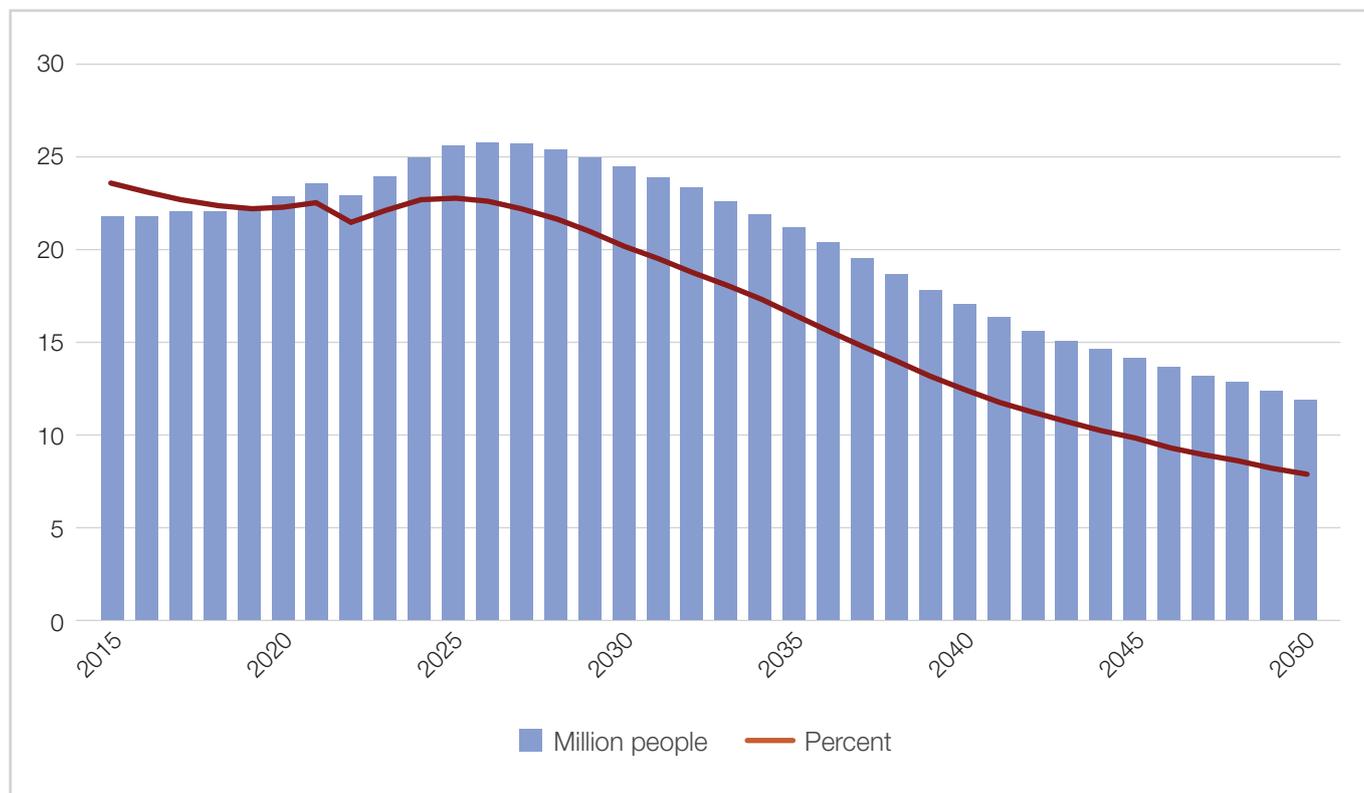
Regional inequalities and disparities also persist. The government reported that between the FY 2017/2018 and 2019/2020, household income in urban areas grew by 16% compared to 13% in rural areas. However, poverty rates in rural areas dropped faster than in urban areas, pointing to income polarisation and the difference in how people in rural and urban areas experience poverty.⁷⁸

To reduce income inequality, the Government of Egypt has undertaken policies related to subsidies (in particular food subsidies), increasing the minimum wage and introducing progressive taxation to reduce inequality in the country. Also, efforts to promote localised development in regions and inclusiveness in government opportunities, including to encourage gender equality, are some actions being pursued by the country.⁷⁹

Foreign direct investment and remittances

According to the UN Conference on Trade and Development (UNCTAD) 2020 World Investment Report, Egypt was the largest recipient of foreign direct investment (FDI) in Africa in 2019. It increased by 11% from the previous year to US\$9 billion.

Chart 11: Extreme poverty (US\$3.20) in millions and percent



Source: IFs v 7.63, historical data from WDI

The increase can be attributed to economic reforms that improved macroeconomic stability and strengthened investor confidence in the country. In the World Bank's 2020 report on Ease of Doing Business, Egypt improved its rank to 114 (out of 190) from position 120 in 2019.⁸⁰ Most FDI still goes to the oil and gas industry, although investments have been made in the non-oil economy as well as in telecommunication, consumer goods and real estate⁸¹ such as the construction of the new capital city east of Cairo.⁸²

In addition, Egypt has seen sizable foreign funding in major infrastructure projects. For example, Egypt's first nuclear project was set at US\$25 billion, with most funding sourced from Russia.⁸³ Investors from the Gulf Cooperation Council states,⁸⁴ Asia (mostly China) and Europe are also investing in projects ranging from rail to oil.⁸⁵

Egypt should make an effort to attract more FDI to other sectors like manufacturing to diversify and improve the value content of its exports and improve productivity and labour market outcomes, and thus avoid growth slowdowns.

Egypt has poor trade relations with the North African and Maghreb block, as well as with sub-Saharan Africa

Egypt is one of the leading labour exporting countries globally, and migrant remittances have been one of its main sources of external finance.⁸⁶ In 2018, remittances were the second largest factor in reducing the country's current account deficit, as they increased by US\$3 billion between 2017 and 2018.⁸⁷

According to the Central Bank of Egypt, between January and September 2020 Egyptian remittances (from abroad) increased by 11.6% compared to the previous year to reach US\$22.1 billion. This increase is also linked to the liberalisation of the country's exchange rate and makes a significant contribution to Egypt's cash reserves. COVID-19 has, however, seen Egypt's cash reserves dwindle as investors reduce their exposure to emerging markets, on top of the decline in tourism due to coronavirus restrictions.⁸⁸

Although remittances are the second highest source of income after labour income for Egyptian households, most of it is used for daily household consumption expenses. In this way remittances alleviate poverty, improve the overall welfare of Egyptians and indirectly impact the economy through increased consumption.

However, increased consumption in relation to investment has a negative long-term impact on economic growth. There is a clear opportunity for the Government of Egypt to encourage its expatriate community to invest in the economy through the establishment of diaspora bonds, as done by countries as diverse as Israel, India, Nigeria and Ethiopia, and to provide opportunities for small-scale investors.⁸⁹

Trade

According to Observatory of Economic Complexity data, in 2019 Egypt exported goods worth US\$36.7 billion and imported about US\$82.5 billion, recording a large negative trade balance, thus making it a net importer. Its largest exports were petroleum products, gold and nitrogenous fertilisers, while its top three imports were refined petroleum, wheat and cars. In fact, in 2019 Egypt was the world's largest importer of wheat. Top trading partners are the United States (US), United Arab Emirates (UAE), Saudi Arabia, Italy, Turkey, China, Russia and Germany.

Egypt's trading partners reveal its poor trade relationship with the North African and Maghreb bloc, as well as with sub-Saharan Africa. Egypt has long recognised the need for greater trade integration on the continent and has signed the Tripartite Free Trade Area (TFTA) that seeks to facilitate movement of goods (largely on a tariff framework) among the signatory country territories.

The TFTA would essentially integrate three existing African trading blocs – the East African Community, the Southern African Development Community and the Common Market for Eastern and Southern Africa. This deal would harmonise trade in the three regions and eliminate overlapping trade rules to reduce the cost of doing business.⁹⁰

Egypt has also ratified its membership to the African Continental Free Trade Area (AfCFTA) agreement, and it is expected that this trade agreement would allow and facilitate the entry of Egyptian goods into the sub-Saharan market.⁹¹

The AfCFTA deal offers significant opportunities for Egypt, which has established itself as an exporter of oil and mineral-related manufactured goods such as cement to Ethiopia and Kenya, in addition to agricultural and food products. It could help Egypt increase its trade volume with Africa, which currently stands at 3% of its total trade volume, particularly with sub-Saharan Africa, which has a large market size and currently constitutes only a fraction of Egyptian exports.⁹²

With regard to the trilateral cooperation, most recently Egypt, Jordan and Iraq have agreed to improve the mobilisation of resources and the implementation of practical programmes in the areas of common challenges, especially on climate change, food security and livelihoods.⁹³

Education

Modern education was introduced in Egypt during the 1800s under Ottoman Muhammad Ali Pasha, who commenced a dual education system. One served the population attending traditional Islamic schools (*kuttab*), and another called *madrassa* (Arabic for 'school') serving elite civil servants. Training on vocational skills was passed on by means of informal apprenticeships. However, the sector suffered significant neglect and disruption under British colonial occupation.⁹⁴

As a result of many educational initiatives and reforms since independence, the education system has made significant strides with improved educational outcomes over the past decades. The mean years of education for people aged 25 and above is almost a year higher than the average for OLMICs. The literacy rate stood at approximately 74% in 2020, while the number of elementary-age out-of-school children has dropped after skyrocketing following the 2011 revolution.

However, World Bank data shows a gradual increase in the number of out-of-school children between 2014 and 2019. In fact, in this period, the number of out-of-school children increased from 44 389 to 90 674, respectively. It is likely that with the coronavirus pandemic, the current number of out-of-school children is much higher.⁹⁵

The public education system in Egypt consists of four stages of learning. The basic and compulsory education stage for children between four and 14 years comprises

kindergarten for two years followed by primary school for six years and preparatory school (ISCED Level 2) for three years. Then, the secondary school (ISCED Level 3) stage is for three years, for ages 14/15 to 17, followed by the tertiary level.

Despite many initiatives, including compulsory education, the sector still faces numerous challenges. Key among these is Egypt's rapid population growth, whose ramifications have been borne in the education sector through sharp increases and demand for enrolment both at primary and secondary level. This means greater funding requirements, capacity shortages and overcrowded learning facilities, particularly in denser regions like Cairo, Alexandria and Giza.⁹⁶

Although the teacher-student ratio has risen in the past few years, teacher salaries have fallen; in 2017, the average teacher salary was about £86 000 (US\$4 800). This is just 1.3 times the average GDP per capita of Egypt and way below the World Bank-recommended average teacher salary of three to 3.5 times the GDP per capita for a productive education system.⁹⁷

An estimated 30% of school children are considered to lack basic reading and writing skills

Due to the inadequacy of the education system, many skilled teachers have turned to private tutoring, which pays better than the public education system. An estimated 42% of household income is spent on after-school tutoring, but some students drop out of school because they cannot afford to sustainably access supplementary tutoring.⁹⁸ An estimated 30% of school children in Egypt, mostly living in rural areas, are considered to lack basic reading and writing skills.⁹⁹

As a result, the World Economic Forum's Global Competitiveness Report for 2017–18 ranked Egypt's quality of primary education at position 133 out of 137 countries – only two positions ahead of war-ravaged Yemen. The number and availability of qualified teachers and desire for teacher training and deployment into public schools is dropping, and will continue to do so if the issue of teacher remuneration is not addressed.¹⁰⁰

Compared to other North African countries like Tunisia and Algeria, it is clear that Egypt's education system is lagging and that bottlenecks have emerged, particularly at lower secondary and tertiary level. Chart 12 shows Egypt's performance at various educational stages in comparison with Algeria and Tunisia, also both lower-middle-income countries in North Africa, and OLMICs globally. It is colour coded in a traffic light system, with red indicating poor performance, intermediate performance between amber and yellow and good performance in green.

The education system can thus be conceptualised as a ladder where students advance from kindergarten (not shown in IFs) to primary, secondary and tertiary level (i.e. completion of one level enables transition to the subsequent level). The more pupils a country can enrol in primary school, the larger the pool of learners who can graduate and transition to secondary and tertiary level.

A good foundation right from kindergarten is crucial to future learning success. As such, any blockages in the system affect attainment of subsequent levels of education. This can be observed in Egypt's lower secondary and tertiary outcomes.

Although Egypt performs relatively well at primary and upper secondary levels, tertiary outcomes perform quite poorly relative to the comparison countries and groups. This is particularly problematic given Egypt's population crisis and the expectation that tertiary enrolment and graduation would be high to absorb and produce skilled graduates. As a result, the quality of education is also affected. In fact, the Global Competitiveness Report for 2017–18 ranked Egypt's quality of tertiary education at a lowly 130th out of 137 countries.¹⁰¹

Underfunding, inefficiency and outdated curricula are some of the key challenges in the higher education

Chart 12: Education pipeline, 2018

Country/region	Primary			Lower secondary			Upper secondary		Tertiary	
	Enrol (gross)	Survival	Completion	Enrol (gross)	Completion	Transition	Enrol (gross)	Completion	Enrol (gross)	Graduation
Egypt	106.3	97	102.3	98.9	79	92	87.9	65.1	35.2	17.7
Algeria	109.9	96.3	110.5	120.2	91.4	89.8	72.2	34.9	51.4	29.2
Tunisia	115.4	94.2	100.6	107.7	73.8	98.6	79.7	33.9	32.2	22.5
OLMICs	75.3	82	79.1	58.7	66.3	83.5	43.2	36.9	25.2	25.3

Source: IFs v 7.63, historical data from UNESCO Institute for Statistics (UIS) and Barro-Lee

Box 4: Education in IFs and definitions¹⁰²

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.

Completion rate: The number of persons in the relevant age group who have completed the last grade of the given level of education, as a percentage

of the population at the theoretical graduation age for the given level of education.

Gross graduation rate: The number of graduates who have completed the last grade of a given level of education, regardless of age, as a percentage of the population at the theoretical graduation age for the given level of education.

Source: UNESCO glossary, <http://uis.unesco.org/en/glossary>

system in Egypt. This amid mounting criticism of a system that churns out graduates without the appropriate and necessary skills for employment in a modern economy. In fact, despite high unemployment rates, many skilled jobs remain unfilled because graduates don't have the technical and soft skills required to execute such jobs.¹⁰³ In 2015 students burnt their higher education degrees in protest of joblessness, showing the gravity of the problem.¹⁰⁴

Vocational training has always been a large part of Egypt's education system. Under Mubarak, one of the best-known schemes – originally called the Mubarak-Kohl Initiative, now known as the dual system – was launched in 1994 by the Ministry of Education and the Deutsche Gesellschaft für Internationale Zusammenarbeit to promote technical training.¹⁰⁵

Despite high unemployment, many skilled jobs are unfilled because graduates lack technical and soft skills

Since 2015, other technical and vocational education and training (TVET) schemes such as the 'Integrated TVET scheme' and 'Life-long learning' (Oumal System) have been rolled out by the government, with a strong emphasis on apprenticeship. Although these efforts have scaled up TVET programmes, increased training opportunities are still needed in Egypt. The government envisions a 50% increase in the dual education system in all schools by 2025. This would be a huge increase in the number of trainees undergoing TVET training.¹⁰⁶

Egypt's government is aware of the need for reforms in the education sector, especially in light of youth unemployment and the associated propensity for political instability. Sisi declared 2019 as 'the year of education' and increased public education spending by 8% in the 2018–19 financial year.¹⁰⁷

In the 2020–2021 financial year, the government budgeted for 6% of GDP towards the education sector.¹⁰⁸ The country's strategic vision for education to 2030 seeks to increase funding and boost tertiary enrolment, improve teacher-student ratio, quality and accreditation mechanisms, reform curriculum to match labour market needs and expand TVET programmes.¹⁰⁹

In its effort to expand capacity in the tertiary sector, Egypt has successfully sought to establish itself as a major higher learning destination (after Saudi Arabia and the UAE in the Arab world). It's attracted many foreign students from the MENA region and sub-Saharan Africa. Low tuition, living expenses and free admission of non-citizens and international partnerships and scholarships are some of the incentives fuelling Egypt's attraction as an education hub.

The country also hosts many reputable international universities like the American University in Cairo, the German University in Cairo, the British University in Egypt, and the Université Française d'Égypte. Furthermore, in 2018, Egypt enacted legislation to attract more international universities to establish their foreign branches in the country with more streamlined licensing procedures, affordable real estate, tax breaks and requirements to teach the same programmes as in their home countries.¹¹⁰

These policies are meant to enhance the global competitiveness of Egypt's education system, increase capacity and intake, enhance performance of domestic universities by increasing competition, foster research collaboration and inbound student mobility, and ultimately improve the stock of human capital in the country.¹¹¹

The government is seemingly aware of the challenges and opportunities that exist in the education sector. Owing to the protracted period of time it generally takes for the impact of formal education to manifest and change the structure of an economy, speedy action is required to fix and transform the country's education problems.

Health

Egypt's health indicators have improved significantly since 1960 and the current health profile largely mirrors that of developed countries. Some of the key accomplishments include a drastic decrease in rates of maternal and child deaths and chronic malnutrition. They also include the elimination of diseases like polio in 2006 and the establishment of a community health worker programme as a primary foundation towards equity in the provision of healthcare services.¹¹²

Egypt's commitment to developing its healthcare has ensured that nearly 95% of the population live within

a 5 km radius of a health facility, family planning services have expanded to over 50% of primary care facilities, and the government has adopted a national plan for family planning. It's also implemented the Social Health Insurance law towards universal health coverage for its population.¹¹³

The success of Egypt's long-running reforms has manifested in reduced incidents of communicable diseases, longer life expectancy of about 72.7 years (projected to reach 77 years by 2050) and economic benefits such as increased household incomes.

The country has essentially met the Sustainable Development Goal (SDG) of reducing child and neonatal deaths to at least 25 and 12 deaths per 1 000 live births. Maternal mortality was 37 per 100 000 births in 2017¹¹⁴ and by 2030 it is projected at three per 100 000 births. Egypt has essentially met the global target of fewer than 70 deaths per 100 000 live births.¹¹⁵

However, alongside the successes, a range of other health issues plague Egypt's ambition of an efficient health system beyond primary care services. Some of the challenges include population pressure and the impact of an increase in the total fertility rate since 2008, which don't bode well for the health system in terms of the demand for services and expenditure that will be required.

Furthermore, due to urbanisation and a rise in disposable income, Egypt faces a high prevalence of non-communicable diseases (NCDs) like cardio-vascular-related illnesses, strokes, cancer, diabetes, respiratory infections¹¹⁶ and other lifestyle diseases that are inherently more expensive to treat.

According to the international classification of diseases (ICD), NCDs have been on the rise in Egypt, particularly since 1990, and are forecast to remain the leading causes of deaths in the country well beyond 2050. The World Health Organization estimates that more than 85% of total deaths in Egypt are caused by NCDs, and this is exacerbated by the prevalence of other behavioural and biological risk factors like smoking, unhealthy diets, physical inactivity, obesity and hypertension.¹¹⁷

Smoking for example is widespread, with roughly 20% of the population using tobacco products daily.¹¹⁸ A study conducted in 2010 showed that raising the average

cigarette tax to £E4.08 per pack (US\$0.23, 70% of the retail price) could prevent over 600 000 premature deaths in current and future smokers and raise cigarette tax revenues by almost £E5.2 billion (US\$294 million).¹¹⁹

The NCD death rate (per 1 000 people) in Egypt is currently more or less on par with the global average for OLMICs, but it will surpass the OLMICs average by around 2033. However the NCD death rate in Egypt is significantly higher than the average of other lower-middle-income countries in Africa, as shown in Chart 13, which includes a forecast of death rates by main ICD categories to 2050.

In 2015 it was reported that the prevalence of diabetes was 16.7% in people between the ages of 20 and 79, representing 7.8 million cases at the time. Obesity among adults was over 33% higher than in some developed countries and one of the highest in the MENA region. The rate of hypertension among adults stood at nearly 25%, one of the highest in the world.¹²⁰

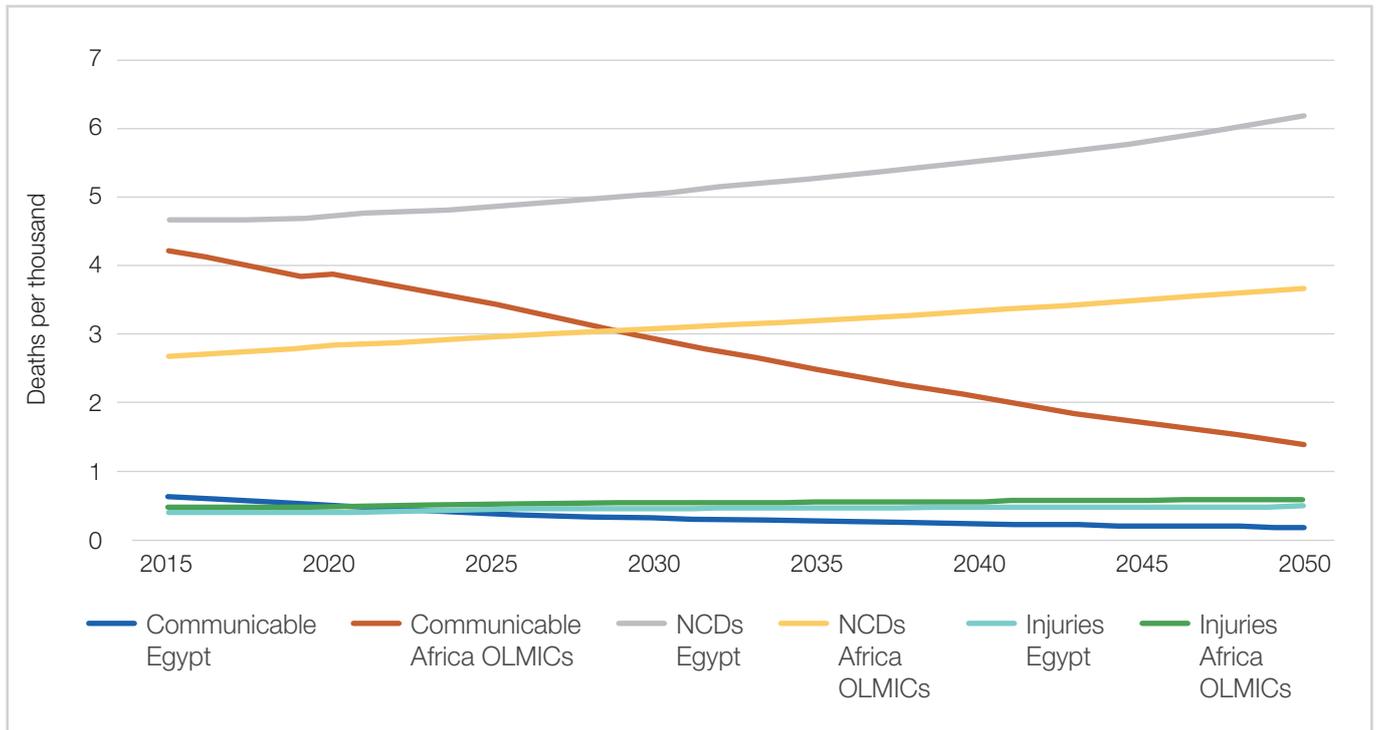
Egypt has reduced incidents of communicable diseases but faces a high prevalence of non-communicable diseases

The increase in NCDs is particularly alarming in light of the infrastructural, funding and management challenges faced by the country's health system. In 2016 it was estimated that Egypt had only 1.5 beds per 1 000 people relative to the global average of 2.7 per 1 000 people. Only about 57% of the population were insured, mainly with two public insurance companies.

Services in the public health sector are generally of low quality due to underfunding, lack of medical equipment and qualified personnel, poor sanitation and safety measures (especially in rural areas). Because of this it is expected that the private sector will be encouraged to take a leading role in providing health services to keep up with the healthcare demands of the country's large and growing population.¹²¹

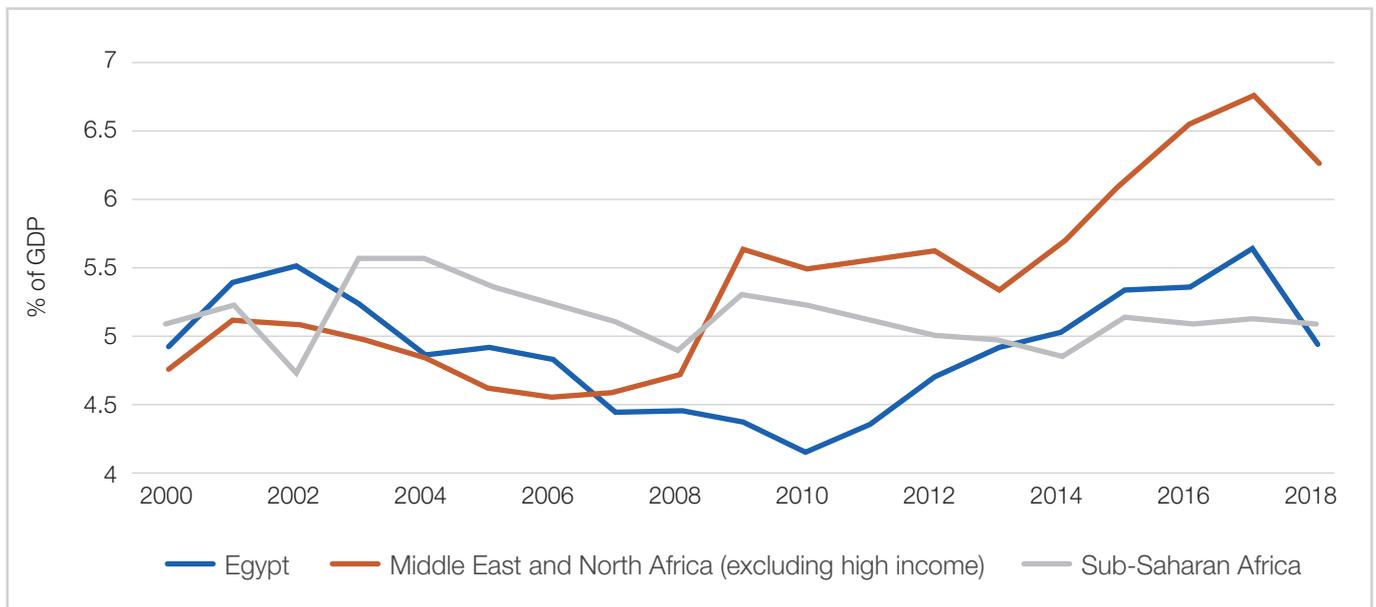
Egypt's healthcare spending has been rising since 2010 but fluctuated after 2018 (Chart 13 shows the trend since 2000). The government has indicated that health spending will constitute 3% of GDP in the FY 2020/21.¹²²

Chart 13: Death rates by main ICD categories



Source: IFs v 7.63, historical data from Global Burden of Disease (Institute for Health Metrics and Evaluation)

Chart 14: Health spending as a percent of GDP



Source: WDI data

However, invariably the level of health spending in itself does not lead to tangible improvements. Although a large portion of health spending is directed toward salaries and wages, healthcare workers often hold more than one job at a time to make a decent income.¹²³

As a result of the system's inadequacies, Egypt has been facing an unprecedented emigration of its doctors. The Egyptian Medical Syndicate estimates that between 2016 and 2019, out of the 220 000 registered doctors, 110 000 left the country. This means that Egypt has only

10 doctors per 10 000 people, trailing the global average of 32 per 10 000 people.¹²⁴

The coronavirus pandemic has further strained and exposed a struggling health system. The World Bank has provided financial assistance to support the country's COVID-19 Emergency Response project¹²⁵ and the implementation of its Universal Health Insurance System.¹²⁶

The implementation of the Universal Health Insurance Law, family practice programmes and other efforts to bridge the public-private gap will make healthcare accessible and equitable to all. However continued and even greater effort to reform the sector should be a top priority for the national social development agenda.

Basic infrastructure

Basic infrastructure discussed in this section includes access to water and sanitation, electricity, roads and ICT.

According to the Africa Infrastructure Development Index (AIDI) of 2020, Egypt (with a score of 88.39) ranks second after Seychelles (96.73) in infrastructure development. AIDI consists of four composite indicators – transport, electricity, ICT and water supply and sanitation needs.¹²⁷ Although Egypt has made significant strides in improving the quality and quantity of basic infrastructure, the country's infrastructure stock is limited and aged.

The sector also faces low levels of investment. A report by the Organisation for Economic Co-operation and Development estimates that for the country to meet its investment gap, it would need to dedicate about 5% of GDP to this sector until 2040 to adequately improve its infrastructure connectivity.¹²⁸ In light of rapid population growth and the accompanying demand, infrastructure development is an essential and critical aspect to enhancing productivity and sustainable long-term growth in Egypt.

Beyond the basic infrastructure components outlined, the construction sector is projected to achieve a 9% growth between 2020 and 2024. Real estate, long considered a preferred destination for investment in the country, has maintained strong growth. The growth is mainly driven by public-private partnerships, and largely skewed towards high-income buyers.

Nonetheless, Egypt's government is a massive investor in the construction industry. It's building smaller and more affordable housing units primarily targeted at poor and low-middle-income groups to provide the 12–20 million Egyptians estimated to live in informal settlements with decent housing.

In addition, the government is planning to build 14 new smart cities, and is currently in the process of building a new administrative capital 35 km east of Cairo. This city is expected to house all government ministries and authorities by 2021. Other upgrades on airports, ports, railway and transportation networks are also planned throughout the country.¹²⁹

Water

The Nile Basin is Egypt's largest water source, with an allocated annual flow of 55.5 billion cubic metres (m³), according to the Nile Waters Agreement of 1959. Ground and surface water sources account for about 0.5 billion m³. The Nubian Sandstone Aquifer System in the Western Desert is also an important water source, but this is fossil groundwater which comes with the risk of contamination.¹³⁰

In 2018, Egypt's annual per capita share of water declined to below the set international standard

Egypt requires about 90 billion m³ of water annually to meet its national needs and at the current water supply records a deficit of about 34 billion m³. In 2018, the annual per capita share of water declined to 570 m³ which is below the set international standard of 1 000 m³.¹³¹

Egypt recycles its water, and treated wastewater is often used for irrigation. In 2014, the country produced about 3.5 billion m³ a year of municipal wastewater and treatment capacity was about 1.6 billion m³ a year. An additional treatment capacity of 1.7 billion m³ was targeted by 2017.

Although the planned capacity increase was significant, it is not enough to deal with the projected increase in wastewater production from municipal sources. This means that the amount of untreated water released into

water bodies might not reduce. It was also estimated that treatment plants served only 55% of the population in towns and cities.¹³²

Egypt has about 146 wastewater treatment plants in total, and since FY 2018/2019, 52 wastewater treatment plants with a capacity of 418 million m³ per year have been under construction in Upper Egypt. Consequently, the percentage of total treated wastewater in the country had increased to 68.7% in 2019. In 2020 the country announced its plan to build the largest wastewater treatment plant in the world (the Bahr al-Baqar water station) with a capacity of five million m³ a day.

According to the Government of Egypt, treated wastewater from the plant will be used for agriculture (342 0000 acres) as part of the Sinai Peninsula Development Program.¹³³ Egypt also has 58 desalination plants with a combined capacity of 440 000 m³ a day, and 39 more desalination plants are under construction.¹³⁴

The country has been under water stress, which is likely to be exacerbated by the upstream conditions regarding the Nile and the Grand Ethiopian

Renaissance Dam. Agriculture consumes over 85% of water, followed by municipalities (8%), industry (6%), and navigation and hydropower.

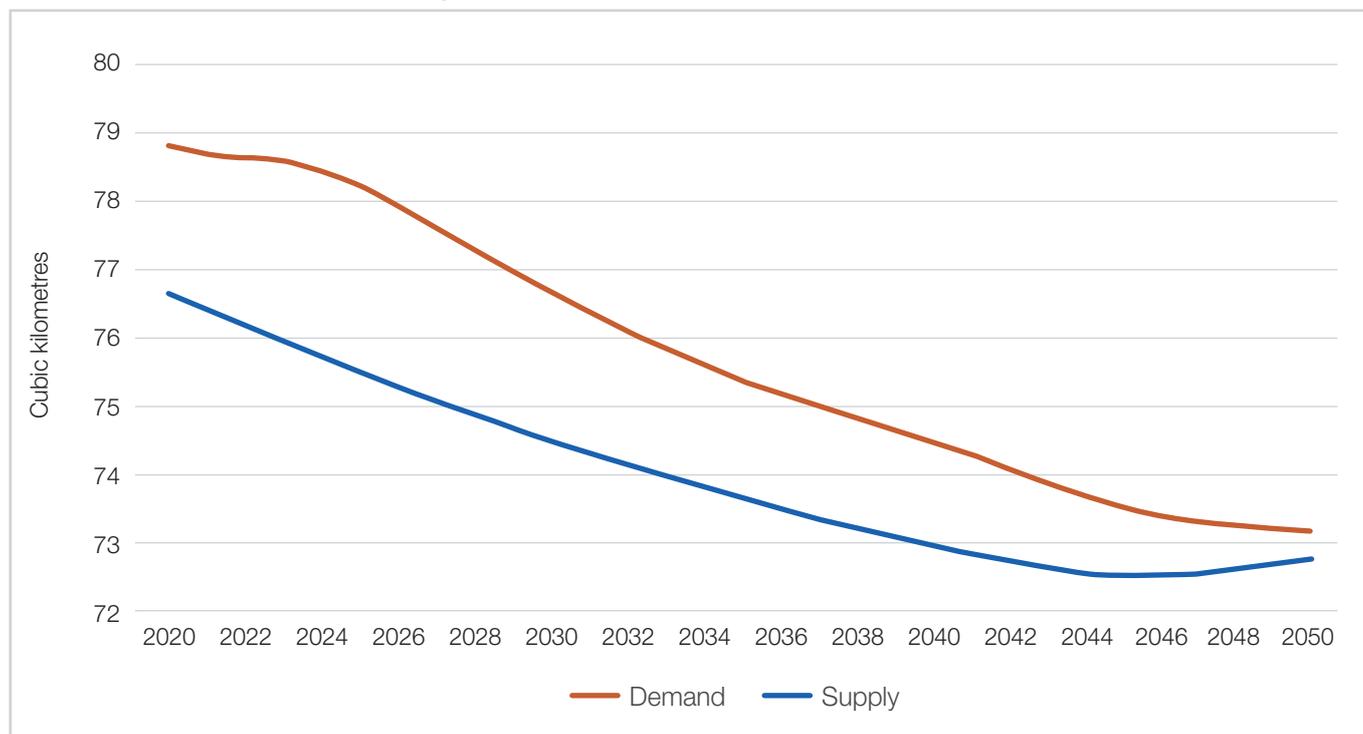
In addition, Egypt faces issues of water quality and its impact on the environment and human health. It also experiences water pollution from a range of sources including chemicals like pesticides and herbicides. Water pollution has led to diseases like bilharzia, especially in rural areas.¹³⁵

97% of Egypt's population had access to piped water, meeting the associated SDG target in urban areas

Despite the challenges, Egypt's water infrastructure has grown significantly, and in 2017 the United Nations Children's Fund (UNICEF) estimated that 97% of the Egyptian population had access to piped water, meeting the associated SDG target in urban areas.

However, a significant number of people in rural areas and urban slums didn't have access to water. In total, about 7.3 million Egyptians did not have access to safe

Chart 15: Water demand and supply



Source: IFs v 7.63, historical data from AQUASTAT

water (5.8 million of them in rural areas and 1.5 million in urban slums). Additionally, in urban slums, only about 77% of the population had access to piped water and most times these were illegal connections.¹³⁶

According to IFs, Egypt has achieved universal access to safe water, although this will decline slightly over the next decade. This is largely due to Egypt's large and increasing population, limited water resources and inadequate investment in water infrastructure. It will then resume an upward trajectory to reach 100% access in 2050.

Meeting the population's water demand and bridging the rural-urban divide will require major investment. Between 2013 and 2017, only about 2.3% of Egypt's total infrastructure investment was directed to water. In the FY 2020/2021, the Government of Egypt allocated 25.9% of total public investments in the urban development sector to water and wastewater projects.¹³⁷

Access to water is critical, especially for desert rural communities that also rely on agriculture for their livelihoods.¹³⁸ IFs projects that water demand will continue to outpace the level of water supply Egypt can provide based on its exploitable water resources.

In summary, the development plans envisioned for Egypt cannot be achieved and are not sustainable without adequate water supply. The government has signed numerous agreements and seeks more funding to build desalination plants in recognition of the important role this would play in the long-term sustainability of water access in Egypt.¹³⁹

However, these must be accompanied by a drive for better water management and more efficient use of this scarce resource, especially in the agriculture sector.¹⁴⁰ Without closing the water supply and demand gap, Egypt is facing an inevitable crisis.

Sanitation and hygiene

According to UNICEF'S survey of 2014, 8.4 million Egyptians did not have access to sanitation facilities. Compared to 1% in urban centres, 15% of Egyptians living in rural areas didn't have access to improved sanitation facilities.¹⁴¹ Sanitation is a major concern in rural places like the Nile Delta where the Nile spreads and drains into the Mediterranean Sea.

Traditional bayaras (sanitation trenches used as septic tanks) are failing because the water table is high and soil percolation is low. In fact, to prevent sewage overflows, families are forced to part with about 5% of household income to clean their bayaras nearly every week, thus making it even more expensive than conventional sanitation solutions.¹⁴²

2020 data by the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) shows that at least 97% of the population now have basic access to improved sanitation, although the forecast shows a slight decline in access to improved sanitation in the short term. This is largely a factor of the population pressure in the country, showing that supply of such basic and crucial services will not keep up with demand.

The development plans envisioned for Egypt cannot be achieved and sustained without adequate water supply

Lack of access to safe water and sanitation leads to poor hygiene and contributes to the spread of diseases, which in turn negatively affects health and nutrition, particularly that of children. In Egypt, for example, diarrhoea is the second most common cause of mortality for children under five.

Investment in this sector is thus critical for sustained human development in Egypt. The National Rural Sanitation Program established by the Ministry of Housing, Utilities and Urban Communities has set a target to expand nationwide access to sanitation services from 34% currently to 60% in 2030. This would be through an integrated system of sewerage networks, sludge treatment and wastewater treatment plants.

One of the initiatives under this programme, the Integrated Rural Sanitation in Upper Egypt-Luxor project, recently received a US\$129.8 million (€109 million) loan from the African Development Bank. This was to improve sanitation infrastructure and services to rural communities in Luxor Governorate in Egypt's Upper Nile region. This venture is expected to improve sewage coverage and services from 6% to 55% in the region.¹⁴³

Energy and electricity access

Owing to increasing electricity demand estimated at an average annual rate of 7%,¹⁴⁴ Egypt has nearly tripled its installed capacity from 15 GW in 2000 to 42 GW by 2017. But even this increase has been insufficient to meet the high and rising demand to end electricity shortages in the country.

Of the 42 GW installed capacity, 91% consists of fossil fuel-based technologies and approximately 8.6% are renewable energy technologies,¹⁴⁵ 77% of which is hydropower. The country has largely developed all its major hydropower sites with little potential to expand further.

Nonetheless, Egypt has a relatively diverse energy mix and has seen significant investment in the sector, particularly after the 2011 revolution that saw increased generation capacity. In 2018, three new power plants came online to contribute an additional 14.4 GW to the country's power supply. In mid-2018, the government signed a deal to construct the Hamrawein coal-fuelled power plant expected to increase generation capacity by 6 GW.

Most recently, Egypt has started the construction of the El Dabaa Nuclear Power Plant in Matrouh Governorate on the Mediterranean coast.¹⁴⁶ The Russian State Atomic Energy Corporation (ROSATOM) is the developer and Russia is expected to fund approximately 85% of the project with a loan of US\$25 billion to be paid over 22 years at 3%. The rest of the 15% financing is to be raised from private investors.

The power plant is expected to generate a total capacity of 4.8 GW. The first unit was expected to be commissioned in 2026.¹⁴⁷ In July 2021, Egypt announced the postponement of the completion of the project to 2030 instead of 2028 following a row with Russia about the GERD.¹⁴⁸ However by August the deal was back on and Russia started equipment production for the plant.¹⁴⁹

Despite the increasing demand for electricity, Egypt achieved universal access to electricity in 2016, although the supply is not reliable. The IFs forecast is for a modest decline as demand for future connections is likely to outstrip the investment in associated infrastructure. Egypt is looking to be a regional leader in electricity supply over the next nine years, and the country is on track to

generate an exportable surplus estimated at 74 GW by 2035. Moreover, the total installed capacity is expected to increase to 83 GW by 2025.¹⁵⁰

Thermal power is expected to remain the dominant source of electricity at 82% followed by solar,¹⁵¹ hydro and wind contributing between 4% and 6%. Nuclear power is expected to be introduced in this period, adding 1.2 GW to the total installed capacity by 2025, and ramping up to 4.8 GW by 2030.¹⁵²

Due to falling costs for renewables, natural gas discoveries and environmental concerns over coal generation, the renewable energy sector will be the fastest growing energy segment between 2019 and 2028. Specifically, Egypt's non-hydropower renewable energy is projected to be the fastest growing market in the region.¹⁵³ In 2018, the country's total installed capacity of renewables amounted to approximately 3.7 GW (2.8 GW of hydropower and 0.9 GW of solar and wind power).

Egypt achieved universal access to electricity in 2016, although the supply is not reliable

According to the Integrated Sustainable Energy Strategy (ISES) to 2035, the government has set the renewable energy target to account for 20% of the electricity mix by 2022 and 42% by 2035. Total installed capacity from renewables is currently expected to reach 8.5 GW by 2028 with an average growth rate of 22.1% year on year (from 2019 to 2028).¹⁵⁴

The strategy envisions that energy subsidies will be eliminated by 2022 so that other energy sources can fairly compete in the market, an ambitious and perhaps unrealistic target.¹⁵⁵

Private sector funding has been the source of buoyancy in this sector and it will probably remain the driving force to greater renewable energy production and uptake in the foreseeable future.

Information and communications technology (ICT)

A dynamic ICT sector is vital for a country that wishes to benefit from the digital economy. Egypt's government

has long realised the benefit of ICT to its continued economic and social development and has over the years deregulated and liberalised the ICT sector while supporting multiple public and private entities.¹⁵⁶

Egypt's Vision 2030 and 2050 consists of an ICT strategy towards a Digital Egypt under the Ministry of Communications and Information Technology (MCIT), which among other things is meant to streamline government services.

Some of the key priorities for Egypt in this sector include expanding ICT infrastructure, strengthening the regulatory framework and growing a pool of labour

skilled in ICT. They also include achieving transition to a knowledge-based economy, ensuring cyber security, supporting research and development, and promoting Egypt's position at the regional and international levels in this sector.¹⁵⁷

Although Egypt has made great strides in ICT diffusion, it trails significantly compared to most of its peer countries as shown in Chart 16.

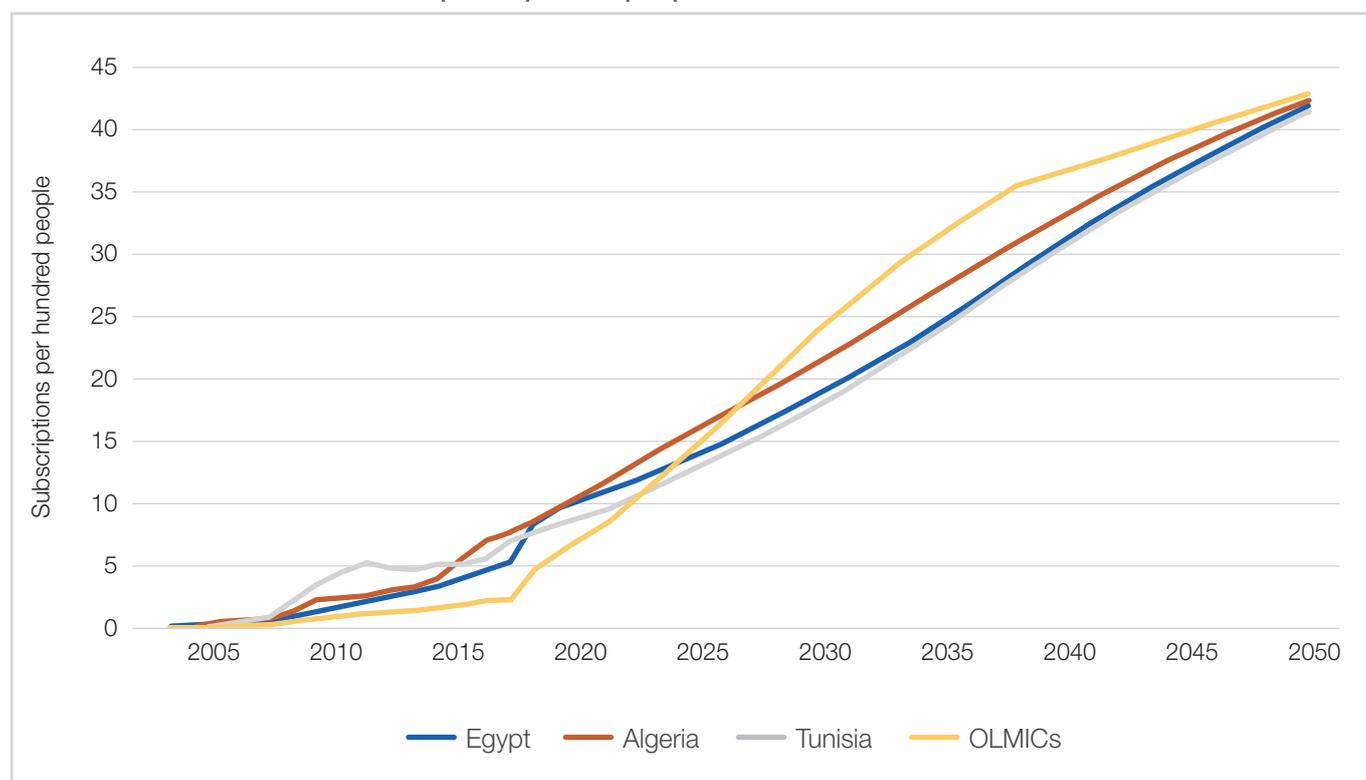
In 2020, the MCIT reported that Egypt's ICT sector grew by 15.2%. The sector's share of GDP rose to 4.4% (£E108 billion) up from 3.8% (£E93.5 billion) in 2019. The ICT sector exports also increased in 2020 to

Chart 16: Selected infrastructure indicators across selected peer countries

ICT	Egypt	Algeria	Morocco	Tunisia
Mobile telephone subscriptions (per 100 people) 2017	105.5	120.7	122.9	124.3
Individuals using the internet (% of population) 2018	46.92	49.04	64.8	64.19
Fixed broadband internet subscriptions (per 100 people) 2017	5.3	7.7	3.9	6.9

Source: OECD Investment Policy Reviews: Egypt 2020 (Table 8.1)¹⁵⁸ and IFs

Chart 17: Fixed broadband subscriptions per 100 people



Source: IFs v 7.63, historical data from International Telecommunication Union

US\$4.1 billion from US\$3.6 billion in 2019, representing a 13% rise. Additionally, investments rose by 35% from £E35.4 billion in FY 2018/2019 to £E48.1 billion.¹⁵⁹

Internet users as a percent of population also increased to 57.3% from 47.6% in 2019 and the average internet speed to 33.2 MB per second. Furthermore, 544 400 Egyptians had subscribed to Egypt's digital platform.¹⁶⁰

By 2050, IFs projects that the rate of fixed broadband subscriptions will be at just 42 per 100 people, but the country will be more or less on a par with its North African neighbours Algeria and Tunisia.

Owing to increasing demand, Egypt will need to grow its ICT capacity and inject more investments to improve the quantity and quality of services to enable the country to transition to the modern economy it envisions.

Roads

The government has made efforts through the National Roads Project launched in 2014 with the goal of improving transport infrastructure and creating a more modern Egypt.¹⁶¹ Since 2014, 4 800 km of the planned new roads have been constructed leaving 1 400 km that are currently being built. In addition, out of the existing 9 000 km of roads that needed improvement, 5 000 km have already been upgraded.¹⁶²

The Nile River and Suez Canal are Egypt's major transportation arteries, while the Suez Canal and Sumed Pipeline are important routes for Persian Gulf oil shipments. Almost 10% of global trade, and 40% of European trade with the East, passes through the Suez Canal.

Egypt has improved in the World Bank's Logistics Performance Index (that measures the quality of trade and infrastructure) to score from 2.22 in 2010 to 2.82 in 2018 on a scale of 1–5 (worst to best). Its ranking has moved from 106th (out of 155) to 58th (out of 160). But the country still faces significant bottlenecks in its infrastructure, and as a result Egypt has significantly higher logistical/operation costs averaging about 20% of GDP compared to the global average of about 10%–12%.¹⁶³

Improved road transport is expected to yield a range of economic benefits for Egypt, including in trade with the region. Recognising the potential benefits to expanded

road transport, the government is undertaking major upgrades to highways, like the one connecting Cairo with the major Port of Alexandria, and the construction of a new tunnel link under the Suez Canal.

International connections include the highway linking Egypt with its North African neighbours, as well as the highway running north-south via Asyut, Sohag, Luxor and Aswan to the border with Sudan.¹⁶⁴

Logistical/operation costs average about 20% of GDP compared to the global average of about 10%–12%

The Ministry of Transportation is also planning to establish a network of logistical areas and villages in Damietta, Sohag, 10th of Ramadan, Borg El Arab, Sadat and Beni Suef and 6th of October to promote industry and trade, increase investments and reduce logistical costs.¹⁶⁵

Furthermore, the new road constructions and upgrades are expected to reduce congestion given Egypt's fast-growing population, and together with new traffic rules, reduce traffic accidents. This will over time improve the human capital contribution to growth.

Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) reported in June 2020 that the number of road accidents had fallen by nearly 30% from 14 403 in 2014 to 9 992 in 2019, indicating steady progress.¹⁶⁶

Agriculture

The Nile's predictability and Egypt's fertile soil have allowed the country to build significant agricultural wealth over the years. The ingenuity of Egyptians to develop basin irrigation and practise agriculture on a large scale allowed the country to grow staple crops like wheat and barley.¹⁶⁷

Today, agriculture is still a major contributor to Egypt's economy at between 11% and 12% of GDP, mostly composed of small-scale farmers. It also accounts for about 28% of jobs, employs 45% of women, and over 55% of employment in Upper Egypt is agriculture-related.¹⁶⁸

Wheat remains a major staple, and Egypt is largely dependent on imports (Egypt is the largest wheat importer globally) to run the bread subsidy programme, which is estimated to benefit over 70 million Egyptians.¹⁶⁹

The food subsidy system is largely controlled by the government which purchases most of the domestically produced wheat at or above global market prices to promote domestic wheat production. The domestic and imported wheat is then sold at subsidised prices but the system is riddled with inefficiencies related to cost and physical loss.¹⁷⁰

The bread subsidy programme benefits more than 70 million Egyptians but is riddled with inefficiencies

Despite these measures, poverty and related food insecurity still exist in Egypt. In fact, budget allocation to the food subsidy scheme more than doubled between 2009 and 2014 owing to a growing population, higher

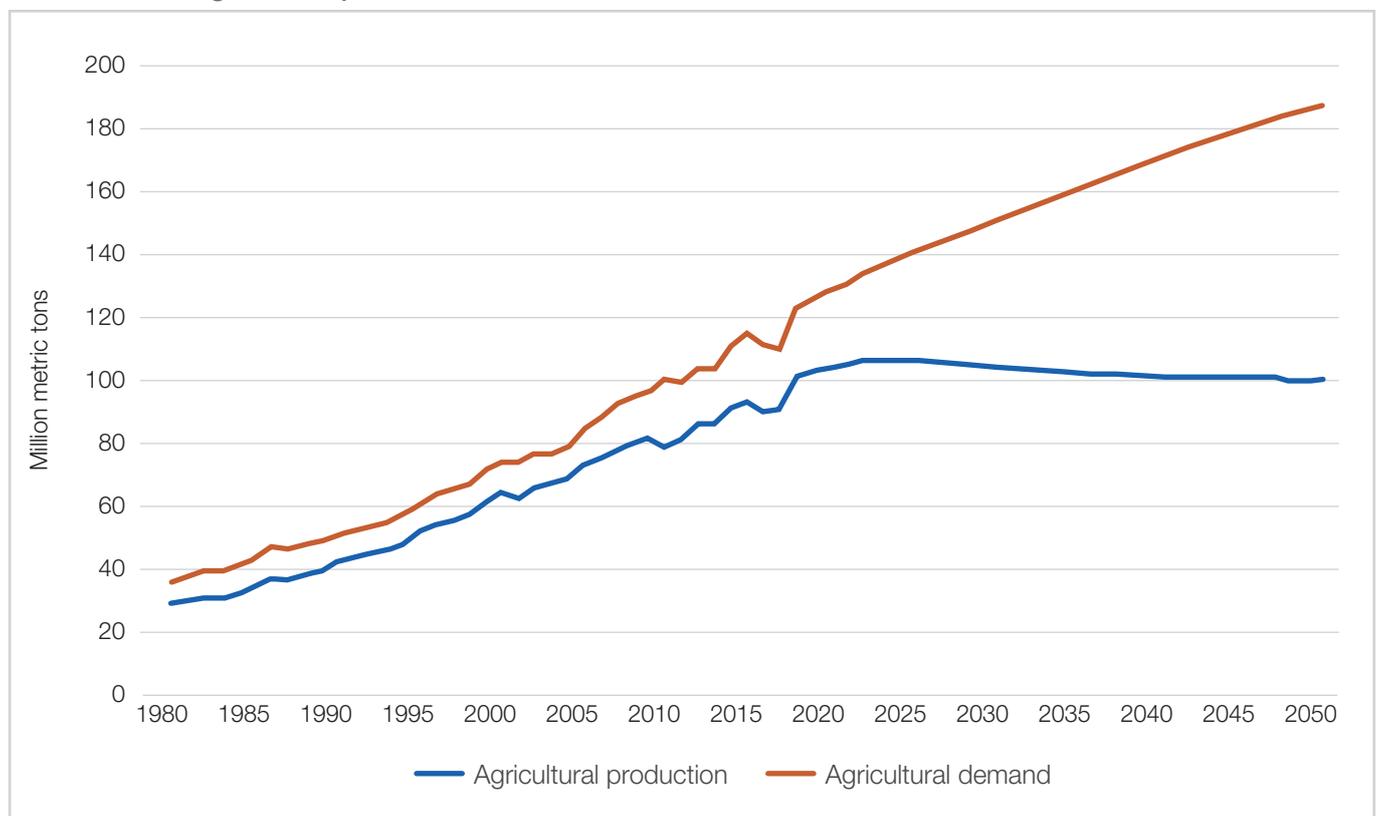
international food prices and wastage along the wheat value chain.¹⁷¹

According to the latest data from 2017, Egypt's average crop yield is about 26.8 tons per hectare. This is significantly higher than the African average at 2.04 tons per hectare and nearly seven times more than the average of the rest of North African countries (3.99 tons per hectare).

Sustaining Egypt's agricultural yields will prove challenging in the face of increased population growth, controversy about the Nile, and limited and declining agricultural land. It is estimated that Egypt's agricultural land in 2018 was 38 360 km², representing only about 3.9% of the country's total land area.¹⁷² In fact, the area of cultivated land per person is only about 0.05 hectare, one of the lowest globally. Most of that is located in a narrow strip along the Nile Delta and 'new lands' reclaimed from the desert after the construction of the Aswan Dam.¹⁷³

Although Egypt produces adequate amounts of rice, fruits, vegetables, poultry, chicken and dairy products,

Chart 18: Total agricultural production and demand



Source: IFs v 7.63, historical data from Food and Agriculture Organization (FAO)

it relies on imports to meet demand for crops such as wheat, lentils, red meat, sugar and oils. Despite the fact that Egypt actually increased production and gains in exports of certain strategic crops, the country remains a net food importer, at an estimated 40% of its food needs.¹⁷⁴

Chart 18 shows that the total agricultural supply has been trailing demand and the gap is projected to widen into the future. Agricultural production is projected to decline slightly and stay stagnant thereafter¹⁷⁵ in the face of increasing food demand, meaning that the gap will have to be offset by imports.

From a food security standpoint, greater import dependence makes Egypt more vulnerable to international price shocks and accompanying risks of disruptions in the global supply chains as seen during COVID-19. Also, reducing the import bill could allow channelling of resources to other productive sectors.

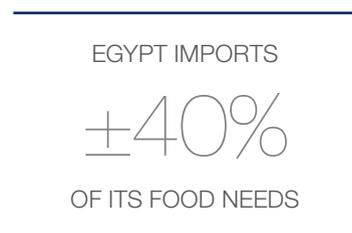
Hotter temperatures and less rain are projected to reduce agricultural productivity, including livestock rearing and fishing, by 15%–20% by 2050

Additionally, production and consumption loss should be reduced. A 2015 study reported that out of the respondents surveyed, only about 14% indicated that they did not throw away food and that food waste increased during the fasting month of Ramadan.¹⁷⁶

Now with a growing population, little rainfall, dispute over Ethiopia's GERD and the impact on its Nile water resources, agricultural fragmentation and shrinking land due to urbanisation, Egypt is at a crossroads to find innovative and effective solutions to its agricultural and food security system.

Furthermore, the country faces serious climate change risks. Flooding due to rising sea levels is affecting the Nile River Delta where Egypt grows most of its crops. About 12% to 15% of the country's fertile arable land in the Nile Delta will be negatively affected by sea level rise and salt water intrusion.¹⁷⁷ Moreover, hotter temperatures and reduced rainfall are projected to reduce agricultural productivity (including livestock rearing and fishing activities) by 15%–20% by 2050.¹⁷⁸

Egypt's National Strategy for Adaptation to Climate Change and Disaster Risk Reduction released in 2011 lays out a strategy that gives a framework of its adaptation policy to deal with the effects of climate change. The 'Green' constitution predicated on the principle of sustainable environment and development as a human right also recognises and promotes responsible and rational use of the country's natural resources while ensuring food security for Egyptians.¹⁷⁹



Box 5: Climate change

CO₂ emissions in Egypt are largely from the energy sector. In 2018, Egypt emitted over 250 million tons (Mt) of CO₂ and ranked 27th globally for energy-related CO₂ emissions. This constituted 0.75% of global emissions and 2.5 tons of CO₂ emissions per capita.

Electricity generation accounted for approximately 40% of the country's total CO₂ emissions. Other contributions to CO₂ emissions were made by transportation (20%), industry (15%), residential buildings, i.e. real estate (5%), and other sectors (20%). Consumption-based emissions accounted for approximately 248 Mt of CO₂.¹⁸⁰ In 2019, fossil fuels and cement production alone accounted for about 247 Mt of CO₂ emissions.¹⁸¹

According to the Global Carbon Project, cities are the hotspot of the global carbon cycle because they concentrate larger population sizes, economic output and energy use. With increasing urbanisation in Egypt, its major cities like Cairo and Alexandria are projected to continue the trend of increasing CO₂ emissions.¹⁸²

The impact of this is reiterated by the recent 2021 report by the Intergovernmental Panel on Climate Change indicating that it is likely that some aspects of climate change may be amplified in cities. This includes heat because urban areas are often warmer than their surroundings, and flooding from heavy precipitation events and sea level rise in coastal cities will occur.¹⁸³

General trends show that Egypt has been warming quite significantly since 1960, with greater warming in summer (0.31°C per decade). Between 1960 and 2003, there has been an increase in the frequency of warm nights and a decrease in the frequency of cool nights. Between 2020 and 2049, maximum temperatures are projected to increase by 1.0°C to 1.22°C, and minimum temperatures by 1.09°C and 1.32°C for the Representative Concentration Pathway (RCP0).¹⁸⁴

By mid-century, mean annual temperatures are projected to increase by 1.64°C and 2.33°C for the RCP4.5 and 8.5 median ensemble.¹⁸⁵ Consequently, Egypt is projected to experience more severe and frequent flash floods but slightly reduced rainfall and greater warming by mid-century. Future drought conditions are expected to be extreme, and by 2030 the total Mediterranean Basin average sea level rise will be between 0.07 m and 0.18 m.¹⁸⁶

Egypt is therefore highly vulnerable to climate change that poses a risk to energy, water and food security, and job and financial security in the country. Key vulnerabilities for Egyptians thus include floods washing away property, claiming lives and displacing people, reducing agricultural productivity, and infrastructure such as water and sanitation (WASH) systems being affected.

Egypt's dependence on the Nile makes it imperative that the country adapts to varying levels of water flow. Some of the actions outlined in the Egyptian Intended Nationally Determined Contributions¹⁸⁷ include promoting resilience in agriculture (changes in sowing seeds, use of hybrid seeds, improving cattle productivity and changing land use), water use, energy, health and tourism.¹⁸⁸

The Green Transformation Agenda adopted by Egypt is thus a pivotal approach to planning and economic competitiveness for the country's future sustainable environment. Following the conventional development trajectory in the face of climate change without a 'green agenda', Egypt risks losing energy independence, economic capital and investments. It also increases the risk of conflict over water and threats to industries such as tourism.

The Green Transformation must therefore be framed with respect to job creation, poverty reduction, sustaining energy independence, mitigating and adapting to climate change, and meeting other national development objectives.¹⁸⁹

In addition, the government through the National Water Resources Plan has long sought to improve overall water use efficiency in agriculture. This includes implementing more effective irrigation systems. According to Food and Agriculture Organization (FAO)-AQUASTAT data from 2015, Egypt's irrigation potential was estimated at about 4 420 000 hectares, and the total land area equipped for irrigation was 3 422 178 hectares in 2002. Eighty five percent of this was in the Nile Valley and Delta.¹⁹⁰

The Government of Egypt is also on a drive to reclaim more land for agriculture with a target of an additional 150 000 acres (60 000 hectares) per year.¹⁹¹

Demographic problems combined with water scarcity and the impact of climate change will be a major challenge in achieving sustainable development

Although the government is taking initiatives to boost domestic production and promote sustainable and green farming, much more needs to be done to make the agricultural system more efficient and better geared towards policies that incentivise farmers to focus on food products for which Egypt has a comparative advantage.

For example, Egypt has a comparative advantage in fruits and vegetables, which could potentially attract higher revenues and foreign exchange to then import wheat at global prices rather than at subsidised domestic prices. Such targeted reforms in the food subsidy system could help the country to achieve a productive and sustainable agricultural sector that advances food security.¹⁹²

Sectoral scenarios

The Current Path analysis has outlined the challenges and opportunities faced by Egypt on its current development trajectory. A central concern is the country's rapid population growth given its resource constraints. Demographic problems combined with Egypt's water scarcity and the impact of climate change will continue to be a major challenge in achieving sustainable development. Thus, the management of shared natural resources with other riparian states, and particularly resolving the controversy over the GERD, is crucial for improving Egypt's water security situation.

Also, economic drawbacks like the high unemployment rate, the health sector crisis that has been accentuated by COVID-19, agricultural import dependence, and challenges relating to good governance and stability need to be carefully managed.

In this section, we complement the Current Path forecast of Egypt's likely future trajectory by simulating the potential impact(s) of seven sectoral interventions to demonstrate the alternative development pathways that

85%

OF LAND EQUIPPED FOR
IRRIGATION IS IN THE
NILE VALLEY AND DELTA

Egypt could adopt towards a more prosperous future. The interventions are predicated on successful reforms and the ability of the Government of Egypt to unlock socio-economic opportunities in manufacturing, agriculture, energy and telecommunications as outlined in its National Structural Reform Programme.

The scenarios consist of interventions in demography; economy and trade; governance and stability; leapfrogging, energy and climate change; health and WASH; and education – each of which is then compared against the Current Path forecast.

The sectoral interventions need to all happen concurrently, and will complement one another. Thus, in the final section, the seven scenario components

are combined in an ambitious integrated development agenda that illustrates the impact of a sustained push across all sectors.

In line with the second ten-year implementation plan of the African Union’s Agenda 2063 long-term vision for the future of Africa, the interventions start from 2024 to 2033, simulating a concerted push in that period, after which the level of performance is maintained out to 2050.

All the interventions are benchmarked against ambitious but reasonable targets that have been achieved by countries at similar levels of development or had the same challenges as Egypt (see annex).

Chart 19 below gives an overview of the sectoral scenarios.

Chart 19: Summary of sectoral scenarios



Demography

This scenario increases access to modern family planning (contraception) and the rate of female labour participation. Modern contraception is an immediate way to manage and reduce the rapid population growth in Egypt.

Increasing the rate of female labour participation is a proxy for boosting the availability of more economic and labour opportunities for women. This factor has been identified as a driver for increased total fertility rate of women within the child-bearing age. Increasing the labour participation rate for women would also have positive economic effects.

The scenario simulates a 20% increase in access to modern contraception for women of child-bearing age (this should be accompanied by greater awareness campaigns and programmes on family planning for both men and women), and an aggressive 50% increase in the rate of female labour participation.

As a result, Egypt's female participation rate in the economy performs better than the other North African countries and surpasses the average rate of lower-middle-income countries globally (41.6%) at 44.5% in 2033 compared to nearly 30% in the Current Path. By 2050, the female labour participation rate will be 50.7% relative to 33.9% in the Current Path.

The outcome is that by 2033, TFR reduces to approximately 2.15 births per woman compared to 2.6 in the Current Path. Egypt therefore reaches the replacement level by 2033 instead of 2043 in the Current Path forecast. By 2050, Egypt's population will be approximately 142.9 million people compared to 149.9 million, a difference of seven million fewer people in that year.

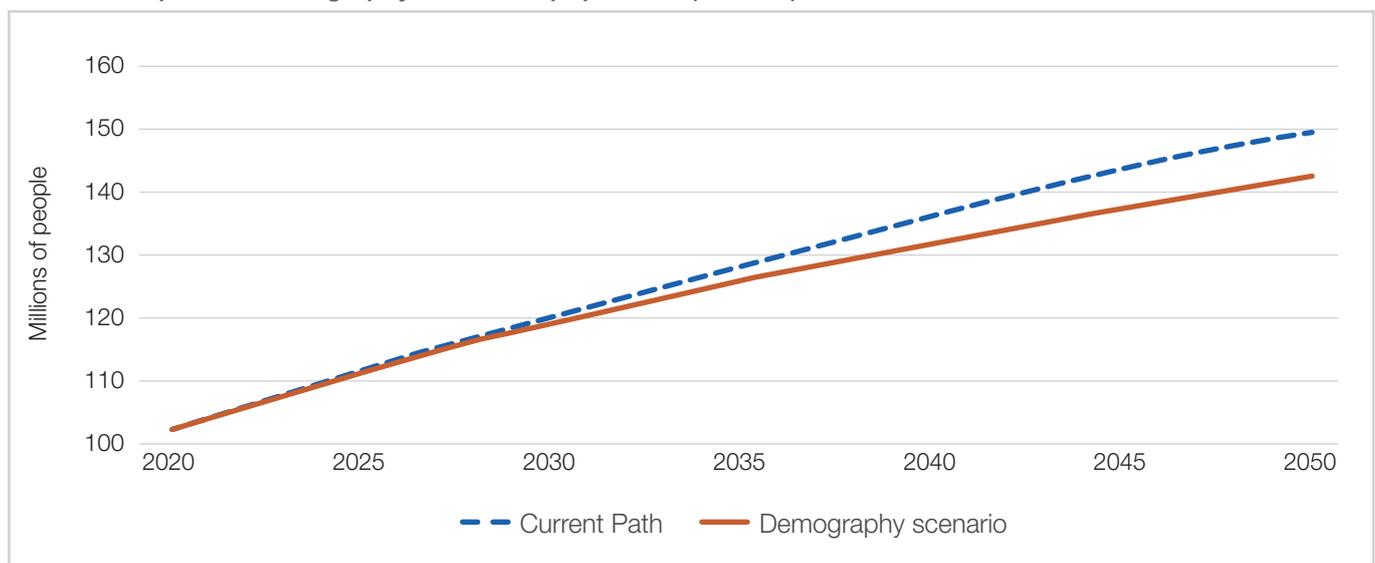
Improvements in the female labour participation rate will require enforcement of anti-discriminatory policies against hiring women, particularly in the private sector. Investments in childcare and early childhood services would also allow women to pursue productive economic activities. Finally, promoting the growth of industries that can increase demand for female labour is a strategy the government should pursue.¹⁹³

Economy and Trade

In the Economy and Trade scenario, the government incentivises manufacturing, energy and agricultural exports. It encourages greater private sector competition through good business regulatory practices, reduces the cost of starting a business, and increases economic freedom.

These interventions reduce the barriers to participating in the economy, and encourage entrepreneurship and the creation and survival of businesses. The interventions facilitate a reduction in the size of the

Chart 20: Impact of Demography cluster on population (millions)



Source: IFs v 7.63, historical data from UNPD

informal sector with accompanying improvements in tax revenues and productivity.

The scenario also increases FDI inflows and domestic investment in the economy to stimulate growth and competition in key sectors. Additionally, owing to the importance of remittances to the Egyptian economy, the government incentivises its large diaspora community to increase remittances to the country, and also encourages more injection of productive investment instruments like diaspora bonds to complement household consumption expenses.

According to the 2021 ITUC Global Rights Index, Egypt ranks as the fifth worst country for workers out of 149 countries globally.¹⁹⁴ To further address the challenge of informality caused by non-compliance of firms to labour standards and worker benefits,¹⁹⁵ the scenario boosts social insurance and welfare, which in turn boosts households' tax contributions. This facilitates greater formalisation of all economic actors and provides workers with the associated benefits, including retirement plans.

The result is increased tax revenue, greater formalisation of the economy, and increased protection of workers' rights and conditions. In addition, this would have the spillover effect of raising funds required

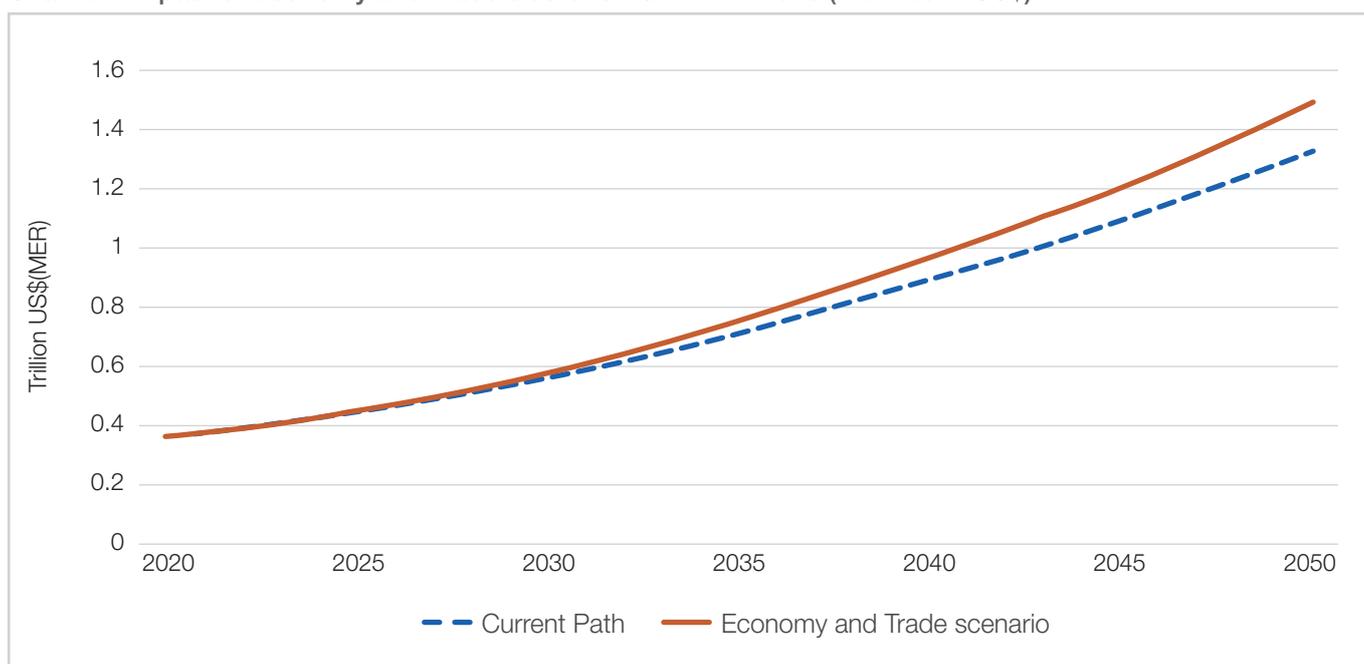
for welfare and social safety net programmes for the vulnerable population.

In this cluster, energy, manufacturing and agricultural exports are increased by a magnitude of 30% and 10% respectively over a 10-year period to 2033. FDI inflows and worker remittances also rise by 20% respectively, and social security and welfare tax increases by 15% (full list of interventions are in the annex).

As a result, revenue from all tax categories (firms, households, indirect and social security welfare tax) will improve. Indirect taxes record the highest increase. Specifically, social security welfare tax increases to US\$26.2 billion in 2033 compared to US\$20 billion in the Current Path forecast. Also, Egypt's GDP is US\$26.3 billion larger than in the Current Path at US\$645 billion in 2033. By 2050, the size of the economy will be nearly US\$1.5 trillion compared to US\$1.3 trillion in the Current Path, a difference of nearly US\$170 billion.

Improved business regulations, increased economic freedom and better labour standards have a very positive impact on reducing the size of the informal economy in this scenario. By 2033, the informal economy will be about 42% of GDP compared to 49% in the Current Path. By 2050, it will be 27% compared to 42% in the Current Path.

Chart 21: Impact of Economy and Trade cluster on GDP in trillions (MER-2017 US\$)



Source: IFs v 7.63, historical data from IMF

Governance and Stability

The Governance and Stability scenario envisions a more effective government that efficiently provides basic services with increased capacity to adequately collect revenue. This also involves less wastage of resources in the form of reduced corruption and greater transparency and accountability.

Egypt can leverage the potential of the private sector if it can reduce corruption and cronyism, thus improving efficiency, and taking advantage of its capable human capital to achieve its Vision 2030 and 2050 for sustainable development.¹⁹⁶

Food subsidy reforms can accelerate economic growth and reduce poverty if better targeted

The Governance and Stability scenario also improves the level of democracy and promotes greater inclusion, in this case, gender empowerment for women. Furthermore, it simulates a decreased active role of the military in public life and day-to-day governance by reducing the level of military expenditure without jeopardising the country's security situation.

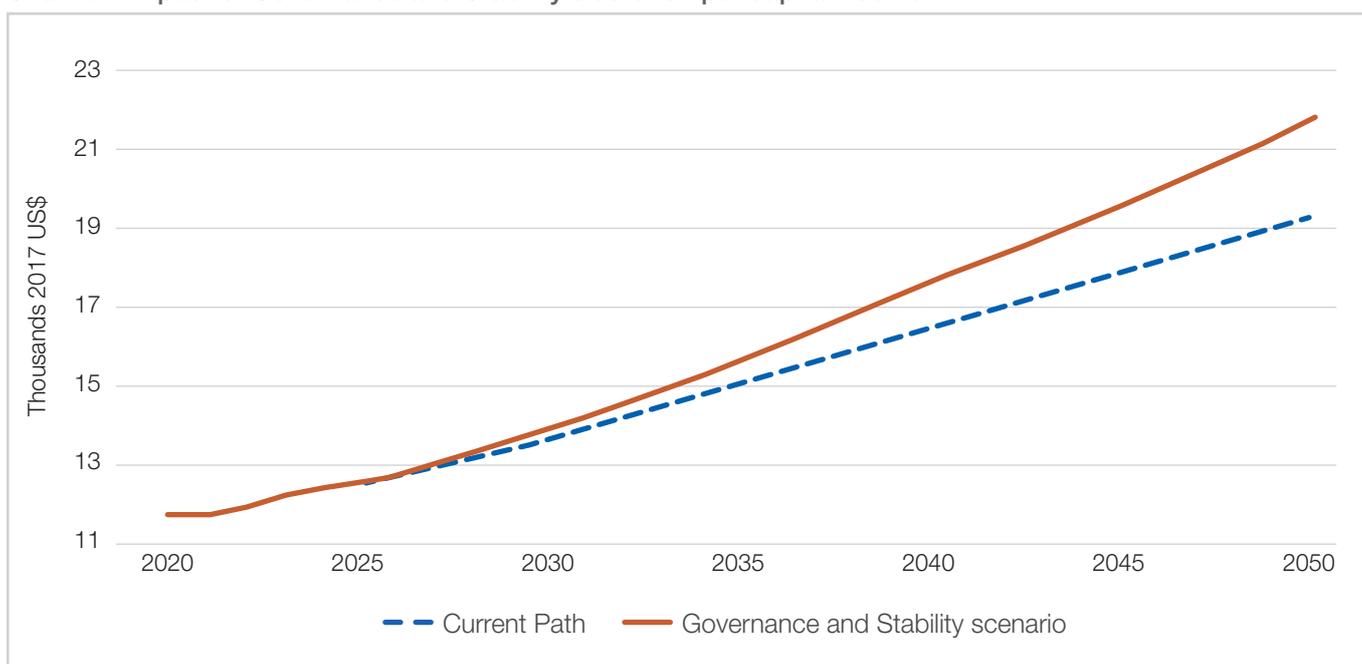
It also promotes the continued reform of the subsidy system by reducing and eventually phasing out subsidy packages that benefit the wealthy. It redirects some of these resources towards more efficient social policy programmes that better target the vulnerable population for more effective poverty alleviation.

For example, food subsidy reforms in Egypt have the potential to accelerate economic growth and reduce poverty if the government can reduce the number of beneficiaries and better target Tamween recipients. Apart from better targeting, moving to a cash-based subsidy system would be more efficient in reducing poverty. It would stimulate economic growth because it is easier to administer and produces better nutritional health outcomes.¹⁹⁷

In this scenario, over the 10-year intervention period from 2024 to 2033, government effectiveness is boosted to simulate a 20% improvement. Corruption is reduced by 30%¹⁹⁸ and government-to-household welfare to the most vulnerable is increased by 10%, while other subsidies, such as on fuel, are reduced (full list in annex).

The Government Effectiveness Index improves to 2.65 over the Current Path's 2.15 in 2033, and by 2050, the index will measure 3.2 against 2.5 in the Current Path.

Chart 22: Impact of Governance and Stability cluster on per capita income



Source: IFs v 7.63, historical data from WB-WDI

The Corruption Perceptions Index score (old score) improves from 3.4 in the Current Path to 4.8 and by 2050 records a score of 6.¹⁹⁹ Owing to overall improvement in this governance cluster, GDP per capita is about US\$382 and US\$2 398 more than in the Current Path in 2033 and 2050, respectively.

Leapfrogging, Energy and Climate Change

In the Leapfrogging, Energy and Climate Change scenario, Egypt uses its considerable ICT and energy potential towards the adoption of modern systems across all spheres of its economy. The country takes advantage of the transformative role of technology and innovation to facilitate healthy competition with the government acting as a regulator to encourage a more conducive business and innovation environment.

COVID-19 has created an opportunity for Egypt to improve its competitiveness and productivity through support of digital transformation by improving associated infrastructure and skills.

The scenario thus makes a push for expansion in the road network to facilitate physical connectivity, particularly in rural areas where even unpaved roads would accelerate movement of people and goods and the penetration of other technological infrastructure. It

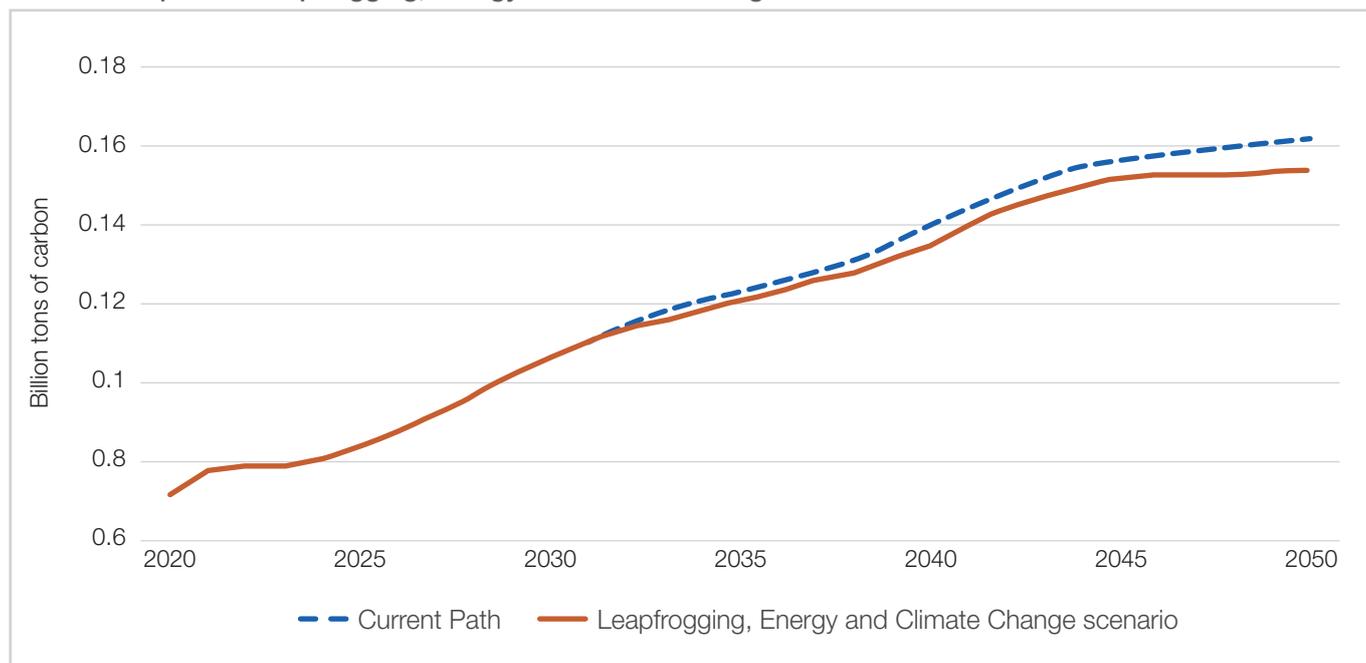
also improves ICT infrastructure, internet access and the ability of the government and Egyptians at large to increase integration of technology in business and government services. This would enhance efficiency and effectiveness in the economy.

Egypt's carbon dioxide (CO₂) emissions are related to the energy industry (fossil fuels) and cement production. In 2018, Egypt emitted about 250 million tons of CO₂ and ranked 27th globally in terms of energy-related CO₂ emissions.²⁰⁰

COVID-19 has created an opportunity to support digital transformation by improving infrastructure and skills

The Leapfrogging, Energy and Climate Change scenario introduces a carbon tax and increases the role of renewables in Egypt's transition to a greener economy and cleaner energy.²⁰¹ The scenario simulates a future where smart innovations eventually reduce the rate of capital investment required for renewables and nuclear energy, and increase the cost of investing in fossil fuels to facilitate greater uptake of renewables.

Chart 23: Impact of Leapfrogging, Energy and Climate Change scenario on carbon emissions



Source: IFs v 7.63, historical data from Carbon Dioxide Information Analysis Center
 * Note that IFs uses carbon and not CO₂ equivalent*

In this scenario, mobile and fixed internet access expands by 20% over the 10 years of intervention, the capital investment on renewables and nuclear energy decreases by 20% and that of coal increases to simulate divestment in that sector. A carbon tax cost of US\$50 is also instituted in line with Egypt's commitments to reduce carbon emissions.

By 2033, the number of people with fixed broadband will be approximately 32.8 million compared to 28 million in the Current Path forecast. And by 2050, 11.6 million more people will have fixed broadband connections relative to the Current Path's 63 million. Carbon emissions will increase to 116 million tons (Mt) compared to 118 Mt in the Current Path in 2033. And by 2050, it will be 154 million tons compared to 162 million tons in the Current Path forecast.

Health and WASH

In the Health and WASH scenario, Egypt reduces deaths of children under five (mostly due to communicable diseases) as well as mortality due to non-communicable diseases (cancer, cardiovascular-related illnesses, diabetes and respiratory infections). It promotes better awareness, diagnosis and management of NCDs to reduce deaths related to them. The scenario also

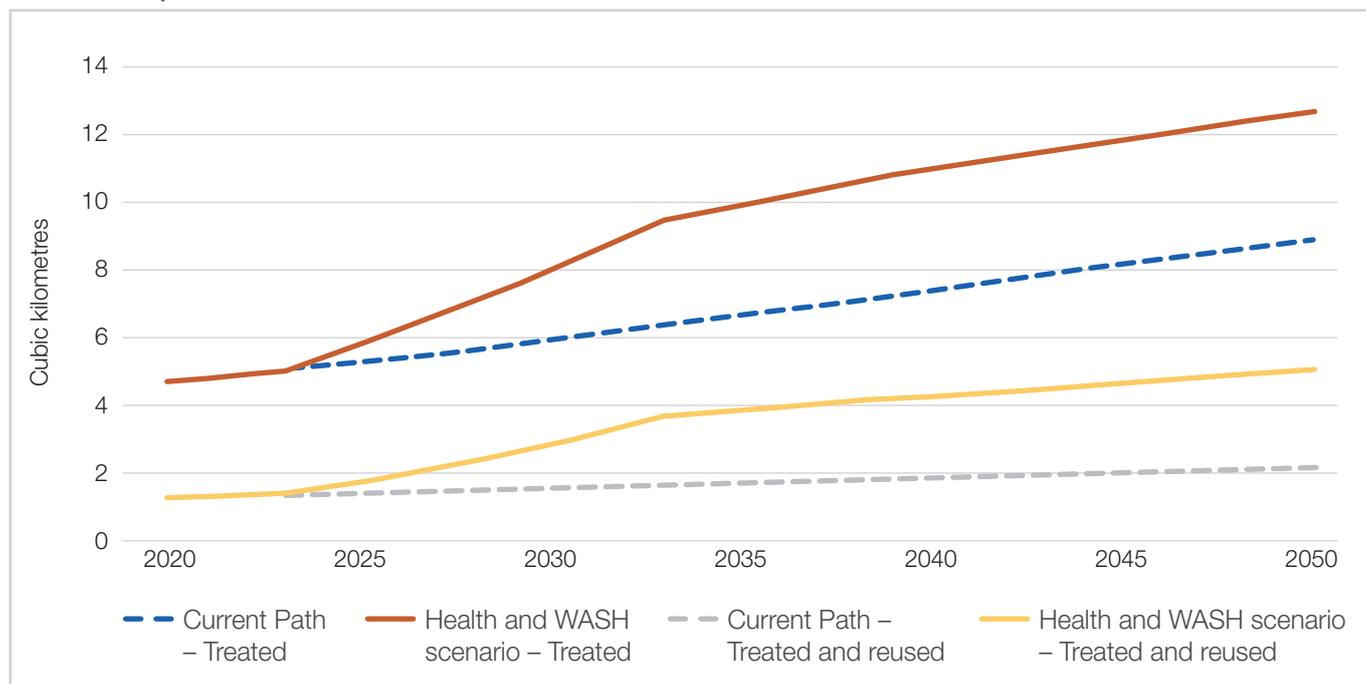
reduces the prevalence of smoking, which is quite high and is associated with most cases of cardiovascular-related complications and other major NCDs in the country. It also reduces the rate of traffic-related deaths.

Egypt also increases the portion of treated wastewater to promote reuse and better water management in a country projected to face a continued crisis. This water crisis is due to climate change and controversy over the use of the Nile water with other riparian states. Wastewater that is treated and reused is also increased by 50% over the intervention period.

In this scenario, NCD deaths are reduced by 30% (full list in annex). Wastewater that is treated and reused is also increased by 50% over the intervention period (full list in annex).

The rate of NCD deaths per 1 000 people reduces to about 4 511 deaths compared to 5 196 in the Current Path in 2033 and by 2050, 5 748 against the Current Path's 6 210. Treated wastewater rises to over 9.5 km³ compared to 6.4 km³ in the Current Path by 2033 and by 2050, 12.7 km³ against 8.9 km³ in the Current Path forecast. Wastewater that is treated and reused increases from 2.2 km³ in the Current Path relative to this scenario at 5.1 km³ by 2050.

Chart 24: Impact of Health and WASH scenario on wastewater treated and reused



Source: IFs v 7.63, historical data from AQUASTAT

Education

The Education scenario improves educational outcomes especially at secondary and tertiary levels where bottlenecks have started to emerge. A good stock of education through a well-trained population would allow Egypt to increase its human capital and promote advancement of the economy by adequately taking advantage of technology and innovation.

In addition, the scenario increases enrolment in science and engineering, and expands the scope and intake for technical skills through more vocational training. The scenario simulates a 20% increase on major educational attainment indicators. Vocational training is expanded to five times the current level.

A good stock of education would allow Egypt to increase its human capital, taking advantage of technology and innovation

Beyond quantity, the education scenario improves the score for quality of education at primary and secondary levels by 20% and 10% respectively. Gender parity is also achieved by 2033 at all levels of the education system in the scenario.

In 2033, relative to the Current Path, the quality of secondary education improves by over four points compared to 45 in the Current Path and by 2050 Egypt records 53 points in the quality index relative to 48 in the Current Path. The rate of tertiary graduation increases to 33% compared to 28% in the Current Path in 2050.

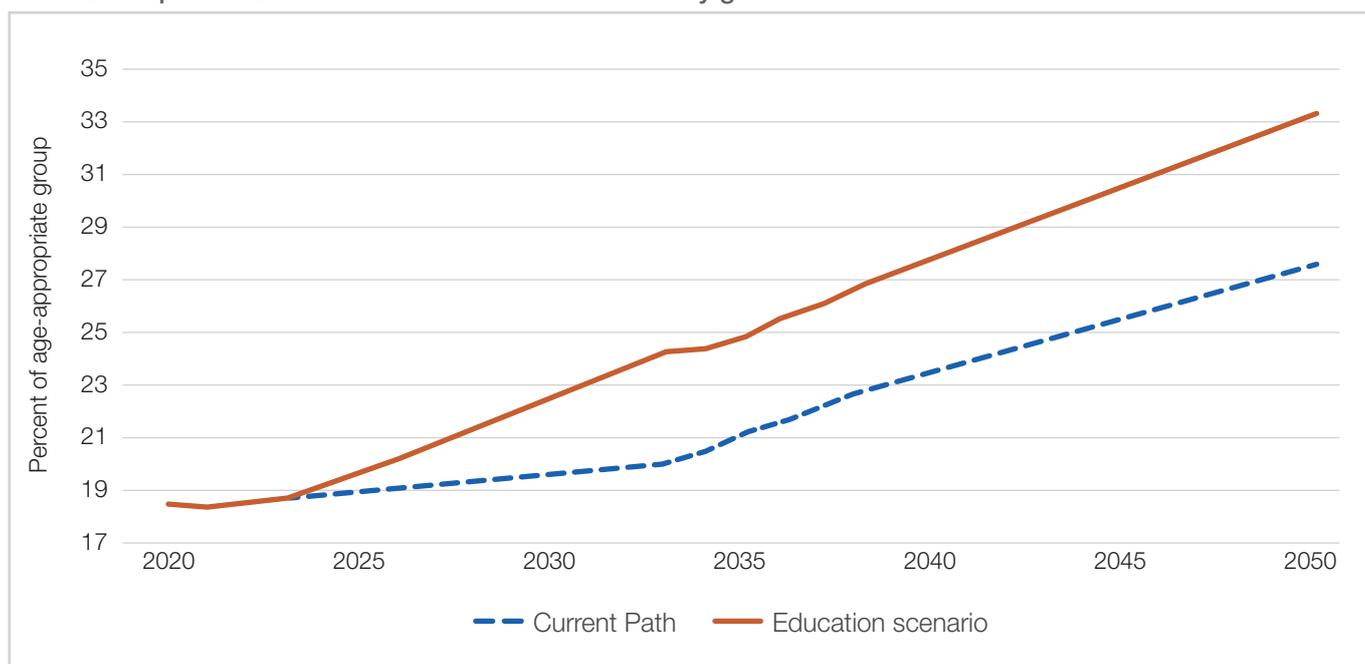
Agriculture

The Agriculture scenario increases agricultural yields and the land area actually irrigated to facilitate stable and reliable agricultural production while restricting increases in water use to emulate greater efficiency and better management of water in the sector.

Agriculture already consumes about 85% of the country's freshwater resources. It simulates an increase in land under cultivation according to Egypt's efforts to reclaim some of the desert land for crop farming.²⁰² It also reduces agricultural and food loss.

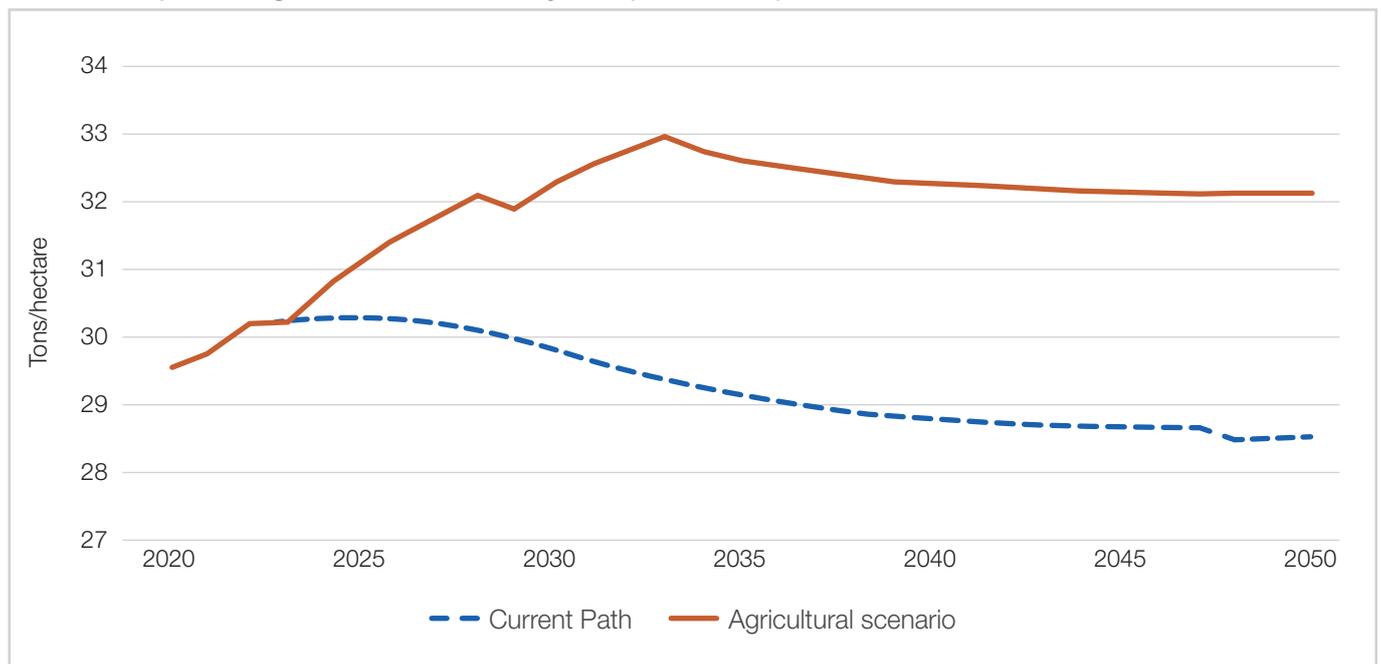
In this scenario, agricultural yields are boosted by 15% and loss of agricultural produce in the transmission process and at consumer level is reduced by 20% and 30% respectively (full list in annex). Additionally, this scenario increases calories per capita to ensure there is enough food in the country to meet domestic demand (a proxy to ensure that not all agricultural produce is exported).

Chart 25: Impact of Education scenario on rate of tertiary graduation



Source: IFs v 7.63, historical data from UIS

Chart 26: Impact of Agriculture scenario on yields (ton/hectare)



Source: IFs v 7.63, historical data from FAO

By 2033, yields will improve from 29.4 tons/hectare in the Current Path to 32.9. The forecast shows a slight gradual decline of yields after 2033, and by 2050, Egypt records 32.1 tons/hectare compared to 28.5 in the Current Path forecast. Additionally, by 2050, agricultural import dependence on crops declines to about 44.5% compared to nearly 46% in the Current Path forecast.

The impact of the Agriculture scenario is an increase in crop production by 12.6 million tons in 2033 and 12.8 million tons by 2050 compared to the Current Path forecast. As a result, Egypt's import dependence as a percent of net demand drops by 1.2% in 2050.

Comparing scenario impacts

When compared with one another, the Demography scenario makes the greatest contribution to GDP by 2033. In the Demography scenario, by 2033, the Egyptian economy would increase by about US\$51.3 billion more than the Current Path forecast to approximately US\$697 billion.

The results illustrate the impact of a significantly higher female labour participation rate and shows how Egypt's rapid population rise constrains growth and development in the country. A reduction in the absolute number of

people would therefore promote sustainable growth and development in Egypt.

After the Demography scenario, the Economy and Trade and the Governance and Stability scenarios make the greatest improvements in GDP in 2033, respectively. From 2037, the Governance and Stability scenario outpaces the Economy and Trade scenario in its impact on the size of the economy.

A reduction in the absolute number of people would promote sustainable growth and development in Egypt

These results highlight Egypt's key challenges and show the importance of good, accountable and inclusive governance to stability and sustainable development once economic reform has been achieved.

The Health and WASH and Agriculture scenarios will also contribute a significant portion to GDP by 2033. This not only illustrates the importance of increased water supply and its efficient management, but also the ability of agriculture to contribute to growth, especially for Egypt's large rural population.

Chart 27: GDP size by scenario compared to the Current Path (in billions 2017 US\$)

	Current Path	Demography scenario	Economy and Trade scenario	Education scenario	Governance and Stability scenario	Health and WASH	Leapfrogging, Energy and Climate Change	Agriculture scenario
2030	562	591	571	563	571	566	562	568
2033	646	697	672	650	671	658	647	655
2040	890	973	964	914	981	933	894	898
2043	1 009	1 102	1 103	1 050	1 137	1 067	1 015	1 017
2050	1 327	1 434	1 495	1 433	1 576	1 437	1 339	1 332

Source: IFs v 7.63, historical data from IMF, WDI

From 2040, the Governance and Stability scenario makes the greatest contribution to the size of GDP until the end of the forecast horizon. By 2050 the Governance and Stability scenario is followed by the Economy and Trade, Health and WASH, Demography, Education, Leapfrogging, Energy and Climate Change, and Agriculture scenarios. The performance of the Agriculture scenario over the forecast horizon reflects the declining role of agriculture as Egypt's economy goes through a structural transformation and the impact of constraints on water supply.

The Demographic scenario records the largest improvement in GDP per capita to 2045. Given that Egypt's population is already beyond the boundaries of sustainable development, fewer people means that the ratio of dependence will drop, and in absolute terms there will be a larger share of the Egyptian national cake to distribute.

Moreover, Egypt already has a sizable portion of human capital that is underutilised. Therefore investing in relevant and useful skills, promoting female participation in the labour market and reducing the barriers to formalising its large informal sector are important factors in boosting the productivity and dynamism of its economy.

After the Demography scenario, increases in GDP per capita are followed by the Economy and Trade and the Governance and Stability scenarios, and by 2050, the Governance and Stability scenario achieves the best outcome in improving GDP per capita. The

improvements in the Governance and Stability scenario demonstrate the significant contribution that good governance could make to the welfare of Egyptians, especially with better targeted social safety nets for the vulnerable population.

Improvements in GDP per capita in 2050 from the Governance and Stability scenario are followed by the Demography, Economy and Trade, Education, Health and WASH, Leapfrogging, Energy and Climate Change, and Agriculture scenarios.

The Demographic scenario records the largest improvements in GDP per capita to 2045

The Demography scenario also has the greatest impact on reducing extreme poverty by 2033. In absolute terms, Egypt would have fewer people therefore reducing the incidence of poverty. Moreover, increased female participation in the economy would ensure that more people are economically productive and earning an income.

Using the US\$3.20 threshold for low-middle-income countries, by 2033 about 15.8% of the population (19.5 million people) are projected to be living in extreme poverty compared to 18.4% (approximately 23 million people) in the Current Path in the same year.

The Governance and Stability scenario has the second greatest impact on extreme poverty alleviation at 16.4%

Chart 28: Impact on GDP per capita relative to the Current Path (2017 US\$)

	Current Path	Demography scenario	Economy and Trade scenario	Education scenario	Governance and Stability scenario	Health and WASH	Leapfrogging, Energy and Climate Change	Agriculture scenario
2030	13 734	14 279	13 876	13 756	13 898	13 799	13 745	13 854
2033	14 508	15 445	14 900	14 573	14 889	14 661	14 530	14 650
2040	16 481	17 996	17 342	16 819	17 625	16 950	16 535	16 612
2043	17 309	18 944	18 268	17 811	18 770	17 876	17 386	17 429
2050	19 315	21 059	20 775	20 416	21 713	20 252	19 446	19 413

Source: IFs v 7.63, historical data from IMF, WDI

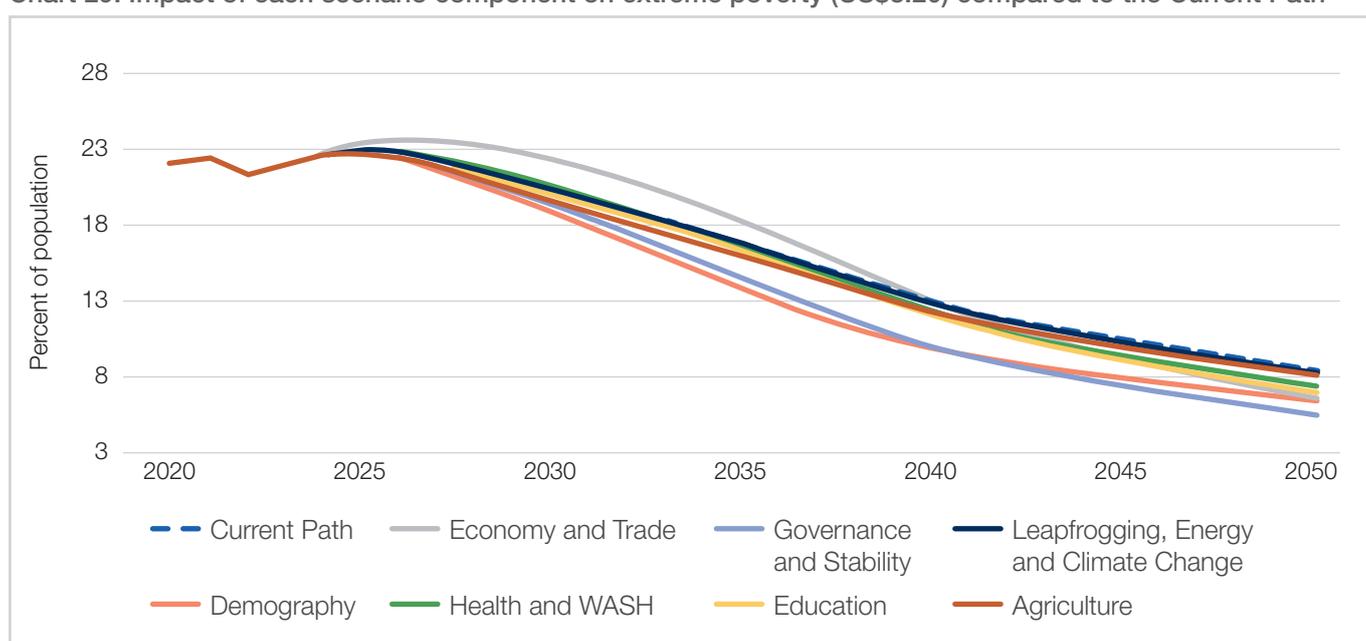
in 2033. It is followed by the Agriculture scenario, reflecting the short- to medium-term importance of agriculture in extreme poverty alleviation, especially for Egypt’s rural poor. Thereafter, reduction in extreme poverty will be followed by the Education, Leapfrogging, Energy and Climate Change, Health and WASH, and Agriculture scenarios.

However, the Economy and Trade scenario and Health and WASH scenarios would, by 2033, modestly increase extreme poverty owing to the massive resources required to invest in the economy to promote

industries in manufacturing and exports and other basic infrastructure. Eventually, by 2050, all the scenarios yield positive reductions in extreme poverty compared to the Current Path forecast. But the Governance and Stability scenario will have the greatest impact with only 8.2 million Egyptians surviving on income below US\$3.20 compared to 12.8 million on the Current Path forecast.

Overall, this reiterates the need for good and efficient governance, even in the management of Egypt’s resources as the country invests in other sectors in light of its rapidly growing population and limited resources.

Chart 29: Impact of each scenario component on extreme poverty (US\$3.20) compared to the Current Path



Source: IFs v 7.63, historical data from WDI

The Demographic scenario has the most significant achievement in propelling Egypt towards an increased demographic dividend – i.e. the economic benefits derived from change in a country's population age structure. In this case, fewer births would reduce the level of dependence in relation to the working-age population. Deceleration in population growth would avail more resources and encourage households to save more and invest in themselves and the economy.

On informality, the Economy and Trade scenario makes the greatest impact on reducing the size of the informal economy as a share of GDP. By 2050, the Economy and Trade scenario reduces the share of the informal economy to about 27.4% relative to 42.4% in the Current Path forecast. Improvements are then followed by the Demography, Education, Governance and Stability, Health and WASH, Agriculture, and Leapfrogging, Energy and Climate Change scenarios.

Finally, the Health and WASH scenario has the greatest impact on increasing Egypt's water supply by 2033. It is followed by the Demography scenario, which illustrates the pressure that Egypt's large and rising population puts on the country's ability to adequately and sustainably meet the water demands of its people. However, by 2038, the Governance and Stability scenario outpaces the Economy and Stability scenario in this regard.

Egypt has dedicated significant resources to undertake projects like desalination, but the country faces financial limitations in realising consistent and sustainable water supply for an extended period of time owing to the costly nature of desalination. These efforts must therefore be supplemented with aspects of good and efficient governance and service delivery that ultimately impact conservation and better use of resources like water.

Combined scenario

This section integrates all the scenarios into one Combined scenario. The change envisioned by this scenario is predicated on a future where there is genuine political will to reform the system and create a society that works for everyone.

The vision for a new future is formulated in a participatory way and shared with the citizenry to establish and reflect a new social contract between the state and the people. This scenario therefore simulates a future where the

Government of Egypt makes a concerted and sustained holistic policy push on all sectors.

In the Combined scenario, Egypt's total population is just over 123 million in 2033. This is approximately two million fewer people than in the Current Path trajectory. By 2050, the country is projected to have around 144.3 million people, a 3.7% drop below the Current Path forecast at 149.9 million.

The GDP size is much larger than in the individual scenario components. Egypt's GDP is larger by US\$135.7 billion at around US\$781 billion compared to the Current Path at US\$645.7 billion in 2033. This represents an over 22% increase in GDP over the Current Path in that year.

Egypt faces financial limitations in realising consistent and sustainable water supply for a long period of time

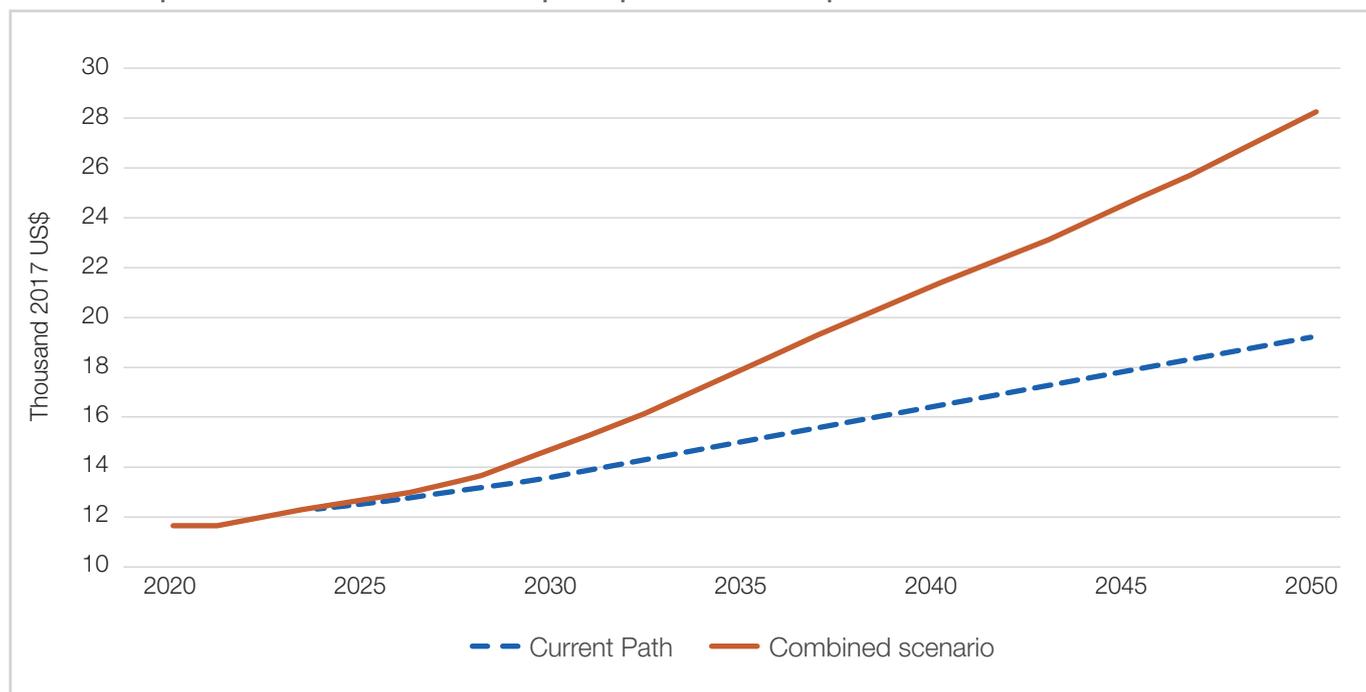
By 2050, the size of the economy would be worth roughly US\$2.3 trillion, about a 72% increase from the Current Path at US\$1.3 trillion. In fact, the Combined scenario nearly doubles the size of the economy relative to the Current Path forecast by 2050.

As a result, per capita income also rises and the average Egyptian can expect to earn about US\$2 126 more in 2033, compared to the Current Path at US\$14 508. By 2050, per capita income is projected to reach US\$28 209 and represents a 46% increase from the Current Path at US\$19 315 (US\$8 894 more).

Extreme poverty at US\$3.20 would also decrease by significant margins, although initially the poverty rate will be more or less on par with the Current Path forecast due to the intensive capital required to invest in the economy.

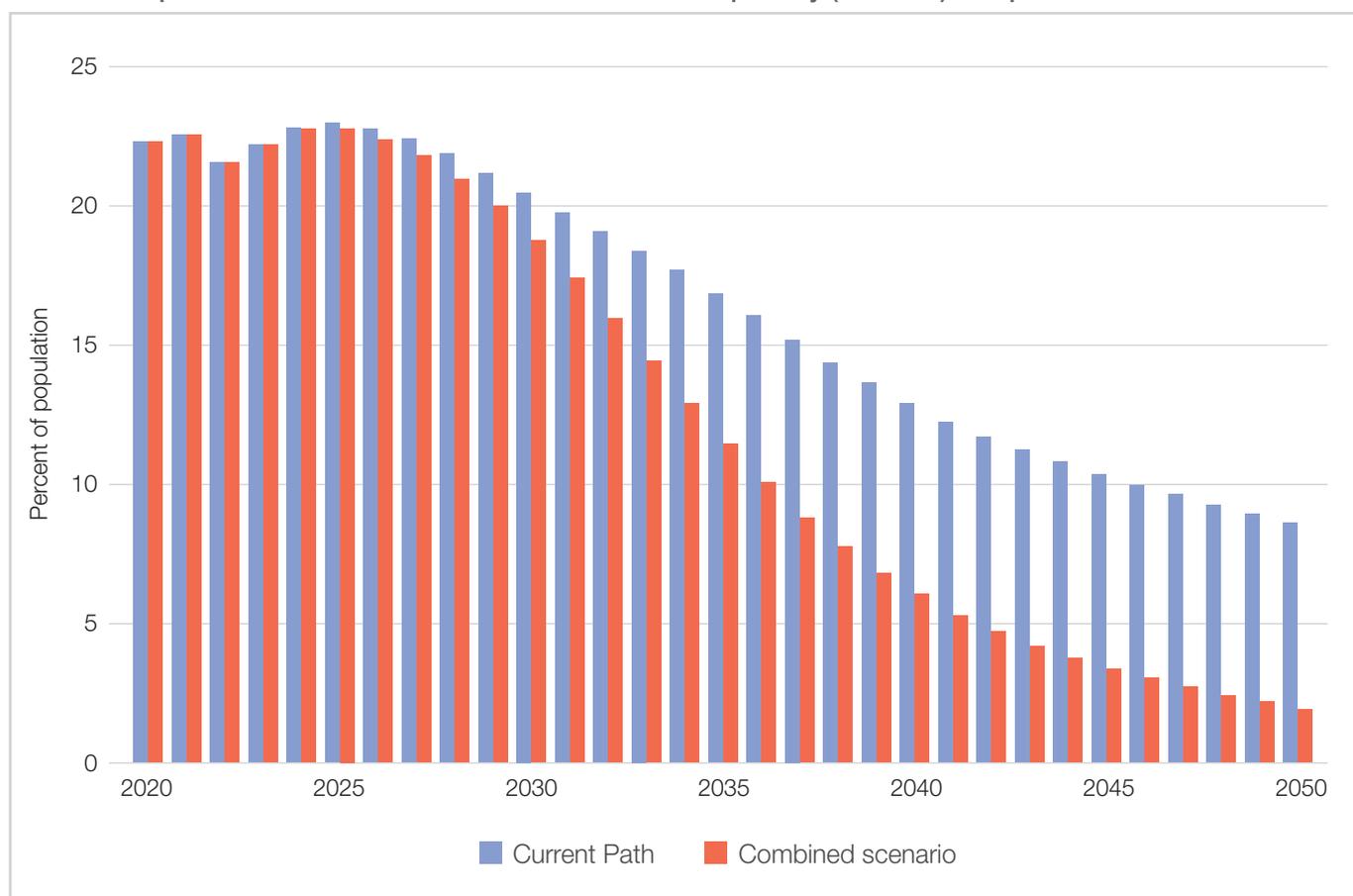
By 2033, only about 14.4% of the population will be living in extreme poverty (approximately 17.7 million people) compared to nearly 18.4% (22.9 million people) in the Current Path in that period. By 2050, Egypt can expect to record just nearly 2% of extreme poverty (2.8 million people). This will be a significant difference from the Current Path's rate at 8.5% (12.8 million people) and represents about 10 million people still in poverty.

Chart 30: Impact of Combined scenario on per capita income compared to the Current Path



Source: IFs v 7.63, historical data from WDI

Chart 31: Impact of Combined scenario on rate of extreme poverty (US\$3.20) compared to the Current Path



Source: IFs v 7.63, historical data from WDI

The Combined scenario also has an impressive impact on the size of the informal economy which is currently estimated to constitute over 53% of GDP. By 2033, the informal economy will shrink to about 41% of GDP compared to about 49% in the Current Path. By 2050, the share of the informal economy in this scenario will be about 23% of GDP, nearly half that of the Current Path at 42% of GDP.

A reduction in the size of the informal economy would mean that many Egyptians are able to find formal employment and that many firms and businesses are compliant with labour laws. This includes providing work contracts and benefits like social security. This would also increase revenue for the government owing to the larger portion of Egyptians and firms that would be eligible for taxation.

Agricultural import dependence (on crops) would also slightly decrease and by 2050, imports would account for nearly 43% of net demand against approximately 46% in the Current Path. Although Egypt would still be reliant on imports, it would be able to divert some of its foreign exchange for other productive investments in the economy.

Owing to conservation efforts, scale-up of water treatment and reuse, Egypt can expect to modestly

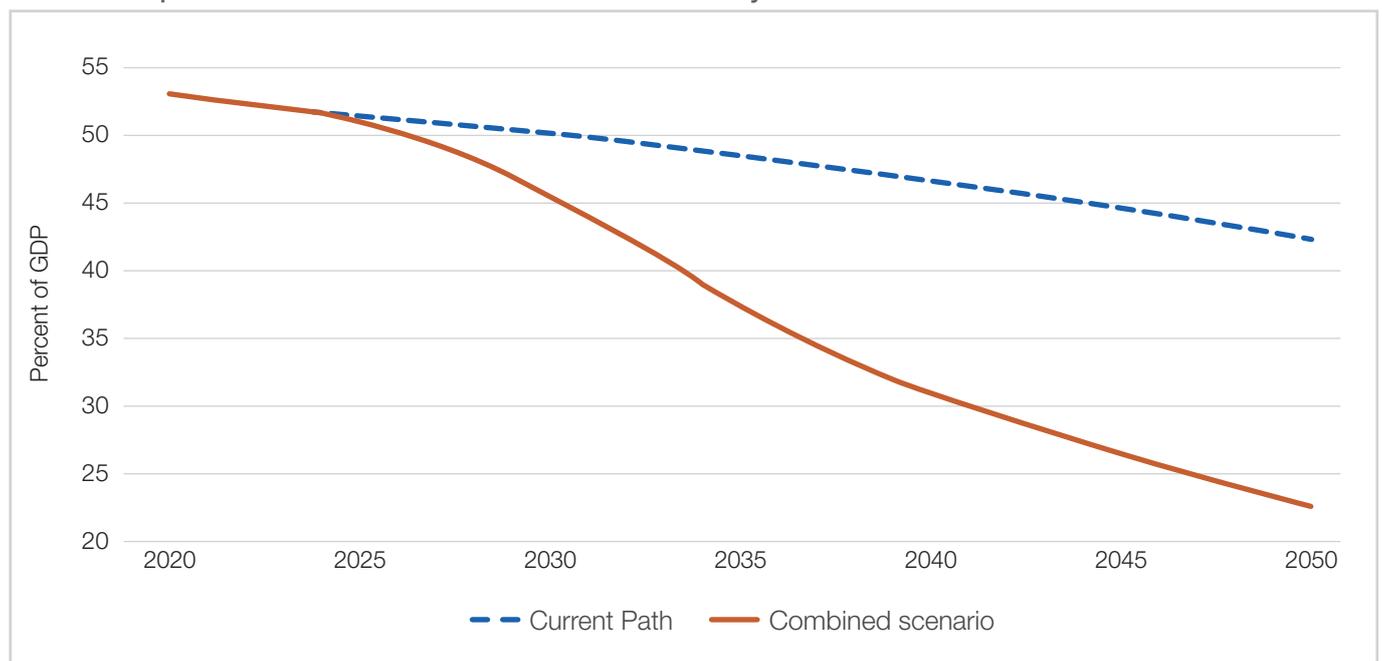
increase its water supply.²⁰³ The country would still not meet the annual national water requirement of 90 billion m³. This would probably also rise in the face of rapid population growth and the pursuit of increased economic activity outlined in Egypt's Vision 2030 and 2050. However, such efforts would enable the country to manage its water crisis as it seeks to resolve the Nile dam dispute and the effects of climate change on its water supply.

In the Combined scenario, Egypt will produce almost 20% more carbon than on the Current Path

With increased economic activity and a much larger economy in the Combined scenario, Egypt is projected to release significantly more carbon emissions. Although the country would have instituted some measures to reduce its contribution to carbon emissions and climate change, by 2050 it is projected that Egypt will produce 194 million tons of carbon (not CO₂) compared to the Current Path at 162 million tons of carbon, which represents an almost 20% rise over the Current Path.

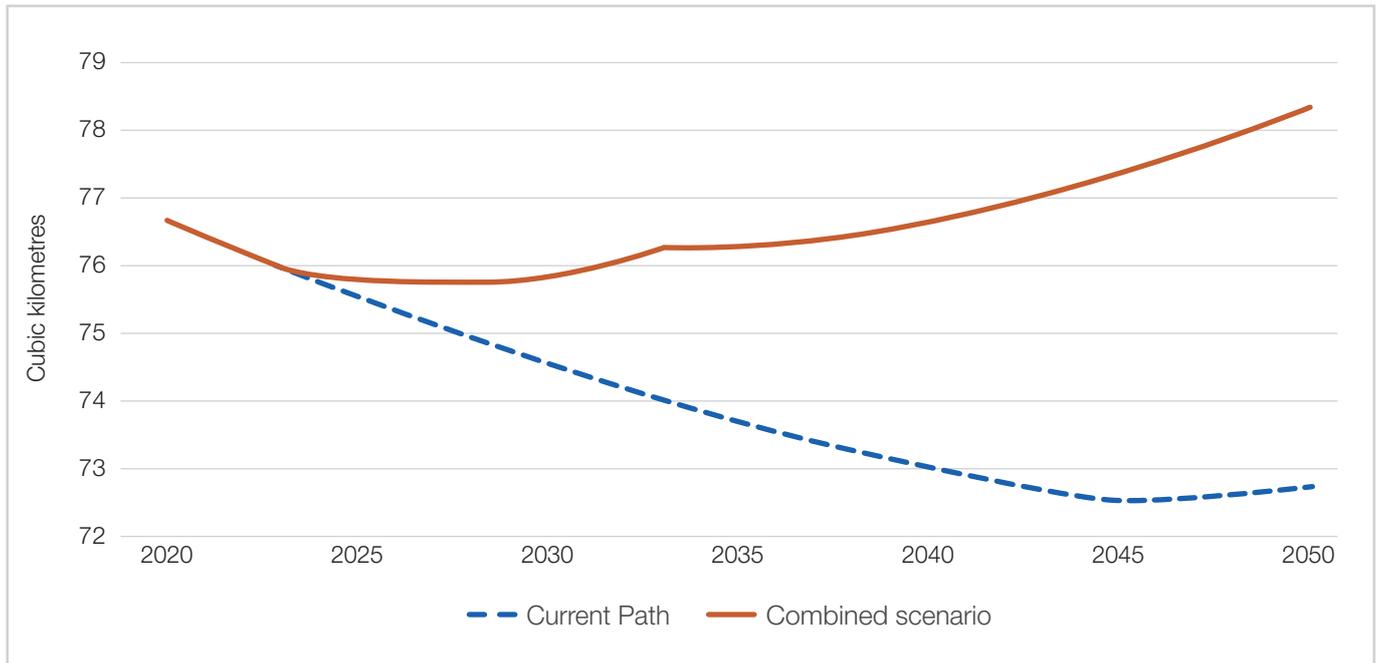
Although carbon emissions in Egypt are driven by the energy sector,²⁰⁴ according to 2019 data the country only

Chart 32: Impact of Combined scenario on informal economy as % of GDP



Source: IFs v 7.63, historical data from ILO

Chart 33: Impact of Combined scenario on water supply compared to the Current Path

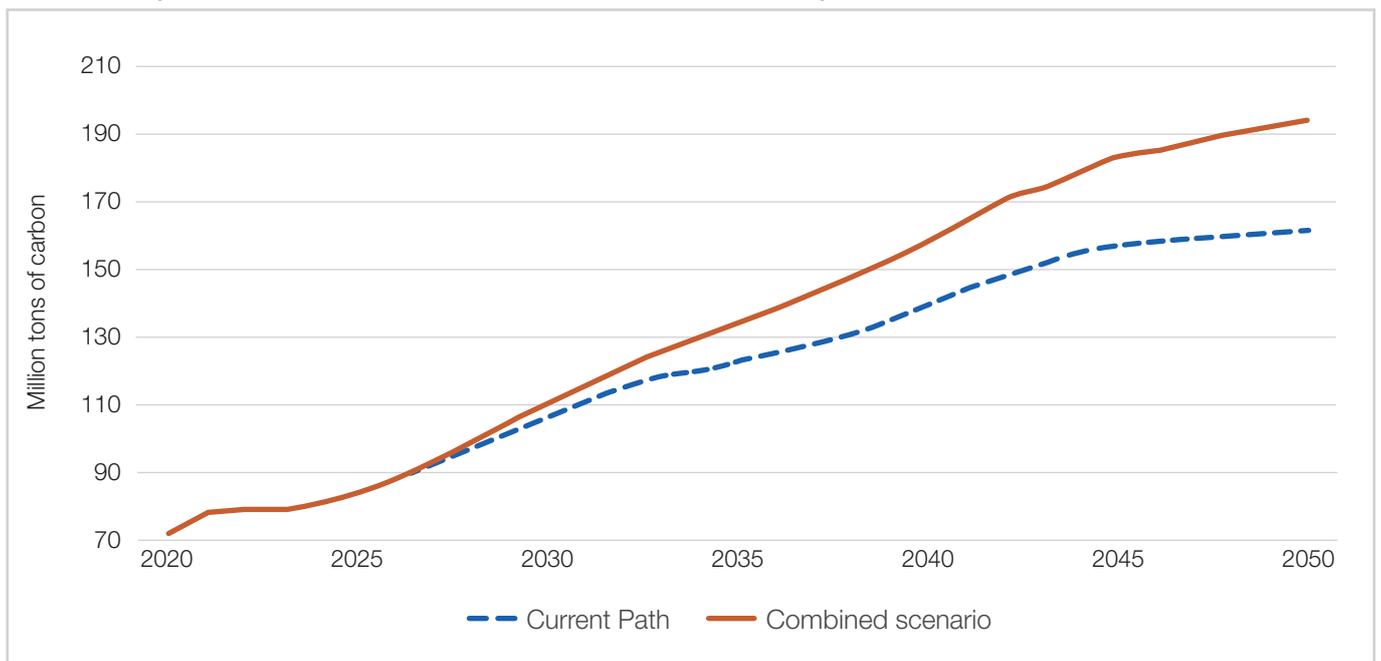


Source: IFs v 7.63, historical data from AQUASTAT

contributed a meagre 0.37% to global CO₂ emissions.²⁰⁵ And while Egypt and Africa must transition to a greener economy towards renewables, the developed and emerging economies that contribute the most to CO₂ emissions must play their part to alleviate the impact of climate change on Egypt and the continent.²⁰⁶

The government does not meet its target of 45% renewable production by 2035. But the share of renewables to the energy mix rises steadily over the forecast horizon to account for nearly 37% of energy production by 2050. This is over eight percentage points lower and 15 years over the Government of Egypt’s target.

Chart 34: Impact of Combined scenario on carbon emissions compared to the Current Path



Source: IFs v 7.63, historical data from AQUASTAT

In summary, the Combined scenario integrates all the critical development areas identified in the analysis, but Egypt needs to systematically push on key priority sectors while accounting for the associated financial implications and trade-offs of various policy decisions.

However, encouraging greater family planning, spurring economic prosperity for all, good governance and efficient management of the country's water resources should be at the forefront of the government's sustainable development agenda.

Conclusion

Egypt's weak economic performance over the decades has been the result of state control, corruption and inadequate enforcement of labour laws that prohibit and effectively exclude most of the population, particularly women, from gainful economic activity.

However, the Government of Egypt has taken steps to initiate reforms in its regulatory and investment laws, and has even started the ambitious but precarious process of reforming the subsidy system towards better targeted relief to the poor.

Egypt's weak economic performance over the decades has been the result of state control, corruption and inadequate enforcement of labour laws

Compounding the problem of sluggish economic growth is Egypt's rapidly growing population. This poses a significant challenge to the government's ability to meet and keep up with demand for basic services like water, sanitation, healthcare and education for the population. Those living in rural areas are disproportionately affected in this respect owing to limited infrastructure compared to urban areas.

Challenges in the agriculture sector regarding production choices and efficiency, and the reform of the food subsidy system, are issues the government must continue to address to set Egypt on a sustainable development trajectory. The stalemate over the GERD is also an issue that Egypt must resolve amicably with the rest of the riparian states. This has direct implications for Egypt's access to water, and is linked to all aspects of economic growth and decent livelihoods.

Although Egypt is also looking at other sources of water supply, such as desalination, these will come with heavy financial and environmental costs. Fundamentally, Egypt cannot sustainably implement its development vision without adequate water supply and efficient management to meet the already high demand for this scarce commodity.

The preceding analysis has outlined sectoral interventions that Egypt should pursue to set it on a more positive development pathway. In summary, Egypt should take the actions outlined below.

GERD

IS LINKED TO ALL ASPECTS
OF ECONOMIC GROWTH AND
DECENT LIVELIHOODS

Raise inclusive awareness on family planning services

Egypt's rapidly expanding population already exceeds the boundaries for sustainable growth and development. Besides giving women greater choice on their reproductive health issues and promoting access to family planning services and contraception, the country should educate and empower men on their role in family planning.

Manage water, and adapt to and mitigate climate change

Egypt is already under water stress, and is projected to suffer severe water shortages and related challenges in the future given the projected population growth and impacts of climate change. This will have huge implications for the economy and livelihoods. Cairo, for example, is one of the fastest growing cities in the world and the provision of basic services like water and sanitation are key, especially in its informal settlements.

Also, more efficient use of water in agriculture through improved irrigation systems, and at industry and household level, are critical. In addition, the country needs to invest in renewable energy sources to mitigate the effects of climate change.

Promote good governance

Good governance underpins the quality and pace of development. Egypt has made significant economic strides, especially post the 2011 revolution, although the country has reneged on some of the issues that initially sparked the protests. Transparency, accountability and civil liberties should be promoted in the reform process to taper the risk of instability in light of demographic and economic challenges, such as high youth unemployment, that could be a driver of destabilisation.

Continue with reforms to liberalise and open the economy

Reforms are being undertaken by the government to remove market barriers and encourage investment in the form of restrictive business regulation and access to credit. These are fundamental to encourage competition and entrepreneurship and boost productivity to curb challenges like unemployment among youth and women.

Enforce basic labour laws

Although Egypt has requisite labour laws and standards, workers get little benefits even in instances that would be considered formal employment. Beyond the lack of adequate firms to employ Egyptians, companies should be required to give contracts and provide appropriate social insurance to their workers. This would promote greater formalisation and also generate revenue through taxes on firms and individuals.

Improve food security

To boost its agricultural sustainability and overall efficiency, Egypt should promote crops for which it has comparative advantage and that use water optimally. This would better manage water use in the agricultural sector, deal with the inefficiency of the food subsidy programme and release foreign exchange towards a better targeted cash-based social policy programme.

Egypt has a relatively good foundation in terms of its human capital and even the physical infrastructure needed to launch it on a more prosperous and sustainable development pathway. Genuine political will, accountability and greater public-private partnerships could unlock economic growth that benefits all Egyptians.

Annex: Current Path adjustments and scenarios within IFs

Current Path

This project used IFs 7.63 with an amended IFsHist Egypt project file dated August 2021.

The following amendments have been made to the IFs Current Path forecast for Egypt:

Chart 1: Interventions

Series updated	Definition	Magnitudes/changes	Justification/source
infraelecencapm	Electricity generation capacity per person	Interpolate 0.91 from 2015 to 2020, 0.82 from 2021 to 2025, maintain	Projected installed capacity by 2025 in IFs was too high. Tapered down ²⁰⁷
POPURBAN	Urban population	Adjust initial condition in 2015 to 42.73	Updated IFs with urban population estimates by 2041 from urban planning report in Egypt ²⁰⁸
GDPINFORMSHR	Informal economy (GDP) share of total	Adjust initial condition in 2015 to 55	Share of the informal economy as a percent of GDP was too modest by over 30 percentage points ²⁰⁹

Chart 2: Project file updates (IFsHistseries)

Series updated	Definition	Magnitudes/changes	Justification/source
EnpProdElec%Gas	Percent of electricity production from gas	80% in 2018	Most recent values ²¹⁰
EnProdElec%Hydro	Percent of electricity production from hydro	7% in 2018	Most recent values ²¹¹
EnProdElec%Oil	Percent of electricity production from oil	12% in 2018	Most recent values ²¹²
EnResorOilBGRBBOE	Oil reserves	4.4 in 2015	Most recent values ²¹³
ICT%GDP	Share of ICT contribution to GDP	3.8% in 2019 and 4.4% in 2020	Most recent values from GoE estimates ²¹⁴
GovtEdPub%GDP	Government expenditure on education as % of GDP	4% of GDP in 2015, 3.52% in 2016	Most recent values from GoE estimates ²¹⁵
GovtHI%GDP	Government expenditure on health as % of GDP	1.5% in 2015,	Most recent values from GoE estimates ²¹⁶
ICTInternet%Pop	Percent of the population using internet	47.6% in 2019, 57.5% in 2020	Most recent values from GoE estimates ²¹⁷
LandAgri	Agricultural land	3 836 in 2018	Agricultural land has slightly increased according to FAO ²¹⁸
RoadPavedKm	Paved roads in kilometres	176 900 in 2017, 179 900 in 2018 and 184 400 in 2019	Update extension of Egypt's paved road network ²¹⁹
WSSJMPSanitation-Total%Improved	Total improved sanitation access	97% in 2020	JMP released new data for 2020 ²²⁰

Scenario cluster interventions

Chart 3: Scenario cluster interventions

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Demography						
contraception	contrusm	Increase access to modern contraception for all females of child-bearing age	Interpolate 1.2 from 2023 to 2033, change/repeat until 2050	Population growth is unsustainable given resource constraints/ Egypt is overpopulated	Egypt decreased the unmet need for contraception by 48.5% between 1992 (22.9%) and 2003 (11.8%)	Contraception use increases from 68.6% in the CP to 82.24% (19.9% increase and 13.7% points) in 2033
female labour force	labparm (female) ²²¹	Increases the percent of female population ages 15 and older who are economically active	Interpolate 1.5 from 2023 to 2033, change repeat until 2050	Low level of economic activity among females is cited as driver of high TFR	Algeria increased female labour force participation rate by 112.9% over a 10-year period (6.65% in 2000 to 14.16% in 2010)	Share of female labour force increases from 29.6% in CP to 44.5% (50% increase and 14.8% points) in 2033
Education						
Lower secondary gender parity time goal for graduation	edseclovr gndreq grad	Increases female to male ratio of lower secondary graduation	Interpolate 10 from 2023, change repeat	Male education attainment is higher than that of female students	Research shows that in most MENA countries, women who get to secondary school often stay on and show great achievement at higher levels of education	Contraception use increases from 68.6% in the CP to 82.24% (19.9% increase and 13.7% points) in 2033
Upper secondary gender parity time goal for graduation	edsecuppr gndreq grad	Increases female to male ratio of upper secondary graduation	Interpolate 10 from 2023, change repeat	Male education attainment is higher than that of female students	Egypt attained a 9.4 percentage point increase in female graduation between 1990 and 2000 and Iran attained a 14.7 percentage point increase in the same time horizon	Female upper secondary graduation increases from 68.9% in CP to 79.3% (10.4% points) in 2033

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Education cont						
Tertiary gender parity for intake	edtergndreqint	Increases female to male ratio of tertiary intake	Interpolate 10 from 2023, change repeat	Male intake is higher than that of female students	Tunisia increased tertiary enrolment by 42% between 1980 and 1990	Tertiary enrolment increases from 38.8% to 45.4% (16.9% increase and 6.6% points) in 2033
Lower secondary graduation rate	edseclowgram	Increases rate of graduation at lower secondary	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Bottlenecks emerging at the secondary level compared to its peers	Iraq had a transition rate (lower to upper secondary) of over 11 percentage points between 2000 and 2006 from 79.06% to 90.18% and implying that many students graduated from lower secondary	Lower secondary graduation increases from 81.7% in CP to 97.6% (19.5% increase and 15.9% points) in 2033
Upper secondary graduation rate	edsecupprgram	Increases rate of graduation at upper secondary	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Bottlenecks emerging at the secondary level compared to its peers	Syria increased secondary graduation rate by nearly 15 percentage points between 2000 (7.75%) and 2010 (22.7%)	Upper secondary increases from 68.7% in CP to 79.9% (11.2% points) in 2033
Upper secondary vocational share	edsecupprvocadd	Increases upper secondary vocational training	Interpolate 5 from 2023 to 2033, change repeat until 2050	High unemployment rate among young graduates. Learning trade skills can increase their opportunities to earn an income	Malawi reduced rate of youth not in education, employment or training by 17.3 percentage points over an eight-year period (50.17% in 2011 to 32.9% in 2017)	Upper secondary vocational enrolment increases from 46.6% in CP to 51.6% in 2033

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Education cont						
Tertiary intake	edterintm	Increase rate of intake at the tertiary level	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Tertiary outcomes are below its peers	Kenya increased tertiary enrolment by 187% (7.4% points) from 3.99% to 11.46% between 2009 and 2017	Tertiary enrolment increases from 37.3% in CP to 44.1% (6.9% points and 18.4% increase) in 2033
Tertiary graduation rate	edtergradm	Increases rate of graduation at tertiary level	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Bottleneck at tertiary level compared to its peers	Syria increased tertiary graduation by 130% (6.4% points) between 2001 and 2010 from 4.94% to 11.36%	Tertiary graduation increases from 20.1% in CP to 24.2% (4.2% points and 20.8% increase) in 2033
Tertiary-Sci-engg share of graduate	edterscienshradd	Increases share of students graduating with science and engineering degrees	Interpolate 5 from 2023 to 2033, change repeat until 2050	Intake in science and engineering is important for Egypt to prepare for Fourth Industrial Revolution and take advantage of technology for economic productivity	Zimbabwe increased share of sci-eng graduates by 37% between 2011 and 2015 from 15.88% to 21.79%	Tertiary sci-eng share of graduates increases from 16.6% in CP to 21.7% (30% increase) in 2033
Education quality-Primary	edqualpriallm	Increases quality of education at primary level	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Quality of primary education lags behind comparable peer country groups		Education quality for primary increases from 35.9 in CP to 43 in 2033

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Education cont						
Education quality-Secondary	edqual secallm	Increases quality of education at secondary level	Interpolate 1.1 from 2023 to 2033, change repeat until 2050	Quality of secondary education lags behind comparable peer country groups		Tertiary enrolment increases from 37.3% in CP to 44.1% (6.9% points and 18.4% increase) in 2033
Health and WASH						
Mortality-Cancer	hlmortm (Maligneopl)	Reduces deaths caused by cancer	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	In the NCD category cancer is among the leading causes of death	These are mostly lifestyle diseases and with increased public awareness, proper facilities and early diagnosis, can be detected and managed to prevent death	Tertiary graduation increases from 20.1% in CP to 24.2% (4.2% points and 20.8% increase) in 2033
Mortality-Cardio-vascular	hlmortm (Cardio vasc)	Reduces deaths caused by cardio-vascular-related complications	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	In the NCD category cardio-vascular-related complications are among the leading causes of death		Cardio-vascular-related deaths decrease from 321.6 (1 000 deaths) in CP to 266.3 in 2033
Mortality-Respiratory infections	hlmortm	Reduces deaths caused by respiratory infections	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	In the NCD category respiratory-related complications are among the leading causes of death		Respiratory infection deaths decrease from 17.08 (1 000 deaths) in CP to 12.8 in 2033
Mortality-Diabetes	hlmortm	Reduces deaths caused by diabetes	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	Diabetes is highly prevalent in Egypt		Diabetes deaths decrease from 19.9 (1 000 deaths) in CP to 16.2 in 2033

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Health and WASH cont						
Mortality (Other non-communicable diseases)	hlmortm	Reduces deaths caused by other NCDs	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	Other NCDs form a huge chunk of deaths in the NCD categorisation of deaths	Syria reduced deaths from other NCDs by 125% between 1990 and 2000	Other NCD deaths decrease from 13.5 (1 000 deaths) in CP to 11.2 in 2033
Mortality-Traffic accidents	hlmortm	Reduces deaths caused by road traffic accidents	Interpolate 0.7 from 2023 to 2033, change repeat until 2050	Traffic accidents are prevalent in Egypt	South Africa reduced traffic accidents by 46% between 2005 and 2015	Traffic accident deaths decrease from 37.8 (1 000 deaths) in CP to 26.7 in 2033
Communicable disease mortality for children under five	hlmortcd chldm	Reduces deaths by communicable diseases in children under five	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	Diarrhoea and other communicable diseases still plague especially rural areas of Egypt	Several African countries have managed this feat between 2000, and 2010 and 2015	U5 child mortality reduces from 14.4 per 1 000 deaths to 11.2 in 2033
Treated wastewater	waste water treatedm	Increases the portion of wastewater that is treated	Interpolate 1.5 from 2023 to 2033, change repeat until 2050	Egypt is experiencing water scarcity. Treating wastewater could help manage the crisis	Egypt increased treated wastewater by 111% between 2002 and 2012	Treated wastewater increases from 6.361 km ³ in CP to 9.478 (49% increase) in 2033
Portion of waste water treated reused	waste watpor treat reusedm	Increased the portion of treated wastewater actually reused	Interpolate 1.3 from 2023 to 2033, change repeat until 2050	Treating wastewater conserves and avails more water for use	South Africa increased the amount of wastewater treated and reused by 382% between 2000 and 2009	Treated and reused wastewater increases from 1.638 km ³ in CP to 3.712 km ³ in 2033 (126.5%)
Rate of smoking	hlsmoking stsw	Enforces more stringent regulation on tobacco sale and use	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Smoking is prevalent in Egypt and is associated with major NCDs	Many European countries have improved their TBS index ²²²	Smoking rate of adults reduces from 14.4% in CP to 11.2%

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Economy and Trade						
Exports (Agriculture)	agxm	Increases agricultural exports	Interpolate 1.1 from 2023 to 2033, change repeat until 2050	Egypt aims to increase its agricultural exports	Egypt increased agricultural exports (crops) by 238% between 1997 and 2007	Value of agricultural exports (crops) increases from 2.34 bn in CP to 3.2 bn in 2033 (38.8% increase)
Exports (Manufacturing)	xsm	Increases manufactured exports	Interpolate 1.1 from 2023 to 2033, change repeat until 2050	Egypt wants to increase manufacturing	Egypt recorded about 20% increase in manufacturing value between 2000 and 2010 and 35% between 1990 and 2000	Share of manufacturing to GDP increases from 26.6% (US\$159.1 bn) in CP to 27.8% (US\$173 bn) in 2033 (-8.7% increase)
Exports (Energy)	enxm	Increases energy exports	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Egypt wants to increase energy exports and boost renewables share of contribution. Egypt has enough oil and gas reserves to achieve this if the international prices of hydrocarbons remain stable		Value of energy exports increases from US\$2 bn in CP to US\$3.5 bn in 2033 (74% increase)
Domestic investment	invm	Increases domestic investment	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Egypt wants to increase domestic investment opportunities for Egyptians	Gross capital formation (%GDP) increases from 16.6% in CP to 20.1% in 2033 (3.5% points)	
Economic freedom	econfreem	Increases economic freedom	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Reducing bureaucracy and raising awareness and opportunities for Egyptians to engage in economic activity is key for the country's growth	Zambia improved economic freedom by 53.5% between 1990 and 1995 and has sustained that growth for over 15 years	Economic freedom index increases from 5.46 in CP to 6.56 (20.2% increase) in 2033

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Economy and Trade cont						
Government regulation of business	govbus regindm	Reduces hyper-regulation of business by government	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	Although regulation of business has been moderated, there is still room to simplify ease of doing business	Government regulatory quality score reduces from 5.0534 in the CP to 4.0347 (20% drop) in 2033	
Cost of starting a business	govbus costm	Reduces the cost of starting a business	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	Access to capital is one of the impediments to investment. Reducing overall costs and availing credit facilities would help to increase productive investment		Declines in the first three years to get to 1% of GDP per capita by 2025 against 1.003% in the CP
Worker remittances (in)	xwork remitm	Increases remittances to Egypt	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Remittances form an important source of revenue for households and foreign exchange for the GoE		Value of net remittances increases from US\$8.5 bn in CP to US\$14.9 bn (74.2% increase) in 2033
FDI inflows	xfdifinm		Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Egypt attracts significant FDI, and this could improve	Cambodia increased FDI by 4% of GDP between 2008 and 2014	FDI inflows increase from 3.9% of GDP in CP to 4.5% in 2033 (15.3% increase)
Social security and welfare tax rate	ssweltax rm	Increases social security and welfare tax rate (increases tax on households and firms for social security and welfare)	Interpolate 1.15 from 2023 to 2033, change repeat until 2050	Over half of Egypt's population rely on the informal sector. Requiring firms to offer social insurance can encourage formalisation. This is achieved by taxing firms and households to raise such revenue		Taxes on unskilled and skilled households increase from US\$22.7 bn to US\$25.3 bn and US\$40.1 bn to US\$44.9 bn in 2033.

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Economy and Trade cont						
Social security and welfare tax rate cont						Firm taxes increase from US\$33.8 bn to 37.6 bn, indirect taxes from US\$43.5 bn to US\$48.7 bn and social security welfare tax increases from US\$20.1 bn to US\$26.2 bn
Leapfrogging, Energy and Climate Change						
Capital costs-to-output ratio (other renewables)	qem	Reduce capital required to produce other renewables	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	The cost of producing renewable energy is still relatively high	Germany increased level of production of renewables (otherren) by over 320% between 2005 and 2015	Production of other renewables (excluding hydro) increases from 0.14bboe in CP to 0.02bboe (42.9% increase) in 2033
Capital costs-to-output ratio (Nuclear)	qem	Reduce capital required to produce nuclear energy	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	The cost of producing nuclear energy is still relatively high	South Korea increased nuclear energy production by 1 430% between 1980 (0.0066bboe) and 1990 (0.101bboe)	Nuclear production increases from 0.00001487 bboe in CP to 0.00002437 bboe (63.9% increase) in 2033
Capital costs-to-output ratio (coal)	qem	Increase capital required to produce coal	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Egypt produces some of its energy with coal and has reserves to last another two decades.	Germany reduced level of coal production by over 50% between 1990 and 2000 and continues to reduce coal production	Coal production reduces from 0.00033695 bboe in CP to 0.00027426 bboe (18.6% drop) in 2033

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Leapfrogging, Energy and Climate Change cont						
Capital costs-to-output ratio (coal) cont				Reducing coal production would facilitate the shift towards renewables		
carbon tax	carbtax	To discourage pollution and CO ₂ emissions	Interpolate to \$50/ton from 2023 to 2033, change repeat until 2050	A carbon tax would regulate pollution by firms, especially the energy industry, thus mitigating the effects of climate change	Germany reduced level of carbon emissions by 14% between 2001 and 2011, and continues to reduce coal production	Carbon emissions reduce from 0.118 bn tons of carbon in CP to 0.116 in 2033 (1.7% reduction)
ICT broadband	ictbroadm	Increases rate of broadband access	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Majority of the population still don't have fixed internet in their homes	Egypt increased fixed broadband per 100 subscriptions by over 900% between 2007 and 2017	Increases from 28 per 100 people in CP to 32.8 (45.7% increase) in 2033
ICT mobile broadband	ictbroad mobil	Increases rate of mobile broadband access	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Only just over half the population have access to internet	Egypt increased mobile broadband per 100 subscriptions by 328% between 2009 and 2017	Marginal increase in subscriptions per 100 people but in millions, increases from 180 million people in CP to 180.014 million in 2033
ICT cyber benefit multiplier	ictcyb benefitm	Increase ICT cyber benefit	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	To increase use of technology in development	Egypt increased the growth and contribution of cyber benefit by about 200% between 2005 (0.479% of GDP) and 2012 (1.438%)	Cyber benefit increases from 1.59% of GDP in CP to 1.88% in 2033 (cumulative cyber benefit increases from US\$804.3 bn to US\$821.6 bn)

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Leapfrogging, Energy and Climate Change cont						
Road network density	infra roadm	Increases road network density	Interpolate 1.15 from 2023 to 2033, change repeat until 2050	Egypt has set on a road expansion agenda	Egypt has expanded over 9 000 km of road in the past five years	Road density increases from 2.47 km/1 000 hectares in CP to 2.82 in 2033. Total road length increases by 35 000 km from 245 964 km in the CP
Governance and Stability						
Democracy	demmm	Increases level of democracy	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Egypt is an anocratic state which makes it more unstable than a full autocracy or full democracy	Egypt achieved a rise in democracy between 2004 and 2005 from -6 to -3 and between 2010 and 2011 from -3 to -2	Increases level of democracy from -2.852 in CP to -1.172 in 2033
Government effectiveness	goveffectm	Increases government effectiveness in provision of basic services and revenue collection	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Government effectiveness lags behind its peers and would ensure efficient service delivery	Côte d'Ivoire improved government effectiveness by 49.8% between 2010 and 2015	Increases from 28 per 100 people in CP to 32.8 (45.7% increase) in 2033
Government corruption	gov corruptm	Reduces corruption by government officials	Interpolate 1.3 from 2023 to 2033, change repeat until 2050	Corruption is pervasive in Egypt	Nigeria improved its corruption perception index by 58.3% between 2000 and 2005. It has sustained improvements for over six years	Egypt scores a higher index (less corrupt) from 3.407 in CP to 4.77 (39.93% improvement) in 2033
Gender empowerment	genm	Increases inclusion, particularly of women, in the democratic and nation-building process	Interpolate 1.3 from 2023 to 2033, change repeat until 2050	Inclusion, especially that of women into socio-economic processes, is needed in Egypt	Botswana increased the GEM index by 38% between 1995 and 2003	GEM UNDP index increases from 0.305 in CP to 0.397 (30% increase) in 2033

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Governance and Stability cont						
Governance security risk	govriskm	Reduces the risk of security deterioration	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	Reduces the risk of insecurity, specifically the threat of terrorism, overpopulation and lack of economic opportunity		Security index in IFs increases from 0.753 in CP to 0.865 in 2033
Government expenditure (military)	gdsm	Reduces spending on military	Interpolate 0.9 from 2023 to 2033, change repeat until 2050	Egypt has one of the largest military forces and data sources on arms procurement deals between 2000 and 2019, and costs related to paramilitary activities highlight gaps and shortcomings in the data reported	Egypt has reduced military expenditure from US\$0.108 bn in 2002 to US\$0.053bn in 2012 (103% drop)	Government consumption on military reduces from US\$21.5 bn to US\$20.2 bn in 2033 (6% drop)
Government to household welfare transfers (unskilled)	govhtrn welm	Increases government to household welfare transfers to poor people	Interpolate 1.1 from 2023 to 2033, change repeat until 2050	Transfers help poor households out of extreme poverty in the short to medium term	Discussions on reforming the food subsidy system, preferably to cash-based, and to better target the most vulnerable are already happening	Household transfers and welfare increase marginally from 11.42% of GDP in CP to 11.46% in 2033
Government to household welfare transfers (skilled)	govhtrn welm	Reduces government to household welfare transfers to wealthy people	Interpolate 0.85 from 2023 to 2033, change repeat until 2050	Gradually reducing transfers to the wealthy e.g. in the form of fuel subsidies avails more resources for development and assisting the vulnerable	Egypt has already started a subsidy reform programme on energy (fuel), for example	

Parameter	Multiplier name	Definition	Magnitude of intervention	Justification	Benchmark	Result
Agriculture						
Yields (switch to allow water to constrain yields set at 1 from 2023 to 2033 and maintained to 2050)	ylm	Increases yields	Interpolate 1.15 from 2023 to 2033, change repeat until 2050	Crop yields are low relative to the resources spent on agriculture	Egypt has increased yields from 17.4 tons/hectares in 1990 to 21.42 in 2000 (23% rise)	Yields increase from 29.4 tons/hectare in CP to 32.9 (12.1% rise) in 2033
Land area actually irrigated	landirarea actualm	Increases area of land actually under irrigation	Interpolate 1.2 from 2023 to 2033, change repeat until 2050	Egypt has embarked on a mission to put more land under irrigation	Kenya doubled its area of land equipped for irrigation between 1992 and 2010 (from 73 000 ha to 150 000 ha)	Yields increase from 29.4 tons/hectare in CP to 32.9 (12.1% rise) in 2033
Per capita calorie demand	clpcm	Increases calorie demand (ensures domestic distribution of food i.e. all produce is not for exportation)	Interpolate 1.1 from 2023 to 2033, change repeat until 2050	To ensure that not all agricultural produce is exported	The Caribbean countries achieved (on average) 20% increase between 1995 and 2010	Egypt scores a higher index (less corrupt) from 3.407 in CP to 4.77 (39.93% improvement) in 2033
Crop land	ldcropm	Increases area of land under cultivation	Interpolate 1.1 from 2023 to 2033, change repeat until 2050	Egypt has embarked on reclaiming some desert land for farming	In 2016, Egypt announced it would reclaim 607 028 ha of marginal or desert lands for agricultural use ²²³	Very slight increase from 3.77065 million hectares in CP to 3.77070 in 2033
Agricultural loss (producer to consumer)	agloss transm	Reduces loss of agriculture as it moves from producer to consumer	Interpolate 0.8 from 2023 to 2033, change repeat until 2050	Agricultural loss occurs in the value-chain		Agricultural loss and waste (crops) as a share of production declines from 23.1% in CP to 20.4% in 2033
Agricultural waste (consumer)	agloss consm	Reduces rate of waste at consumption level	Interpolate 0.7 from 2023 to 2033, change repeat until 2050	Food waste is prevalent in Egypt	Many countries have started food banks to avoid food wastage	

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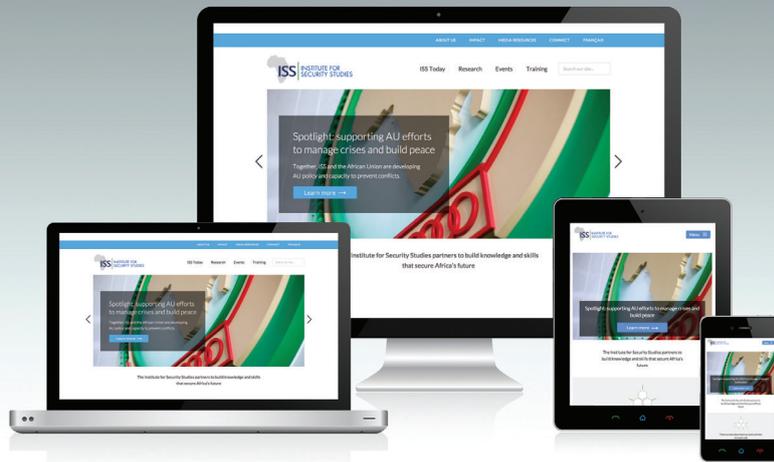
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