Kenya to 2030 and beyond

Kenya to 2030 and beyond

Table of Contents

Acronyms

ACLED ....Armed Conflict Location and Event Dataset
AIDS.................Acquired Immune Deficiency Syndrome
AU....................African Union
CBR ....crude birth rate
CDCS...............Country Development Cooperation Strategy
CIA...................Central Intelligence Agency
CSP..................Center for Systemic Peace
DALYs...............disability adjusted life years
EAC..................East African Community
ECI ....Economic Complexity Index
EU ....European Union
FAO ....Food and Agriculture Organization of the United Nations
FDI ....foreign direct investment
FPE ....free primary education
FSC ....food supply chain
FY ....fiscal year
GIS...................Geographic Information System
GDP ....gross domestic product
GDPPC ....gross domestic product per capita
GNI...................gross national income
GPS ....Global Positioning System
GTP..................Growth and Transformation Plans
HDI...................Human Development Index
HIV ....Human Immunodeficiency Virus
HQ ....headquarters
HDR ....Human Development Report
ICD...................International Classification of Disease
ICT ....information and communications technology
IDA ....International Development Association
IEA ....International Energy Agency
IFs ....International Futures system
IIAG ....Ibrahim Index of African Governance

IGAD ....Intergovernmental Authority on Development
IGO ....inter-governmental organisation
IMF...................International Monetary Fund
IOM ....International Organisation for Migration
IPCC ....Intergovernmental Panel on Climate Change
IRENA ....International Renewable Energy Association
ISS ....Institute for Security Studies
ITU ....International Telecommunication Union
JMP ....Joint Monitoring Programme
KEMSA.............Kenya Medical Supplies Agency
KIPPRA ....Kenya Institute for Public Policy Research and Analysis
KNBS ....Kenya National Bureau of Statistics
KNUT ....Kenya National Union of Teachers
KPC ....Kenya Pipeline Corporation
LAPPSETT ....Lamu Port, South Sudan, Ethiopia Transport
LE ....life expectancy
LSPs ....local service providers
M&E ....monitoring and evaluation
MDGs...............Millennium Development Goals
MECS...............Monitoring and Evaluations Capacity Strengthening
MER ....market exchange rates
MFP ....multifactor productivity
MIT...................Massachusetts Institute for Technology
MMR ....maternal mortality ratio
MMT.................million metric tonnes
MP ....Member of Parliament
MPI...................Multidimensional Poverty Index
MPT ....Medium-Term Plan
MW ....megawatt
NAAIAP.............National Accelerated Agricultural Inputs Access Programme

NCDs ....non-communicable diseases
NESP ....National Education Sector Plan
OCA ....Organizational Capacity Assessment
OCHA...............United Nations Office for the Coordination of Humanitarian Affairs
ODA ....overseas development assistance
ODI....................overseas direct investment
OECD................Organisation for Economic Co-operation and Development
OEC ....Observatory of Economic Complexity
Pardee Center ...Frederick S Pardee Center for International Futures, University of Denver
PEV ....post-election violence
PPM ....parts per million
PPP...................purchasing power parity
PPP...................public–private partnership
PV ....photovoltaic
R&D...................research and development
SDGs ....Sustainable Development Goals
SMEs ....small and medium-sized enterprises
TB ....tuberculosis
TI.......................Transparency International
TFR ....total fertility rate
UCDP................Uppsala Conflict Data Program
UIS ....UNESCO Institute for Statistics
UK.....................United Kingdom
UN.....................United Nations
UNDP................United Nations Development Programme
UNEP ....United Nations Environment Programme
UNESCO ....United Nations Educational, Scientific and Cultural Organization
UNHRC ....United Nations Human Rights Council

UNICEF ....United Nations Children's Fund
US.....................United States
USAID ....United States Agency for International Development
V-Dem...............Varieties of Democracy Project
WASH ....water, sanitation and hygiene
WB ....World Bank
WDI ....World Development Indicators
WFP ....World Food Programme
WGI...................Worldwide Governance Indicators
WHO ....World Health Organization

Executive summary

Kenya's future offers a wealth of opportunities, as well as some significant challenges.

On the one hand, the country is a continental leader in information and communications technology (ICT) and has relatively well-developed health and education systems. Despite average incomes in the country (about US$1 380) being at the very low end of the World Bank lower-middle-income country threshold (US$1 006 to US$3 955), Kenya has relatively good outcomes on a number of human development indicators. For example, people in Kenya have, on average, more years of education in the adult population (over the age of 25) and longer life expectancy (by about five years) than people living in other lower-middle-income African countries. The country is also a relative island of stability in a strategic – if turbulent – region, and scores above the average for other lower-middle-income African countries on various measures of social equality and government efficiency.

On the other hand, the country suffers from a significant infrastructure deficit, and a series of corruption scandals cast a long shadow over development prospects in the country. Although Kenya scores high on a number of governance measures, access to basic services is still among the lowest of any lower-middle-income country.

People in other lower-middle-income countries around the world are more than 80% more likely to have access to an improved sanitation facility and about 35% more likely to have access to clean water than people living in Kenya. This in a country that scores above the lower-middle-income average on the World Bank Government Effectiveness measure, the World Bank Regulatory Quality measure and the Economic Freedom Index from Fraser House.

Kenya has somehow managed to support the development of its human potential relatively well despite having a substantial deficit of core infrastructure such as potable water, improved sanitation facilities, housing and, until recently, electricity. If the government of Kenya is able to manage small improvements in health and education while making a significant push to improve core infrastructure and transparency in governance, the country will be much better positioned to achieve significant gains across a broader range of measures of human well-being. If, however, service delivery stalls and the prospect of natural resource wealth exacerbates corruption and poor governance, Kenya will miss the opportunity to harness its full potential and could even be at increased risk of social instability surrounding the 2022 election.

In an effort to better understand this context, the Hanns Seidel Foundation (Nairobi) and the German Federal Ministry for Economic Cooperation and Development (BMZ) through the GIZs Employment for Sustainable Development in Africa (E4D) Programme has contracted the Institute for Security Studies (ISS) and the Kenya Business Guide (KBG) to carry out a sustainability trends assessment for Kenya to 2040.

To promote more inclusive economic growth and improve human development outcomes for a broader segment of the population, the government will need to strategically sequence investment across a number of key areas. The core challenge will be to expand access to underserved populations in areas where the country is currently underperforming relative to its peers, without sacrificing recent gains made in areas such as health and education. This report explores Kenya's recent development trajectory across a number of core development systems using the International Futures (IFs) forecasting tool – developed and housed

at the Frederick S Pardee Center for International Futures (Pardee Center) at the Josef Korbel School of International Studies at the University of Denver.

This report also examines trends and analyses data to show how the country arrived at where it is today. It then presents a likely development trajectory out to 2040 – referred to as the Current Path or Stuck in Traffic scenario. Finally, the report introduces two scenarios (Tuko Kazi and Bila Hopes) that represent two very different paths for Kenya. In all instances the forecasts represent five-year policy pushes from 2019 to 2023. The effects of those interventions are then explored out until 2040, and in some cases beyond.

In the positive Tuko Kazi scenario the Kenyan government makes targeted investments in a number of key areas where the country is performing below average relative to its continental peers. In addition to comparing Kenya to the continent as a whole, a number of comparison groups were selected and used throughout the report for benchmarking and to provide context about how Kenya is doing relative to other countries (for more information see section 1.5). These investments include improving access to basic infrastructure such as clean water and improved sanitation (WASH) facilities, increasing the productivity of the agricultural sector and maintaining gains made in health and education. The result is that the economy is more than 14% larger in 2040 than in the Stuck in Traffic forecast, there are about 4.5 million fewer people living in extreme poverty and more than 200 000 fewer children suffering from undernutrition.

In the negative Bila Hopes scenario investment in human development stalls, the quality of governance declines and the government pursues some questionable development projects. This causes service delivery to slowly deteriorate (over the next five years) while social tensions mount in the run-up to and wake of the 2022 presidential election. In this scenario Kenya's economy is about 14% smaller in 2040 than in the Stuck in Traffic forecast, the average Kenyan is about US$500 poorer, and infant mortality is about 17% higher.

The Tuko Kazi and Bila Hopes scenarios serve to realistically frame the wide band of possibilities facing the country. The actual path that Kenya will follow will likely fall somewhere in between the two scenarios. Nonetheless, using quantitative models to explore the implications of certain policies can help decision makers get a better sense of the trade-offs around respective policy choices.

Chapter 1: Introduction

1.1 Purpose and scope

This report presents a forecast of economic and human development in Kenya with a time horizon to 2040. It presents a likely trajectory (the Stuck in Traffic current path forecast), as well as various interventions that are packaged into two broad scenarios, Tuko Kazi and Bila Hopes, which are presented in the final chapter.

A first version of this report was circulated to potential stakeholders and experts on 20 February 2018, ahead of the first round of workshops and consultations in Nairobi from 26 February to 2 March. A second version was circulated ahead of the second round of workshops in Nairobi from 24 to 26 April 2018. These meetings introduced the International Futures (IFs) model (see section 1.3), the data used in this report (see section 1.6) and each of the various chapters, in preparation for discussions with various in-country issue experts. These trips were extremely useful for discussing various potential adjustments to the IFs Stuck in Traffic scenario (see section 1.5) and identifying additional sources of data.

This report forms part of a series of forward-looking country studies undertaken by the African Futures & Innovation (AFI) programme at the ISS. Previous country studies include Ethiopia, Mozambique, Namibia, South Africa and Nigeria. Working in partnership with the Pardee Center under the umbrella of the African Futures Project (AFP), the AFP has also published forecasts on fragility, violence/instability, democracy, urbanisation, development aid and the potential for Africa to achieve key Sustainable Development Goals (SDGs) in poverty reduction, health and infrastructure. These reports have all, to varying degrees, used the IFs forecasting model hosted at the Pardee Center for the associated forecasts and scenarios.

This study was funded by the Hanns Seidel Foundation (HSF) Kenya and the German Federal Ministry for Economic Cooperation and Development (BMZ) through the GIZs Employment for Sustainable Development in Africa (E4D) programme, completed in close collaboration with the Kenya Business Guide (KBG).

The report was authored by Zachary Donnenfeld, Lily Welborn, Jakkie Cilliers and Stellah Kwasi at the ISS with the support of others at the Pardee Center and Sahil SR Shah at the KBG.

1.2 Collaboration on this report

The ISS (www.issafrica.org) is an African organisation with a substantial legacy of policy work on human security, peace and development across the continent with its head office in Pretoria, South Africa. In addition to its offices in Addis Ababa and Dakar, the institute also has a regional office in Nairobi, Kenya.

The Pardee Center (pardee.du.edu) at the University of Denver brings decades of quantitative modelling expertise through its IFs platform, which integrates trend data across many development sectors.

The KBG (kenyabusinessguide.org/) is a think tank that seeks to support the improvement and strengthening of the business environment in Kenya by providing access to information on key features of both private and public sector prerequisites in the effective functioning of business.

The mission of the HSF is to promote democracy, peace and development. Running more than 100 projects in 65 countries, the regional project of HSF Kenya (kenya.hss.de) also undertakes work in Tanzania, Uganda and Ethiopia.

The mission of the BMZ's E4D Programme at GIZ is to improve cooperation between private and public partners in sectors with great employment potential such as agriculture and infrastructure. The E4D runs projects in Ghana, Cameroon, Kenya, Mozambique, South Africa, Tanzania and Uganda.

1.3   The International Futures forecasting system (IFs)

IFs is a dynamic, global model that integrates data and outcomes across several key development systems. It is an integrated assessment model that draws on a number of traditional modelling approaches (e.g. general econometric modelling, computer-generated equilibrium models and social accounting matrices) to form a series of algorithms. IFs is therefore a hybrid model that integrates a large number of variables across numerous development systems. The model is open-source and all of the data and code are open for interrogation. IFs can be downloaded for free at http://pardee.du.edu/understand-interconnected-world.

IFs holds over 4 000 data series for 186 countries and produces long-term forecasts for hundreds of variables across development sectors including agriculture, demographics, education, economy, environment, governance, health, infrastructure, international politics and technology. These sub-models are dynamically integrated, so IFs represents how changes in one system lead to changes across a variety of other systems. As a result, the model endogenises a large number of relationships from a wide range of key global systems.

IFs can be used to identify and measure trends by modelling dynamic relationships and forecasting hundreds of variables for every year from 2015 to 2100. The tool provides forward-looking, policy-relevant material that offers a framework for thinking about uncertainty surrounding the future of countries (or groups of countries) and across development systems. It thus allows users to think more systematically about possible futures, along with development goals and targets.

There are three main paths for analysis in IFs. First, the user can analyse historical trends and relationships to understand how a country or region has developed over time. Second, these relationships are formalised in the model to produce a Current Path scenario. These initial forecasts, which are integrated across all systems within IFs, are useful indicators of where a country seems to be heading under current circumstances and policies, and in the absence of major shocks to the system (e.g. wars or pandemics). Third, scenario analysis augments the Current Path forecast by exploring the leverage that policymakers may have to push systems toward more desirable outcomes. This project used all three types of analysis.

IFs forecasts represent informed extensions of current trends and dynamics, constructed upon our current knowledge of development patterns, and are meant to illustrate a range of potential outcomes. The IFs platform is designed to enable people to think more carefully about how development systems unfold and how policy interventions could play out, rather than as a predictive exercise. When forecasts are explicit and transparent, policy planners are presented with a map of how development works to inform decisions.

1.4   Comparisons and country groups

The comparison groups used in this study are as follows:

- *Sub-Saharan Africa:* Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Somalia, South Africa, Sudan, South Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

- *World Bank low-income*: Afghanistan, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Eritrea, Ethiopia, The Gambia, Guinea, Guinea-Bissau, Haiti, North Korea, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, Rwanda, Senegal, Sierra Leone, Somalia, South Sudan, Tanzania, Togo, Uganda and Zimbabwe.

- *Other World Bank lower-middle-income:* Angola, Armenia, Bangladesh, Bhutan, Bolivia, Cape Verde, Cambodia, Cameroon, Republic of Congo, Côte d'Ivoire, Djibouti, Egypt, El Salvador, Georgia, Ghana, Guatemala, Honduras, India, Indonesia, Jordan, Kiribati, Kosovo, Kyrgyz Republic, Lao PDR, Lesotho, Mauritania, Micronesia, Moldova, Mongolia, Morocco, Myanmar, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Philippines, São Tomé and Príncipe, Solomon Islands, Sri Lanka, Sudan, Swaziland, Syria, Tajikistan, Timor-Leste, Tunisia, Ukraine, Uzbekistan, Vanuatu, Vietnam, West Bank and Gaza, Yemen and Zambia.

- *World Bank upper-middle-income:* Albania, Algeria, American Samoa, Argentina, Azerbaijan, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, Cuba, Dominica, Dominican Republic, Ecuador, Equatorial Guinea, Fiji, Gabon, Grenada, Guyana, Iran, Islamic Republic of Iraq, Jamaica, Kazakhstan, Lebanon, Libya, Macedonia, Malaysia, Maldives, Marshall Islands, Mauritius, Mexico, Montenegro, Namibia, Nauru, Panamá, Paraguay, Peru, Romania, Russian Federation, Samoa, Serbia, South Africa, St Lucia, St Vincent and Grenadines, Suriname, Thailand, Tonga, Turkey, Turkmenistan, Tuvalu and Venezuela.

- *Peer countries:* Cameroon, Côte d'Ivoire, Uganda, Bangladesh, Cambodia and Pakistan.

- *East African Community (EAC):* Burundi, Rwanda, Tanzania and Uganda. Given the current conflict situation there we have not included South Sudan in the EAC.

Note that Kenya was removed from 'other lower-middle-income Africa', 'other World Bank lower-middle-income countries' and 'EAC' in order to make the comparison with its peers more genuine.[1] Since the stated goal of Kenya is to graduate to upper-middle-income status by 2030, the World Bank group of upper-middle-income countries serves as a useful aspirational grouping.

1.5   The IFs Current Path

The IFs Current Path is a dynamic scenario both within and across key development systems that represents a continuation of current policy choices and environmental conditions. Although the Current Path generally demonstrates continuity with historical patterns, it generates a wide range of non-linear, dynamic and endogenous forecasts rather than simple extrapolations of historical trends. The Current Path assumes no major paradigm shifts, seismic policy changes or transformative events (very low probability but high impact). Given that the Current Path is built from initial conditions of historical variables and is calibrated against other forecasts, it is a good starting point to carry out scenario analysis and construct alternative future scenarios.

This report was completed using IFs version 7.33. To make comparisons more realistic, this report used the last year for which data was available when comparing Kenya with other countries or groups (e.g. most data from the United Nations [UN] Food and Agriculture Organization [FAO] currently ends in 2014, while the International Monetary Fund [IMF] has released gross domestic product [GDP] growth figures for 2016). This may result in some inconsistency in the years being compared.

In this report, all monetary figures are listed in constant US$ 2011, unless indicated otherwise.

1.6   Data used in IFs[2]

IFs version 7.33 uses 2015 as base year, i.e. the year from which it initialises to produce forecasts. Values beyond 2015 generally represent forecasts, unless indicated otherwise. Of the more than 4 000 data series in IFs, more than 500 primary series are read into the model and used for forecasts. This data comes from a variety of sources, particularly large international organisations such as the World Bank, the United Nations (UN) and the World Health Organization (WHO).

---

1   Any comparison with a group that included Kenya would necessarily pull the average of that group toward Kenya, even if very slightly.

2   This section is an extract from the data report submitted to the Hanns Seidel Foundation Kenya in December 2017.

More often than not, these organisations derive data from national and local sources and then standardise it. The purpose of this large data repository is to have comparable data across issue areas and countries, which requires gathering standardised data from international organisations for, among others, the three reasons listed below.

- International organisations collect data from a variety of sources and must standardise the results to ensure consistency and quality. By collecting data that is already standardised, the research team saves much time that would otherwise be spent collecting and validating data.

- Time-series data is critical for long-term forecasting. Not only do international organisations standardise data but they also tend to collect data across time (annually) and commit substantial resources to frequent updates.

- Limiting the number of data sources helps minimise the amount of time and organisational resources required to keep the data up to date in the model.

The roughly 550 primary data series used to initialise the model may have missing values and/or the data between sources can be contradictory. That is, some series may report different values for the same observation. Before running the model, a series of algorithms (the 'preprocessor') reconciles all data for all countries for the initial year. To do this, the model must 'preference' particular data series, determined by the data's credibility and coherence with other observations.

So, the preprocessor acts as both a set of key series in IFs and a feature of the tool used to estimate missing data points. Although international organisations commit significant resources towards updating data, it often lags behind the present year. 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.[3]

In the interests of transparency, the Pardee Center keeps track of the data used in the model (metadata). The standard metadata can be accessed within the model (DataDict.mdb), and includes units, definition, source, last update, etc. The Pardee Center also keeps detailed internal documentation on the methodologies used to create the data to allow for easy adjustment to the model as needed.[4]

Figure 1.1 shows data coverage for Kenya for the primary data series in the preprocessor. The composition is presented in four categories:

- *Green* (70%) corresponds to series that have been updated within IFs since January 2013 AND for which there is Kenya country data point in 2012 or later. Data points that meet the above criteria for Kenya are considered up to date, but may be subject to further validation against local sources.

- *Orange* (14%) corresponds to data that has not been updated since before 2012.

- *Blue* (4%) corresponds to series that have been updated since January 2013, but for which there is no country data later than 2010 for Kenya. These series are up to date in the model, but alternative sources may provide more up-to-date data for Kenya.

- *Yellow* (12%) corresponds to series that appear out of date but have not been updated because data updates are not readily available or are used in variables that do not change rapidly across time, or for other internal circumstances.

---

3   A good example of this is S Hedden, Parched prospects 2: a revised long-term forecast of water supply and demand in South Africa, Institute for Security Studies (ISS), African Futures Paper 16, March 2016, https://issafrica.org/research/papers/parched-prospects-ii-a-revised-long-term-water-supply-and-demand-forecast-for-south-africa. In this paper water withdrawals in South Africa were forecasted using 2006 values. When data was eventually released for 2013, the total withdrawals forecasted using the IFs were within 2% of the actual figures.

4   All of this documentation is available at University of Denver, Frederick S Pardee Center for International Studies, https://pardee.du.edu/access-ifs
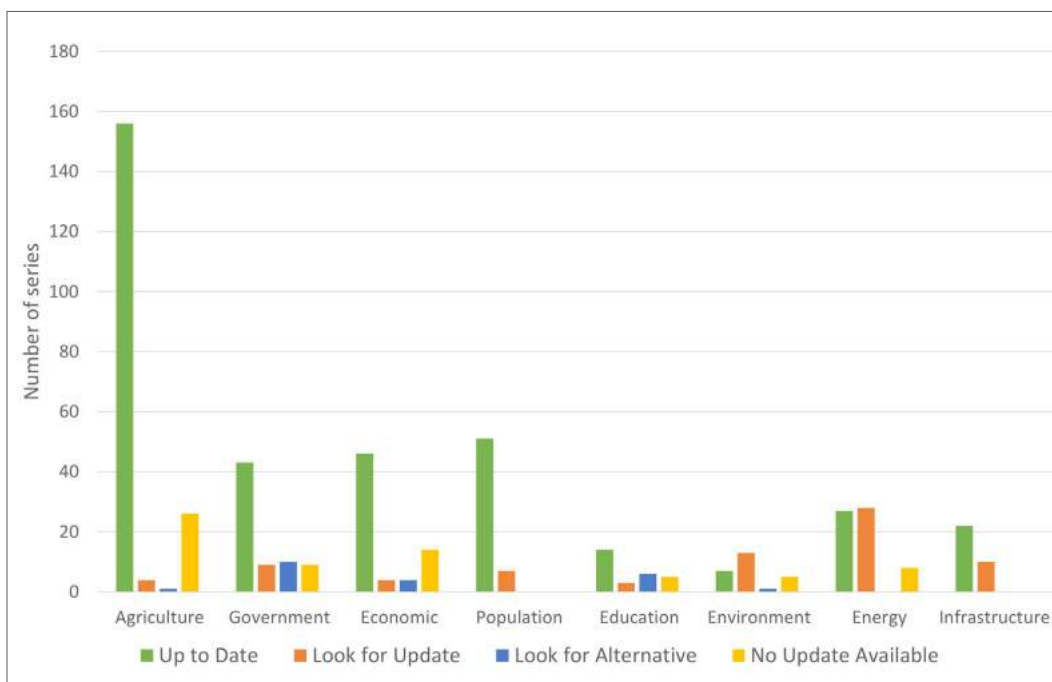
Figure 1.1: Breakdown of data series for Kenya in IFs by category
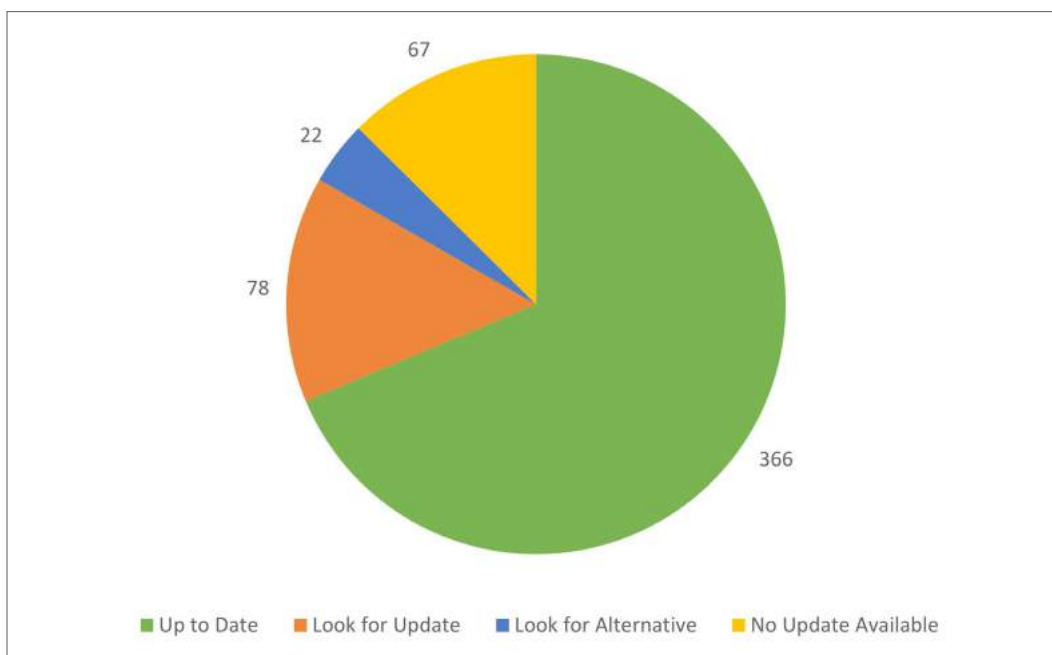
Figure 1.2 shows the data coverage in IFs for Kenya categorised by major sector. It shows that most of the out-of-date series are in the education, economics and governance sectors.

Figure 1.2: Data in IFs for Kenya by sector and update status

Of the outdated series, a few stand out as particularly relevant. Infrastructure, energy, education and public debt were all areas where researchers prioritised data collection to incorporate into the model for a revised Current Path forecast. This Stuck in Traffic scenario represents a more plausible future trajectory for the country and has incorporated a number of important development projects, outlined below.

1.7 Current Path adjustments

Based on desktop research and discussions with stakeholders while in Kenya, the project team developed an adjusted Current Path scenario using interventions to more accurately emulate Kenya's expected development trajectory. The adjustments to the IFs Current Path are as follows:

- *Electricity generation capacity*: This adjustment increased Kenya's electricity generation capacity to approximately 3 200 MW in 2022, which is close to the peak demand projected by the United States Agency for International Development (USAID) and a number with which stakeholders were comfortable.[5] This increased electricity generation capacity reflects new projects such as the Lake Turkana Wind Farm, which is expected to be capable of generating about 310 MW, a 1 000 MW coal plant and some additional geothermal. There is, however, uncertainty around timelines for some of these projects, particularly coal.[6]

- *Coal imports and production:* This intervention changed Kenya's production and imports of coal to reflect plans to develop a 1 000 MW coal plant in Lamu.[7] Adjustments include increasing energy imports for Kenya from around 2022 until 2033, when it begins producing coal.[8] Although there is a pending court case to halt the development of the plant on environmental grounds, the consensus appears to be that the Kenyan government is intent on developing the coal plant nonetheless.[9]

- *Government debt:* The project team increased public debt's share of GDP to roughly 62% in 2018. This reflects Kenya's recently issued Eurobond, although it is uncertain how that will affect levels of government debt.[10] The government is probably going to use some of the Eurobond money to pay off existing debt, but the exact intent is unclear at this time.

- *Land use:* There has been consistent growth in the amount of land dedicated to the cultivation of crops, so there was some uncertainty about the sustainability of that trend. In-country experts did not believe that Kenya had much additional land to convert, so the land-use forecast was tapered down slightly. Also, the emphasis from the government seems to be on converting existing land to commercial farming and increasing productivity, although there does not appear to be an associated strategic plan.

- *Electricity access*: This intervention increased electricity access in Kenya to approximately 56% in 2018. This adjustment reflects more recent data from the World Development Indicators and USAID.[11]

- *Other renewables:* There is some scepticism about the potential of geothermal in Kenya. For one, some believe that estimates of how much geothermal power is available in the Rift Valley generally have been overstated. More practically, much of this energy is not located anywhere near major population centres or areas of major economic activity, and would require a massive investment in grid infrastructure. As

5   USAID estimates peak demand to be between 2 600 and 3 600 MW in 2020, so 3 500 may be a slightly conservative estimate. See Power Africa, Development of Kenya's power sector 2015–2020, https://www.usaid.gov/sites/default/files/documents/1860/Kenya_Power_Sector_report.pdf

6   S Sengupta, Why build Kenya's first coal plant? Hint: think China, *New York Times*, 27 February 2018, https://www.nytimes.com/2018/02/27/climate/coal-kenya-china-power.html

7   Ibid.

8   *The Conversation*, Why the Lamu coal plant doesn't make sense. Kenya has better energy options, 31 May 2017, https://theconversation.com/why-the-lamu-coal-plant-doesnt-make-sense-kenya-has-better-energy-options-78479. Because this adjustment is particularly challenging, the adjustments are not intended to offer a precise presentation of reality. The adjustment was made so that Kenya's energy imports are roughly equal to the amount of coal necessary to run a 1 000 MW coal plant for 10 years in BBOE.

9   S Sengupta, Why build Kenya's first coal plant? Hint: think China, *New York Times*, 27 February 2018, https://www.nytimes.com/2018/02/27/climate/coal-kenya-china-power.html

10 C Mwaniki, Kenya raise $2bn in fresh Eurobond issue, *Business Daily*, 22 February 2018, https://www.businessdailyafrica.com/markets/capital/Kenya-says-fresh--2bn-Eurobond-oversubscribed-seven-times/4259442-4315350-14pr01l/index.html

11 Power Africa, Development of Kenya's power sector 2015–2020, https://www.usaid.gov/sites/default/files/documents/1860/Kenya_Power_Sector_report.pdf

renewables are still likely to be the dominant source of power in the country, the forecast has been tempered a bit.

- *Lower secondary transition:* There is an initialisation problem with lower secondary transition so an adjustment was created to present a more realistic forecast based on the historical trajectory.

- *Improved sanitation access:* Due to recent methodological changes from the United Nations Children's Fund (UNICEF) and WHO Joint Monitoring Project, Kenya's WASH data looks significantly different. Based on historical trends the researchers felt the forecast was too aggressive, particularly in light of large investments in electricity, so it was tempered down.

1.8   The Kenyan context in brief

Kenya gained independence from Britain on 12 December 1963. It straddles the equator and is bordered by Tanzania to the south and south-west, Uganda to the west, South Sudan to the north-west, Ethiopia to the north and Somalia to the north-east. From the coast on the Indian Ocean, Kenya is bisected by the Great Rift Valley and rises to the highlands and the site of the second highest mountain peak in Africa, Mount Kenya. The 47th largest country in the world by land area, Kenya covers approximately 581 309 km^2 and has an estimated population of 49 million people.

A new constitution was promulgated in 2010 and with it came administrative changes that created 47 counties in Kenya. The county form of government was implemented in 2013 and departs from the steady centralisation of authority that had occurred since the early years after independence. Each county has a governor, senator and members of Parliament (MPs) affiliated with it. In total, Kenya has 390 MPs, of whom 12 are nominated and the rest elected. County governments form a critical element of the decentralisation strategy outlined in the new constitution that is also reflected in a number of different strategic areas.[12]

After services (43%), agriculture was the largest contributor to GDP at over 30% in 2017. Agriculture is the backbone of the economy and has great historical and cultural significance. Kenya's highlands are one of the most productive agricultural regions in Africa.[13] Coffee, tea and horticulture are the major export crops and foreign exchange earners for Kenya's farmers. However, subsistence farming is the main source of livelihood for about 70% of the population.[14]

Kenya's economy is the largest and most diverse in East and Central Africa. Its GDP, measured at market exchange rates (MER), nearly doubled between 2000 and 2015 – from about US$25.9 billion to US$51.6 billion. Meanwhile, GDP per capita, measured at purchasing power parity (PPP), rose from US$2 160 in 2000 to US$2 900 in 2015. In 2016 Kenya's GDP grew by 5.8%, up slightly from 5.7% in 2015. A positive outlook was projected for 2018 at roughly 6%.[15]

The recent expansion of the economy has largely been facilitated by a dynamic service sector (e.g. tourism), growing investments in real estate and transport, a rapidly expanding telecommunications industry and financial and agricultural activity. Kenya's thriving telecommunications sector is epitomised by the success of mobile money – particularly the M-Pesa platform offered by Safaricom. Manufacturing activity is mainly concentrated in the major towns of Nairobi, Mombasa and Kisumu and is dominated by agro-processing industries and fast-moving consumer goods.

The country has an extensive network of paved and unpaved roads, and the last decade has seen the most significant push on road construction in Kenya's history. Highways and bypasses to decongest Nairobi

---

12   Government of Kenya, Constitution of Kenya (2010), www.kenyalaw.org/lex/actview.xql?actid=Const2010

13   World Bank, *Adjustment in Africa: reforms, results and the road ahead*, 1994, http://documents.worldbank.org/curated/en/219981468192845881/Adjustment-in-Africa-reforms-results-and-the-road-ahead

14   Government of Kenya, *Agricultural sector development strategy 2010–2020*, 2010, http://www.gafspfund.org/sites/gafspfund.org/files/Documents/5.%20Kenya_strategy.pdf

15   African Development Bank (AfDB), Organisation for Economic Co-operation and Development (OECD) and UN Development Programme (UNDP), African economic outlook 2017: Kenya, http://www.africaneconomicoutlook.org/en/country-notes/kenya

have been built, including the Nairobi–Thika highway that began in 2009 and was completed in 2012.[16] The railway system also received a boost in 2016 with the completion of the Standard Gauge Railway (SGR) that connects the coastal city of Mombasa to Nairobi,[17] and that complements the Uganda railway line built in the 19th century.

More recently, recoverable oil deposits of over 750 million barrels were discovered in Turkana County in north-western Kenya.[18] The oil prospects have brought Kenya into the global limelight by its potentially joining the ranks of oil-producing countries, but actual production remains clouded by uncertainty.[19] Turkana County is a historically marginalised region and there is optimism that wealth emanating from oil will elevate the livelihoods of this predominantly pastoralist community, but also concerns that those proceeds will not be reinvested back into the community. To this end, a resource-sharing framework was in contention between the 10% proposed by the Turkana County government against the national government's proposal of 5% of oil revenue.[20]

Politically, Kenya has made much progress since the de jure one-party system instituted in 1982 gave way to multiparty politics and elections in 1992.[21] Elections have since been held every five years. Despite challenges in the 2007/2008 post-election violence (PEV) that saw the displacement of about 600 000 people and the death of at least 1 100,[22] Kenya has achieved many democratic milestones, including the 2010 constitution referred to earlier. The government has created opportunities for women in leadership roles by providing space for representative posts for women in every county and funding opportunities for youth in a bid to accelerate job creation and support the *jua-kali* (literally 'hot sun', referring to the informal sector). It has also facilitated the transition of government services to an online system through the *e-huduma* (service) platform for better and more efficient public service provision. Nonetheless, elections and electoral processes and corruption are critical governance issues in the future of Kenya. Political stability remains uncertain, as evident in the period of political confusion experienced after the disputed 2017 elections.[23]

With its recent elevation to lower-middle-income status, Kenya is expected to thrive as a major innovation and business destination in East Africa, despite the hazards posed by the current political instability, corruption, high unemployment, poverty and inequality.[24]

1.9   Kenya's various development plans

Kenya's long-term development plan, Vision 2030, is an aspirational document with the intention to transform it into an upper-middle-income country by 2030.[25] The framework for the document is based on three pillars: economic, social and political. According to Vision 2030, the aim of the economic pillar is to

---

16 AfDB, AfDB-Funded Thika superhighway: a masterpiece for East Africa, 'a national pride' – President Mwai Kibaki, 9 November 2012, https://www.afdb.org/en/news-and-events/afdb-funded-thika-superhighway-a-masterpiece-for-east-africa-a-national-pride-president-mwai-kibaki-9986/

17 Railway Technology, Mombasa–Nairobi Standard Gauge Railway Project, http://www.railway-technology.com/projects/mombasa-nairobi-standard-gauge-railway-project/

18 M Kamau, Tullow strikes more oil in latest Turkana find, *Standard Digital,* 26 April 2017, https://www.standardmedia.co.ke/business/article/2001237778/tullow-strikes-more-oil-in-latest-turkana-find

19 Kenya Business Guide, Sector brief: Oil – Kenya within global context, 2018, https://kenyabusinessguide.org/oil-kenya-within-global-context/

20 K Senelwa, Row brewing over how oil revenue from Turkana basin will be shared, *The East African*, 3 January 2017, http://www.theeastafrican.co.ke/business/Row-brewing-over-how-Turkana-oil-revenue-will-be-shared/2560-3505470-sqvlpd/index.html

21 J Perlez, Kenyan yielding on multiparty politics, *New York Times*, 1991, http://www.nytimes.com/1991/12/03/world/kenyan-yielding-on-multiparty-politics.html

22 *The Daily Nation,* Kenya since 2007–2008 post-election violence, 6 August 2017, https://www.nation.co.ke/news/politics/Kenya-since-post-election-violence-/1064-4046876-12j38pyz/index.html

23 The Economist Intelligence Unit, Kenya Briefing Sheet: Outlook for 2018–2022, 2017.

24 AfDB, OECD and UNDP, African economic outlook: Kenya 2017, http://www.africaneconomicoutlook.org/en/country-notes/kenya

25 Government of Kenya, Vision 2030, 2017, www.fao.org/fileadmin/user_upload/drought/docs/Vision%202030-%20Popular%20Version.pdf

'improve the prosperity of all Kenyans' by achieving a growth rate of 10% per year from 2012.[26] The social pillar seeks to attain a 'just and cohesive society with social equity in a clean and secure environment' while the political pillar endeavours to 'realize a democratic political system founded on issue-based politics that respects the rule of law, and protects the rights and freedoms of every individual in Kenyan society'.[27]

Each pillar is composed of several 'sectors', which are in turn made up of a number of 'flagship projects'.[28] Broadly, the economic pillar focuses on infrastructure development and structural transformation of the economy toward higher value added activities, while the social pillar focuses on expanding access to basic services such as education, health and medical services, water and sanitation facilities with a focus on gender, youth and other vulnerable groups.[29] The political pillar emphasises public sector reforms and led to the new constitution of 2010.

Vision 2030 was also tied to the Millennium Development Goals (MDGs), and the subsequent Medium-Term Plans (MTPs) were linked to the goals in the SDGs. The first MTP (MTP 1) covered the period 2008–2012, the second (MTP 2) 2013–2017 and the third 2018–2022.[30] These MTPs also contain various detailed plans for each of the sectors within each pillar.

In addition, Vision 2030 includes an 'enablers and macros' umbrella over its pillars. It identifies reforms in eight key sectors that it hopes will 'form the foundation of society for socio political and economic growth'.[31] These are macroeconomic stability; infrastructure; energy; science, technology and innovation; land reform; human resources development; security; and public sector reforms.[32]

In December 2017 President Uhuru Kenyatta announced 'The Big Four' initiative, which establishes the government's development priorities and agenda for 2018–2022 (MTP 3). The initiative prioritises manufacturing, food and nutrition security, health and affordable housing. While each of these areas overlaps with the existing development agendas articulated in Vision 2030, the Big Four initiative further focuses the government's attention on these areas for immediate action.

---

26 Ibid., 1.

27 Ibid.

28 Ibid.

29 Ibid.

30 Government of Kenya, The Presidency, First Medium Term Plan (2008–2012), 2008, https://www.sida.se/contentassets/85567 7b831b74ea0b226ce2db4eb93a3/kenya_medium_term_plan_2008-2012.pdf; Government of Kenya, The Presidency, Second Medium Term Plan (2013–2017), http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/Second%20Medium%20 Term%20Plan%202013%20-2017.pdf; Government of Kenya, The Presidency, The Third Medium Term Plan, (2018–2022) for Vision 2030, http://www.mtp3.go.ke/pillars.php?p=2&s=3. See also the concept note for MTP 3: Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20 NOTE%20MTP 3.pdf

31 Government of Kenya, Vision 2030, 2017, www.fao.org/fileadmin/user_upload/drought/docs/Vision%202030-%20Popular%20 Version.pdf

32 Ibid.

Chapter 2: Demographics

2.1   Introduction

Kenya's youthful, growing and urbanising population offers both challenges and opportunities as the country strives to become an upper-middle-income economy by 2030 and achieve many of the SDGs.[33] Since independence, the Kenyan government has recognised the importance of population management to sustainable social and economic development.[34]

The government continues to structure national population policy around the objective to 'attain a high quality of life for the people of Kenya by managing population growth to a level that can be sustained with the available resources'.[35] The primary demographic goal of Vision 2030, as articulated in the population, urbanisation and housing sector brief, is to 'ensure that the country's population is provided with adequate and decent housing in well planned urban areas while ensuring that smaller towns and rural areas have access to decent housing and related basic infrastructure'.[36]

The sections in this chapter explore Kenya's demographic diversity and the historical trends in its demographic structure, and present forecasts of the country's likely trajectory. Comparisons are drawn between the demographic histories and future trajectories of Kenya and its regional and global peers. Key areas analysed include:

• Diversity
• Population size and growth
• Fertility rates
• Life expectancy
• Age structure
• Urbanisation
• Macroeconomic implications

2.2   Diversity in Kenya

Kenya has a diverse ethnic composition with no single group a majority. The country is home to 43 official ethnic groups, but this number is estimated to be as high as 60 when smaller groups are included.[37] Kiswahili and English are the only two official languages, however.

Because this report provides a national-level analysis of the likely future trajectory of Kenya, the country's diversity falls largely outside the scope of analysis. However, Kenya's varied cultural landscape forms

---

33   National Council for Population and Development (NCPD), Ministry of State for Planning, National Development and Vision 2030, Sessional Paper No. 3 of 2012 on population policy for national development, 2012, vi, https://www.afidep.org/?wpfb_dl=86

34   Ibid., v.

35   Ibid., iv.

36   Republic of Kenya, Sector plan for population, urbanization and housing 2013–2017, 2013, iv, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/SECTOR%20PLAN%20FOR%20POPULATION,%20URBANIZATION%20AND%20HOUSING%20 2013-2017.pdf

37   African Studies Center, East Africa living encyclopedia, https://www.africa.upenn.edu/NEH/kethnic.htm

a critical component of its past and future development trajectory and largely informed the decision to devolve power to the local level.

Nairobi has by far the largest urban population and is the most populous and ethnically diverse of the country's 47 counties, with a population estimated at 3 million people. In contrast, larger counties such as Marsabit have a smaller population of just over 290 000 people.[38] Nairobi and Mombasa are the most densely populated counties (4 515 and 4 292 people/km², respectively). Mombasa is the 16th most populated county, but the smallest in terms of land mass.

The average population density for the country is 66.4 people/km².

The constitution of Kenya also guarantees freedom of religion. Over 78% of Kenyans are Christians while approximately 10% practise Islam and are mostly concentrated in the coastal towns of Kenya. Other religions such as Hinduism and Sikhism are mostly found in cities and are predominantly practised by Kenyans of South Asian descent. Many indigenous religions are no longer widely practised, although some of the denominations considered indigenous combine aspects of African traditions and Christianity in their worship.

2.3   Kenya's demographic history and trajectory

The population of Kenya reached roughly 47.2 million people in 2015, and IFs forecasts that it grew about another 5% to 49.5 million in 2017. Kenya has the third largest population in East Africa, the seventh largest on the continent, and the 28th largest in the world. Just a half century ago, Kenya had the 48th largest population in the world, at approximately 10.5 million (1968). IFs forecasts that the population will increase to 65.2 million people by 2030 – roughly the same size as the projected population of France by that year. This population forecast would mark over a six-fold increase from the Kenyan population of 8.9 million people at independence in 1963.

The Kenyan population will likely grow at an average rate of 2.1% per year until 2030. In the Stuck in Traffic scenario, the government will have to provide essential services such as education, healthcare and employment opportunities for an additional 15.7 million Kenyans by that year.

**Figure 2.1: Populations of the four most populous East African countries**
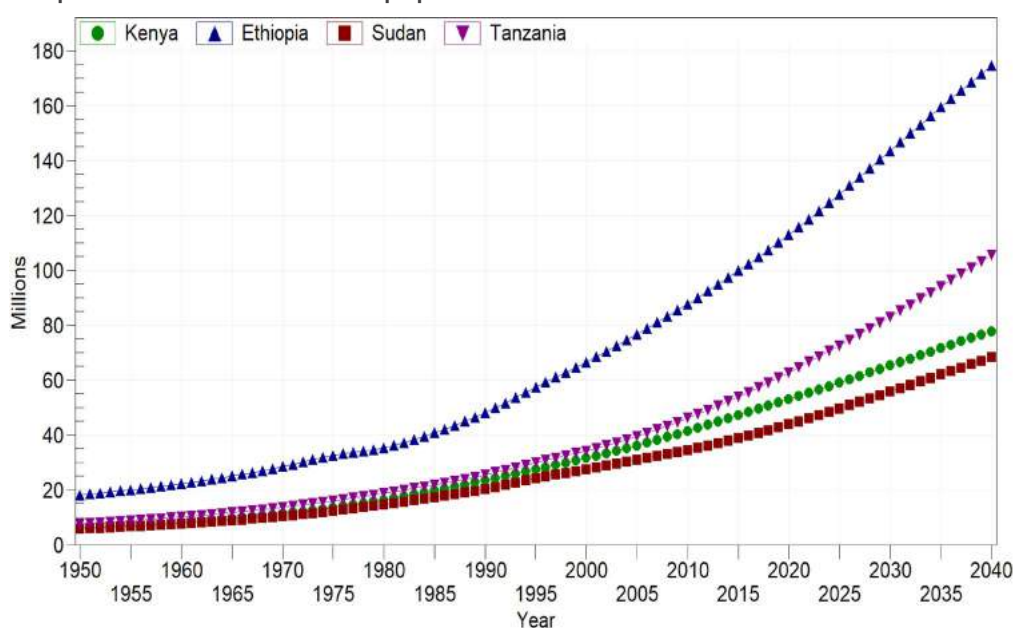
Source: IFs v. 7.33 initialised from UNPD data

---

38   Kenya National Bureau of Statistics (KNBS), Population distribution by sex, number of households, area and density by administrative units, https://www.knbs.or.ke/population-distribution-by-sex-number-of-households-area-and-density-by-administrative-units/

From 1960 to 1980 the Kenyan population grew at an average rate of 3.5% per year – faster than the global average growth rate (1.9%) and the sub-Saharan African average growth rate (2.7%) over the same period. From 1980 to 2000 Kenya grew at an average rate of 3.3% per year, still rapid relative to both the global (1.6%) and sub-Saharan African average growth rates (2.8%) over the same period. Kenya's growth rate has since slowed significantly, but remains rapid in global terms: in 2016 the population grew by approximately 2.3%.

Figure 2.2: Population growth rate using a 5-year moving average
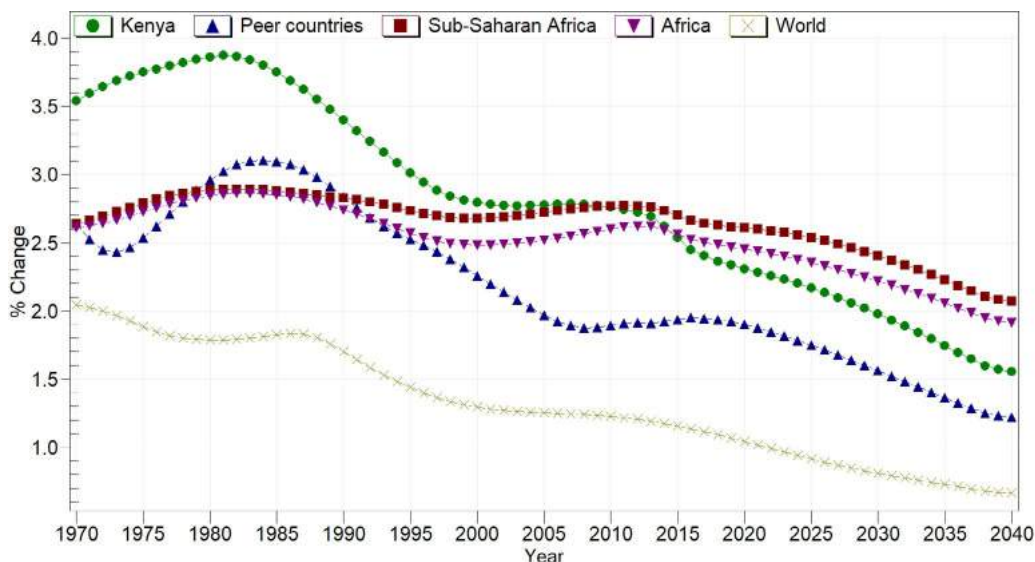
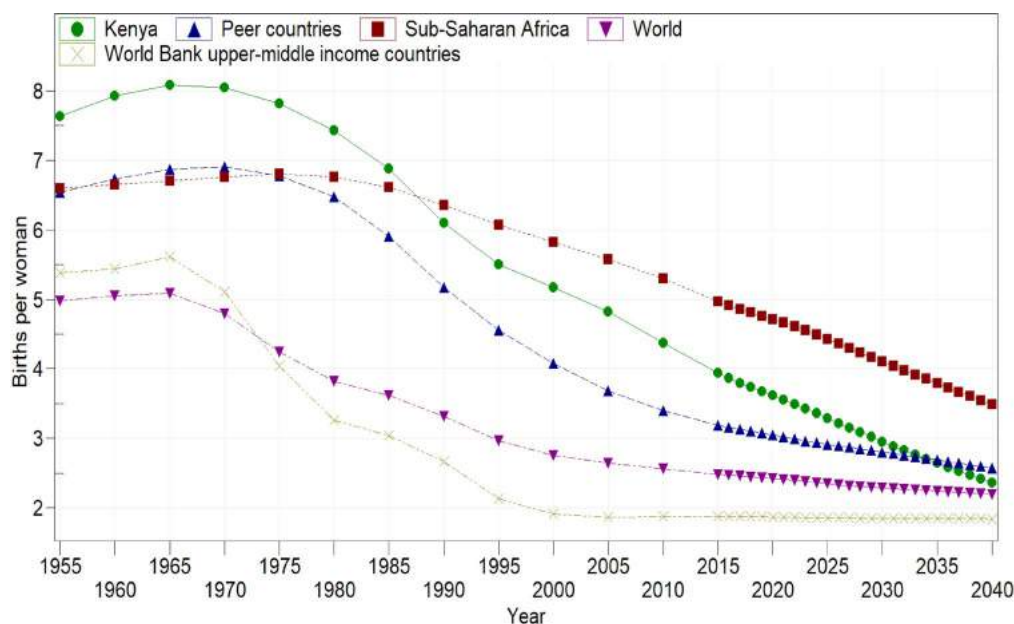Source: IFs v. 7.34 initialised from UNPD data

In the Stuck in Traffic scenario, Kenya's population growth rate is forecast to fall to about 2% per year by 2030, which would make it the 40th fastest growing country globally, but only the 35th fastest growing country on the continent. IFs forecasts Kenya's population growth rate to fall to 1.5% by 2040, at which point it will have the 42nd fastest growing population in the world and the 38th fastest growing population in Africa.

2.4 Fertility

Kenya's average fertility rate has fallen sharply over the last half century. However, it continues to remain significantly higher than the global average.

In 2015, it had an average total fertility rate (TFR) of four children per woman, marking a dramatic reduction from the 1960s, when it had the second highest TFR in the world – an average of eight children per woman. Figure 2.3 shows TFR in Kenya, peer countries, sub-Saharan Africa, World Bank upper-middle-income countries and the world from 1955–2040.

Figure 2.3: Fertility rates

Source: IFs v. 7.33 initialised from UNPD data

Many scholars cite the positive relationship between lowered fertility rates and greater female educational attainment as the driver of this reduction. In 1985 an education reform programme in Kenya that extended primary school by a single year led to improvements in educational attainment, delayed marriage and reduced fertility rates.[39] In addition, providing free uniforms to teen students was found to lead to reductions in fertility and dropout rates, as well as in the frequency of teen marriage.[40]

Table 2.1: Forecast of TFR

Year	Kenya	Peer countries	Sub-Saharan Africa	World Bank upper-middle-income	World
2015	3.9	5.3	4.9	1.8	2.5
2020	3.6	4.9	4.7	1.8	2.4
2030	3	4.2	4.1	1.8	2.3
2040	2.4	3.4	3.5	1.8	2.2

Source: IFs v. 7.33 initialised from UNPD data

As fertility rates around the world have generally trended downwards, so too have the number of people per household.[41] Kenya has been no exception to this global trend.[42] From 1980 to 2000 the average Kenyan household consisted of five people. A 2013 publication of the Kenyan National Bureau of Statistics (KNBS) and Society for International Development (SID) estimated that most Kenyan households had four to seven members, with the UN Population Division (UNPD) estimating average household size at about four people in Kenya in 2016.[43]

---

39 L Chicoine, Education and fertility: evidence from a policy change in Kenya, Institute for the Study of Labour (IZA), Discussion Paper 6778, August 2012, ftp.iza.org/dp6778.pdf. See also D Canning, S Raja and AS Yazbeck, Africa's demographic transition: dividend or disaster?, Agence Française de Développement and World Bank, 2015, https://openknowledge.worldbank.org/bitstream/handle/10986/22036/AfrDemographicTransitionOVERVIEW.pdf

40 E Duflo et al., Education and HIV/AIDS prevention: evidence from a randomized evaluation in western Kenya, World Bank, Policy Research Working Paper 4024, 2006, https://openknowledge.worldbank.org/handle/10986/9007

41 UNPD, Population facts: household size and composition around the world, October 2017, 2, http://www.un.org/en/development/desa/population/publications/pdf/popfacts/PopFacts_2017-2.pdf

42 Ibid.

43 KS Njonjo, Exploring Kenya's inequality: pulling apart or pooling together?, KNBS and Society for International Development (SID), 2013, http://inequalities.sidint.net/kenya/wp-content/uploads/sites/3/2013/10/SID%20Abridged%20Small

Household size plays a pivotal role in decisions on family planning, employment, migration, education, healthcare and numerous other issues. In addition, households with more members tend to be poorer than those with fewer members. In Kenya, households in rural areas are twice as likely to have more members than their urban counterparts.

**Figure 2.4: Household size in urban and rural areas in Kenya**
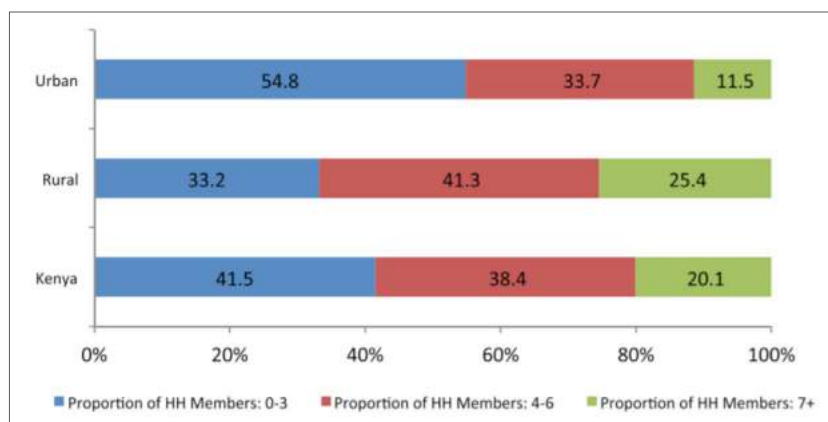
Source: SID and KNBS

2.5   Life expectancy

Average life expectancy in Kenya has remained above average relative to the rest of the continent. In 1970 the average Kenyan lived to 52 against a continental average of 46 years. By 2015 average life expectancy had increased to 66 versus 62 for Africa as a whole. However, in 2017 Kenya's projected life expectancy of 67 years was still well shy of the average life expectancy globally (72 years), underscoring the magnitude of the disease burden in Africa generally. Meanwhile, the average individual living in an upper-middle-income country can expect to live to 75 years.

In the Stuck in Traffic scenario, Kenyans are forecast to continue to live longer than individuals in other countries on the continent – 73 years by 2030, compared to 67 for Africa. At the same time, the average life expectancy globally will have increased to 75 years and 77 years in upper-middle-income countries. This suggests that Kenyan health outcomes are improving but remain poor relative to the average performance of global and more developed countries.

Figure 2.5: Life expectancy
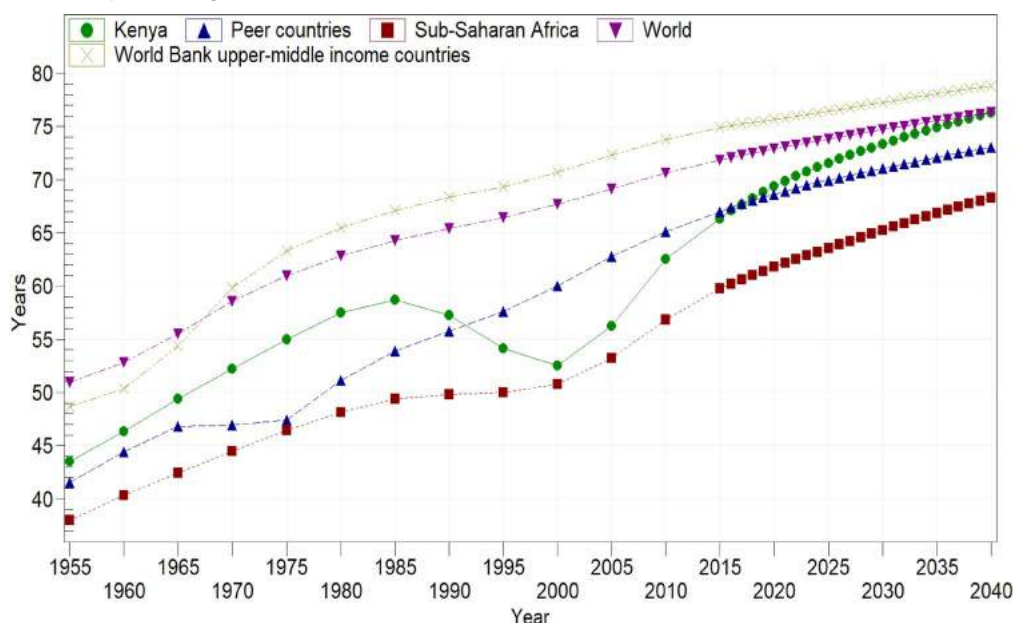
Source: IFs v. 7.33 initialised from UNPD data

2.5.1 HIV/AIDS

The dramatic drop in Kenya's life expectancy that started in the mid-1980s, reached its lowest point at the turn of the century, and then eased by 2010, reflects the country's struggle with HIV/AIDS and the successful introduction of antiretroviral (ARV) medication. From 1990 to 2003 the HIV/AIDS death rate in Kenya spiked from 0.09% to 0.38% of the population. At the height of the epidemic in 2003, approximately 130 000 Kenyans – four out of every 1 000 in the total population – died from complications that resulted from HIV/AIDS.

The drop in the average life expectancy across sub-Saharan Africa also demonstrates the effect of HIV/AIDS. However, Kenya's average life expectancy increased by a decade between 2000 and 2010, whereas the average life expectancy for sub-Saharan Africans increased by eight years over the same period. This rapid improvement in the life expectancies of Kenyans evidences the success of Kenya's introduction of ARVs and HIV/AIDS awareness campaigns.[44]

The implications of HIV/AIDS for development in Kenya are explored more fully in the chapter on health.

2.6   Age structure

Half of the Kenyan population was under 19 years old in 2015, which was slightly older than the average for sub-Saharan Africa (18.2 years) but about one and a half years younger than the average for lower-middle-income African countries (20.5 years). In contrast, the median age in upper-middle-income countries around the world in 2015 was about 34 years, while the global average was about 30 in 2015.[45] As such, Kenya has the 31st youngest population in the world.

In the Stuck in Traffic scenario, Kenya is projected to have a median age of 22 years by 2030 and 26 by 2040. Thus, by 2030 Kenya will likely still be young in both continental (18th youngest population in Africa) and global terms (42nd youngest population in the world).

Figure 2.6: Median age
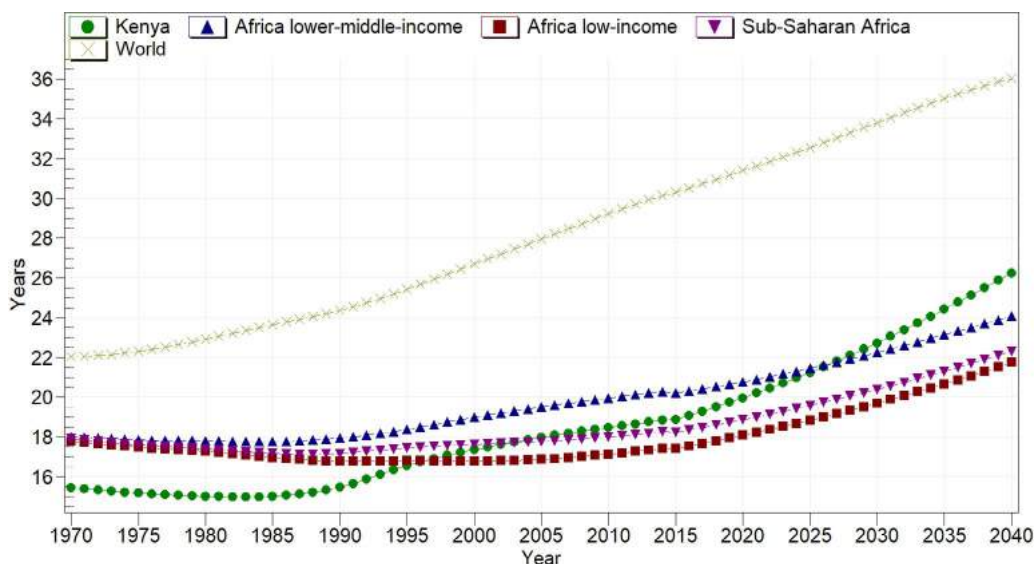
Source: IFs v. 7.34 initialised from UNPD data

In 2015 approximately 42% of the Kenyan population (20 million people) was under 19 years of age. Roughly 28% of the population (13.5 million people) was between 15 and 29 years of age, 27% (12.6 million people) between 30 and 64, and 3% (1.3 million people) 65 or older.

---

44   IN Mukui et al., Rates and predictors of non-adherence to antiretroviral therapy among HIV-positive individuals in Kenya: results from the second Kenya AIDS Indicator Survey, 2012, *PLoS ONE*, 11:12, 2016.

45   The median age marks the age where half the population is younger, and the other half is younger.

Figure 2.7: Population by age cohorts
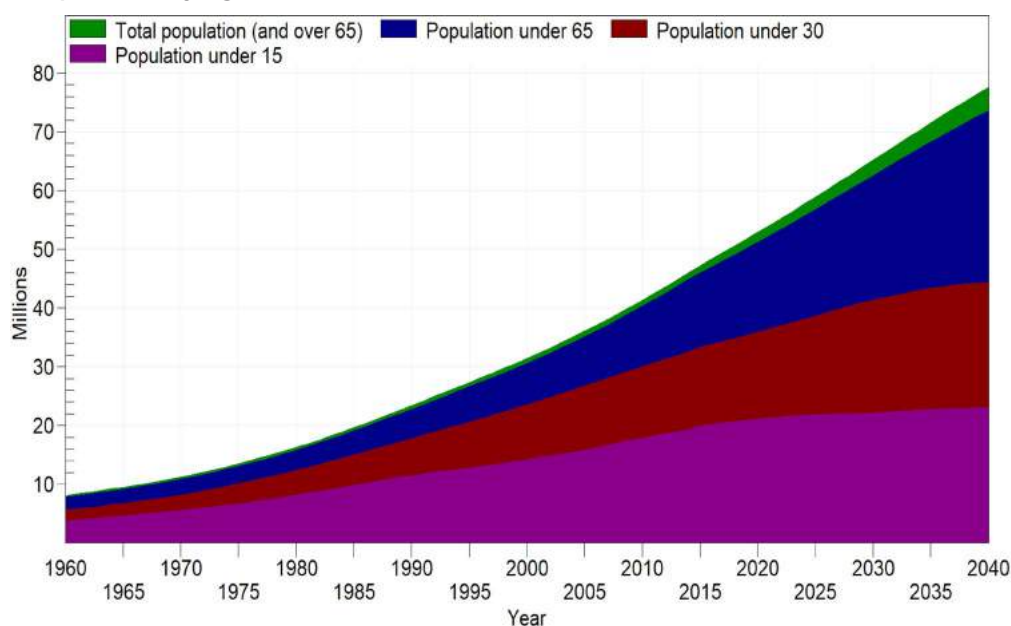
In the Stuck in Traffic scenario, the percent of the population under 15 years of age is forecast to decline while the percent of the population aged 15–64 increases.

Table 2.2 presents the projected population growth in each age cohort. It shows that the vast majority of Kenya's population growth will be in the 30–64 age cohort. Overall, the working age population in Kenya (ages 15–64) will account for roughly 65% of Kenya's demographic growth by 2040. Despite this increase in the working population, by 2040 Kenya will still have more than 23 million children under 15 requiring care and about 4 million people over the age of 65, a roughly 28% increase in the dependent population from 2015.

Table 2.2: Population by age cohorts, millions

Year	Under 15 years	15–29 years	30–64 years	65 and above
2015	19.9	13.4	12.6	1.3
2030	22.1	19.1	21.2	2.7
2040	23.0	21.4	29.2	4.1
Increase	3.1	8.0	16.6	2.8

Kenya's large youth population (15 to 29 years of age) will continue to pose challenges to development through 2040.[46] Kenya's youth bulge, defined as the population aged between 15 and 29 relative to the population 15 or older, contributes to large numbers of unemployed and has the potential to contribute to economic, social and political instability.[47] A disproportionately large number of young people, in the absence of adequate service delivery and employment opportunities, can be a catalyst of instability – a phenomenon discussed in Chapter 9 on governance.

46   In IFs, youth is defined as between 15 and 29 years old, while the KNBS defines youth as between 15 and 35.

47   BB Hughes et al., Strengthening governance globally: forecasting the next 50 years, Boulder: Paradigm, 2014, 120.

Figure 2.8: Youth bulge
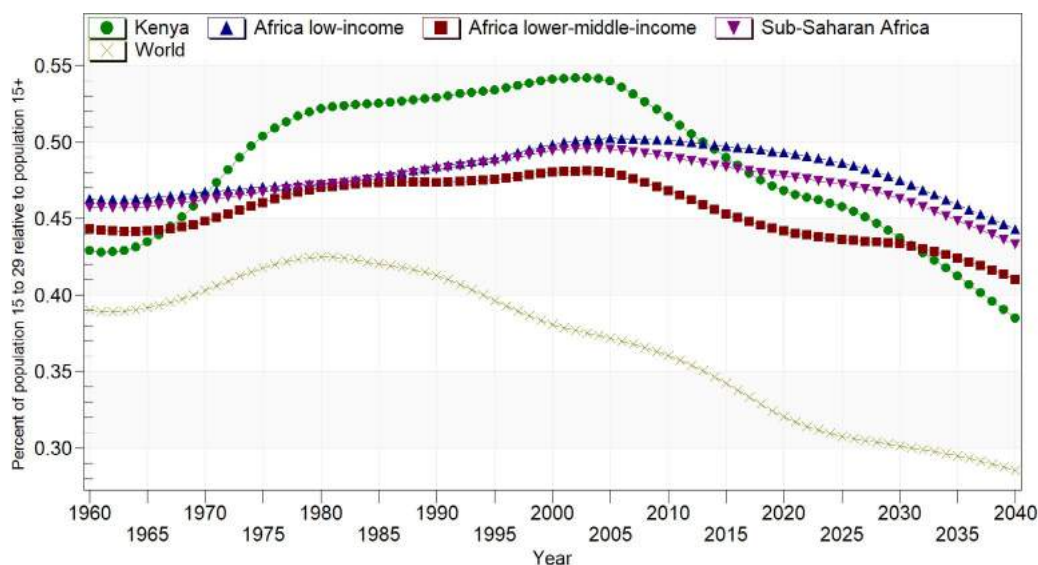
Source: IFs v. 7.34 initialised from UNPD data

In 2015 Kenya's youth bulge was nearly 50%. This ratio is the 25th highest in the world and nearly as high as the world's highest youth bulge since 1950 (Zimbabwe, 56%, 2005). While IFs forecasts Kenya's youth bulge to shrink over time, it will remain among the 40 countries globally with the highest youth bulge until the late 2030s.

2.7   Demographic dividend

Kenya is several decades away from achieving a demographic window conducive to more rapid economic growth. A favourable demographic window exists when 0–14-year-olds make up less than 30% of the population and those 65 or older make up less than 15%.[48] Alternatively, the window for more robust economic growth opens when the median age is between 26 and 41 years.[49] The median age for sub-Saharan Africa is currently 18.4; only Mauritius, Seychelles and South Africa have median ages between 26 and 41. In the Stuck in Traffic scenario, Kenya is forecast to only enter that window around 2040.

Thus, although the working-age population (15–64) will steadily grow as a percent of the total population (from 56% in 2017 to 65% in 2040), that growth is too slow to allow for a demographic dividend in the short term. However, this economic growth is contingent upon high levels of access to basic services, quality education and employment. In other words, the demographic dividend is not a given and states need to work hard to establish the necessary preconditions for harnessing its potential.

Figure 2.9 shows the Stuck in Traffic forecast of Kenya's age distribution shifting to become more favourable to economic growth as fertility rates fall and more Kenyans become of working age. Meanwhile, we expect Europe and the Asian Tigers (four East Asian[50] countries that experienced phenomenal economic growth while having a large workforce and a small dependent population) to have declining demographic dividends. Globally, IFs forecasts the demographic dividend to decline very slightly, translating in slower global growth.

---

48   R Cincotta, Opening the demographic window: age structure in sub-Saharan Africa, NewSecurityBeat, 2017, https://www. newsecuritybeat.org/2017/10/opening-demographic-window-age-structure-sub-saharan-africa/

49   See Cincotta's response to questions at Hom Nath Chalise, What is demographic dividend and how long is the demographic window of opportunity of different country?, Research Gate, https://www.researchgate.net/post/What_is_demographic_dividend_ and_how_long_is_the_demographic_window_of_opportunity_of_different_country, where he also lists his various publications on this matter.

50   The Asian Tigers are comprised of Taiwan, Singapore, Hong Kong and South Korea. These countries experienced unprecedented economic growth in the latter half of the 20th century, which has been attributed in part to their favourable demographic dividend.

Figure 2.9: Demographic dividend
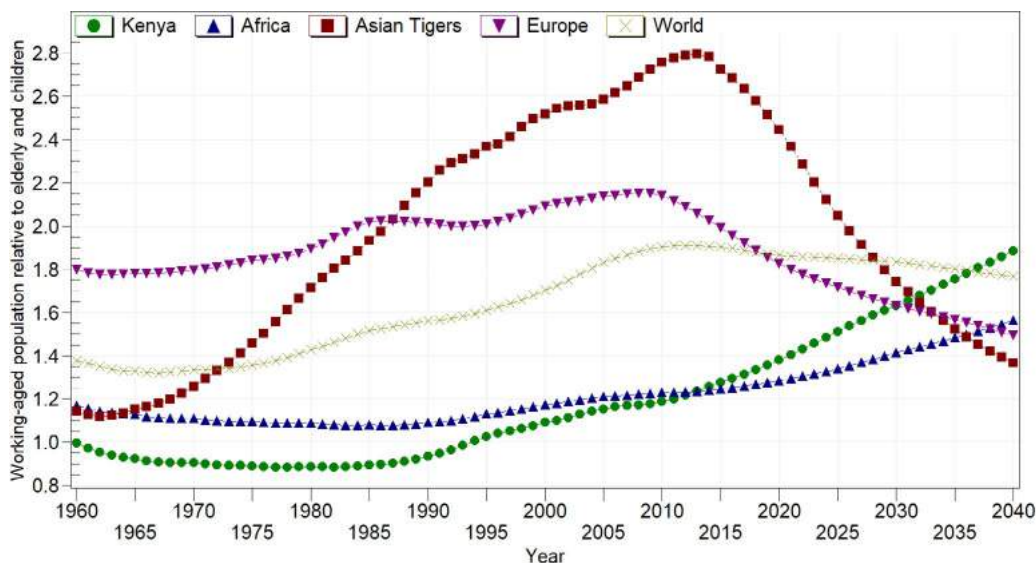
A flip side of the demographic dividend coin is the dependency ratio, defined as the number of dependents per worker in a country or region. According to IFs, Kenya's dependent population constituted 44% of the total population in 2017, with the overwhelming majority of dependents in the 0–15 age cohort. From 1978 to 1983 Kenya's dependency ratio of 1.1 was the highest in the world, and for much of the 1980s its dependency ratio was the highest on the continent, ranging from 1.1 to 1. It remained higher than the sub-Saharan African average until 2003. By contrast, in the years of its peak economic growth – averaging 9.2% GDP growth from 1987–1997 – Singapore had an average dependency ratio of about 0.39.

Figure 2.10: Dependency ratio
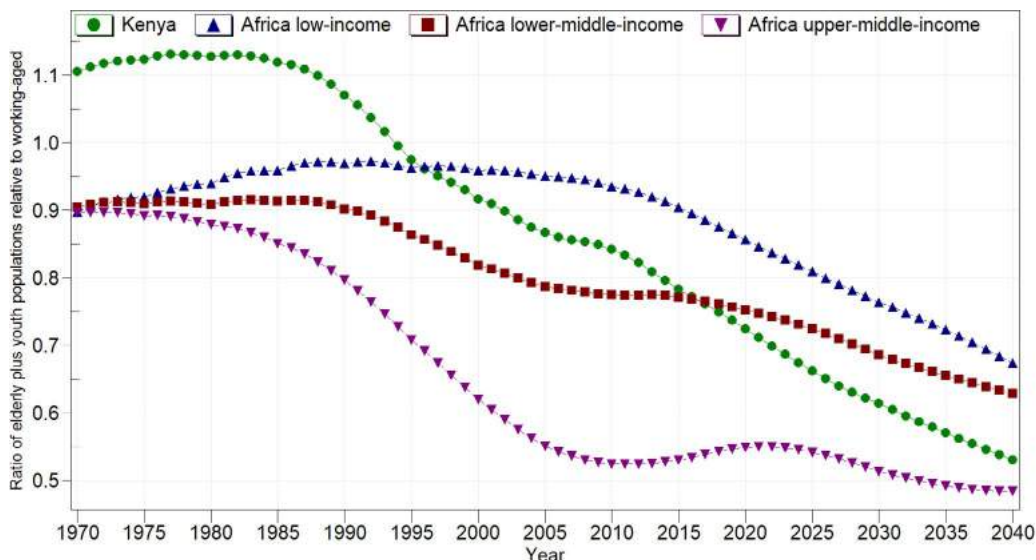
IFs estimates that Kenya's dependency ratio has since dropped to 0.8 (2017). This means that for every 80 dependent persons, there were 100 persons of working age. Figure 2.10 demonstrates that Kenya and other African lower-middle-income economies have very high dependency ratios relative to global lower-middle-income and upper-middle-income economies, expressive of the large youth populations of sub-Saharan Africa relative to the rest of the world.

In the Stuck in Traffic scenario, Kenya's dependency ratio will continue to decline as its dependent youth population becomes old enough to enter the workforce, but will remain significantly higher than the global average until around 2040.

Moreover, over half of the population living in Mandera, West Pokot, Tana River, Samburu, Narok and Migori counties are below 14 years old. These counties have the highest dependency ratios and are also among the poorest in Kenya, with the exception of Migori and Narok counties. Nairobi, Mombasa and Kiambu have the biggest youthful populations while Nairobi, Mombasa, Kiambu, Kirinyaga and Nyeri have the biggest working-age populations (over 60%). These counties have the lowest dependency ratios and are among the richest counties in Kenya. On the other hand, Muranga, Nyeri and Vihiga counties have the greatest number of old people in the country.[51]

> The *demographic transition* is the process by which a population moves from having high birth and death rates to an older, more stable population structure characterised by low fertility and infant mortality rates and other improved health outcomes. This process tends to go hand in hand with social and economic development. Although demographic trends vary across countries, Africa has progressed through the demographic transition more slowly than other regions have historically. Consequently, the continent has been unable to enjoy the social and economic benefits of its large working age population and consumer class.

2.8 Urbanisation

Roughly three-quarters (36.6 million) of Kenya's population live in rural areas, making it the 16th most rural population in the world and the third most rural of the six peer countries (behind Cambodia and Uganda). Of Africa's 18 lower-middle-income countries, Swaziland has the largest percentage of population living in rural areas.

However, Kenya is urbanising at a moderate pace. In the Stuck in Traffic scenario, the urban population is projected to increase by between 4 and 4.3% per year through to 2030 to comprise one-third (33.5%, or 21.8 million people) of the total population by 2030. As Figure 2.11 demonstrates, Kenya is projected to only become a predominantly urban country by around 2055.[52]

In absolute numbers, Kenya's urban population is projected to increase by 9 million to reach 21.8 million by 2030, while the rural population is projected to increase by nearly 8 million to reach 43.3 million by 2030.

Although often a driver of modernisation, urbanisation places huge pressure on urban infrastructure, institutions and land. Striving towards sustainable and inclusive growth, as articulated in the SDGs and the African Union's (AU) Agenda 2063, will require forward-looking improvements in urban planning and basic service delivery. Given the centrality of infrastructure as an enabler of sustainable urban and rural development, special attention will have to be paid to ensuring that infrastructure promotes not only economic growth but also the conservation of biodiversity and clean air and water.[53]

---

51 SID, Demographics, http://inequalities.sidint.net/kenya/abridged/demographics/2/

52 According to Kenya Vision 2030, the country will be predominantly urban by 2030 (See Government of Kenya, 'Kenya Vision 2030: the popular version', 2017, 19). IFs, using data from the World Bank's World Development Indicators, forecasts that Kenya will only be 33% urban by 2030. This discrepancy is likely owing to differing definitions and methodologies between the World Bank and the KNBS. MS Kimenya et al., *African lions: Kenya country case study*, Brookings, Report, 16 May 2016, also estimate that 33% of Kenya's population will be urban by 2030 (8). In its 2012 urbanisation report, the KNBS provided the following definitions: 'Rural: This is a large and isolated part of an open or agricultural country, including trading, market and service centres with relatively low population concentrations of less than 2,000 people. Urban: This is a built-up and compact human settlement with a population of at least 2,000 people defined without regard to the local authority boundaries. It is normally a trading, market and service centre that provides goods and services to both the resident and surrounding population and is therefore sometimes referred to as an urban centre.'

53 UN Environmental Programme (UNEP), GEO-6 regional assessment for Africa, Nairobi: UNEP, 2016, 6.

Figure 2.11: Kenya: Urban and rural population
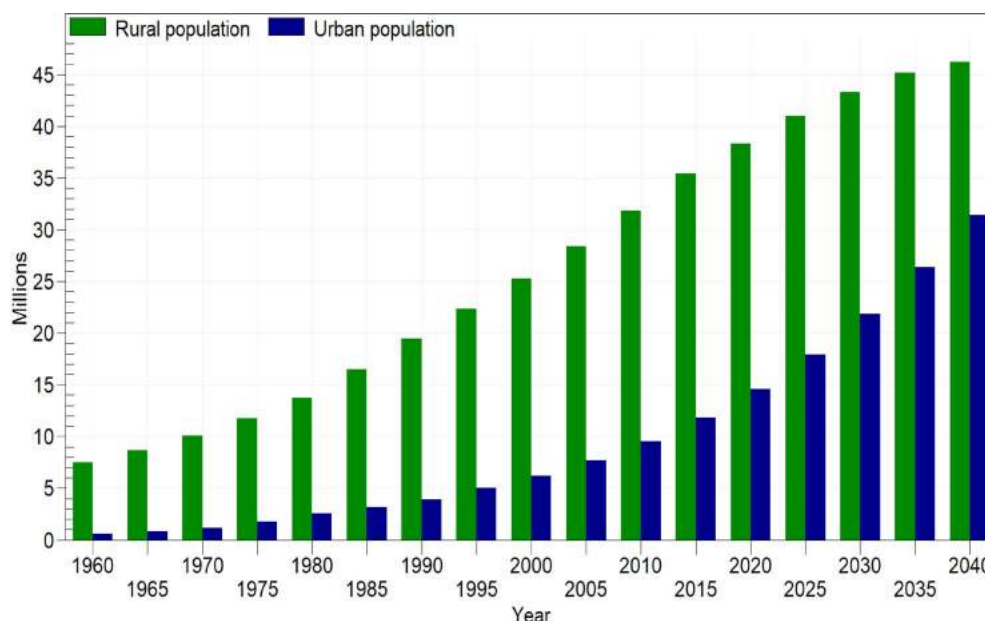
Source: IFs v. 7.33 using data from World Bank

2.9 Migration[54]

The number of foreign-born migrants (including refugees, unless otherwise specified) living in Kenya was just over 608 000 in 2012, compared to 594 000 in 2015.[55]

At the end of 2016 Kenya hosted the 10th largest refugee population in the world.[56] However, from the beginning of 2016 to the end of 2016 Kenya's refugee population decreased from 553 900 to 451 600. Over 70% of this refugee population came from Somalia, while significant numbers were from South Sudan, Ethiopia and the DRC.[57] This decline was primarily owing to introducing re-verification exercises, returning refugees and resettling the Somali population in Kenya.[58]

The top destinations for Kenyans emigrating from Kenya include the United States (US), the United Kingdom (UK), Tanzania and Uganda.[59]

Figure 2.12 shows that between 1970 and 1990 Kenya had a relatively neutral net migration rate compared to its regional peers, which experienced high levels of migration. During the first half of the 1990s, Kenya saw high levels of inward migration, which peaked at roughly 570 000 people in 1992. Net migration has since remained relatively neutral.

Kenya's recent history of net migration contrasts sharply with that of its regional peers, especially Somalia and Ethiopia.

---

54 Data on migration is notoriously difficult to obtain. As such, this section should be interpreted as an analysis of broad migration trends, not of precise figures.

55 UN High Commissioner for Refugees (UNHCR), Kenya Comprehensive Refugee Programme: programming for solutions, 2016, https://reliefweb.int/sites/reliefweb.int/files/resources/2016-KCRP5.13fv.pdf

56 UNHCR, Global trends in forced migration, 2017, 15–16, https://africacheck.org/wp-content/uploads/2017/06/UNHCR-Global-Trends-2016.pdf

57 Ibid.

58 Ibid., 16.

59 International Organization for Migration (IOM), *Migration in Kenya,* 2015, 17, https://publications.iom.int/system/files/pdf/migration_profile_kenya.pdf

Figure 2.12: Net migration
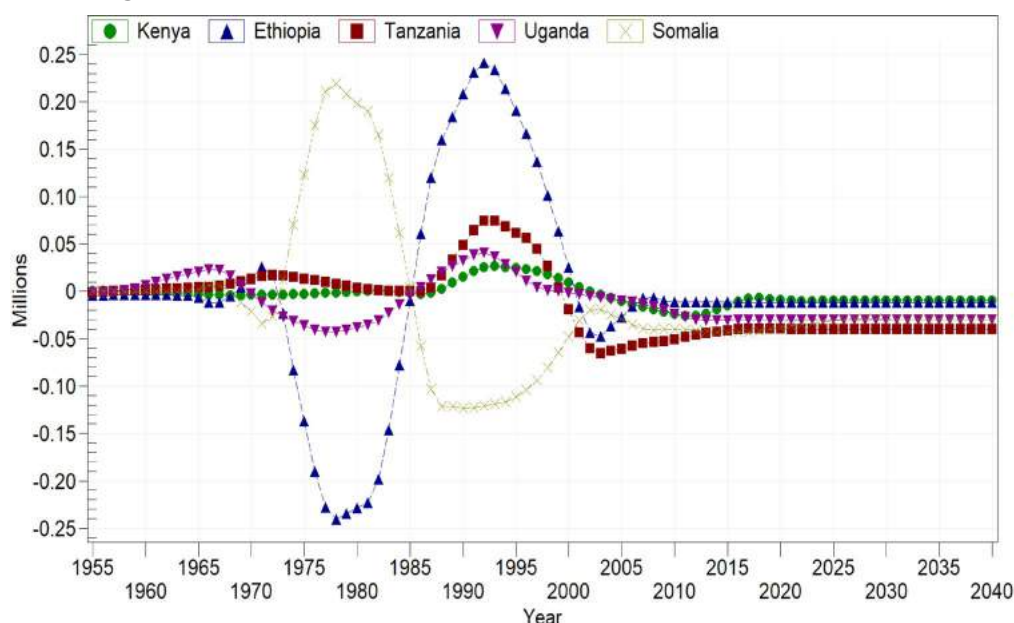
Source: IFs v 7.33 initialised from UNPD data

Kenya is also a major origin, transit and destination country for irregular migrants migrating within and out of Africa.[60] While there is a dearth of data on irregular (undocumented) Kenyan emigration, it has been estimated that between 200 000 and 300 000 undocumented Kenyans live in the US alone.[61]

2.10 Macroeconomic implications

Kenya's large youth population constrains its transition from a lower-middle-income to an upper-middle-income economy in important ways. High dependency ratios mean that more resources are needed to support non-working populations, and these resources can draw from other productive spending in the short term. Because the dependent population is large relative to the working-age population, workers must provide significant economic support to children and the elderly – money that otherwise could be invested or saved. But it is also an investment in the future – if this can be harnessed to its full effect it can drive very high rates of economic growth.

Of the 52 lower-middle-income countries globally, Kenya had the ninth highest dependency ratio in 2017, according to IFs. IFs forecasts that by 2030 Kenya's dependency ratio will drop to 0.8, which will be the 14th highest of all lower-middle-income countries.

As more of Kenya's population enters the workforce, there will be increased pressure on both the public and private sectors to provide jobs. In the Stuck in Traffic scenario, there will be almost 13 million more Kenyans in the workforce by 2030 – an increase of about 46% from the number of Kenyans of working age today. By 2040 there will be 23 million more working-age Kenyans, representing an 84% increase from today.

---

60   Ibid., 24.

61   Ibid., 24.

Table 2.3: Kenya population (in millions) in need of basic services and employment opportunities

Year	2017	2025	2030	Change from 2017–2030
Population without access to piped water, millions	30.7	30.7	29.7	1 million less
Population without access to improved sanitation, millions	34.1	35.6	36.0	0.92 million more
Adults without primary education, millions	12.8	12.3	11.9	0.82 million less
Population of stunted individuals, millions	5.6	6.5	7.0	1.4 million more
Population living in extreme poverty, millions	13.0	13.4	13.0	No change
Population of working age (15–64), millions	29.5	34.9	40.4	10.9 million more

Source: IFs v. 7.33 using data from World Bank, WHO/UNICEF Joint Monitoring Project, FAO, UNPD, and UNESCO Institute for Statistics

2.11 Conclusion

Kenya's demographic composition could be a blessing, provided the government is able to concretise the preconditions necessary to harness that demographic potential. Population growth and urbanisation rates, while moderate relative to the average rates for sub-Saharan Africa, will continue to place substantial pressure on the government to provide affordable housing, employment and access to basic services. Kenya's fertility rate of four children per woman, while marking a dramatic decrease from the peak of eight children per woman in the 1960s, remains high. Moreover, the country's large and growing youth population will pose a potential risk to social stability and governance if not provided with basic services and employment.

If the Kenyan government is able to implement policies that contribute to lowering fertility rates, job creation and the provision of affordable housing, then the country will be better positioned to benefit from its growing, youthful population. If, however, the government does not provide the requisite conditions for lowering fertility (such as education and family planning), sufficient employment opportunities or affordable housing, then its demographic structure will be more likely to present greater challenges than benefits.

The interventions in Chapter 10 represent a scenario where the government invests in a national family planning initiative.

Chapter 3: Health

3.1   Introduction

The government of Kenya has made impressive gains on a number of health indicators in recent years. From 2008 to 2012 (the time period covered by MTP 1) the country lowered infant mortality to 52 deaths per 1 000 live births (from 77) and under-five mortality to 74 deaths per 1 000 (from 115), and increased immunisation coverage to 83% (from 77%).[62] It also constructed more than 1 500 health facilities and increased the number of clinics providing basic health services from about 6 200 in 2005 to almost 8 500 in 2012.[63]

MTP 2 re-emphasised the commitment of the Ministry of Health to 'deliberately build [a] progressive, responsive and sustainable technologically-driven, evidence-based and client-centered health system for accelerated attainment of the highest standard of health to all Kenyans'.[64] Going forward, the government's plans focus on three broad areas: developing and constructing new health facilities; modernising existing systems, procedures and facilities; and ensuring a more equitable distribution of health services through subsidies.

Yet despite the modern and sophisticated healthcare system aspired to in Vision 2030 and subsequent MTPs, the reality for many Kenyans is quite different.

The communicable disease burden remains high, while non-communicable diseases such as cancer, heart disease and obesity are also becoming increasingly prevalent, a sign that some in the country are doing quite well while others are trapped in a cycle of underdevelopment and poverty. A high prevalence of communicable and non-communicable diseases (i.e. the double burden of disease) can put health systems under enormous strain. Non-communicable diseases are generally more difficult (and costly) to diagnose, treat and manage, and therefore can place significant pressure on health systems still struggling to bring communicable diseases under control.

There are many challenges facing Kenya's health sector. While it will be important to take aggressive strides against communicable diseases by implementing a series of 'vertical' health programmes – those aimed at eliminating a specific disease – it is also critical to develop a 'horizontal' health system that is better adapted to diagnose and treat a wide variety of causes of mortality and morbidity. With improving health outcomes featuring as a key pillar of Vision 2030, the MTP 3 Concept Note and Kenyatta's Big Four initiative, the Kenyan government seems to be taking a broad view of health outcomes by developing a horizontal system that strives to build on the momentum of recent years.

As part of Vision 2030, and in line with some of the health targets of the SDGs, the government aims to achieve the following policy objectives in the health sector:

- Eliminate communicable diseases
- Halt and reverse the burden of non-communicable diseases

---

62   Government of Kenya, Ministry of Health, Sector Plan for Health 2013–2017, 2013, www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/SECTOR%20PLAN%20FOR%20HEALTH%202013-2017.pdf

63   Ibid.

64   Ibid., xi.

- Reduce the burden of violence and injuries
- Provide essential healthcare
- Minimise exposure to health risk factors
- Strengthen collaboration with sector providers

Like many countries in Africa, a core challenge for Kenya will be to manage the pressures of extending traditional or basic health services to rural and underserved communities, while simultaneously modernising its health infrastructure and preparing for the disease burden of the future.

3.2 Mortality distribution

The burden of disease in Kenya is slanted overwhelmingly toward communicable diseases, particularly at younger ages. Figure 3.1 shows the mortality distribution for Kenya in 2015 in terms of communicable diseases, non-communicable diseases and injuries. The communicable disease burden is heaviest in the under-five category, accounting for more than 80% of total deaths in that cohort. Non-communicable diseases increase in prevalence with age, accounting for roughly 60% of fatalities in people over the age of 65 against about 11% in children under five.

Although the country is forecast to transition toward a health system characterised by a high burden of non-communicable disease over time, communicable diseases will likely still be a prominent cause of death in 2030. The Stuck in Traffic scenario suggests that, by 2030, communicable diseases will account for about 72% of deaths in children under five (down from 82% in 2015), while non-communicable diseases will account for about 65% of deaths in people over 65 (up from 60% in 2015). This is in line with a standard epidemiological transition where countries move toward a higher burden of non-communicable diseases as incomes rise.

Figure 3.1: Mortality distribution (thousands) by age, sex and cause of death in Kenya, 2015
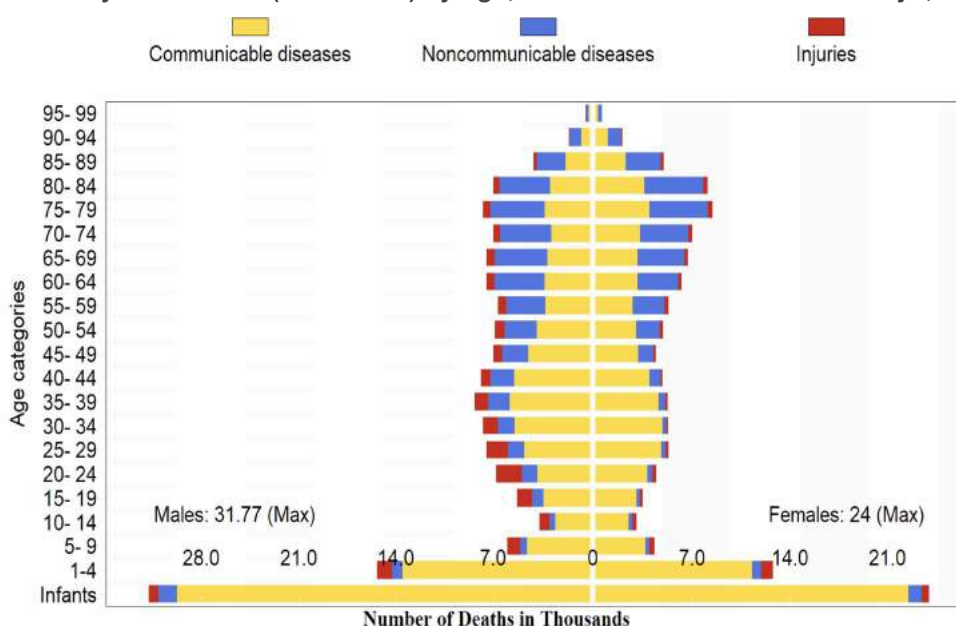
Source: IFs v 7.33 using IHME data

This transition is reflected in figures 3.1 and 3.2, which show absolute number of deaths in thousands in Kenya in 2015 and 2030. These figures illustrate the transition away from communicable diseases and toward non-communicable diseases as the leading cause of death as Kenya becomes more developed. This is in line with global trends, as non-communicable diseases tend to affect people later in life, as well as being strongly associated with higher levels of income. The Stuck in Traffic forecast for the distribution of absolute deaths in 2030 looks quite different than that in 2015, with a noticeable growth in the proportion of deaths from non-communicable diseases, particularly in ages of 45 or over.

Figure 3.2: Mortality distribution (thousands) by age, sex and cause of death in Kenya, 2030
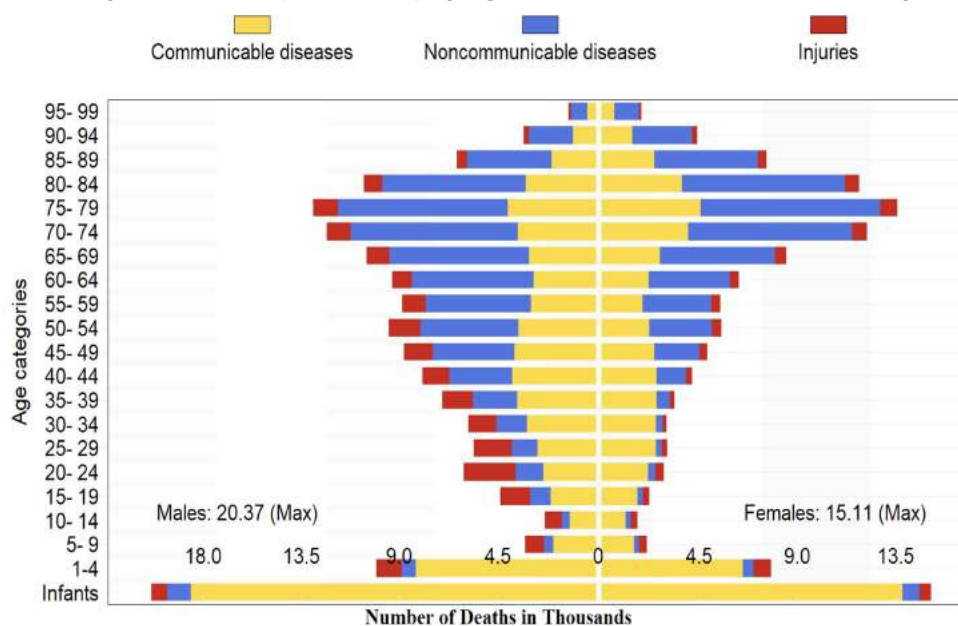
Source: IFs v 7.33 initialised from IHME data

3.3   Specific causes of mortality

IFs uses the International Classification of Disease (ICD) from the WHO to model three broad categories (communicable, non-communicable and injuries) and 15 sub-categories of mortality and morbidity in its health model.[65] The sub-categories include 'other communicable' (e.g. Ebola or dengue fever) and 'other non-communicable' (e.g. asthma or chronic obstructive pulmonary disorder) diseases to capture less prevalent illnesses.[66]

The category 'other communicable diseases' was the leading cause of death in Kenya in 2015, and is forecast to remain so until after 2030, when cancer is forecast to become the leading cause of mortality. Figure 3.3 shows the breakdown of communicable disease deaths by subtype in 2015. Along with the high rates of HIV/AIDS and other communicable diseases, Figure 3.3 highlights the high rates of diarrheal disease across age groups in Kenya. This is likely driven by low levels of access to clean water and improved sanitation facilities. Respiratory infections are also a prevalent cause of death, particularly in very young and very old age cohorts.

By contrast, Figure 3.4 shows death rates from communicable diseases in other lower-middle-income African countries. Figure 3.4 is intentionally distorted, to keep the scale approximate to Figure 3.3 to show how much more likely people in Kenya are to die from a communicable disease in older age groups. It also shows that, while the communicable disease burden in Kenya is relatively high in older age groups, for the under-five category it is relatively low when compared to other lower-middle-income African countries.

In other words, death rates from all types of communicable diseases in Kenya are about 60% lower in the under-five category but nearly 2.5 times as high in the 75+ cohort.

---

65   World Health Organization (WHO), International Classification of Disease, 2016, http://www.who.int/classifications/icd/en/

66   IFs forecasts death by category of cause based on categories obtained from the Global Burden of Disease Project (GBD) at the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. See IHME, http://www.healthdata.org/ For more information, see B Hughes et al., *Patterns of potential human volume 3: improving global health*, Frederick S Pardee Center for International Studies, 2011, www.pardee.du.edu/patterns-potential-human-progress

Figure 3.3: Mortality distribution (deaths per thousand) by age, sex and type of communicable disease in Kenya, 2015
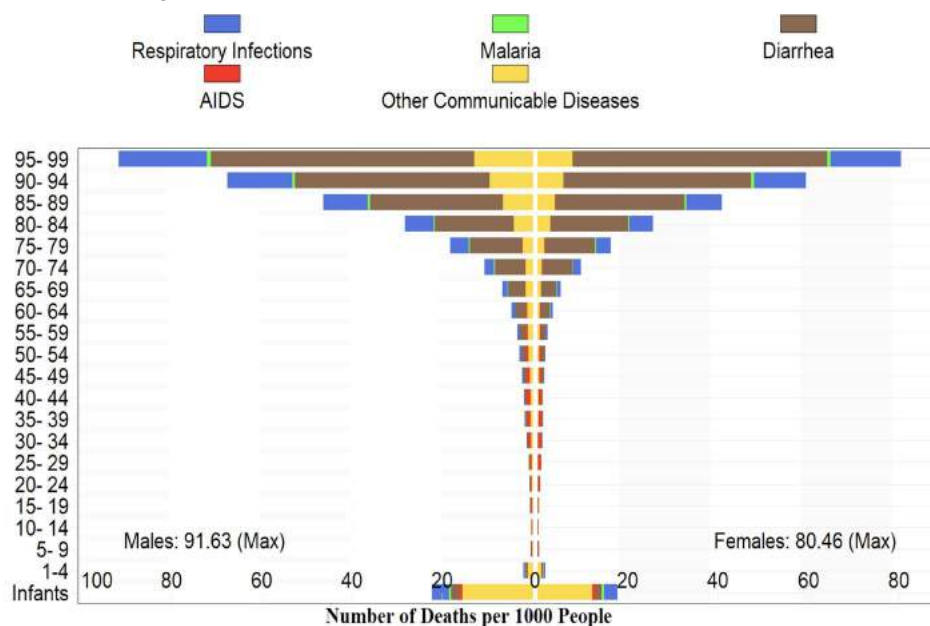
Source: IFs v 7.33 using IHME data

However, there are some obvious areas for improvement in Kenya's health system. One area where it does seem more vulnerable than other lower-middle-income countries in Africa is with respect to diarrheal disease. Death rates from diarrheal disease are nearly twice as high in Kenya as in other lower-middle-income African countries and forecast to remain higher through 2040. This is likely driven by the below-average levels of access to clean water and improved sanitation facilities, relative to other lower-middle-income African countries. The other disease that affects Kenya more heavily than other lower-middle-income countries is HIV/AIDS, although the gap is less severe than with diarrheal diseases.
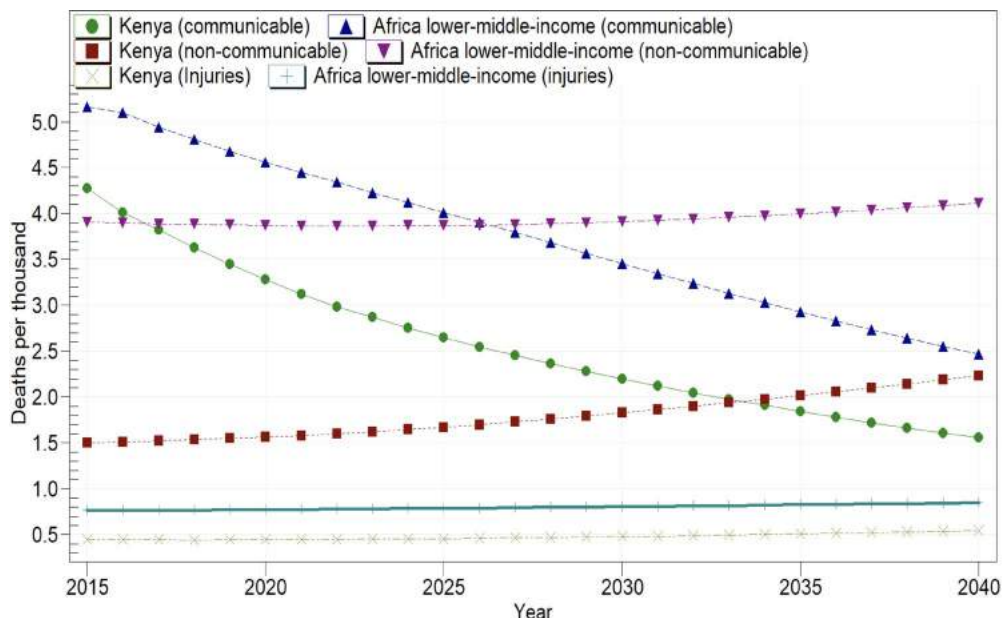
Figure 3.4: Mortality distribution (deaths per thousand) by age, sex and type of communicable disease in other lower-middle-income African countries, 2015
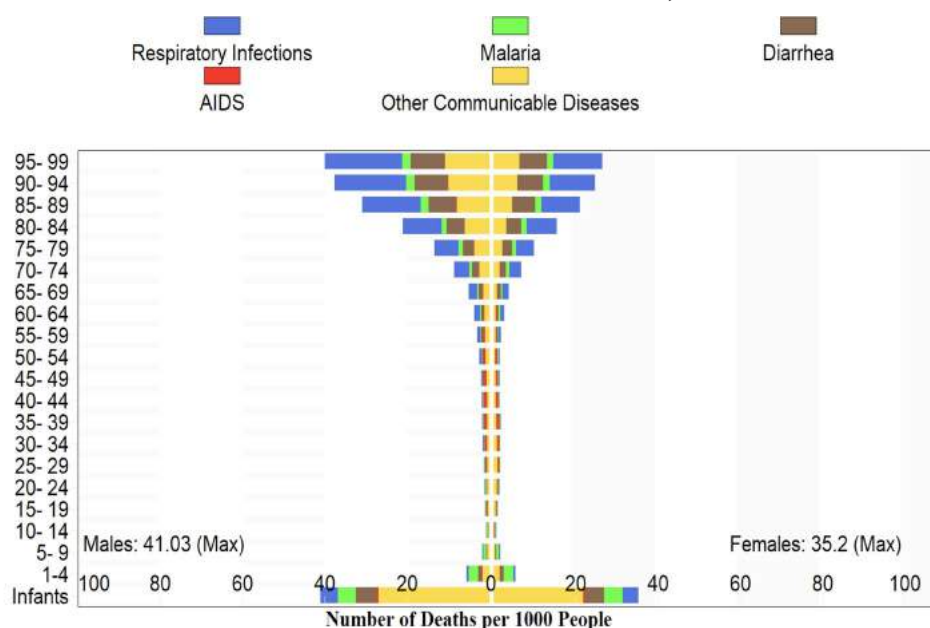
Source: IFs v 7.33 using IHME data

Figure 3.5 shows death rates by main disease subtype, as categorised by the ICD.[67] In Kenya, communicable diseases accounted for about one fewer death per 1 000 residents than in other lower-middle-income African countries in 2015. Kenya is also forecast to continue to have lower death rates from communicable diseases until 2040. Impressively, non-communicable diseases are also lower in Kenya today – significantly so – and forecast to remain so through 2040, although they do begin to increase more rapidly toward the end of the forecast.
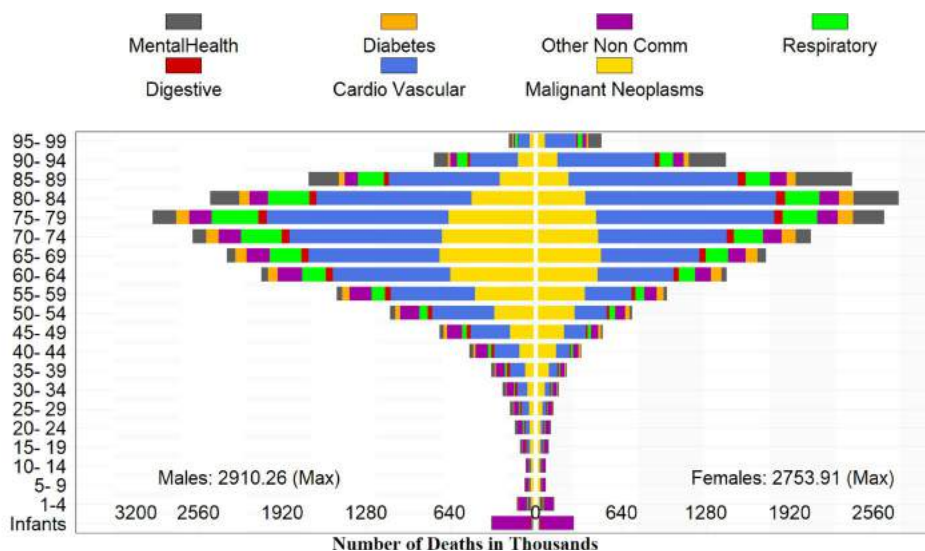
Figure 3.5: Causes of death by main ICD subtype in Kenya and other lower-middle-income African countries

Source: IFs v 7.33 initialised from IHME data

Figure 3.6 shows non-communicable disease by subtype, and clearly illustrates the high rates of cardiovascular disease and cancer (i.e. malignant neoplasms) in adults over the age of 65 in Kenya in 2015.

Figure 3.6: Mortality distribution from non-communicable disease subtypes in Kenya, 2015

Source: IFs v 7.33 initialised from IHME data

---

67   WHO, International statistical classification of diseases and related health problems, 10th revision, 2016, http://www.who.int/classifications/icd/en/

Kenya and other lower-middle-income African countries have a similar non-communicable disease burden. However, people in other lower-middle-income countries are much more likely to succumb to a non-communicable disease, across all age cohorts, than people living in Kenya. This is unsurprising, as Kenya is just above the income threshold for lower-middle-income countries, and therefore earlier in its transition away from communicable diseases as the primary cause of death and disease.[68]

In the Stuck in Traffic scenario it appears highly unlikely that Kenya will be able to eliminate deaths from communicable diseases by 2030, as set out in Vision 2030. By the end of the SDG period, diarrheal disease and other communicable diseases are forecast to remain the second and third leading causes of death in Kenya, respectively. Nevertheless, the country is forecast to make meaningful improvements on some of the major diseases identified by the SDGs. HIV/AIDS is forecast to fall from the second leading cause of death in the country today to the fifth by 2030. Malaria deaths are also forecast to fall by roughly 75% from 2015 levels by 2030, going from the ninth leading cause of death to the least deadly of the 15 categories.[69]

Conversely, non-communicable diseases are forecast to increase in prevalence, with cardiovascular disease expected to become the leading cause of mortality in 2040. The SDG target for non-communicable diseases (target 3.4) is to reduce premature deaths from non-communicable diseases by one-third.[70] In the Stuck in Traffic scenario, death rates from non-communicable diseases are forecast to increase by more than 70% in the 40–70 cohort. Although this is in line with expectations for countries at Kenya's level of development, it does suggest that it will fall short of both the SDG targets and the second target of Vision 2030.

Apart from high rates of diarrheal disease and HIV/AIDS deaths relative to other lower-middle-income African countries, Kenya has lower death rates across the other 13 sub-categories of mortality and morbidity captured in IFs. This is quite remarkable for a country at the low end of an income threshold and is an aspect of development that the Kenyan government ought to seek to leverage going forward.

3.3.1 Violence and injuries

Another health-related goal of Vision 2030 is to reduce the burden of violence and injuries on Kenya's health system. The Sector Plan for Health (2013–2017) estimates that traffic accidents alone may account for between 50% and 70% of hospital occupancy nationwide.[71] However, the Stuck in Traffic forecast from IFs suggests that death rates from accidents, injuries and intentional injuries are already lower in Kenya than in other lower-middle-income countries around the world and in Africa, and forecast to remain lower until 2040.

68 B Hughes et al., *Patterns of potential human progress volume 3: improving global health*, Frederick S Pardee Center for International Studies, 2011, www.pardee.du.edu/patterns-potential-human-progress

69 Other communicable disease deaths also decline significantly, falling from the leading cause of death in 2015 to the third by 2040 in the Current Path forecast.

70 Premature mortality refers to any death that occurs before the age of 70.

71 Government of Kenya, Ministry of Health, Sector Plan for Health 2013–2017, 2013, www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/SECTOR%20PLAN%20FOR%20HEALTH%202013-2017.pdf

Figure 3.7: Death rates from accidents, injuries and intentional injuries in Kenya and other lower-middle-income countries in Africa and globally
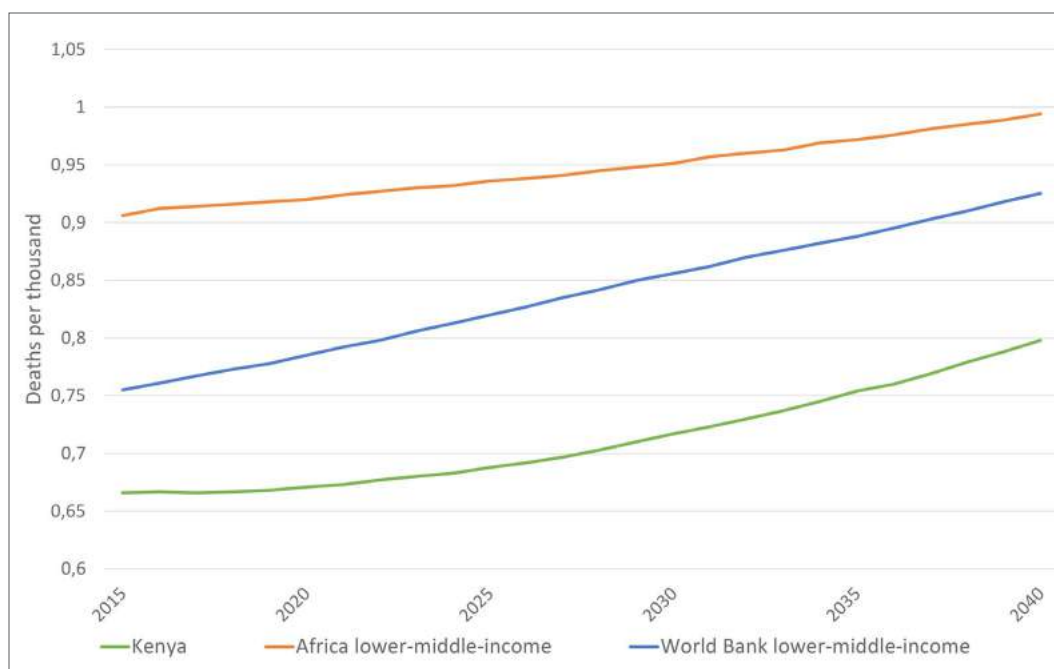
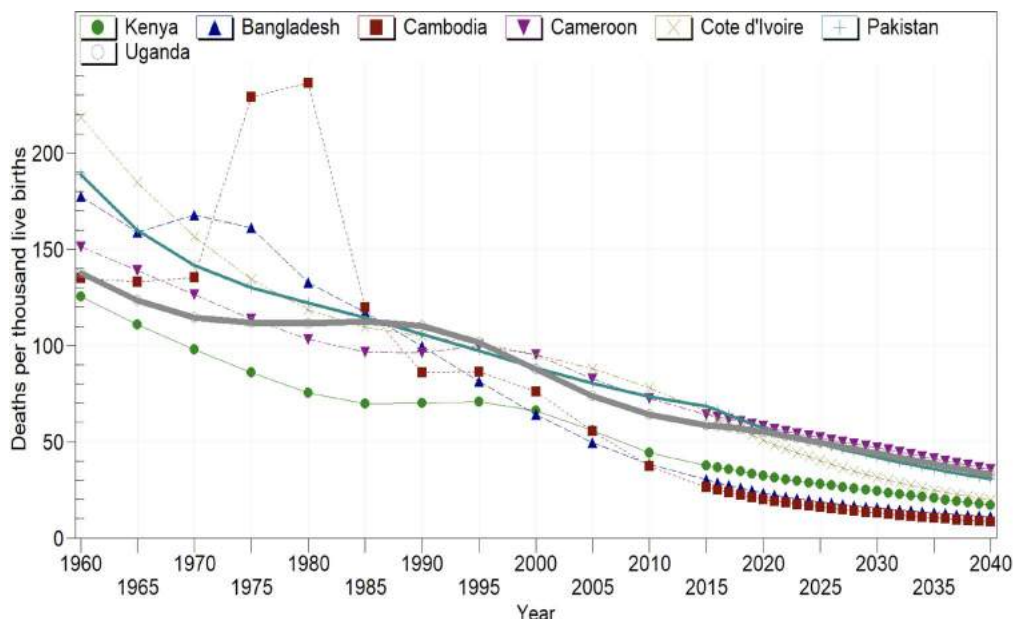Source: IFs v 7.33 initialised from IHME data

3.4 Health outcomes

As the previous sections have shown, Kenya's health sector performs relatively well when compared to other countries in Africa and the world at similar levels of income. If anything, Kenya performs better than expected across a number of causes of mortality, and therefore tends to perform better on other health outcomes as well.

Relative to the group of comparison countries, Kenya has historically had very low infant mortality rates, although Bangladesh and Cambodia experienced steeper declines beginning in the mid-1990s. Infant mortality rates are still significantly lower in Kenya (38 deaths per 1 000 live births) than in Cameroon (64), Côte d'Ivoire (65) or Uganda (58), i.e. other African countries in the group. In 2015 infant mortality rates in Kenya were also more than 12 deaths per 1 000 live births lower than in other lower-middle-income African countries.

Kenya has also been a relatively strong performer on childhood undernutrition, attaining around the average for lower-middle-income African countries before making a fairly aggressive decline beginning in 2005. By 2015 childhood undernutrition rates were about 8 percentage points lower in Kenya than the average for other lower-middle-income African countries.

In the Stuck in Traffic scenario, Kenya is forecast to decrease childhood undernutrition from about 10% of children in 2015 to about 6% in 2040, roughly 2.5 percentage points below the average for other lower-middle-income African countries. However, the Stuck in Traffic scenario also suggests that childhood undernutrition rates in Kenya will remain more than double those in upper-middle-income countries around the world in 2040, 10 years after Kenya's goal of achieving upper-middle-income status.

Figure 3.8: Infant mortality rates in Kenya and comparison countries

Figure 3.9: Childhood undernutrition rates using a five-year moving average
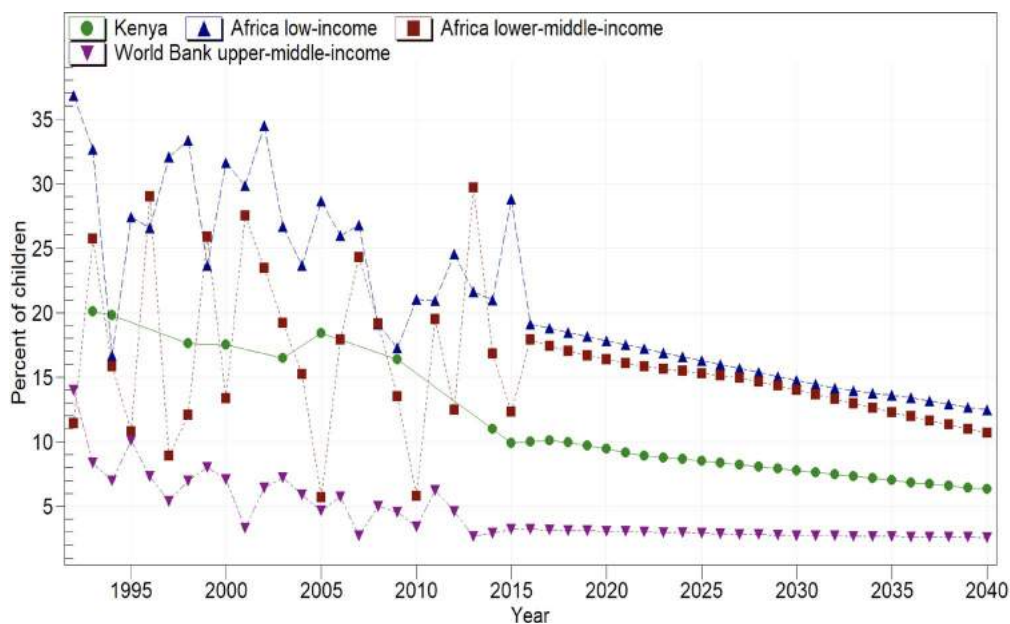
That Kenya has a relatively smaller proportion of undernourished children pays dividends for the country. Because undernourishment (and malnourishment more broadly) can lead to stunting, the low levels of undernourishment in the country improve the contribution of human capital to total productivity in Kenya, relative to its peer countries.[72]

Figure 3.10 provides a forecast of stunting rates in Kenya, low-income African countries and other lower-middle-income African countries until 2040, and shows that stunting rates are significantly lower in Kenya than in other African countries.

---

72   For more detail on how multifactor productivity is conceptualized in IFs, see the economy section of this publication or B Hughes, IFs economics documentation v21, Frederick S Pardee Center for International Studies February 2014, 28, http://pardee.du.edu/ifs-economic-model-documentation

Figure 3.10: Stunting rates in Kenya, low-income and other lower-middle-income countries in Africa
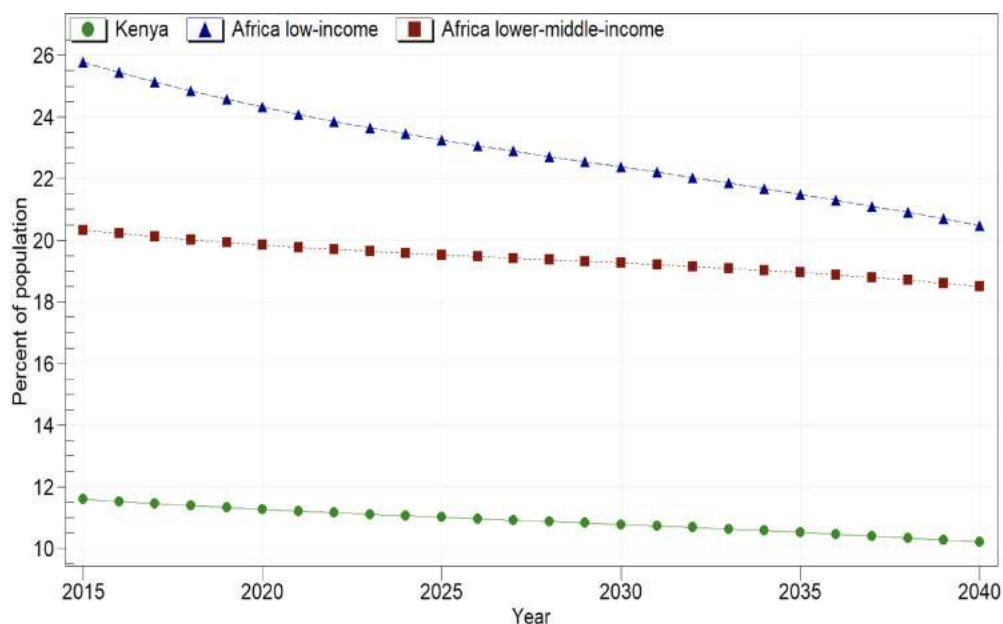
Source: IFs v 7.33 initialised from IHME data

While stunting is generally understood in terms of its physiological impacts on people (measured by a height-for-age ratio that is more than two standard deviations below average), it also has serious effects on cognitive development. Impaired cognitive development can hinder educational attainment and reduce the long-term economic productivity of affected individuals. Moreover, stunting is a permanent condition, so individuals who are stunted as children do not fully develop either physically or mentally.

Figure 3.11: Contribution of human capital to GDP growth in Kenya, low-income and other lower-middle-income countries in Africa
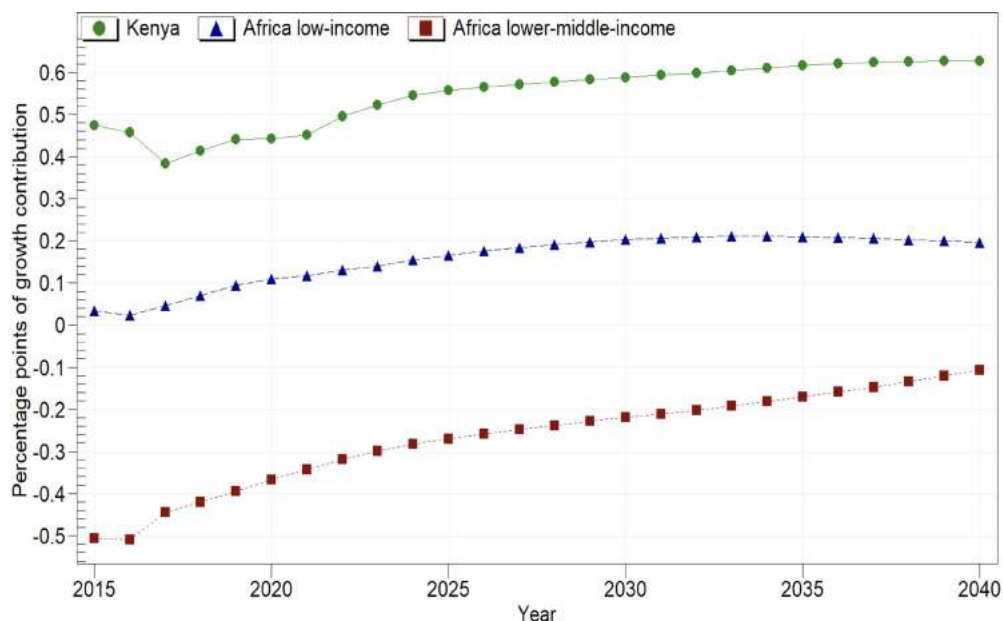
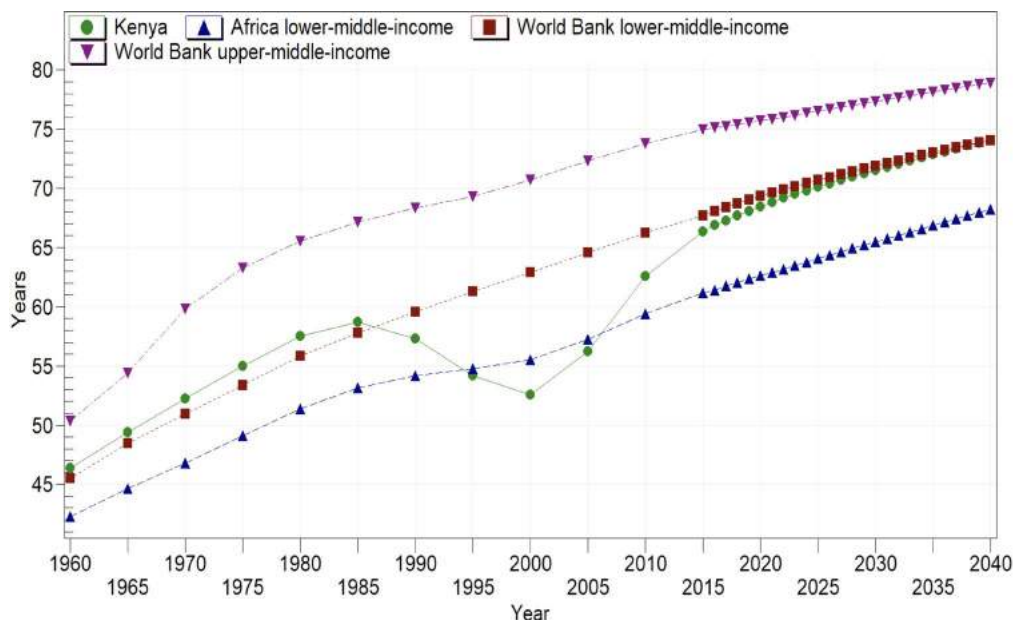Source: IFs v 7.33

A result of these favourable outcomes is that life expectancy at birth in Kenya is significantly higher (more than five years) than in other lower-middle-income African countries, although it is a bit lower (more than one year) than other lower-middle-income countries globally. Life expectancy in Kenya is roughly nine years lower than in upper-middle-income countries globally.

This gap between life expectancy in Africa and elsewhere reflects the tremendous impact of communicable diseases, particularly HIV/AIDS, on the continent. In 2015 about 90% of the world's malaria deaths and more than 75% of HIV/AIDS deaths occurred in Africa. The communicable diseases burden is not limited to HIV/AIDS though, as nearly 50% of infectious disease deaths worldwide occur in Africa. For context, Africa had about 16% of the world's population in 2015.

Figure 3.12: Life expectancy in Kenya, lower-middle-income countries in Africa and globally and World Bank upper-middle-income countries

Source: IFs v 7.33 initialised from WHO data

From the late 1980s until around 2005, the height of the HIV/AIDS crisis, life expectancy decreased significantly in many African countries, including Kenya, and many countries are still recovering. Such a phenomenal drop in life expectancy is typically only seen in countries experiencing extremely violent conflict, such as Rwanda or Cambodia, or that were disproportionately affected by the HIV/AIDS crisis, such as South Africa or Botswana. While it is nearly impossible to overemphasise the impact of HIV/AIDS, Africa's communicable disease burden is more complex than just one disease, and health systems on the continent need to simultaneously address that immediate challenge while preparing for other causes of death that are already a reality in many countries.

3.5 Health finance

Figure 3.13 shows public health spending (as a percentage of GDP) in Kenya and other lower-middle-income African countries over time. Because the country performs better than many of its peers on health outcomes, it is unsurprising that Kenya has historically spent relatively more on its health system compared to those countries.

Between 1991 and 2015 the Kenyan government spent, on average, a slightly larger proportion of its GDP (2.2%) on health than either low-income (2.1%) or other lower-middle-income African countries (1.6%). This higher public health spending has surely contributed to Kenya's lower rates of infant mortality, childhood undernutrition and stunting, and its higher life expectancy, relative to other African peer countries.

What is also clear from Figure 3.13 is that there has been a significant increase in public health spending in Kenya since 2010. Beginning that year, Kenya increased public spending on health by nearly 2 percentage points in just three years. This increase demonstrates the Kenyan government's commitment to the goal of providing essential healthcare to all; a key goal of Vision 2030 and the Big Four agenda, and its recognition that improving health outcomes is an important step in improving livelihoods and reducing poverty.

However, there are trade-offs inherent in this decision. As Kenya already performs relatively well on health outcomes, this may be drawing money from other development priorities.

Figure 3.13: Public health spending in Kenya, low-income and other lower-middle-income countries in Africa
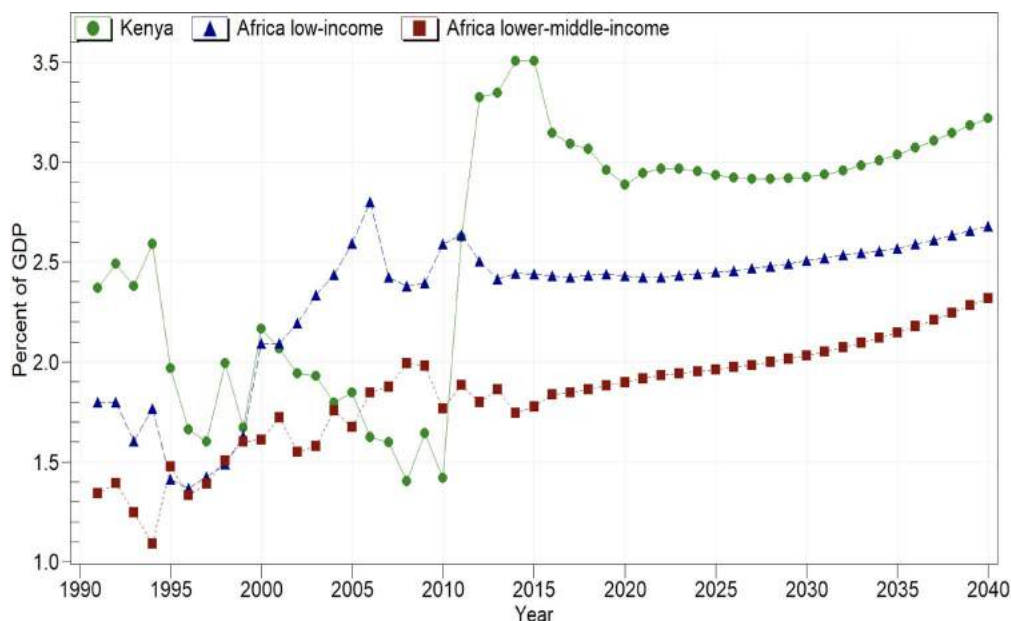
Source: IFs v 7.33 initialised from WHO data

This above-average public spending on health has also enabled the country to keep private health expenditure below that in countries in comparison groups, as shown in Figure 3.14. Furthermore, as a key component of Kenya's inclusive growth strategy is higher consumer spending, keeping private health expenditure low could also help achieve economic goals by increasing disposable income without sacrificing anything in terms of human capital formation.

Figure 3.14: Private health spending in Kenya, low-income and other lower-middle-income countries in Africa
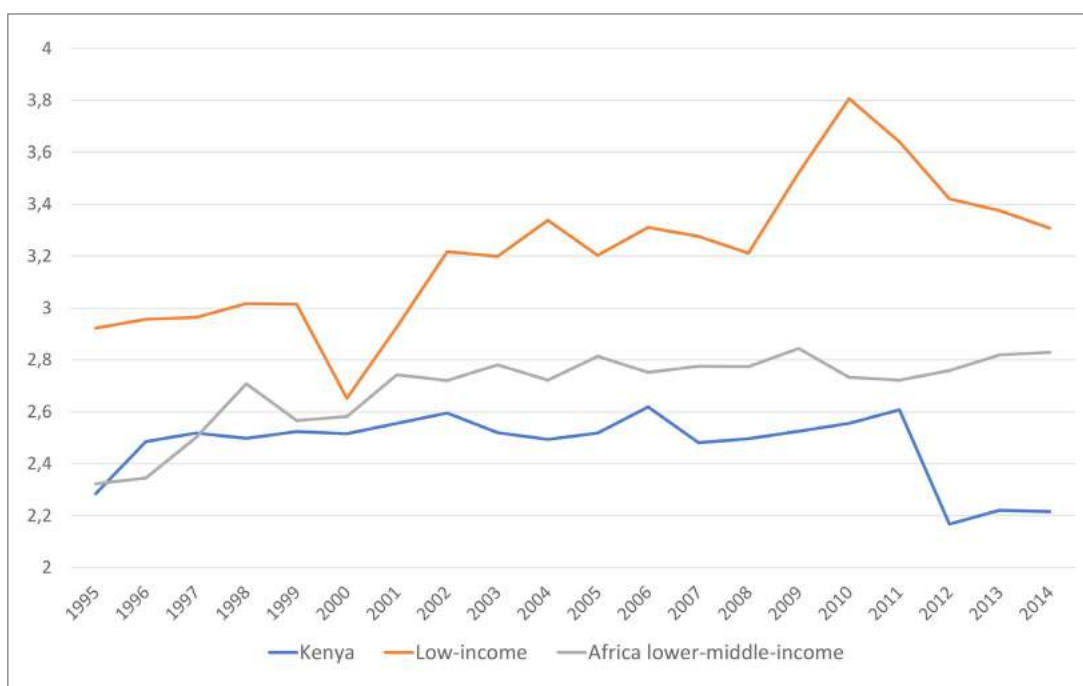


Source: World Bank (using WHO data)

Between 2010 and 2014 private health spending declined by nearly half a percentage point of GDP, and is forecast to decline further to around 1.8% of GDP by 2040.

3.6   Health and the MTP

While most of the country's health goals are more qualitative in nature (e.g. the 'strengthen Kenya Medical Supplies Agency [KEMSA]' goal has the target of the 'effective supply of drugs through an efficient KEMSA') and not well suited to quantitative evaluation, there are some concrete targets. As part of the government's goal to implement an environmentally friendly hygiene policy, the country aims to increase access to improved sanitation facilities to roughly 66% of the population by 2022. However, the Stuck in Traffic scenario indicates that the country will still be below 40% in 2022 and will only reach about 52% by 2040. Moreover, Kenya has failed to make significant progress in improving the percentage of people with access to an improved sanitation facility in the country and has actually lost ground relative to its position in 1990.

In 2000 more than 31% of people in Kenya had access to an improved sanitation facility. By 2015 this had declined to less than 30%. This occurred despite the country's installing around 700 000 new connections over that time period, and underscores the pressure that population growth places on service delivery. In the Stuck in Traffic scenario, Kenya (56%) is projected to continue to have access rates to improved sanitation facilities below its lower-middle-income peers in Africa (63%) and globally (86%) in 2040.

Figure 3.15: Access rates to improved sanitation facilities in Kenya, low-income African countries and other lower-middle-income countries in Africa and the world
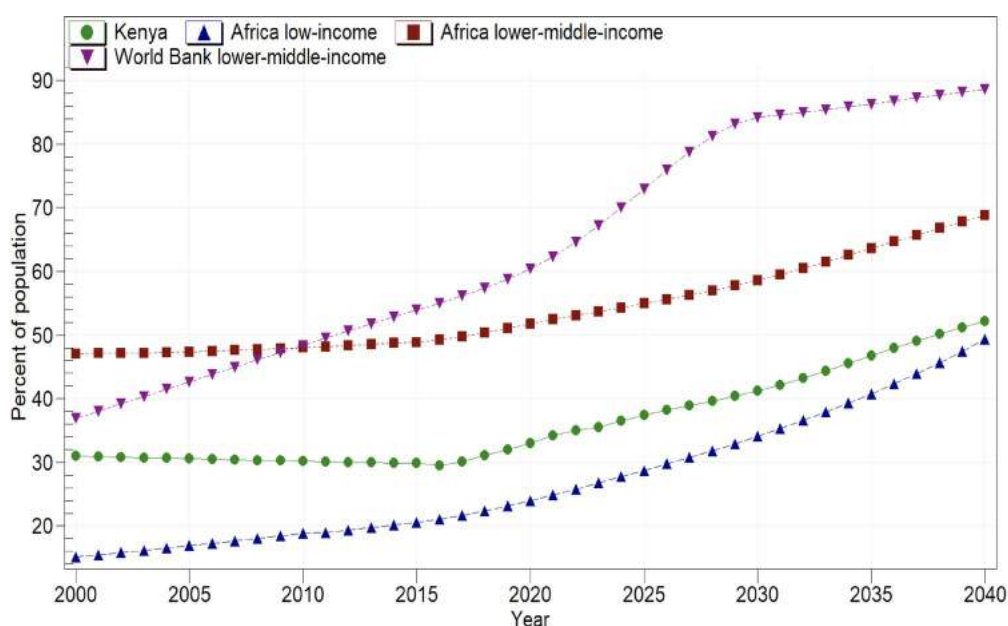
Source: IFs v 7.33 initialised from WHO/UNICEF data

Along with a hard target on sanitation facilities, the government also has an extensive list of planned health infrastructure projects.[73] It intends to rehabilitate 53 hospitals (nine of which have been completed) across the country's eight provinces. Only two of these projects are in Nairobi (and three in the Coast Province, home to Mombasa), indicating that the government is keen to reach underserved communities outside the major metropolitan areas.

In the same vein, elements of the country's broader devolution strategy are evident in planning for the health sector. There are a number of goals that specifically aim to devolve decision-making and other functions of governance, including funding, to the county level.

---

73   Government of Kenya, Vision 2030, Social pillar, http://www.vision2030.go.ke/pillars/

Of the 13 flagship projects in the health sector of the social pillar of Vision 2030, at least eight have some element of devolution to them. One of the goals is to explicitly decouple service delivery from the Ministry of Health, while others are targeted specifically at rural and underserved communities located far outside Nairobi.[74]

3.7   Conclusion

The government of Kenya has been relatively effective at improving health outcomes in recent years relative to other lower-middle-income African countries. The country has lower death rates from both communicable and non-communicable diseases than its income peers, at least in younger age cohorts. The high death rates from diarrheal disease remain a concern, but could likely be addressed largely through more inclusive access to clean water and improved sanitation facilities.

As Kenya continues to improve livelihoods and as incomes increase, the burden of disease continues to shift toward non-communicable diseases throughout the forecast. Nonetheless, communicable diseases, especially diarrheal disease, will remain a major concern going forward. Furthermore, Kenya must not take its foot off the gas with respect to combatting HIV/AIDS. The Kenya AIDS Strategic Framework (KASF) is a good example of what a successful policy in the health sector can accomplish.[75]

As non-communicable diseases become more prevalent, the Stuck in Traffic forecast suggests that cardiovascular disease will become the most prominent causes of death by 2040. To manage the high levels of communicable and non-communicable diseases, Kenya needs to invest in a horizontal health system capable of addressing the double burden of disease. Kenya's health sector has an advantage over those of other lower-middle-income countries in Africa, and its favourable health (and education) outcomes should be preserved while pursuing targeted investments in infrastructure to maximise human and economic development in the country.

The interventions in Chapter 10 focus on maintaining the progress Kenya has made while targeting slight reductions in child and maternal mortality.

---

74   Among the goals aimed at decentralising healthcare are rehabilitate health facilities, develop human resource strategy, de-link Ministry of Health from service delivery, promote community-based information systems, channel funds directly to health facilities, restructure Ministry of Health, and fast-track implementation of the community strategy by training community health workers.

75   Government of Kenya, Ministry of Health, Kenya AIDS response progress report 2016, 2016.

Chapter 4: Education

4.1 Introduction

Vision 2030 outlines three broad areas of focus as the framework for its development agenda, namely the economic, social and political pillars. Education and training is one of the sectors under the social pillar, with six flagship projects generally aimed at investing in and improving the well-being of Kenyans 'by targeting a cross-section of human and social welfare projects'.[76] Beyond the goals and targets outlined in Vision 2030, the government also has a number of additional long-term plans specific to the education sector.

The National Education Sector Plan (NESP) 2013–2018 is the government's current five-year plan for reforming the education sector and aims to reduce illiteracy, increase access to education facilities, improve transition rates at all levels and ensure quality and relevance of learning in Kenyan schools.[77]

The education system in Kenya has been structured under the 8-4-4 education model for over 30 years. Learning at the primary school level takes eight years, followed by four years of secondary schooling and thereafter four years of study for a first degree at the tertiary level. Free universal access to primary education was introduced in 2003 and this led to an increase of just over 1.3 million students enrolled in primary education by 2009. Additionally, free secondary education was instituted in 2008. The Stuck in Traffic forecast is that Kenya is expected to increase the absolute number of students enrolled in secondary school by roughly 39% from 2009 levels, which should have translated to almost 660 000 additional students by 2017.

A new curriculum – 2-6-6-3 – was to be rolled out in January 2018 and piloted in 470 schools (pre-school and lower primary) across the country. The new education platform proposes two broad levels of primary education, pre-primary and primary, with primary divided into two tiers. The new system consists of two years in pre-primary, three years in lower primary and three years in upper primary, for a total of eight years. Students then advance to secondary education, which also has two tiers – three years in junior secondary and another three years in senior school. In senior school, students specialise in their areas of interest in preparation for either vocational or three-year tertiary education and training.[78]

The new education system therefore proposes a total of 17 years of education and incorporates a pre-primary level of education in the structure, which is a departure from the old 8-4-4 system of 16 years of formal schooling that excluded the two years of pre-primary education.[79]

Overall, the proposed new curriculum has been received well, but critics such as the Kenya National Union of Teachers (KNUT) oppose the proposed implementation timeline and prefer that the new curriculum be

---

76   Government of Kenya, Vision 2030, 2007, http://www.fao.org/fileadmin/user

77   Government of Kenya, Ministry of Education Science and Technology, National Education Sector Plan March 2014, https://www.globalpartnership.org/content/education-sector-plan-2013-2018-kenya

78   *Kenya Yote*, Breakdown of Kenya's new 2-6-6-3 education curriculum framework: subject taught, 17 April 2017, http://kenyayote.com/breakdown-kenyas-new-2-6-6-3-education-curriculum-framework-subject

79   Chalkboard, The Kenyan education system, http://chalkboardkenya.org/chalkboard-kenya-programme/the-kenyan-programme/

rolled out in 2019. They cite the need for more time to develop the curriculum, engage and train teachers on the new curriculum and expand learning facilities if this new education platform is to succeed.[80]

Data from past budgets indicates that education has historically received a large portion of annual allocations. This is expected to increase further amid a recent surge in public debt. This means that Kenya's GDP will have to grow rapidly to accommodate the expected rise in education allocations. The pilot project is currently estimated at US$168 million before scaling up – a process that would increase costs by requiring the procurement of additional materials, learning facilities and the training of teachers.[81]

Analysis in this section will be done according to IFs definitions of levels of education, which follow the UNESCO Institute for Statistics (UIS) classification of primary school.[82] In this case, when talking about primary school, we will be referring to Class 1–8. Lower secondary consists of Forms 1–2 and upper secondary Forms 3–4.[83]

4.2   Attainment by level and gender

The average years of education in a population can serve as a rough estimate of the level of accumulated knowledge within that community. Kenya has historically performed well and made gains across a number of different measures of education outcomes (i.e. relatively high enrolment and completion rates, as well as the mean years of education for its adult population considering its level of development). However, the country experienced a decline in the average years of education in its adult population (over the age of 15) between 2005 and 2015. This decline may, among other factors, be attributed to the relatively low access to sanitation and its effect on female education, persistent droughts that have left millions of people food insecure and caused a rise in dropout rates, an influx of refugees with fewer years of formal education and the big push for infrastructure development. While developing other sectors is also important, policymakers must think of ways to successfully improve these sectors while sustaining the gains already made in education.

The number of average years of education in Kenya has increased significantly since independence. In 1965 Kenyans had, on average, about 1.7 years of education per adult (over the age of 15), but by 2015 that figure had grown to more than six years per adult. In 2015 the average Kenyan over the age of 15 had about 6.1 years of formal education, which made Kenya 24th (out of 54 countries) in Africa and 140th (out of 186 countries) in the world. The literacy rate in Kenya in 2015 stood at just about 80%, which is almost 14 percentage points more than in its continental peers and other lower-middle-income African countries, although it is still 141st globally.

While about 52% of adults (15+ years) had completed primary education in 2015, only about 25% had completed secondary school. The population pyramid in Figure 4.1 shows the level of educational attainment by age–sex cohort in Kenya in 2015 (most recent data). In that year, about 5.1 million males and 5.2 million females over the age of 15 had either no formal education or incomplete primary education. This represents almost 38% of the population aged 15 and over.

About 8.6 million adult males and 8.5 million adult females had completed primary education in 2015, which represents about 63% of the total adult population over the age of 15. Approximately 86% (about 4.2 million pupils) of the population between the ages of 15 and 19 had completed primary education. The significantly higher educational attainment in the younger cohorts points to the success of universal access

---

80   G Kajilwa, Kenya National Union of Teachers: let new curriculum start in 2019, *The Standard,* 1 February 2017, https://www. standardmedia.co.ke/article/2001227900/kenya

81   P Wafula, The economics behind Kenya's 2-6-6-3 education system, *The Standard,* 5 April 2016, https://www.standardmedia. co.ke/business/article

82   IFs uses the UIS International Standard Classification of Education (ISCE) codes. See UN Education, Scientific and Cultural Organization (UNESCO), International Standard Classification of Education: ISCED 2011, http://uis.unesco.org/sites/default/files/ documents/international-standard-classification-of-education-isced-2011-en.pdf

83   Grades 9–10 and 11–12 are commonly referred to as Forms 1–2 and 3–4 respectively, in Kenya.

initiatives in recent years, and may portend the reversal of the recent decline in average education years in the adult population.

Figure 4.1: Kenya: educational attainment by age–sex cohort (in millions)
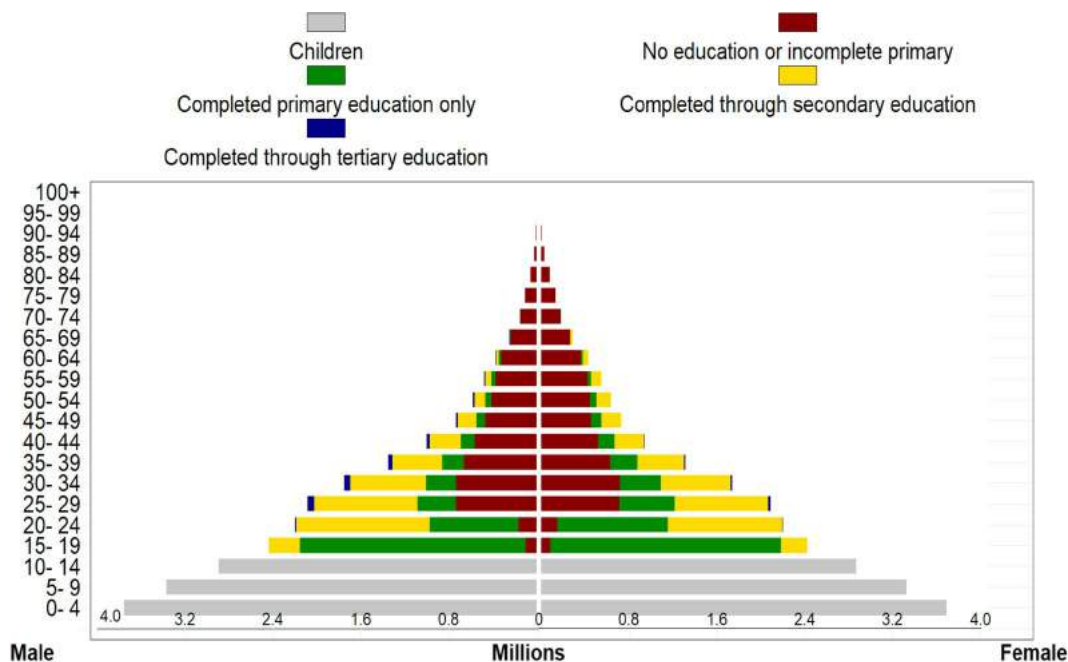
Source: IFs version 7.33, historical data from Barro-Lee

In contrast, only 4.5 million adult males and 3.9 million adult females completed secondary school in 2015, representing roughly 30% of the total adult population over the age of 15. This points to the significant time horizon necessary to improve average years of education. A much smaller percentage (10.8%) of students within the 15–19 age range had completed secondary education. In total, this was about 520 000 students. Alternatively, only about 252 900 adult males and 57 400 adult females had completed tertiary education by 2015. This represents only 1.1% of the population aged 15 and above and indicates a comparatively larger gender gap at higher levels of education.

Although the Kenyan government introduced free secondary education to public schools in 2008 (shortly before national elections) to encourage higher transitions to and enrolment in secondary education, the programme has faced a myriad of challenges.

For one, secondary schools are overstretched owing to the high enrolment rates caused by the policy of universal primary education, and the subsequent flow of pupils completing primary school. Because of this recent influx of students, facilities in secondary schools cannot accommodate the number of students now entering.[84] Furthermore, parents are still responsible for boarding and other miscellaneous costs associated with secondary education. While the relief from tuition fees helps, it is not enough, and a large portion of the population cannot meet these additional costs.[85]

Additionally, teacher absenteeism is a perennial problem. In 2015 the Global Monitoring Report estimated a 20% teacher absenteeism rate in Kenyan schools. According to the Global Corruption report on education by Transparency International, this is a slight improvement, based on a survey conducted between 2004 and 2011 that estimated teacher absenteeism in Kenya to be about 30% – the highest of any African country in the study.[86] The main reasons cited for teacher absenteeism included illness, official business

---

84   A Shiundu, Factsheet: Cost of providing 'truly' free secondary education in Kenya, Africa Check, 18 June 2017, https://africacheck.org/factsheets/factsheet-cost-providing-free-secondary

85   Ibid.

86   AH Patrinos, The hidden cost of corruption: teacher absenteeism and loss in schools, World Bank Blogs, 1 October 2013, http://blogs.worldbank.org/education/hidden-cost-corruption-teacher-absenteeism-and-loss-schools

and other personal issues.[87] Teachers play a significant role in facilitating education outcomes and reversing this trend needs to be a priority.

Teacher absenteeism is classified into three categories: teachers absent from school; teachers on school premises but absent from class; and teachers in class but not teaching. According to the World Bank's Service Delivery Indicators (SDI) of 2013 for Kenya, on average 15.5% of teachers were absent from school, while 42.2% were absent from the classroom. Only 2 hours and 40 minutes of teaching time, out of the 5 hours scheduled (on average) per day, were completed.

To optimise the learning experience, the Teacher Service Commission (TSC) has instituted strict rules. Teachers have to obtain written permission to be absent from duty, among other measures, including attending union meetings and conferences on the weekends. Nonetheless, the TSC must improve its supervisory role to ensure compliance with these rules.[88]

The Kenyan government hopes to alleviate the plight of schools and improve enrolment rates by devolving much of the responsibility to local government (counties), in line with the broader trend of locating service delivery closer to the point of use. County education boards monitor education and training and initiate proposals for policy reforms at the county level on behalf of the national government.[89] The implementation of this strategy is, however, premised on the timely release of funds to schools, provision of more education facilities such as classrooms and learning supplies, and an improvement in the teacher–learner ratio by recruiting more trained teachers to public schools.[90]

Pre-primary education was not formally recognised in the 8-4-4 system, but will be incorporated into the new education system that should fall within the purview of county governments. Universities are still managed by the national government through the Commission for University Education (CUE), whose mandate includes monitoring and evaluating university objectives in relation to national goals and providing advice on tertiary education policy.[91]

4.3   Progress through the system

Growing the overall stock of education in a population requires efforts to expand access, ensure that pupils remain in school and improve the quality of education, more or less simultaneously. Exploring the 'flow' through the education system can help identify bottlenecks that are inhibiting better education outcomes, and can provide leverage points policymakers can exploit to foster a better educated population and more productive workforce over the long run.

IFs conceptualises education as a structured pipeline consisting of consecutive segments. The idea is to move as many students as possible through each section in the pipeline in a deliberate manner while equipping pupils with the academic and social skills necessary to become productive members of society.

Each successive level in the education pipeline is vital to ensure that students receive the appropriate level of education. Transition from one education level to the next, from primary through secondary and finally to the tertiary level, is critical to achieving economic prosperity. In Kenya, much progress has been made at the primary level but, as Table 4.1 indicates, a clear bottleneck exists between lower and upper secondary

87   Ngware, Teacher absenteeism: the hidden facts, *Daily Nation*, 17 April 2015, https://www.nation.co.ke/oped/opinion/Teacher-absenteeism-The-hidden-facts/440808-2689214-8jwx7qz/index.html

88   *The Standard*, Enforce rules to curb teacher absenteeism, 4 February 2017, https://www.standardmedia.co.ke/article/2001228157/enforce-rules-to-curb-teacher-absenteeism

89   JT Kaimenye, Reforms in the education sector in Kenya, Public Lecture at Kenyatta University, 24 February 2015, http://education.go.ke/images/cs_speeches/Education%20Reforms%20in%20Kenya.pdf

90   JM Khamati and WJ Nyongesa, Factors influencing the implementing of free secondary education in Mumias District in Kenya, *Journal of Social Science for Policy Implications*, 1:1, June 2013.

91   JT Kaimenye, Reforms in the education sector in Kenya, Public Lecture at Kenyatta University, 24 February 2015, http://education.go.ke/images/cs_speeches/Education%20Reforms%20in%20Kenya.pdf

school, which impedes further educational attainment. There is an additional (smaller) bottleneck in upper secondary completion as well.

Table 4.1: Education flow rates in Kenya (most recent data)

	Primary		Lower secondary		Upper secondary		Tertiary	
	Enrol (gross)	Completion	Enrol (gross)	Transition	Enrol (gross)	Completion	Enrol (gross)	Completion
Kenya	109.0	108.5	97.5	73.6	44.1	19.8	4.0	3.4
Peer group	105.9	68.2	67.9	83.4	40.7	23.5	10.7	3.0
Other lower-middle-income Africa	109.3	76.7	80.3	87.3	41.4	23.5	24.9	4.0
Africa	104.7	62.3	60.4	84.0	26.2	19.9	22.7	2.5

Source: IFs version 7.33, historical data from UIS

In order to boost secondary completion and tertiary enrolment figures, Kenya will have to sustain the gains made at lower levels of the education system, while also focusing on relieving the bottlenecks in lower secondary transition and upper secondary completion. Figure 4.2 shows gross enrolment rates in Kenya compared to its African peer countries from 1990 through 2040. Primary enrolment rates in Kenya were highest in the group in the 1990s and stood at just over 100%, but dropped between 1995 and 2002 to about 92% before spiking at 107% in 2003, when the free universal primary education programme was introduced.

4.3.1   Net versus gross enrolment

Historically (1990–2015) Kenya had had slightly above-average enrolment rates in primary school relative to the peer group used in the report, as shown in Figure 4.2. Figure 4.2 shows the implementation of universal primary education in Uganda in 1997, which spiked enrolment rates in order to meet the MDGs.[92] Kenya maintains a steady enrolment of students, but the Stuck in Traffic scenario expects Uganda, currently a low-income country, to surpass gross primary enrolment rates in Kenya by just over 3% in 2040.

Net enrolment rate is the number of students who enrol in a level of education at the appropriate entry age (usually six for primary school) divided by all children at that age (both in and out of school). Gross enrolment is the total number of students (whether of the appropriate entry age or not) who have enrolled, expressed as a portion of the age-appropriate population – and can therefore be greater than 100%.

---

92   A Mwesigwa, Uganda's success in universal primary education falling apart, *The Guardian*, 23 April 2015, https://www. theguardian.com/global-development/2015/apr/23/uganda-success-universal-primary-education-falling-apart-upe

Figure 4.2: Gross primary enrolment rates
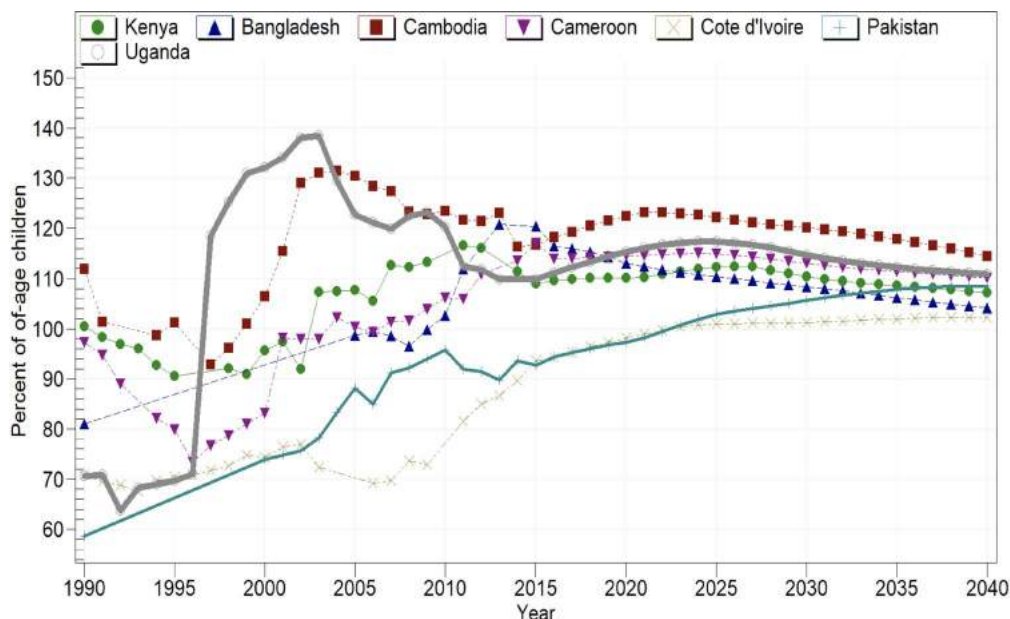
Source: IFs version 7.33, historical data from UIS

Additionally, Kenya's primary enrolment level outpaces the average for other lower-middle income African countries through 2040 by 2.4 percentage points.

Completion rates in Kenya have risen steadily over the years following the introduction of 'fee-free' education for the first four years of primary education in 1974.[93] Between 1975 and 1995 gross primary completion rates improved from almost 21% to about 45%. However, since 2005 there has been a relative stall in the primary completion rate.

Figure 4.3: Primary completion rates
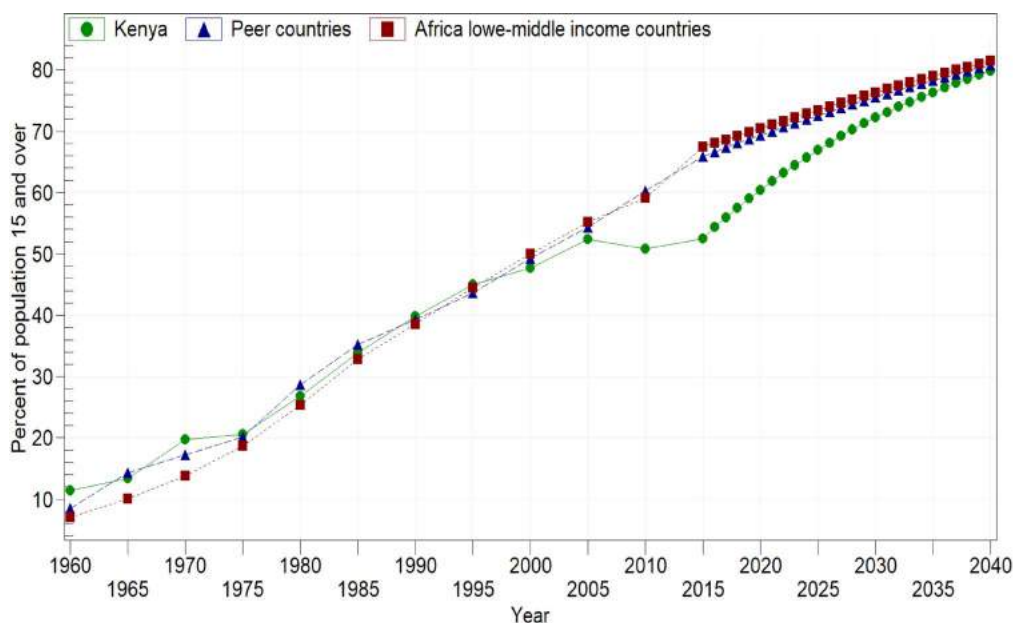
Source: IFs version 7.33, historical data from Barro-Lee

---

93   JB Musungu, Free primary education in Kenya: a critical analysis, *International Journal of Humanities Social Sciences and Education*, 2:7, July 2015.

Free primary education (FPE), parallel reforms in the curriculum, and the provision of textbooks and other learning material have contributed to the improved performance in primary school.

Although primary completion rates are relatively high in Kenya, the country essentially failed to make progress between 2005 and 2015. This could be the result of a confluence of factors. First, the level of access to improved sanitation in Kenya is quite low and this may have had an effect on female students' ability to regularly attend school to completion. Second, Kenya experienced adverse droughts in 2000, 2004/2005 and again in 2008 and 2011.[94] About 1.4 million people were affected in 2008.[95] In 2011 Kenya was among the East African countries ravaged by one of the worst droughts in the last 60 years.[96] Another drought crisis was declared in 2014 and is still ongoing.[97] Persistent drought conditions have led to declines in school attendance and participation and therefore to rising dropout rates.

Despite the recent inconsistency, progress in primary completion is expected to continue through 2040, climbing to about 80% from around 56% in 2017. This means that more pupils are expected to be completing primary education, increasing the number of students eligible to proceed to secondary education level.

Another important element of education, particularly at the primary level, is survival.[98] In the next 22 years, primary survival rates in Kenya are forecast to rise from almost 83% in 2017 to 95% in 2040, a 12-percentage point increase. In the Stuck in Traffic scenario, Kenya is forecast to remain ahead of the average for other lower-middle-income African countries by about 5 percentage points in 2040, nearly converging with other lower-middle-income countries globally.

Figure 4.4: Primary survival rates
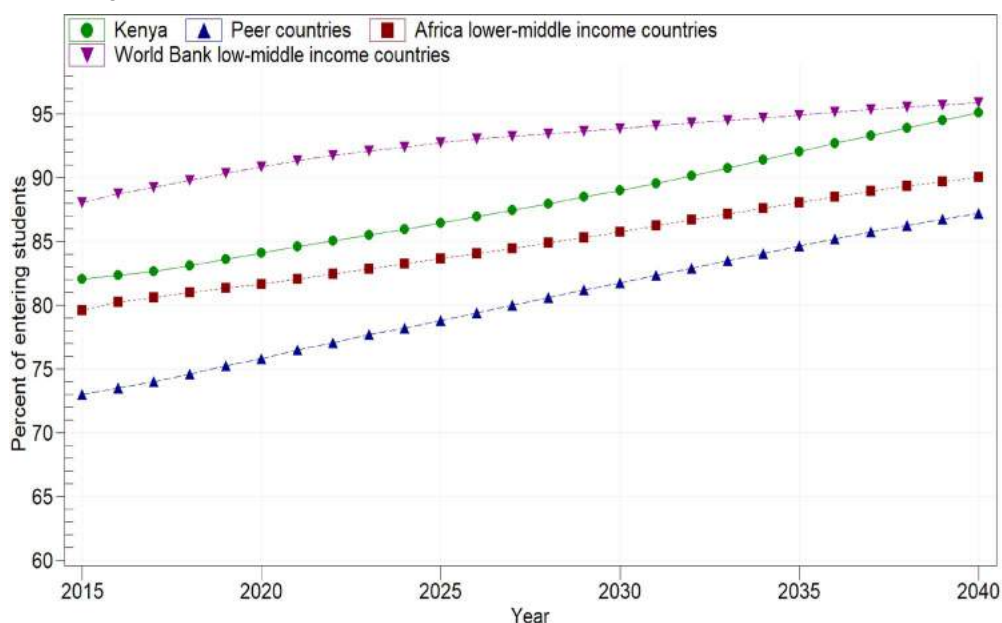
Source: IFs version 7.33, historical data from UIS

94 World Agroforestry, Drought in Kenya: climatic, economic and socio-political factors, *New Standpoints*, November–December 2006, http://www.worldagroforestry.org/downloads/Publications/PDFS/NL06291.pdf

95 ED Mateche, Cycle of drought in Kenya a looming humanitarian crisis, *ISS Today*, 18 January 2011, https://issafrica.org/iss-today/the-cycle-of-drought-in-kenya-a-looming-humanitarian-crisis

96 *Reuters*, Worst drought in 60 years hitting Horn of Africa: UN, 28 June 2011, https://www.reuters.com/article/us-africa-drought-idUSTRE75R2JQ20110628?feedType=RSS&feedName=environmentNews

97 Relief Web, Kenya: drought – 2014–2018, https://reliefweb.int/disaster/dr-2014-000131-ken

98 The UNESCO Institute for Statistics (UIS) defines survival as percentage of a cohort of students enrolled in the first grade of a given level or cycle of education in a given school year who are expected to reach a given grade, regardless of repetition. See UIS, Survival rate by grade, http://uis.unesco.org/node/334806

Continued high survival rates at the primary level affect the transition rates to secondary school. Kenya continues to maintain a roughly 14-percentage point lead over the average primary to lower secondary transition rate of its peer countries. The country's transition rate from primary education to lower secondary is forecast to remain the highest among the comparison groups out to 2040. Continued high primary completion rates ensure many more students are eligible to proceed to secondary education. Additionally, the effort by the government to provide free secondary education, which largely involves a tuition waiver for all students in public secondary schools, is an additional driving factor towards the high transition rate expected to continue through 2040.[99]

However, as was shown earlier, the real bottleneck to further educational attainment in Kenya is the transition from lower to upper secondary school. Here Kenya trails significantly behind other comparison groups, according to the most recent data (2014). While the lower to upper secondary transition rate in Kenya was about 74%, in other lower-middle-income countries in Africa and globally it was 87% and 85% respectively.

Figure 4.5: Lower to upper secondary transition rates
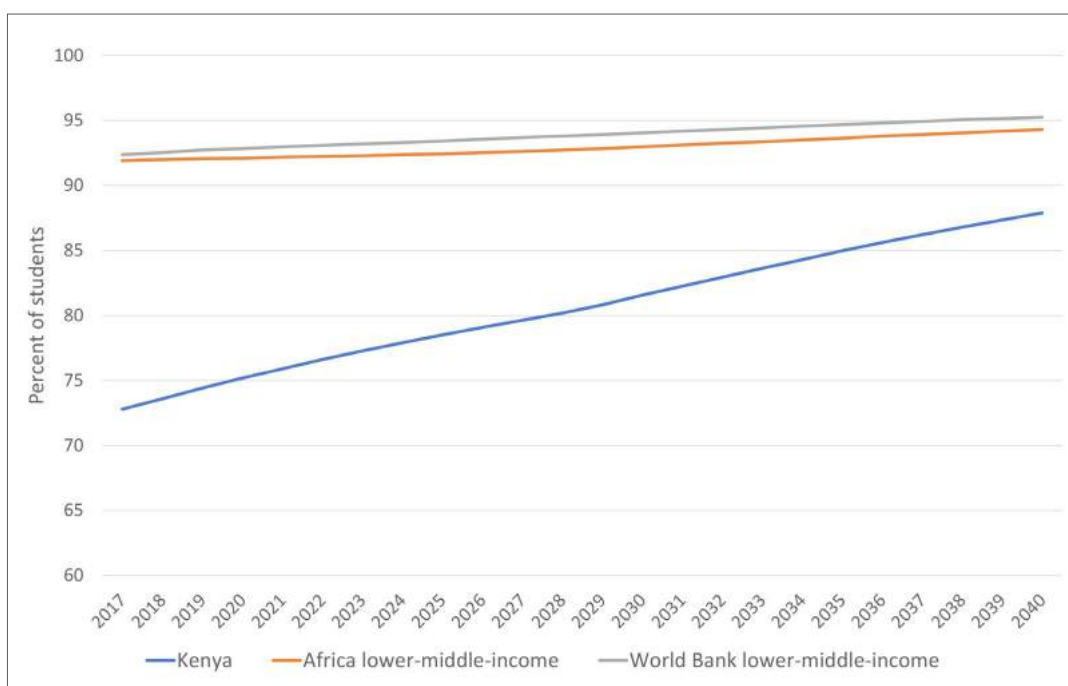
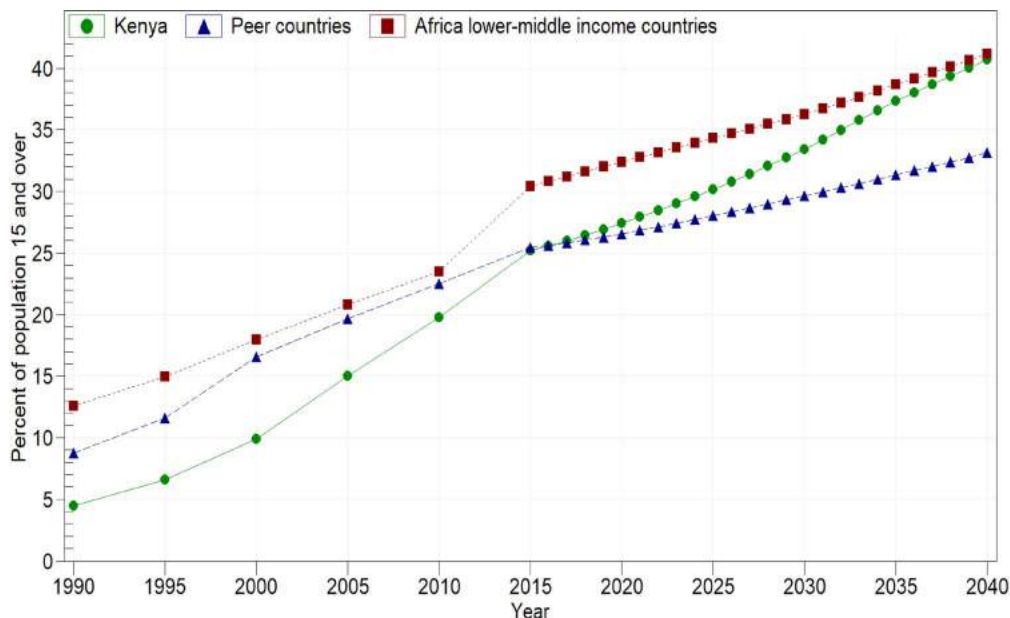Source: IFs version 7.33, historical data from UIS

Furthermore, while Kenya's transition levels do converge with those of other lower-middle-income countries, the country is forecast to remain nearly 10 percentage points behind in 2040, as shown in Figure 4.6. Although Kenya's bottleneck in education from a national-level perspective lies in the transition rate from lower to upper secondary, interventions in education may vary by region due to the implementation of a devolved system. Therefore, targeted and specific education policy interventions will be necessary, based on the needs of each county.

In fact, the transition rate from lower to upper secondary education in Kenya has historically been lower than in many low-income countries such as Cabo Verde, Comoros, the Republic of Congo and Djibouti, and this trend tracks well into 2040. Even with a considerably higher transition rate between lower to upper secondary in the forecast, completion rates remain low at the secondary level. The Stuck in Traffic scenario suggests that only about 40% of enrolled students will complete secondary school education in 2040.

99   *Daily Nation*, Govt to effect full free day secondary learning in January, 6 November 2017, https://www.nation.co.ke/news/education

Addressing the bottleneck between lower and upper secondary education is important if Kenya is to improve educational outcomes further along in the system, and reap the full benefits of having a healthy and well-educated population. However, there is another important – if smaller – bottleneck in the upper secondary completion rate, which is currently about 5 percentage points lower than in other lower-middle-income African countries, despite a significant improvement in recent years.

Figure 4.6: Secondary completion rates

Source: IFs version 7.33, historical data from Barro-Lee

Increased access to education, especially for underserved populations, has slightly alleviated concerns over the ability of families to afford primary education.[100] This is crucial, as many linkages exist between education and other development indicators in health, income and fertility rates. As a result, policy reforms that facilitate higher secondary transition and completion rates are critical to the prosperity and well-being of Kenya in the coming years.[101] While primary education may have become more accessible, there are still financial and logistical considerations around the ability to access secondary school, along with other concerns around equality of access.

4.4   Gender parity

Although Kenya performs well relative to comparison groups in terms of overall educational attainment, equality of access across genders is also important to consider. Gender parity is a measure of equality of access to education across sexes and is calculated as the ratio of female to male students at any given level of education or demographic cohort, e.g. primary school or adults over the age of 15. Looking at the gender parity ratio in terms of average years of education for the adult population over the age of 15 reveals that gender equality in education was greater in Kenya (0.85) than in other lower-middle-income African countries (0.80) in 2015.

The Stuck in Traffic scenario shows that Kenya does, however, have a gender gap in secondary school, and by 2040 it is forecast to rank 164th globally. Figure 4.7 illustrates gender parity in gross secondary enrolment and indicates that, relative to the peer group used in this report and the group of other lower-

100 R Avenstrup, X Liang and S Nelleman, Kenya, Lesotho, Malawi and Uganda: universal primary education and poverty reduction, in World Bank, *Reducing poverty, sustaining growth: what works, what doesn't, and why a global exchange for scaling-up success*, 2004, http://web.worldbank.org/archive/website00819C/WEB/PDF/EAST_AFR.PDF

101 D Sridhar, Linkages between nutrition, ill-health and education, Paper commissioned for the EFA Global Monitoring Report 2009: Overcoming inequality: why governance matters, http://unesdoc.unesco.org/images/0017/001780/178022e.pdf

middle-income countries globally, there was less equality of access to education for women and girls in Kenya in 2015, and that the gap is forecast to widen in the Stuck in Traffic forecast.

Figure 4.7: Gender parity in secondary enrolment
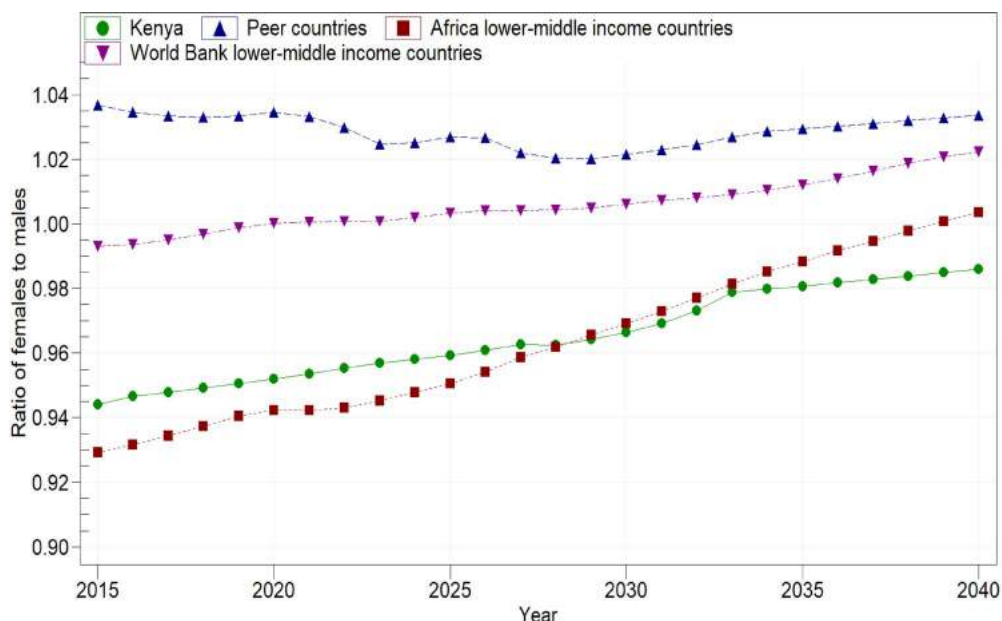
Source: IFs version 7.33, historical data from Barro-Lee

In the Stuck in Traffic scenario, Kenya's male–to–female ratio of enrolment in secondary school stands at 0.98 and ranks 13th out of 18 among African lower middle-income countries by 2040.

Figure 4.8 shows the relationship between average years of schooling and GDP per capita in various African countries. There is a strong relationship between average years of education and the level of income. Figure 4.8 illustrates that, relative to its level of economic development, average educational attainment was higher than expected in Kenya in 2015.

Figure 4.8: Africa: relationship between average years of education and GDP per capita (2015)
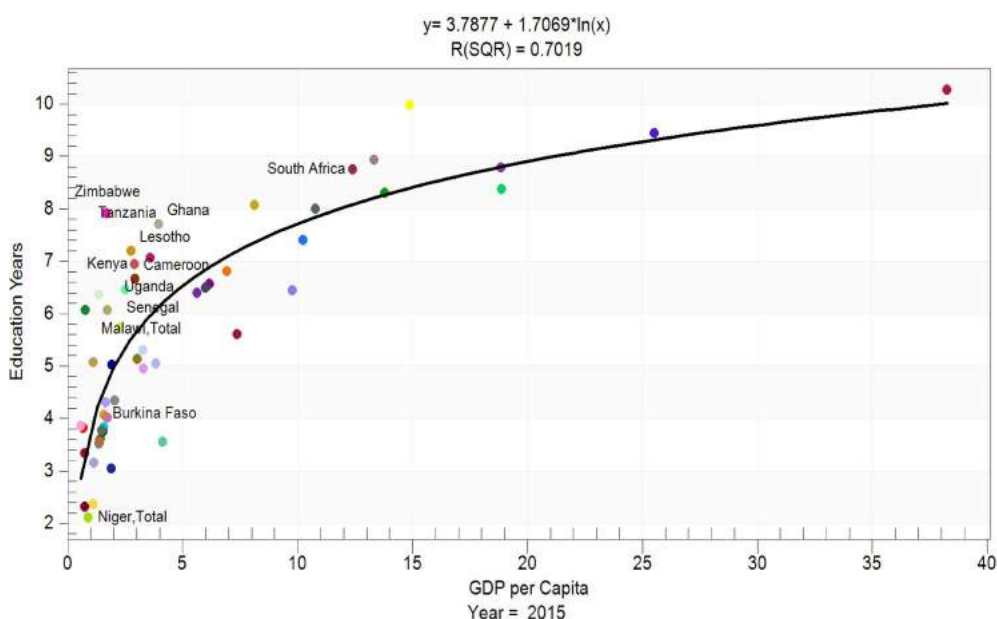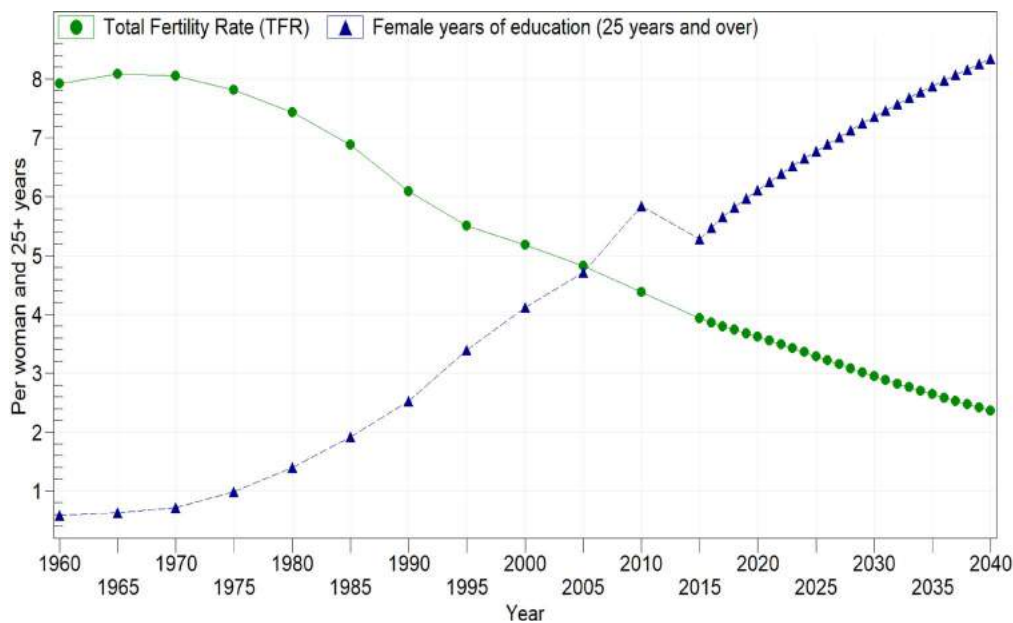

Source: IFs version 7.33, historical data from Barro-Lee, IMF

Educational attainment among females (particularly at the secondary level) has numerous benefits. According to a study by Subbarao and Raney, completion of secondary education would reduce total fertility rate (TFR) among women in developing nations by 26% while doubling access to family planning

would reduce TFR by only 13%.[102] Economically, female education increases household income when women enter the workforce and are gainfully employed. A 2003 study by UNESCO in 19 countries points out that a country's long-term economic growth increases by 3.7% (not percentage points) for every year the adult population's average years of schooling increase.[103]

Figure 4.9 shows the change in education and total fertility rate in Kenya since 1960. There is a strong negative correlation between the average number of years of education in the female population over the age of 25 and the fertility rate.

Figure 4.9: Kenya: total fertility rate and education years

Source: IFs version 7.33, historical data from Barro-Lee, UNDP

Female education, therefore, should be a cornerstone of any nation's strategy to ensure women are empowered economically, socially and intellectually.[104] However, here again there is a disturbing trend of declining average years of education in the adult population.

4.5   Education outcomes

The literacy rate in Kenya stood at 78% in 2015, which was about a 4-percentage point decline from 2000. Despite this recent decline, literacy rates are expected to improve over the next 22 years. By 2040 Kenya is forecast to rank 10th among lower-middle-income countries in Africa and 145th (out of 186 countries) globally. Additionally, Kenya is expected to achieve a literacy rate of about 92% in 2040. This is 3.5 percentage points higher than the average of its peer countries.

---

102 K Subbarao and L Raney, Social gains from female education: a cross-national study, *Economic Development and Cultural Change*, 44 October 1995, 105–128.

103 UIS, *Financing education – investments and returns: analysis of the World Education Indicators, 2002 Edition, Executive Summary*, http://uis.unesco.org/sites/default/files/documents/financing-education-investments-and-returns-executive-summary-2002-en_3.pdf

104 B Kinsella, Secondary education for females: a primary way to prevent overpopulation, *Harvard College Global Health Review*, IV:1, 11 November 2011.

Figure 4.10: Literacy rates
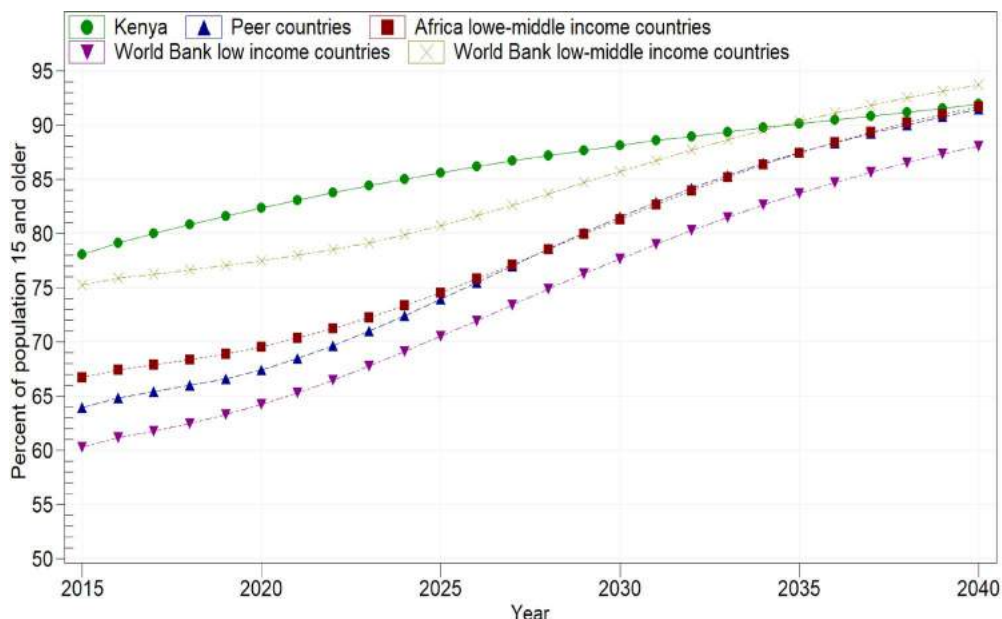
Source: IFs version 7.33, historical data from UNESCO

The Stuck in Traffic forecast projects that by 2040, the average number of years of education for adults 15 and over will improve from 6.1 years in 2015 to 8.4 years. This is partly the result of more students getting into the education system and pushing through primary school until eventual completion and progression on to secondary and tertiary levels.

There will likely be an improvement in the average number of years of schooling, and Kenya's rank is forecast rise from 139th to 134th globally, and 23rd to 18th in Africa from 2017 to 2040. However, the recent declines could offset that trend if they continue. As stated previously, Kenya has relatively low sanitation access levels, which could continue to have an impact on female education; persistent droughts, which could force dropouts for inconsistent periods; and a large and poorly educated refugee community. In combination, these factors could affect the mean years of education among the adult population in Kenya.

Figure 4.11: Years of education (adults over the age of 15)
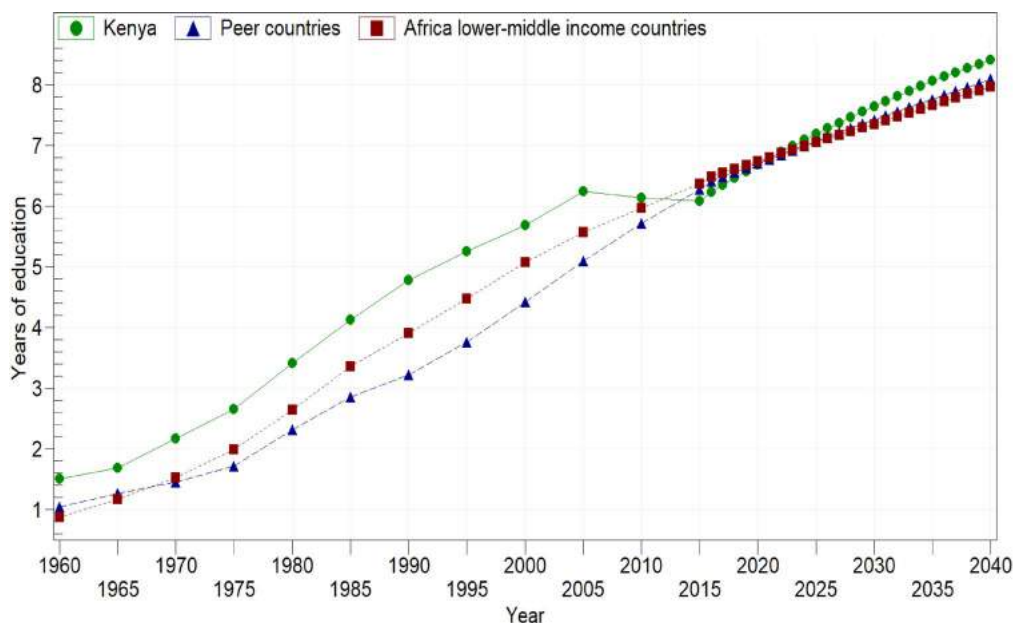
Source: IFs version 7.33, historical data from Barro-Lee

If Kenya hopes to achieve its goal of becoming an upper-middle-income country by 2030, it cannot afford any further declines in the overall stock of education in its population. The main challenge for the government will be to regain its relative advantage in education while advancing other key areas of development as well.

Although Kenya performs well across various primary school metrics and the incipient phase of secondary education, tertiary education completion levels are still very low, even relative to that in other African countries.

Figure 4.12: Tertiary enrolment
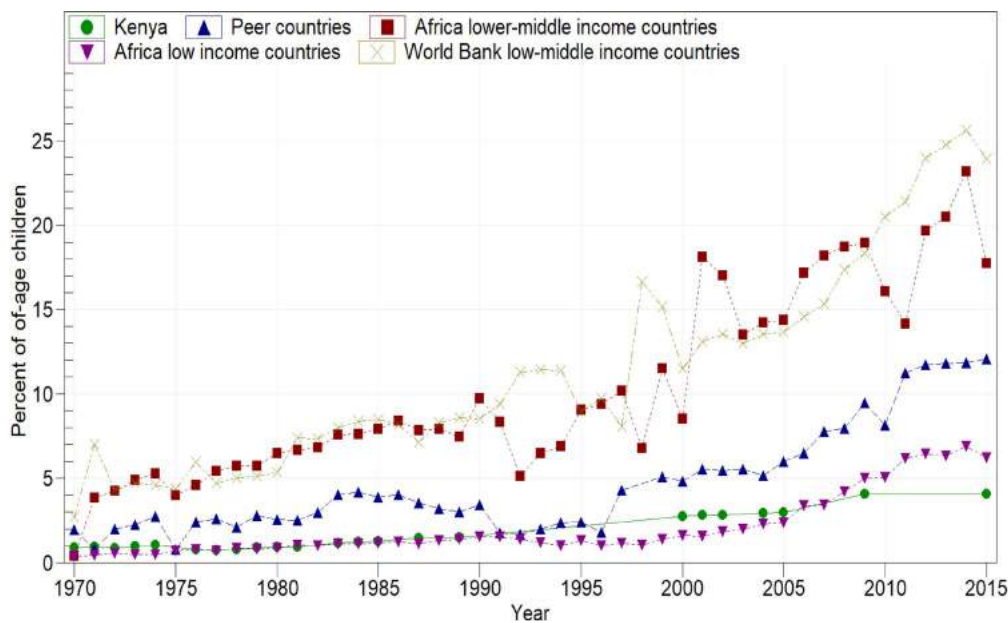
Source: IFs version 7.33, historical data from Barro-Lee

Bottlenecks in the initial years of education have undermined progress in tertiary enrolment.

Figure 4.13: Tertiary education completion
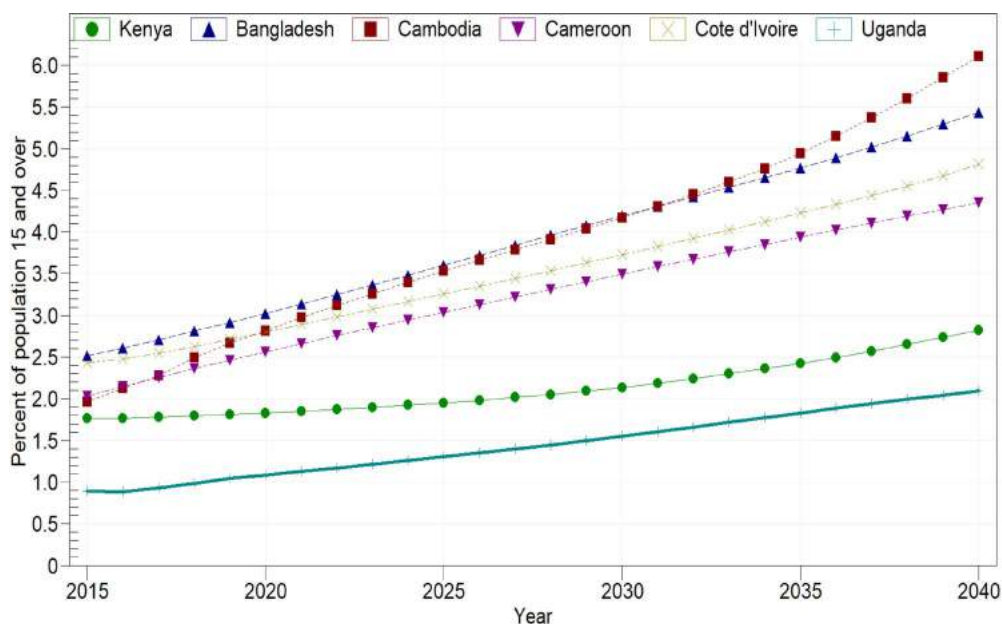
Source: IFs version 7.33, historical data from Barro-Lee

Kenya trailed behind all other countries in the peer group (except Uganda) in tertiary completion rates in 2015, as shown in Figure 4.13. While World Bank lower-middle-income countries are forecast to record tertiary completion rates of roughly 18% in 2040, only 2.8% of students are expected to complete tertiary education in Kenya. In fact, tertiary graduation rates in Kenya more closely resemble those in countries such Lesotho and Swaziland (both low-income countries) than in its lower-middle-income peers. To improve tertiary enrolment and completion rates, the government must address the bottleneck between lower to upper secondary transition.

Education affects demographics through improved health outcomes and reduced fertility rates, which in turn improve the ability of education systems to handle the flow of students. These open up opportunities in terms of classroom size and change the characteristics of the school-going population.[105] Educational attainment also has a direct impact on improved productivity as a result of a more literate and skilled workforce, which tends to increase incomes and improve general economic circumstances.[106]

Education also promotes democracy. A better-educated citizenry tends to make more informed political choices.

Lastly, education expansion reduces social inequalities by promoting a system where individuals can progress and are judged based on merit, regardless of social background.[107] Ensuring that the population attains education to appropriate levels is critical to realising these benefits.

4.6   Education finance

On average, Kenya has historically spent more on education as a percent of its GDP than its peer group. Kenya's average spending on education between 1990 and 2005 stood at 6.1% of GDP. Between 2005 and 2015, however, spending declined from more than 7% of GDP to just over 5%. Among other factors, mentioned above, this might help explain the drop in average years of education in Kenya between 2005 and 2015. This is of concern because Kenya's stock of education is one of the primary advantages it has relative to other African countries.

In 2015 average education expenditure as a percent of GDP among African lower-middle income countries was about 4.9%, and Kenya had one of the 20 highest expenditure levels on education (as a share of GDP) of any country in Africa. Education expenditure in Kenya was about 5.3% of GDP in that year (about US$2.7 billion). In the Stuck in Traffic scenario, education spending declines to about 4.7% of GDP between 2018 and 2020. This is owing to the large push on infrastructure the government is currently undertaking.

After 2020 Kenya's level of expenditure on education is expected to rise and follow a steady trajectory to 5.4% of GDP, against 5.1% in its peer group, by 2040.

Government expenditure on education is highest at the secondary level. The Stuck in Traffic scenario indicates that about 20% more was spent on secondary education than primary education in 2015, and this trend continues through 2040. Furthermore, spending on primary education will remain relatively even until 2025, when it is projected to decline and thereafter remain steady to 2040. Additionally, tertiary spending is forecast to rise to about 1.5% of GDP by 2033 and remain relatively steady until 2040.

105 B Hughes et al., *Patterns of potential human progress volume 2: advancing global education*, Frederick S Pardee Center for International Futures, 2010, http://pardee.du.edu/pphp-2-advancing-global-education

106 Ibid.

107 Ibid.

Figure 4.14: Education expenditure
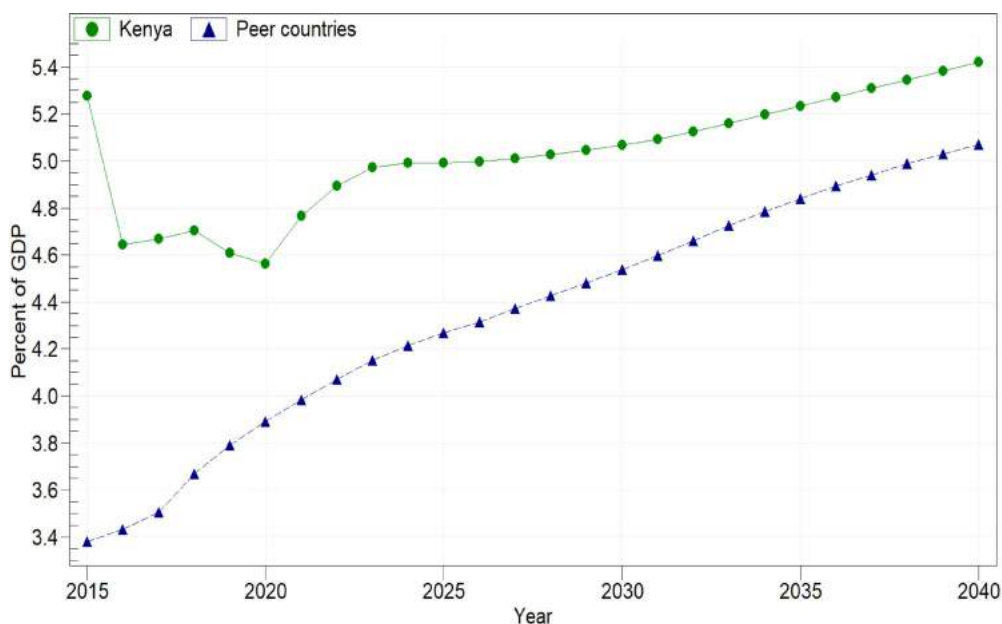
Source: IFs version 7.33, historical data from UIS, IMF

Figure 4.15: Kenya: education expenditure by level
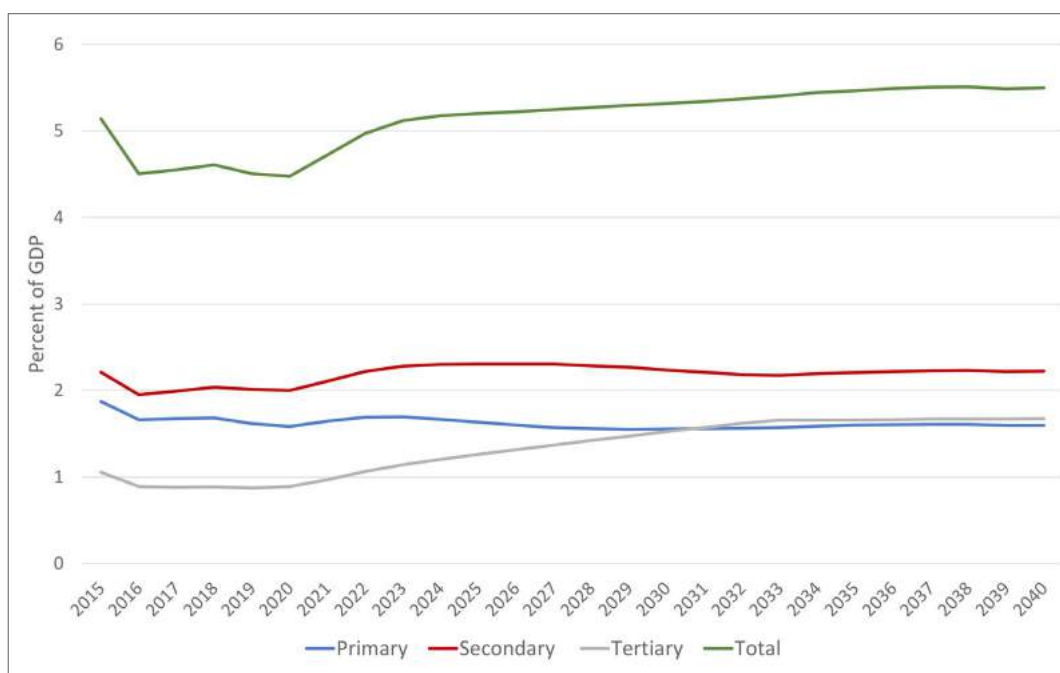
Source: IFs version 7.33, historical data from UIS, IMF

Overall, spending on education declines significantly from 2016 to 2021, because the Stuck in Traffic scenario adjustments redirect a significant portion of expenditure to infrastructure to reflect the push on electricity access and other big infrastructure projects such as the Lamu coal plant. While infrastructure is important, the Kenyan government must plan carefully and think about trade-offs and investment priorities to maintain gains already made. Although the benefits of education take a long time to manifest, a continued decline in education spending – and associated declines in education outcomes – could negatively impact economic potential over the long run.

Kenya may not benefit from the economic dividend that can be achieved if the school-going age cohort, who will account for over 40% of the youthful population, does not receive quality education.

4.7 Conclusion

Until recently, Kenya's education system has been producing above expectations. Despite some bottlenecks at higher levels of the system, its primary enrolment, survival and completion rates have historically progressed well and remained higher than those of most of the comparison groups used for this report. However, some recent trends in many of those indicators are troubling.

Since 2005 Kenya's progress has stalled or declined in primary enrolment, primary completion, gender parity in education and average years of education in the adult population. If these trends continue it will make it extraordinarily difficult, if not impossible, to achieve meaningful structural economic transformation.

Going forward the Kenyan government should have two broad priorities in its education system. The first is to reverse the trends of the last 10 years in the indicators mentioned above. The second should be to focus on alleviating the bottlenecks in lower secondary transition and upper secondary completion. Facilitating progress in these areas should be a priority to ensure more students transition to upper secondary and stay on through completion. The benefits of education take a long time to manifest and therefore interventions to address key issues raised in the analysis of the education system should occur sooner rather than later.

The interventions in Chapter 10 focus on relieving the identified bottlenecks in this section.

Chapter 5: Agriculture and impact of climate change

5.1   Introduction

Agriculture is the cornerstone of the Kenyan economy. Seven out of 10 Kenyans depend on subsistence farming and/or agricultural employment for their livelihoods.[108] It is also a key component of Vision 2030 and the Big Four agenda.[109] Roughly three-quarters of the Kenyan population lived in rural areas in 2017 (36.6 million people) and while that proportion is forecast to decrease over time, the rural population will still grow in absolute terms to approximately 46 million people by 2040. In 2016 agriculture accounted for more than 26% of total GDP, while its share of value added to GDP was roughly 32.9% (US$17 billion). That same year, agricultural exports accounted for 6% of GDP and half of total revenue from exports.[110]

> The World Bank and other international organisations measure sectors' contributions to the economy by its 'value added'. A sector's value added is 'the net output of a sector after adding up all outputs and subtracting all intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification.'

Source: https://datamarket.com/data/set/15ad/industry-including-construction-value-added-of-gdp#!ds=15ad!hb9=5x.6r.6h.5t&display=line

There are many ways to increase agricultural production or improve food security. More land can be placed under crop cultivation, more efficient farming practices or fertilisers can improve yields or farmers can plant more drought-resistant crops. In Kenya, though, inefficiency is constraining more rapid development of the agriculture sector, which is a vital element of Kenya's efforts to stimulate equitable economic growth, provide food security for its citizens and reduce poverty rates.

Agricultural yields in Kenya are lower than the average for other lower-middle-income countries in Africa and globally, and just 50% of the average yields of upper-middle-income countries around the world. Drought, primarily in the northern and north-eastern regions, has also adversely impacted the agriculture sector, rendered millions of Kenyans food insecure and prompted internal displacement.[111] This development is exacerbated by the fact that Kenya's primary food crop, maize, remains predominantly rain-fed.

The Kenyan government aims to move the agricultural sector up the value chain by improving crop yields, increasing packing and processing and developing the agro-industry – a critical element of Vision 2030. The idea is to strengthen the forward linkages between the agricultural and manufacturing sectors,

---

108 World Bank Group, Kenya country economic memorandum, Washington D.C., USA: World Bank Group, 2016, viii, 34–35.

109 See Government of Kenya, Vision 2030: the popular version, 2007, 13, http://www.fao.org/fileadmin/user_upload/drought/docs/Vision%202030-%20Popular%20Version.pdf; Government of Kenya, The Big Four: immediate actions and priorities, December 2017, 9, https://npck.org/Books/GovernmentofKenyaBigFour.pdf.

110 Deloitte, *Kenya economic outlook 2017*, 2017, 18, https://www2.deloitte.com/content/dam/Deloitte/ke/Documents/tax/Economic%20outlook%20ke%202017%20Final.pdf

111 World Food Programme (WFP), Horn of Africa emergency dashboard, 2018, https://reliefweb.int/sites/reliefweb.int/files/resources/HOA_Dashboard_EXT_JAN_2018%20copy_0.pdf

increasing overall productivity in both. Emphasis has also been placed on improving irrigation,[112] increasing investment in storage and preservation facilities and increasing the income of farmers, pastoralists and fisherfolk in order to boost the growth of agricultural products and exports.[113]

If Kenya is able to make the agricultural sector more efficient and mitigate the impact of climate change, the country will be able to increase agriculture's contribution to economic growth, food security and poverty reduction.

The following sections will review likely future trajectories of Kenya's agriculture sector and the implications of climate change. The chapter is structured as follows:

• Agriculture in the Kenyan economy
• Agricultural supply
• Agricultural demand
• Food insecurity and climate change

5.2   Agriculture in the Kenyan economy

The agriculture sector's value add rose from 23% of GDP (US$7.6 billion) in 2006 – the sector's lowest contribution to GDP in Kenya's history – to 36% (US$17 billion) in 2015. This growth likely reflected a general recovery following the 2007/8 PEV, which had resulted in the forcible displacement of farmers in the Rift Valley and other agricultural heartlands of Kenya.[114] It also reflected policy advances of the Grand Coalition Government of 2008 and the implementation of the National Accelerated Agricultural Inputs Access Programme (NAAIAP), a targeted input subsidy programme that provided subsidised maize seed and inorganic fertiliser to smallholder farmers.[115] This increase in agriculture's contribution to GDP growth is atypical, even in developing countries, and may be an unsustainable trend over the long term, particularly given the inability of the country to expand the land under crop cultivation in recent years.

In the Stuck in Traffic scenario, the sector's value-added contribution to GDP fell to about 34% (US$19.6 billion) in 2017, and IFs projects that agriculture's share of value added to GDP will continue to decline, reaching 31% (US$21.2 billion) in 2020 and about 20% (US$25.2 billion) in 2030.

However, agriculture's absolute value in USD will still increase in the Stuck in Traffic scenario from US$19.6 billion in 2017 to nearly US$30 billion in 2040. This is in line with the conventional expectation that as countries develop and their economies become more sophisticated, the relative contribution of primary sectors (agriculture and energy) declines while the relative contribution of services and manufacturing tends to increase over time. This trend is reflected in Table 5.1, which presents the Stuck in Traffic forecast for agriculture's contribution to GDP and value in billions of US$.

---

112 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, 14, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

113 Ibid., 11.

114 C Kamunyan et al., Causes and effects of post-election violence on agricultural production in Kesses Division, Uasin Gishu County, Kenya, *Journal of Emerging Trends in Economics and Management Sciences*, 4:1, 2013, 62–70.

115 NM Mason et al., The effects of Kenya's 'smarter' input subsidy program on crop production, incomes, and poverty, Tegemeo Institute of Agricultural Policy and Development, Policy Brief 11, October 2015, https://pdfs.semanticscholar.org/0ffe/f3e7aa63f3b422adc6fa726f075aa09bbac8.pdf

Table 5.1: Kenya: agriculture, value added

Year	% of GDP	US$ billion
2015	36%	$17
2020	29.9%	$21.2
2025	25.4%	$23.3
2030	20.2%	$25.2
2035	15.9%	$27.3
2040	12.4%	$29.5

Source: IFs v 7.33 initialised from World Bank data

The forecasted decline in the agriculture sector's contribution to GDP reflects the expected structural transformation of the Kenyan economy in which labour and other productive resources are moving from low-productivity towards higher-productivity sectors. Shifting productivity in the agricultural sector away from low-value subsistence farming towards higher-value agro-industry activities will also be critical to this process. This transition would carry positive spillover effects, including the creation of better paying jobs in the agricultural sector. Currently, agriculture accounts for over 70% of employment in rural areas, and more productive employment is needed in order to absorb the rural unemployed and thereby reduce rural poverty.[116]

Kenya's agricultural sector is under great stress owing to numerous factors such as climate change, poor rural infrastructure and dependence on maize as the dominant food crop.

In recent years, the production of crops for local consumption has decreased while the production of cash crops has increased. This divergence may be attributed to the fact that over 75% of maize production is carried out by smallholder farmers and thus largely dependent on highly variable rainfall. Cash crops such as tea and horticulture products, Kenya's two chief agricultural exports, are largely irrigated, providing protection against drought.

Most Kenyans rely on subsistence farming for their livelihoods, producing primarily maize for their own consumption. Only 25% of maize production is carried out by medium and large-scale farmers, who are predominantly located in the Rift Valley.[117] In fact, only 2% of Kenya's agricultural land is equipped for irrigation.[118]

5.3 Supply

5.3.1 Total production

Kenya produced a total of 29 million metric tonnes (MMT) of agricultural products in 2013, making its agricultural sector the fourth largest in Africa. In 2013 roughly 79% of its 2015 agricultural products (by weight) was crops, about 20% was meat products and less than 1% was fish. IFs estimated that Kenya's

In IFs, food production is a function of the total area of land under cultivation of consumable crops, yields and the losses that may occur during the production, distribution and consumption of agricultural goods.[119]

---

116 World Bank Group, Kenya country economic memorandum, Washington DC: World Bank Group, 2016, 35.

117 USAID, Famine Early Warning Systems Network (FEWS Net), Kenya food security brief, 2013, 20, http://www.fews.net/sites/default/files/documents/reports/Kenya_Food%20Security_In_Brief_2013_final_0.pdf; T Surey et al., Rural incomes, inequality and poverty dynamics in Kenya, Nairobi: Tegemeo Institute of Agricultural Policy and Development, WPS 20/2008, 2008; World Bank Group, Kenya country economic memorandum, Washington DC: World Bank Group, 2016, 34.

118 World Bank Group, Kenya country economic memorandum, Washington DC: World Bank Group, 2016, 35.

119 DS Rothman, BB Hughes and KB Narayan, IFs agricultural model documentation, Frederick S Pardee Center for International Futures, Working Paper 2017.04.04, August 2017, http://pardee.du.edu/sites/default/files/IFs%20Agricultural%20Model%20Documentation%20V25.03.pdf

agricultural production increased to 32.4 MMT in 2017, and it is forecast to remain more productive (in an absolute sense) than that of countries in the peer group, except for Bangladesh and Pakistan.

Figure 5.1: Total agricultural production[120]
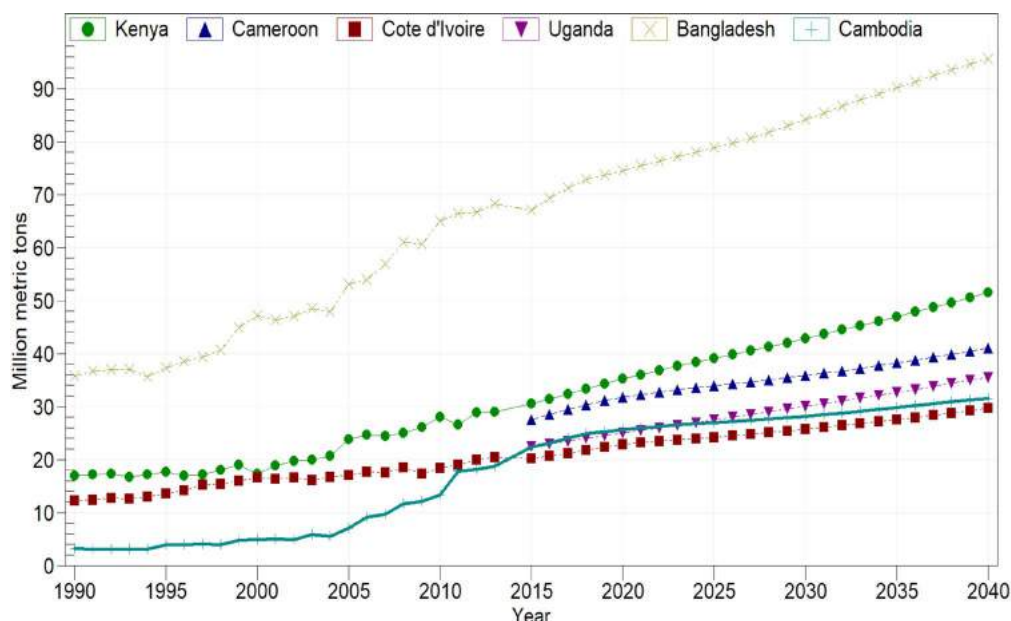
Source: IFs v 7.33 initialised from FAO data. Note that Pakistan was removed from this graph because its size distorts the scale.

Table 5.2 shows historical data and a forecast of agricultural production in Kenya and its peer group through to 2040. In the Stuck in Traffic scenario, agricultural production is projected to increase by roughly 40% to 42.8 MMT by 2030, making Kenya the seventh largest producer of agricultural products in Africa. The shares of crops, meat and fish will also shift over time. Meat and fish production is forecast to nearly triple by 2040 in an absolute sense, while meat will also increase its share of total production from just over 20% in 2015 to about one-third in 2040.

Table 5.2: Kenya: agriculture production by type, MMT and percent of total

Year	Crop	Meat	Fish	Total
2015	24.1 (78%)	6.3 (21%)	0.2 (0.6%)	30.6
2020	27.2 (77%)	7.7 (22%)	0.2 (1%)	35.2
2025	29.4 (75%)	9.4 (24%)	0.3 (1%)	39
2030	31.1 (72%)	11.3 (26%)	0.3 (1%)	42.8
2035	32.9 (70%)	13.6 (29%)	0.4 (1%)	46.9
2040	34.8 (68%)	16.1 (31%)	0.4 (1%)	51.4

Source: IFs v 7.33 initialised from FAO data

5.3.2 Land use

The 46th largest country in the world and the 22nd largest in Africa, Kenya covers 56.9 million hectares (ha) of land. Roughly 80% of its land area is arid or semi-arid, home to 50% of the country's livestock and unsuitable for crop cultivation. Only 20% of the country is humid or semi-humid.[121]

---

120 Pakistan is excluded from this figure because its total agricultural production far exceeds that of the other peer countries, which distorts the scale of the graph.

121 USAID, FEWS Net, Kenya food security brief, 2013, 14, http://www.fews.net/sites/default/files/documents/reports/Kenya_Food%20Security_In_Brief_2013_final_0.pdf.

In 2015, the Food and Agriculture Organization (FAO) of the UN classified 21.3 million ha of land as dedicated to grazing, 6.5 million ha as cropland, 4.4 million ha as forest and 1.2 million ha as urban. Approximately 23.5 million ha were classified as 'other', comprising land that is neither agricultural land (used for crop cultivation or grazing) nor forest, and includes built-up and related land, barren land, other wooded land, etc.[122]

In the Stuck in Traffic scenario, IFs projects that land dedicated to grazing and crop cultivation will increase by roughly 1.3 and 0.5 million ha respectively by 2030, decreasing the area of land formerly classified as 'other' and, to a lesser extent, Kenya's forestland. Kenya has been converting other land to crop and grazing land for much of the past 15 years. However, as more and more land is converted it will become increasingly difficult and/or expensive to turn the remaining unproductive soil into fertile land.[123] Moreover, since 2011 Kenya has failed to place any additional land under crop cultivation and it is questionable how much additional land there is for farming purposes.

5.3.3 Yields

Total crop yields are a general indicator of the technological sophistication and efficiency of the agricultural sector.[124] Kenya has made only moderate improvements in agricultural yields over the last several decades. Between 1970 and 2000 the country had an average agricultural yield of 2.6 metric tonnes/ha; between 2000 and 2015 the average agricultural yield modestly improved to 3.6 metric tonnes/ha, tracking just below the average for other lower-middle-income countries. In other words, between 1980 and 2000 average yields in Kenya failed to improve, with the biggest increase in total production coming from increasing the amount on land under cultivation, as shown in Figure 5.2.

Figure 5.2: Average yields and land used for the cultivation of crops in Kenya (1970–2040)
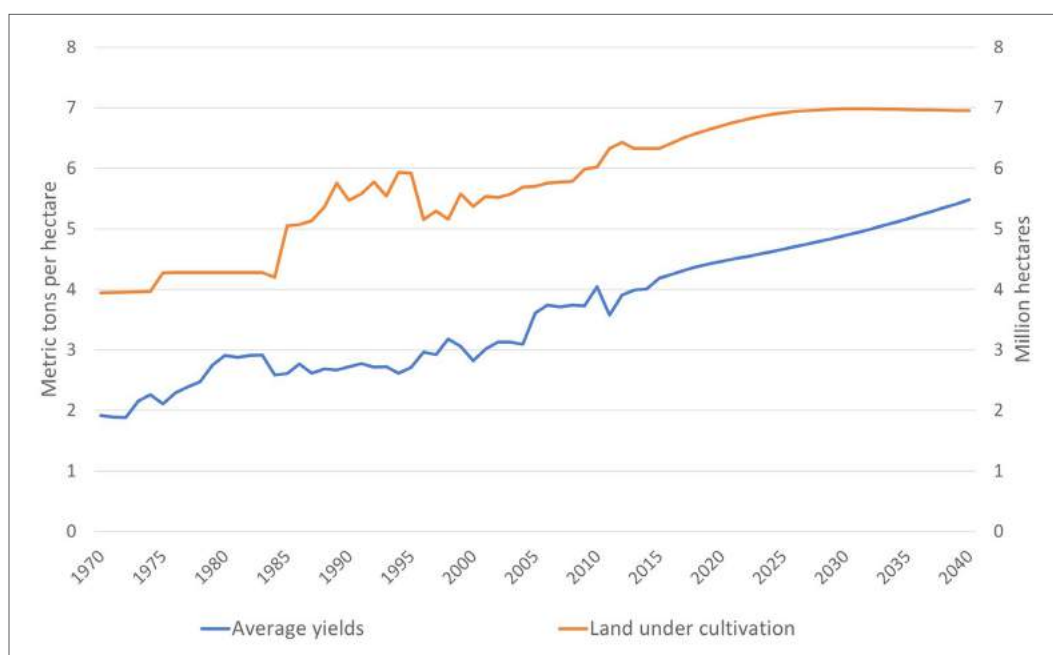
Source: IFs v 7.33 initialised from FAO data

Yields have rebounded since 2005, but remain below average for lower-middle-income countries. In 2013 (most recent data), Kenya's average crop yields were 3.9 metric tonnes/ha. This is about 50% lower than the average yield per hectare of upper-middle-income economies (7.9 metric tonnes) and about 10% lower than that of other lower-middle-income economies in Africa (4.4 metric tonnes).

---

122 FAOSTAT, Land use, definitions and standards, http://www.fao.org/faostat/en/#data/RL

123 This forecast has been adjusted slightly based on feedback from stakeholders - see section 1.6.

124 Z Donnenfeld et al., *Ethiopia development trends assessment,* Institute for Security Studies (ISS), Report, 2017, https://issafrica.org/research/books-and-other-publications/ethiopia-development-trends-assessment

In the Stuck in Traffic scenario, Kenya is projected to continue to have low crop yields relative to both African and global lower-middle-income economies. IFs forecasts that average crop yields will increase to roughly 4.9 metric tonnes/ha by 2030 in the Stuck in Traffic forecast – 1.9 metric tonnes less than the average yield per hectare of other lower-middle-income countries around the world (6.8 metric tonnes/ha). In other words, there is likely scope to improve the efficiency of the agricultural sector, in part by improving overall yields.

Figure 5.3: Yields per hectare
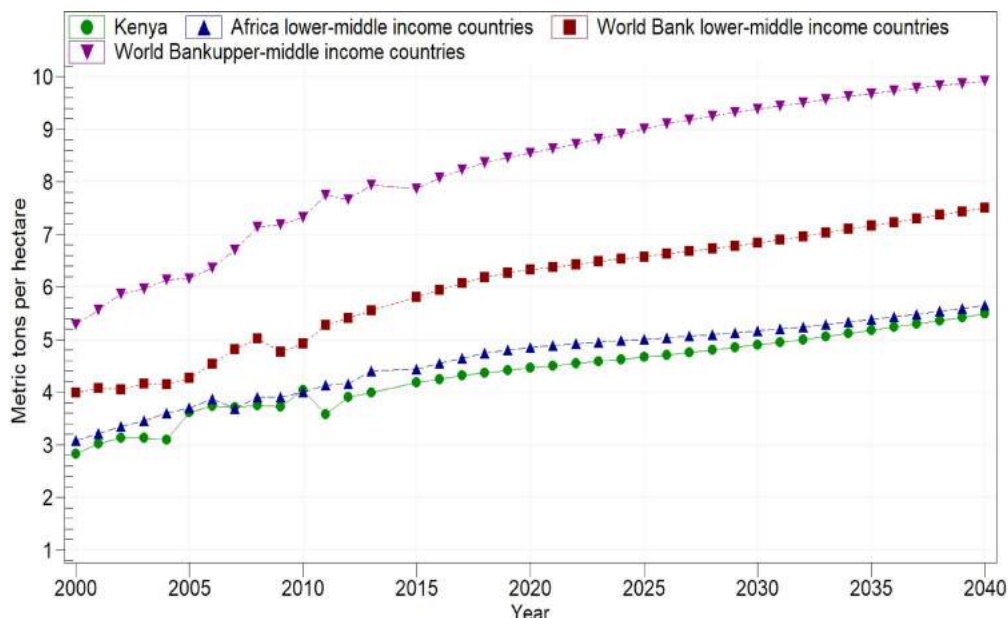
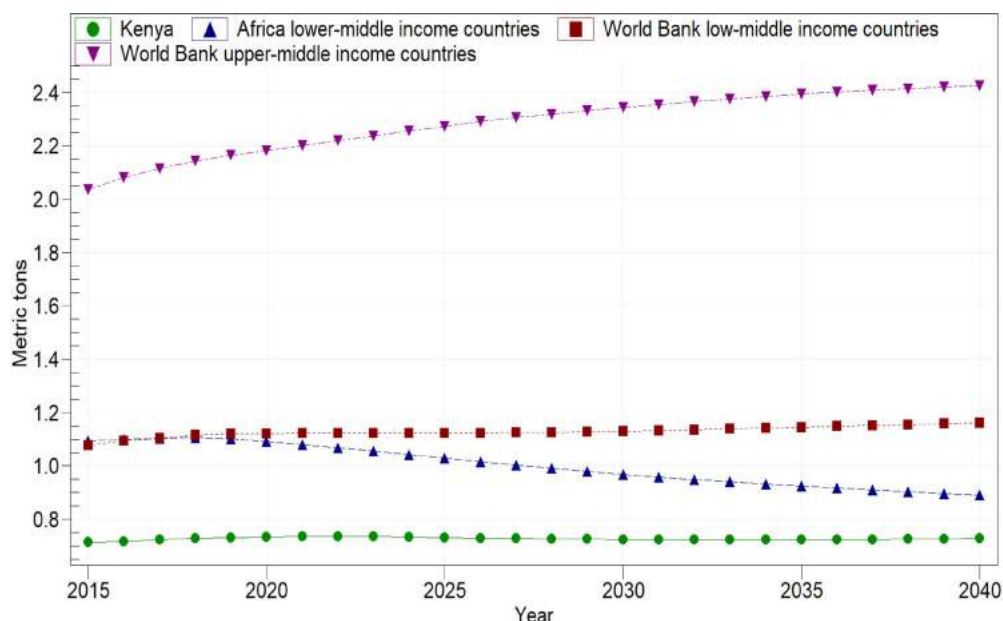Source: IFs v. 7.33 initialised from FAO data

Kenya's agricultural production per capita, a slightly different indicator of technological sophistication and efficiency in the agricultural sector, is also low relative to that of lower-middle-income economies in Africa and globally, and incredibly low relative to that of upper-middle-income economies.

In 2015 Kenya produced 0.7 metric tonnes of agricultural product per capita - about one-third the amount of food per person than the average for upper-middle-income countries (about 2 metric tonnes). In the absence of significant gains in productivity, Kenya will continue producing very little food per capita relative to its regional and global income peers through to 2040.

One possible explanation for the declining agricultural yield per capita in African lower-middle-income economies is that their populations are growing faster than their agricultural production. Specifically, IFs forecasts that between 2015 and 2040 African lower-middle-income economies will experience over 68% population growth but only about a 38% improvement in agricultural production.

IFs forecasts that between 2015 and 2040, Kenya's population will increase by 64% while agricultural production will grow by 68%. That these growth rates are so similar makes it difficult for agricultural yields per capita to increase. Conversely, when agricultural growth exceeds population growth, agricultural production per capita grows. In the Stuck in Traffic scenario, this will be demonstrated by lower-middle-income economies globally, which will experience 45% agricultural growth by 2040 (from 2015) and only 32% population growth over that time period.

Figure 5.4: Kenya: agricultural production per capita

Source: IFs v. 7.33 initialised from FAO data

5.3.4 Food loss

Food loss and waste, defined as 'wholesome edible material intended for human consumption, arising at any point in the food supply chain that is instead discarded, lost, degraded or consumed by pests',[125] undermines human development and economic growth across all sectors.[126] Food loss and waste may take place during the production, transformation or consumption of agricultural products.[127]

In 2015, Kenya's total food loss and waste equalled 20% of total agricultural production, or just over 6 MMT. This annual rate of food loss and waste is lower than the average for other African lower-middle-income countries, roughly equivalent to that of lower-middle-income countries globally and higher than that of upper-middle-income countries globally.

In the Stuck in Traffic scenario, food loss and waste in Kenya is projected to equate roughly 20% of total agricultural production through to 2040. This would mean that by 2020, about 7 MMT of Kenya's agricultural production (including crop, meat and fish) will be wasted per year. IFs forecasts that roughly 9 MMT will be wasted annually by 2030.

Table 5.3: Total food loss and waste as % of total production

Year	Kenya	African lower-middle-income	World Bank lower-middle-income	World Bank upper-middle-income
2015	19.8%	27.9%	18.9%	15.6%
2020	19.8%	28.0%	18.6%	14.7%
2030	20.4%	30.4%	18.2%	13.2%
2040	20.6%	31.9%	17.3%	12%

Source: IFs v 7.33 initialised from FAO data

125 J Parfitt, M Barthel and S Macnaughton, Food waste within food supply chains: quantification and potential for change to 2050, *Philosophical Transactions of the Royal Society B*, 365:1554, 27 September 2010.

126 S. Hedden, BB Hughes, DS Rothman, AJ Markle, and J Maweni Ending Hunger in Africa, NEPAD and the Frederick S. Pardee Center for International Futures; University of Denver, NEPAD Planning and Coordinating Agency., Ending hunger in Africa, 2016, http://pardee.du.edu/ending-hunger-africa-elimination-hunger-and-food-insecurity-african-continent-2025-conditions

127 Production refers to crops lost before harvest; transformation refers to food lost between harvest, sale and consumption; and consumption refers to food lost during consumption.

Across all three sectors of agricultural production accounted for in IFs (crops, meat and fish), most food loss and waste takes place during production.
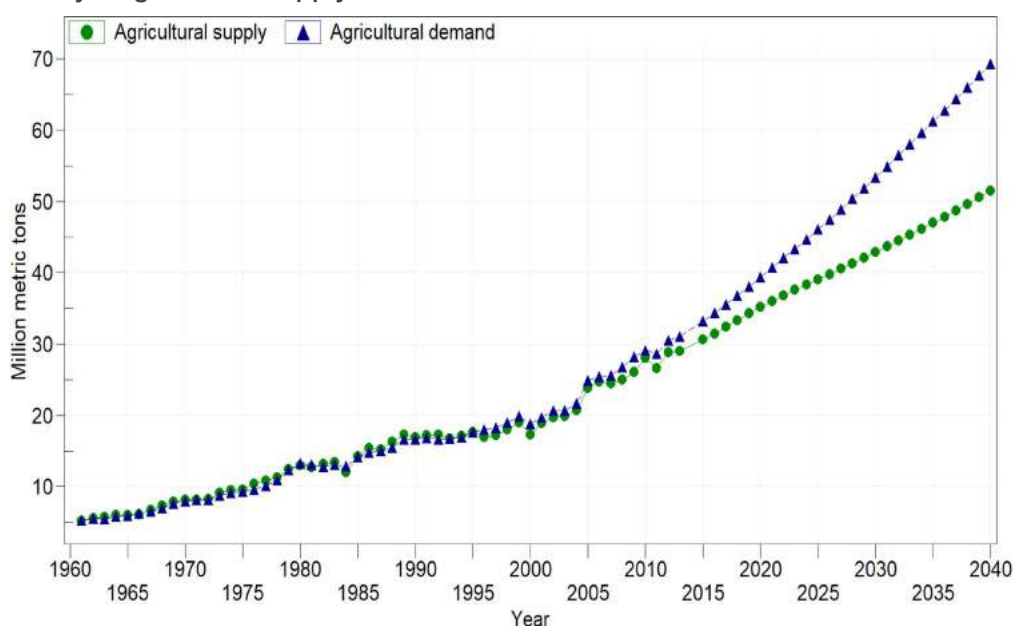
5.4 Demand

Historically, Kenya has produced enough food to meet domestic agricultural demand (defined as access to calories for consumption). However, owing to population growth and inefficiency in the agriculture sector, demand is projected to increasingly exceed supply, which could worsen food insecurity and increase dependence on food imports.

Although demand has exceeded supply in various years throughout Kenya's history, the difference between supply and demand did not exceed 2 MMT until 2009, when demand reached 28.2 MMT and only 26.1 MMT of agricultural goods were produced. While this difference may seem small, it was still an 8% gap between supply and demand and, more importantly, it marked the beginning of the concerning trend of demand increasingly exceeding supply.

By 2015 demand surpassed supply by nearly 3 MMT. In the Stuck in Traffic scenario, the gap between demand and supply is projected to continue to widen, reaching roughly 10 MMT by 2030 and 17 MMT by 2040. As Figure 5.5 illustrates, this widening gap may be attributed to rapid population growth, rising incomes and, among other dynamics, low efficiency in the agricultural sector.

Figure 5.5: Kenya: agricultural supply and demand

Source: IFs v 7.33 initialised from FAO data

If demand is disaggregated by food item (crops, meat or fish), demand for crops far exceeds demand for meat and fish in Kenya. In 2015 demand for crops constituted 80% of total agricultural demand. In the Stuck in Traffic scenario, it will constitute 77% by 2040, reflecting growing demand for meat. Rising incomes and the resultant shift in consumer preferences toward meat and, to a lesser extent, fish, drive this shift.

In terms of weight, demand for crops will continue to exceed demand for meat and fish combined in the period to 2040. Demand for crops alone is projected to nearly double to 53.1 MMT per year by 2040. Demand for meat is projected to increase from the current estimated level of 6.9 MMT per year to 15.5 MMT by 2040. Meanwhile, demand for fish is forecast to double to 0.3 MMT by 2030 and reach 0.5 MMT by 2040.

5.5 Food insecurity

Food insecurity is a grave and deepening concern for Kenya.[128] Over 80% of its land area is pastoralist, agropastoral or marginal agricultural livelihood zones, which are particularly vulnerable to food insecurity.[129]

Severe drought conditions have caused 3.4 million people to be severely food insecure, according to a 2018 UNICEF report.[130] The World Food Programme (WFP) estimated that in mid-2017, 309 000 Kenyans were internally displaced owing to food insecurity and drought.[131] Many parts of Marsabit and Turkana counties reached 'crisis' levels of hunger, according to the International Food Security Phase Classification system, and could therefore quite readily be vulnerable to reclassification to 'emergency' levels – one step away from famine.[132] The UN Office for the Coordination of Humanitarian Affairs (OCHA) has reported large numbers of animal deaths in Turkana, Marsabit, Samburu and Mandera, while UNICEF data suggests that 'close to 175 000 children were not attending pre-primary and primary schools, primarily due to the drought's impact'.[133]

Looking towards the future, urgent action will be needed to mitigate the impact of population growth in Kenya. Agricultural demand in the country is increasingly exceeding supply, and seven out of 10 Kenyans – more than 35 million people – rely on agriculture for subsistence and employment. In the Stuck in Traffic forecast, this population is projected to increase to over 54 million people, assuming that the share of agriculture-reliant Kenyans to the total population stays the same.

Figure 5.6 shows that in the Stuck in Traffic scenario, Kenya will have to import more and more agricultural goods to fulfil its unmet demand. Meanwhile, agricultural exports will remain stagnant, staying below 2 MMT per year through 2040.

Kenya's dependence on agricultural imports is therefore forecast to rise quite sharply. Figure 5.7 shows its net agricultural imports (agricultural imports minus agricultural exports) as a percent of agricultural demand. IFs estimates that imports currently meet 11% of Kenya's agricultural demand (2018), but projects that figure to rise to more than 25% in 2040. Countries that are heavily reliant on imported food to meet domestic demand are very vulnerable to commodity price shocks and other fluctuations in international markets, in addition to the negative impacts that food insecurity can have on human development.

Demand for crops is driving Kenya's deepening import dependence. IFs projects crop imports to meet nearly 20% of crop demand in 2030 and about 25% in 2040. Kenya's dependence on meat imports is projected to decline, while its production of fish is forecast to exceed demand for fish until the mid-2030s.

---

128 The widely accepted definition of food security states that 'food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'. life' (Food Security Policy Brief, 2006, http://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf) This definition encompasses four elements that together express the multidimensionality of food security: food availability, food access, food use and food stability.

129 USAID, FEWS Net, Kenya food security brief, 2013, 14, http://www.fews.net/sites/default/files/documents/reports/Kenya_Food%20Security_In_Brief_2013_final_0.pdf

130 Relief Web, Humanitarian action for children 2018: Kenya, 4 January 2018, https://reliefweb.int/report/kenya/humanitarian-action-children-2018-kenya

131 WFP, Horn of Africa emergency dashboard 2018, https://reliefweb.int/report/somalia/horn-africa-emergency-dashboard-january-2018. The WFP produced the estimate of population in need of food assistance derived from Government of Kenya, Kenya Food Security Steering Group, *The 2017 long rains season assessment report*, July 2017, https://reliefweb.int/sites/reliefweb.int/files/resources/2017%20LRA%20National%20Report.pdf

132 Hunger levels correspond to the internationally accepted Integrated Food Security Phase Classification, http://www.ipcinfo.org/. On 8 February 2018 the European Civil Protection and Humanitarian Aid Operations (ECHO) classified parts of Kenya as having passed the IPC-3 (Crisis) threshold. See ReliefWeb, Horn of Africa: food insecurity and drought, January 2018, https://reliefweb.int/sites/reliefweb.int/files/resources/ECDM_20180208_Horn-Of-Africa_Food-Insecurity_Jan2018.pdf

133 ReliefWeb, Kenya: drought 2014–2018, https://reliefweb.int/disaster/dr-2014-000131-ken. For the full OCHA report, see ReliefWeb, *Horn of Africa: a call for action*, February 2017, https://reliefweb.int/sites/reliefweb.int/files/resources/HOA_CALL_FOR_ACTION_Leaflet_Feb2017_1.pdf

Figure 5.6: Kenya: agricultural imports and exports
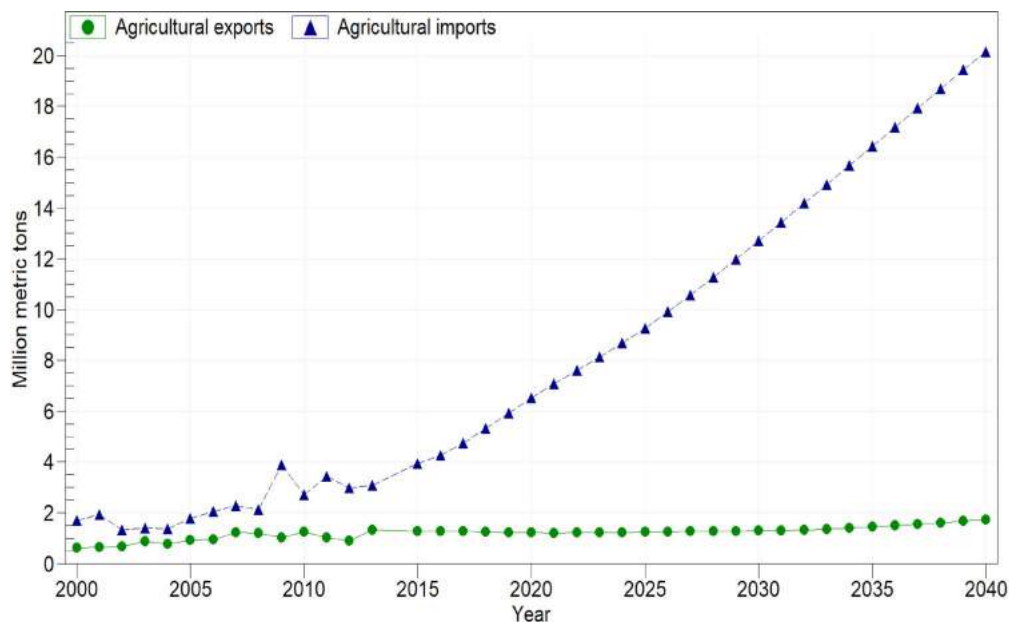
Source: IFs v 7.33 initialised from FAO data

Figure 5.7: Kenya: agricultural import dependence
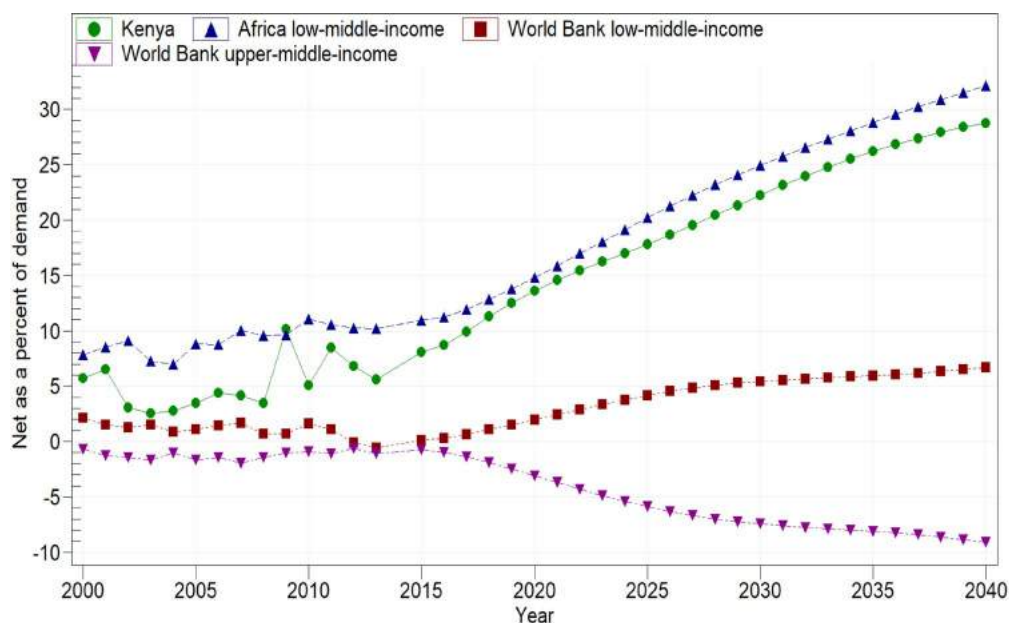
Source: IFs v 7.33 initialised from FAO data

5.6   Climate change

In February 2017 the Kenyan government declared a national drought emergency, with 23 of 47 counties affected, primarily in the north and north-east. Water shortage is also an urgent concern. While Kenya is not technically a water-scarce country (in the aggregate sense), there is a lack of adequate infrastructure to distribute water effectively, and 80% of the country is classified as arid or semi-arid.[134]

---

134 USAID, FEWS Net, Kenya food security brief, 2013, 11, http://www.fews.net/sites/default/files/documents/reports/Kenya_
    Food%20Security_In_Brief_2013_final_0.pdf

Climate change will continue to exacerbate food insecurity in the short and long term and disproportionately harm disadvantaged people and communities.[135] It will harm marine biodiversity, adversely impact the production of maize and other staple crops and reduce renewable surface water.[136] Global temperature increases coupled with rising food demand will amplify already urgent needs for food assistance.

The forecasts from the Intergovernmental Panel on Climate Change (IPCC) in IFs project an increasing rainfall trend in Kenya and, to a lesser extent, across all of East Africa. Despite the declining rainfall trend observed over the last three decades, wet seasons are projected to intensify and droughts will become less severe from March through April and from October through December.[137] However, rainfall is also likely to occur with larger fluctuations than in the past. Major improvements in infrastructure, especially in irrigation, will be necessary to lessen the likelihood of growing water scarcity and food insecurity.

In terms of temperature, IFs projects that Kenya will become warmer over time. As a result, most parts of Kenya will become dryer by the end of the century, despite the expected increase in rainfall at the country level.[138] This paradoxical trend underscores the complexity of the impact of climate change in a country such as Kenya and the need for strategic, long-term solutions to deal with these structural changes.

Table 5.4: Change in precipitation (%) and temperature (°C) from 1990 levels

	Temperature change		Precipitation change	
	Kenya	Eastern Africa	Kenya	Eastern Africa
2015	0.63	0.67	4.13%	0.17%
2020	0.76	0.81	5%	0.22%
2025	0.9	0.95	5.9%	0.26%
2030	1.03	1.1	6.8%	.32%
2040	1.3	1.36	8.6%	.44%

Source: IPCC; IFs v. 7.33

5.7   Conclusion

Kenya is modernising, but agriculture will remain critical to the Kenyan economy and to the livelihoods of most of its citizens, especially in rural areas. Against the backdrop of Kenya's rapidly growing population and vulnerability to climate change, improving the efficiency of the agricultural sector is critical. Kenya's low yields per hectare and per capita production relative to that of its regional and global income peers highlight this inefficiency.

The government has emphasised irrigation as a potential solution to mitigate the effects of climate change, increase food security and boost agricultural growth. However, there are financial, institutional, technological, biophysical, infrastructural and informational barriers to the expansion of irrigation. Among the most critical are Kenya's high poverty rate and general lack of access to credit, poor infrastructure, pests and diseases.[139]

---

135 Intergovernmental Panel on Climate Change (IPCC), Climate change 2014 synthesis report: contribution of working groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change, 2014, 13, http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

136 Ibid., 13.

137 IPCC, *The IPCC's fifth assessment report: what's in it for Africa?*, 2014, 18, https://cdkn.org/wp-content/uploads/2014/04/AR5_IPCC_Whats_in_it_for_Africa.pdf

138 Ibid.

139 Ibid., 18.

If Kenya is to carve a path to a productive, sustainable agricultural sector, then the agricultural agenda must be broadened to include not only irrigation but also measures to reduce food loss, improve access to inputs and implement adaptive climate change strategies.

The scenarios in Chapter 10 represent the potential impact of policy interventions aimed at improving efficiency in the agricultural sector through to 2040.

Chapter 6: Energy

6.1　Introduction

Kenya has a potentially dynamic, if underdeveloped, energy sector. Although the country is still reliant on biofuels for total energy production (about 75%), more than 80% of total electricity production in the country came from renewables in 2015. Moreover, a large chunk of the country's additional electricity generation capacity is planned to come from geothermal, wind, solar and hydro. If all these pieces fall into place, the country has the potential to become a continental – and possibly global – leader in the deployment of renewable technologies.[140]

Kenya is already the fourth leading producer of geothermal energy globally and first in Africa, according to the International Renewable Energy Association (IRENA).[141] According to the Geothermal Energy Association, the Rift Valley has the potential to supply roughly 15 000 MW of installed capacity across six countries (Djibouti, Ethiopia, Kenya, Rwanda, Tanzania and Uganda).[142] The Kenya Ministry of Energy and Power estimates that the valley could supply the country with up to 10 000 MW of baseload capacity.[143] Even if the actual figure were half that, it would still be sufficient to more than double the country's existing capacity. Geothermal is an important contribution to Kenya's baseload capacity, as geothermal plants produce more consistently than other renewable sources. However, much of Kenya's renewable energy is situated in remote areas that are sparsely populated and located far from major centres of economic activity, and thus would need additional infrastructure to be connected to the grid. Some challenges notwithstanding, Kenya still has significant potential to both expand and diversify its energy and electricity production profiles.

For instance, the Lake Turkana Wind Project is the continent's largest wind farm, which will produce 310 MW/h at full capacity once fully operational.[144] Further, the Great Rift Valley, which cuts through the heart of the country, is one of the most promising areas for geothermal power production in Africa. Kenya also has substantial potential for distributed generation electricity in rural areas from photovoltaic (PV) solar and wind. Like geothermal, though, much of this potential capacity is located far away from major population centres and will require additional planning and investment.

140　Power Africa, Development of Kenya's power sector 2015–2020, 2016, www.usaid.gov/sites/default/files/documents/1860/Kenya_ Power_Sector_report.pdf

141　International Renewable Energy Association (IRENA), Data and statistics dashboard, resourceirena.irena.org/gateway/ dashboard/?topic=4&subTopic=18

142　Geothermal Energy Association, US–East Africa Geothermal Partnership fact sheet, www.geo-energy.org/EastAfrica/EAGP.aspx

143　ESI Africa, Geothermal energy: 'in Kenya alone there is a potential of approximately 10 000 MW of electric power', Interview with Dr Nicholas Mariita, Chief Geothermal Training Officer KenGen, 15 July 2013, https://www.esi-africa.com/geothermal-energy-in-kenya-alone-there-is-a-potential-of-approximately-10-000-mw-of-electric-power/

144　According to IRENA, 'Renewable power generation capacity is measured as the maximum net generating capacity of power plants and other installations that use renewable energy sources to produce electricity'. While renewable facilities (notably wind and solar) can produce a given amount in ideal conditions, they cannot produce that amount of power consistently, i.e. when there is no wind or sun. Although the Lake Turkana project has been completed, it is not yet supplying energy to the grid because of a lack of transmission lines. Reuters, Turkana power line to move electricity from Loiyangalani to Suswa, *The Standard*, 9 January 2018, www.standardmedia.co.ke/business/article/2001265401/turkana-wind-power-line-70-percent-finished-to-be-complete-by-june

This chapter focuses on Kenya's energy sector, with particular attention on the targets for increasing overall capacity – and access to electricity for homes and businesses – and the development of its oil (and potentially gas) sector. It includes the following subsections:

- Current and future power landscape
- Electricity production
- Oil industry
- Assumptions for this report
- Distributed generation
- Natural resource governance

6.2   Current and future power landscape

Along with enormous potential for geothermal and wind production, Kenya is investing in hydroelectric facilities and distributed generation from solar as well. Most impressively, most of the planned increases in generation capacity are expected to come from renewable sources.[145] The biggest question mark surrounds additional geothermal capacity, where the forecast from USAID's Power Africa programme is that the country will significantly expand capacity. Any expansion will rest, however, on the ability of the government to provide the necessary support infrastructure to connect those power sources to the grid. The next largest increase is expected in wind power, with smaller increases in solar, hydro and biofuels.

Although Kenya has reason to be optimistic about its energy and electricity future, the current state of affairs is less sanguine. Despite the fact that Kenya has enjoyed one of the more rapid expansions of access to electricity of the last five to 10 years, only about 57% of the population had access in 2018.[146] Moreover, the government had expressed lofty ambitions to expand the amount of installed capacity before, announcing that it was 'firmly on course' to meet a 5 000 MW target by 2016.[147] Based on a combination of factors, including low demand and questions surrounding enabling infrastructure and the ability of consumers to afford the high price of electricity, it is doubtful if the government will be able to meet the 5 000 MW target. However, this is likely unnecessary, given that USAID estimates peak demand at approximately 3 200 MW in 2020, while the Kenya Electricity Generating Company estimates peak demand at around 1 800 MW in 2018.[148]

What is certain is that Kenya is blessed with a very diverse profile of potential energy and electricity options. Most other African countries that use renewables for a high percentage of total power generation have one, maybe two, renewable sources. For instance, Zambia uses renewables for more than 90% of its total power generation, but that is all from hydro and biomass, with no wind, solar or geothermal production.[149]

---

145 Power Africa, Development of Kenya's power sector 2015–2020, 2016, www.usaid.gov/sites/default/files/documents/1860/Kenya_Power_Sector_report.pdf
     Interviews with stakeholders in Nairobi Interviews, stakeholders assembled by KBG and HSF, Nairobi, 26 February to 2 March and 23 to 26 April 2018.

146 There is some uncertainty around the figure. According to USAID Power Africa, Kenya doubled access to electricity in the four years prior to 2015. Power Africa, Development of Kenya's power sector 2015–2020, 2016, www.usaid.gov/sites/default/files/documents/1860/Kenya_Power_Sector_report.pdf The agency has since released electricity access figures of 73%, which would represent another near doubling, this time in just three years. By comparison, it took Cambodia about 10 years to achieve an increase similar to what Kenya achieved in seven years. A similar move took Bangladesh about 20 years.

147 N Otuki, Will Kenya meet ambitious 5 000MW electricity plan?, *Business Daily*, 23 November 2015, www.businessdailyafrica.com/corporate/Will-Kenya-meet-ambitious-5-000MW-electricity-plan-/539550-2968100-7wgmylz/index.html

148 Power Africa, Development of Kenya's power sector 2015–2020, 2016, www.usaid.gov/sites/default/files/documents/1860/Kenya_Power_Sector_report.pdf; G Obulutsa, Kenya's KenGen says to add extra 1,745 MW to grid by 2025, *Reuters*, 19 February 2018, https://www.reuters.com/article/kenya-electricity/kenyas-kengen-says-to-add-extra-1745-mw-to-grid-by-2025-idUSL8N1Q928Z. The Power Africa estimate of peak demand is between 2 600 and 3 600 MW by 2020, but that figure seemed optimistic in light of current peak demand figures, and we have used a peak demand figure of 3 200 MW in 2022, rather than 2020.

149 International Energy Agency (IEA), Zambia: renewables and waste for 2015, https://www.iea.org/statistics/statisticssearch/report/?year=2015&country=ZAMBIA&product=RenewablesandWaste

Figure 6.1 shows energy production by type in Kenya over time, with a forecast to 2040. Geothermal is nestled within the 'other renewables' category, which represents the largest contribution to energy production in Kenya today and into the future.[150]

Figure 6.1: Energy production by type in Kenya
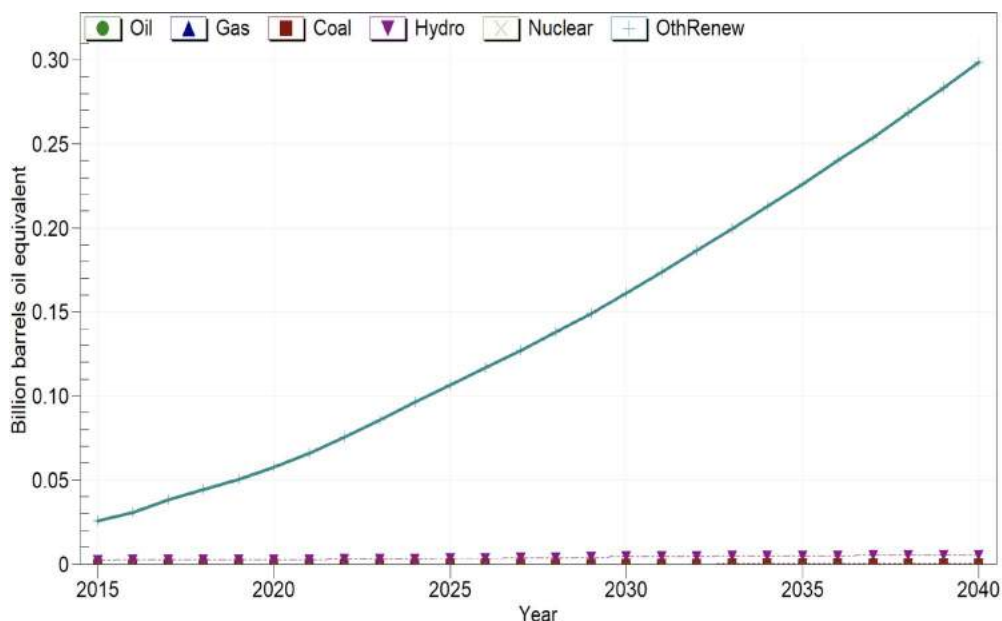
Source: IFs v 7.33 initialised from IEA data

Kenya's energy sector is at a crossroads. On the one hand, there appears to be an aggressive expansion of access underway, potentially fuelled by a rollout of small-scale renewables. There is also significant potential for other, larger-scale renewable projects from geothermal, hydroelectric and wind.

On the other hand, the government is investing in a coal-fired power plant in Lamu, and there is considerable anticipation surrounding the recent discovery of oil in the country. While the Lamu plant would supply much-needed base load capacity to Kenya's electricity grid and potentially help drive down the per kWh cost of electricity, it has other costs. For more on the Lamu coal plant see Chapter 7.

Finding the right balance between providing baseload capacity in the short term while ensuring that the country can provide environmentally sustainable solutions to its energy challenges in the long term, might serve as a bellwether for what road the country is likely to take.

6.3   Oil industry

In 2012 oil was discovered in the Lokichar Basin in Turkana County, a remote area in north-west Kenya. Since then a number of other discoveries have been made and the prospector (UK's Tullow Oil) estimates that the find can yield about 750 million barrels of recoverable reserves. Tullow has stated that it deems these reserves economically viable at US$55 a barrel, which is roughly equal to current world oil prices. Technically Kenya still has no 'proved reserves', i.e. 'commercially recoverable from a given data forward, from known reservoirs and under current economic conditions'.[151]

However, the optimism generated by the discovery of oil has been muted by the inability of the Kenyan government and its neighbours to secure a viable export route in the intervening years. Initially, Kenya planned to export its oil through a shared pipeline running from landlocked Uganda – which itself

---

150 The other renewables forecast has been adjusted slightly based on feedback from stakeholders about the potential of geothermal in the Rift Valley – see section 1.6.

151 Central Intelligence Agency (CIA), World Factbook: Crude oil – proved reserves, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2244rank.html

discovered 2.5 billion barrels of proved reserves between 2006 and 2010.[152] Oil has also been found on the other side of Lake Victoria in the DRC, and South Sudan is interested in an alternative outlet for its oil instead of continuing to rely on its northern neighbour, Sudan.

In 2016 Uganda threw a wrench in the initial plans for export eastward to the Indian Ocean when it announced its intention to go ahead with a separate pipeline located further south and running through Tanzania, not Kenya.[153] Uganda cited concerns over cost, environmental impact and security, as the proposed Kenyan site of Lamu lies close to Somalia and could present a soft target for al-Shabaab militants in the area. Figure 6.2 shows a map of the alternative pipelines. Given the number of competing producers in the region, Kenya's relatively limited reserves and the remote location of the oil – which necessitates the construction of a heated pipeline – may all augur against aggressively pursuing the development of this field at this time.

Figure 6.2: Map of potential pipeline projects in Kenya, Uganda and Tanzania
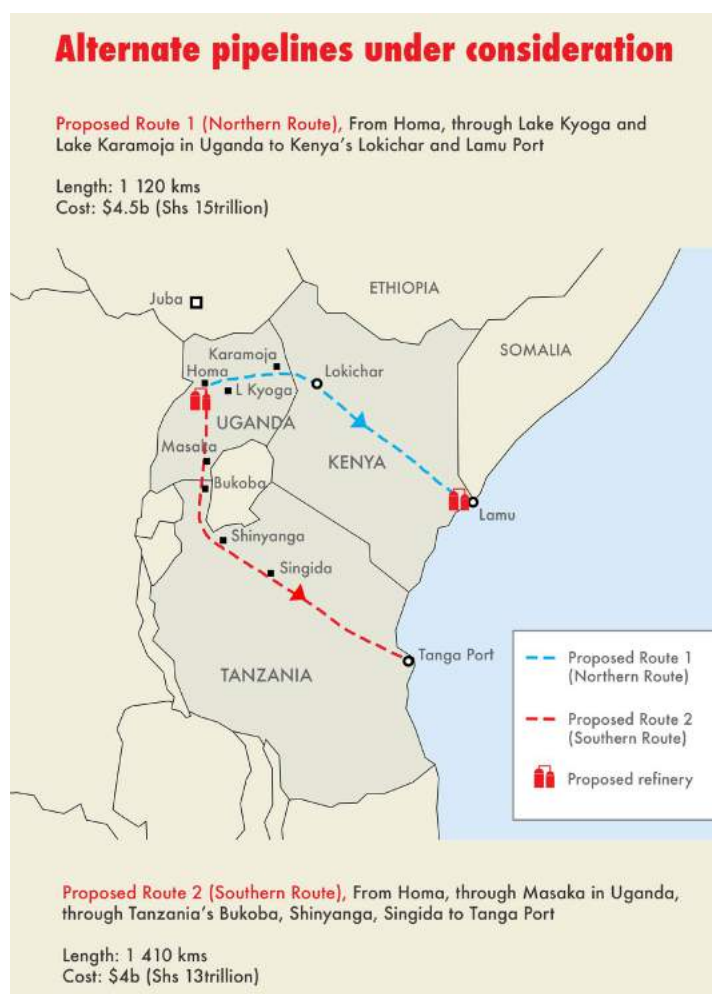
Source: Uganda Monitor[154]

In light of Uganda's decision to shift construction of its pipeline to Tanzania, the Kenyan government announced its intention to construct its own pipeline. This is not a sure thing, however. In November 2017 the government announced its intention to go ahead with a feasibility study on an 830 km pipeline running from the Lokichar region to Lamu. The proposed pipeline could carry roughly 70 000 barrels a day and

---

152 Ibid.

153 A Mwesigwa, Uganda chooses Tanzania over Kenya for oil pipeline route, *The Guardian*, 12 May 2016, www.theguardian.com/global-development/2016/may/12/uganda-chooses-tanzania-over-kenya-for-oil-pipeline-route

154 F Musisi, Total readies Shs13 trillion for oil pipeline development, *Uganda Monitor*, 16 March 2016, http://www.monitor.co.ug/Business/Markets/Total-readies-Shs13-trillion-for-oil-pipeline-development/688606-3118484-sjksgcz/index.html

provide a much-needed revenue stream for the Kenyan government. However, Tullow Oil (which owns the field) still has until 2019 to make a final investment decision.[155]

6.3.1   Potential refinery

There is significant interest in the beneficiation of natural resources in East Africa, including oil. Ethiopia, Kenya and Uganda all have plans to move forward with – or are currently developing – an oil refinery. Ethiopia is actively courting investors from Asia,[156] Kenya is contemplating two locations[157] and in August 2017 Uganda awarded a contract to a consortium including General Electric (US) and Saipem (Italy) to construct and operate a 60 000 barrel/day refinery in Hoima, the site of the proposed Ugandan refinery in Figure 6.4.[158] This has not deterred interest in Kenya and Ethiopia to construct their own refineries, however.

Mombasa is home to an aging oil refinery, once the only refinery in East Africa, which has been dormant since September 2013.[159] In March 2017 the Kenya Pipeline Corporation (KPC) signed a three-year lease to assume control of the facility, in the expectation that early oil programmes would come online in June 2017. KPC estimates that it will cost roughly US$1.9 billion to convert the refinery into a facility that can process the type of waxy crude oil located in the Lokichar basin. However, on 31 January 2018 Energy Secretary Charles Keter reiterated a decision to shift the location of the refinery to Lamu.[160] This can be seen, partly, as a reflection of the Ugandan decision to construct the pipeline with Tanzania, and adds impetus to consideration for an oil corridor to become part of the broader LAPPSET initiative, explained in more detail in Chapter 7.

Reducing dependence on imported fossil fuels will be important, as the region is set to see a fairly rapid increase in the number of motor vehicles. As incomes rise and vehicles become cheaper there will be more vehicles per capita in many East African countries than is currently the case and the IFs forecast is that vehicle uptake will be more rapid in Ethiopia and Kenya than in World Bank low-income countries, and that Kenya also has significantly more vehicles per capita than its regional peers today, and will continue to have more into the future. Between 1990 and 2011 Kenya roughly doubled the number of vehicles per capita, from 12 to 25 per 1 000 people. As incomes rise this trend is likely to continue, placing pressure on fuel supplies and further congesting existing infrastructure.

Without additional production and beneficiation capacity, these trends – higher incomes and demand for vehicles – will push up demand for fuel across the region, as shown in Figure 6.3. Although Kenya is forecast to decrease its reliance on imported energy over time, it will still be spending roughly 1.8% of GDP financing its energy needs out to 2035. The growth of energy imports in EAC countries also presents opportunities, provided Kenya is able to coordinate regional infrastructure development and policy cooperation to facilitate intra-EAC trade in energy and other goods.

155 G Obulutsa. Update 1: Kenya signs agreement for oil pipeline study, Tullow says top conservationists onboard, *Reuters*, 24 October 2017, www.reuters.com/article/kenya-pipeline/update-1-kenya-signs-agreement-for-oil-pipeline-study-tullow-says-top-conservationist-on-board-idUSL8N1MZ5Q0. This figure was revised downward from 100 000 to 70 000 barrels/day based on consultations with stakeholders.

156 P Burkhardt and N Manek, Ethiopia oil refinery planned as Blackstone pipeline shelved, *Bloomberg*, 29 January 2018, www.bloomberg.com/news/articles/2018-01-29/ethiopia-oil-refinery-proposed-as-blackstone-backed-line-shelved

157 F Aminga, Ministry rules out refining crude oil in Mombasa ahead of exports, *MediaMax*, 1 February 2018, www.mediamaxnetwork.co.ke/people-daily/405707/ministry-rules-refining-crude-oil-mombasa-ahead-exports/

158 F Ojambo, Uganda picks GE for group to develop oil refinery project, *Bloomberg*, 7 August 2017, www.bloomberg.com/news/articles/2017-08-07/uganda-government-chooses-group-with-ge-to-develop-oil-refinery

159 W Mwita, KPC takes over Mombasa refinery ahead of early oil exports from June, *The Star*, 9 March 2017, www.the-star.co.ke/news/2017/03/09/kpc-takes-over-mombasa-refinery-ahead-of-early-oil-exports-from-june_c1521044

160 F Aminga, Ministry rules out refining crude oil in Mombasa ahead of exports, *MediaMax*, 1 February 2018, www.mediamaxnetwork.co.ke/people-daily/405707/ministry-rules-refining-crude-oil-mombasa-ahead-exports/

Figure 6.3: Energy imports minus exports as a share of GDP
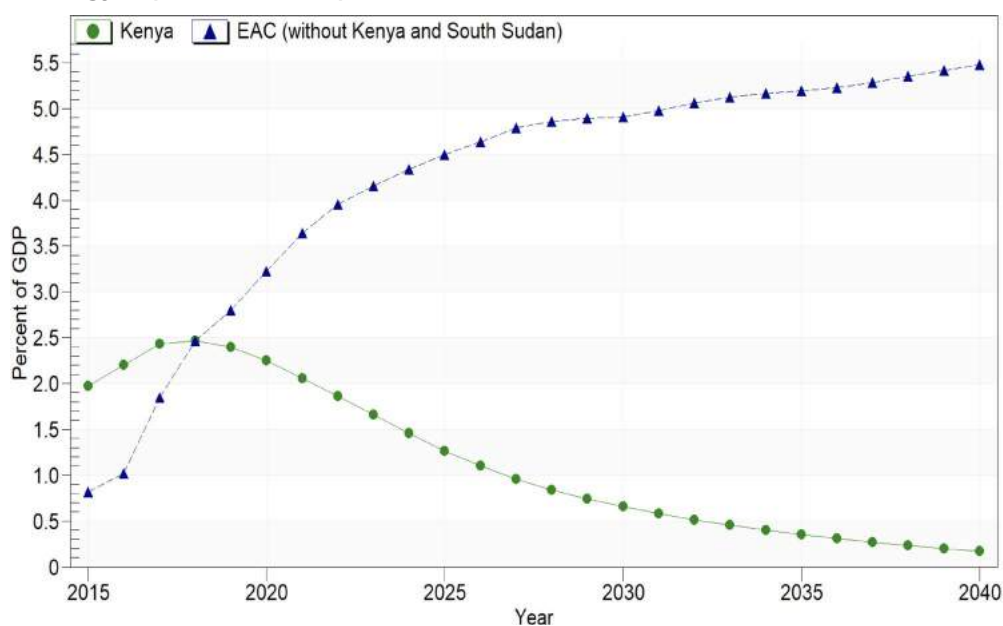
While there are opportunities for Kenya to move into the oil sector, there are still just as many if not more opportunities in other energy technologies. Moreover, while oil revenues can offer a welcome boost to government revenues, they also have the potential to fuel corruption and mismanagement.

Petroleum is Kenya's single biggest import, representing about 14% of total imports in 2015.[161]

Not only does Kenya's dependence on imported energy pose structural budgetary risks, it also leaves the country vulnerable to shocks from volatile changes in international commodity prices. Reducing the country's dependence on fossil fuels will help move the country toward a more innovative, environmentally sustainable energy mix, and help alleviate fiscal pressure on the national government – provided it is done responsibly.

6.4 Distributed generation

Another development that could figure prominently in Kenya's economic growth is the potential for small-scale renewables, possibly deployed through micro-grids, to deliver power to millions of rural Kenyans currently living without electricity. Not only can renewables deliver clean, reliable power, they can also do so at a fraction of the cost of more traditional infrastructure. As the Rocky Mountain Institute has noted, 'these rapidly evolving economics are tilting the balance in favor of micropower – leaving behind dirtier, costlier, less-flexible electricity sources, like coal and nuclear'.[162]

Another reason why renewables are becoming increasingly viable for rural communities in underdeveloped countries is that national governments no longer need to foot the bill for complex, expensive transmission lines. The US Environmental Protection Agency has identified distributed generation as a technology that can help support the 'delivery of clean, reliable power to additional customers and reduce electricity losses along transmission and distribution lines'.[163] However, supply is only part of the equation. Efforts to expand access to electricity must be paired with other interventions to enable people to have sufficient disposable income to afford to purchase that additional capacity.

---

161 Massachusetts Institute for Technology (MIT) and Organization for Economic Complexity (OEC), Imports, https://atlas.media.mit.edu/en/profile/country/ken/#Imports, using data from UNCOMTRADE, https://comtrade.un.org/

162 E Goldenfield and R Laemel, RMI's 2017 Micropower database release: electricity generation from micropower is on the rise while nuclear power's output share continues to flatline, Rocky Mountain Institute (RMI), 16 August 2017, https://rmi.org/news/rmis-2017-micropower-database-release-electricity-generation-micropower-rise-nuclear-powers-output-share-continues-flatline/

163 US Environmental Protection Agency (EPA), Distributed generation of electricity and its environmental impacts, https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts

Rural electricity access in Kenya is a significant barrier to improving human development outcomes. For one, rural households without access to electricity are forced to use traditional fuels for cooking and heating, which can significantly increase chances of contracting illnesses such as pneumonia, emphysema, cataracts, lung cancer, bronchitis and cardiovascular disease, and for low birth weight.[164] The Global Alliance for Clean Cookstoves estimates that 'exposure to smoke from traditional cookstoves and open fires' is responsible for up to 20 000 premature deaths in Kenya every year.[165]

Furthermore, this negative impact falls disproportionately on women and children. Approximately 25% of the premature respiratory deaths associated with traditional stoves (about 5 000 per year) in Kenya occur in children. Furthermore, the group estimates that women can spend up to 90% of their time collecting food and water.[166] A wider provision of basic services could significantly improve the lives of women and girls in Kenya and allow them to participate in more diverse economic and social activities.

6.5 Natural resource governance

Regardless of when oil comes online, transparent and effective management of the revenues obtained from those resources will be paramount. Although Kenya does not have a history of dependence on natural resources, the government has struggled with corruption, accountability and the effective allocation of state resources. Kenya ranks near the middle of African countries on Transparency International's Corruption Perceptions index (28 out of 49 sub-Saharan African countries), scoring 28 out of a possible 100 – a few points ahead of Cameroon (25 out of 100) but a bit behind Côte d'Ivoire (36 out of 100). Harnessing the full developmental potential of oil in Kenya will require that the government impose clear rules governing its extraction and take other measures to ensure that revenues are not mismanaged.

The 'resource curse' is the phrase typically used to describe a phenomenon whereby the presence of contestable resources 'heightens competition for control of the state' and undermines the promotion of good governance and creation of strong institutions by an 'implicit reliance on extraction in economic life'.[167] Put differently, countries with plentiful supplies of extractable resources need not spend time and money developing a social contract underpinned by mutual tax and representation relationships with their citizens. Instead, the governing elite sustain themselves by diverting the large income streams that accrue to the state for personal use without having to entertain accountability considerations from the broader population.

Kenya has much more inclusive governance than many of the countries typically associated with the resource curse. It scores far more favourably on measures of regime type (19 out of 20) and economic freedom (7.1 out of 10) than countries such as Angola (2 and 5.4), Equatorial Guinea (4 and N/A) or Chad (8 and 5.2), but continues to struggle with accountability, graft and public corruption. The presence of oil and other high-value natural resources could exacerbate those tendencies. (Also see Chapter 9 on governance for more on this issue.)

An unhealthy reliance on natural resources to finance political allegiance not only undermines the need for the state to provide basic services and ensure adherence to the rule of law but also presents other, less foreseen challenges. For instance, when commodity prices decline – as happened in 2014 – states that depend on natural resources may see unfavourable trade balances arise rapidly. In these circumstances, services tend to be curtailed and frustration mounts. These crises reveal the brittle nature of resource-based patronage systems and can compel regimes to rely on violence to compensate for their lack of legitimacy.

---

164 Global Alliance for Clean Cookstoves, Country profiles: Kenya, http://cleancookstoves.org/country-profiles/focus-countries/4-kenya.html

165 Ibid.

166 This is a global figure, although it is likely the experience of women in Kenya is similar. See Global Alliance for Clean Cookstoves, Issue areas: women & gender, http://cleancookstoves.org/impact-areas/women/

167 M Ross, The political economy of the resource curse, *World Politics*, 51:2, 1999, 297–322.

There is another side to this story as well. While dips in commodity prices may complicate governance in states with poor overall capacity, high commodity prices can further incentivise rogue actors to attempt to take over control of the state, which now appears to have more value. In Kenya, with its history of ethnic political mobilization and a series of high-profile corruption scandals, this mechanism appears to have operated via the legitimate political process. In a country with high levels of political contestation, strong ethnic divisions and pervasive urban/rural divides, the discovery of oil could increase political competition and further undermine inclusive economic development.

Revenue from oil would certainly be a boon to the Kenyan economy. Exported oil can be used to pay down levels of debt, expand service delivery or finance new infrastructure projects or food imports. If used for any or all of those purposes, Kenya's modest future oil production could unlock significant human and economic development. On the other hand, if those rents were to accrue to only a small political and business elite, they could deter investment and increase perceptions of corruption. This could be particularly relevant given the location of the discovery.

Turkana County is one of the poorest and most remote parts of Kenya. According to Oxfam, poverty levels are among the highest in the country (more than 94% of the population) and residents also have low levels of education (about 82% have no formal schooling) and poor access to other basic services.[168]

Perceptions that local resources are being exploited to enrich a few elites in Nairobi or abroad, rather than improve the livelihoods of those in the community, could easily foster resentment. This could be significantly exacerbated if there are negative environmental consequences from the presence of extractive industries.[169]

The discovery of oil should be treated with guarded optimism. However, it is likely not as valuable a resource as Kenya's renewable energy potential, examined elsewhere in this chapter. Therefore, the aim expressed in the MTP 3 Concept Note to 'accord priority to foster investment in upstream, midstream and downstream infrastructure to facilitate development of the country's oil and mineral resources sector' could be misplaced.[170]

6.6   Conclusion

Kenya is already a leader, both in Africa and globally, in terms of the potential of its renewable sector. It is a diverse player in the renewable space (fourth leading producer of geothermal globally) and produces power from all five major sources of renewables (geothermal, hydro, wind, solar, biofuel). However, a new coal plant and the discovery of oil threaten to derail that progressive future. The government need not turn its back on fossil fuels, but should also develop its energy sector with an eye to the future. This means employing a diverse mix of generation technologies that provide not only baseload capacity but also an environmentally sustainable source of energy over the long run.

In terms of electricity access, distributed generation offers great potential for rural electrification in Kenya without the expense of a traditional network of transmission lines. In addition to geothermal there is significant potential for wind and solar in the country. Crucially, oil revenues must be managed transparently and effectively to ensure that the additional funds are employed to maximise human and economic development for the entire country.

The interventions in Chapter 10 represent a responsible and modest development of the oil sector over time.

---

168 Oxfam, Testing community consent: Tullow oil project in Kenya, Oxfam, 2017. d1tn3vj7xz9fdh.cloudfront.net/s3fs-public/file_attachments/bp-testing-community-consent-tullow-oil-kenya-081117-en.pdf

169 There are several empirical examples of this, perhaps most prominently in the Niger Delta. See, among others, J Omotola, From the OMPADEC to the NDDC: an assessment of state responses to environmental insecurity in the Niger Delta, Nigeria, *Africa Today*, 54:1, 2007.

170 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

Chapter 7: Infrastructure

7.1   Introduction

Improving the quality and overall stock of infrastructure in Kenya is a core component of the government's long-term growth and development strategy. The foreword to MTP 2 states that 'to further enhance efficiency and competitiveness of our economy, the government will devote more investment to infrastructure and the key sectors of the economy that will drive growth particularly through public private partnership agreements'.[171] This commitment to infrastructure is also reflected in the government's positioning of infrastructure as a key 'enabler' of its larger Vision 2030 strategy.

Sound infrastructure can buttress economic productivity, promote healthy lifestyles, facilitate better education outcomes and support effective governance.[172] However, Kenya currently has a significant infrastructure deficit that is likely hampering not only economic growth but also livelihoods and opportunities throughout the country. Investment in infrastructure is necessary in Kenya, and part of government plans, but infrastructure is a broad term and it is important to sequence the construction of infrastructure in a way that promotes not only economic growth but also human development and well-being.

Kenya lags well behind other lower-middle-income countries in Africa in nearly every category of basic infrastructure explored in this report. The country also falls behind the group of global peer countries, and its level of infrastructure is more in line with that of low-income African countries. Figure 7.1 shows the contribution to GDP growth (positive or negative) in Kenya from the four drivers of multifactor productivity conceptualised in IFs.[173]

A lack of physical capital (i.e. a lack of basic infrastructure) is the most significant hindrance to more rapid economic growth in Kenya today, and is likely to remain so until the end of the forecast horizon.

Infrastructure deficits are common in Africa, and physical capital is a negative contribution to productivity in the peer group used for this report, as well as in Africa's low-income and other lower-middle-income countries. Not only does this infrastructure deficit present challenges for human development – the consequences of a lack of access to clean water and improved sanitation facilities for health and education outcomes are good examples – but it can also inhibit macro-economic development in important ways.[174] For example, the lack of regional infrastructure between neighbouring countries in Africa acts as a barrier to regional trade and deters foreign investment.[175]

---

171 Republic of Kenya, Office of the Presidency, Ministry of Devolution and Planning, Second Medium Term Plan 2013–2017: Transforming Kenya: pathway to devolution, socio-economic development, equity and national unity, 2013. devolutionasals.go.ke/wp-content/uploads/2018/04/Ministry-of-Devolution-and-Planning-Strategic-Plan-2013.2017-revised-version.pdf

172 D Rothman et al., *Patterns of potential human progress volume 4: building global infrastructure*, Frederick S Pardee Center For International Futures, 2014, https://pardee.du.edu/pphp-4-building-global-infrastructure

173 These are variations on the classic economic model pioneered by Cobb and Douglas and later modified by Solow. The Solow growth residual attempts to identify the level of economic growth not measured by growth in labour and capital, i.e. growth attributed to technology. For more information on multifactor productivity see Chapter 8 in this publication and B Hughes, IFs economics documentation v21, February 2014, 28, http://pardee.du.edu/ifs-economic-model-documentation

174 D Rothman et al., *Patterns of potential human progress volume 4: building global infrastructure*, Frederick S Pardee Center For International Futures, 2014, https://pardee.du.edu/pphp-4-building-global-infrastructure

175 W Davis, Tracking regional integration in Africa, *Bridges Africa*, 5:8, 18 October 2016.

Figure 7.1: The four contributors to multifactor productivity represented in IFs for Kenya
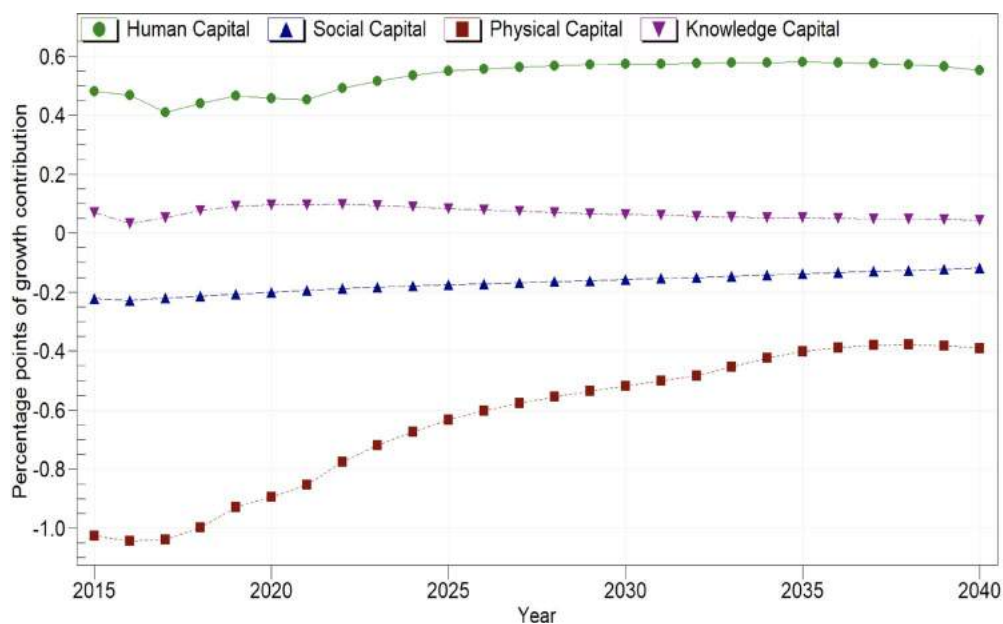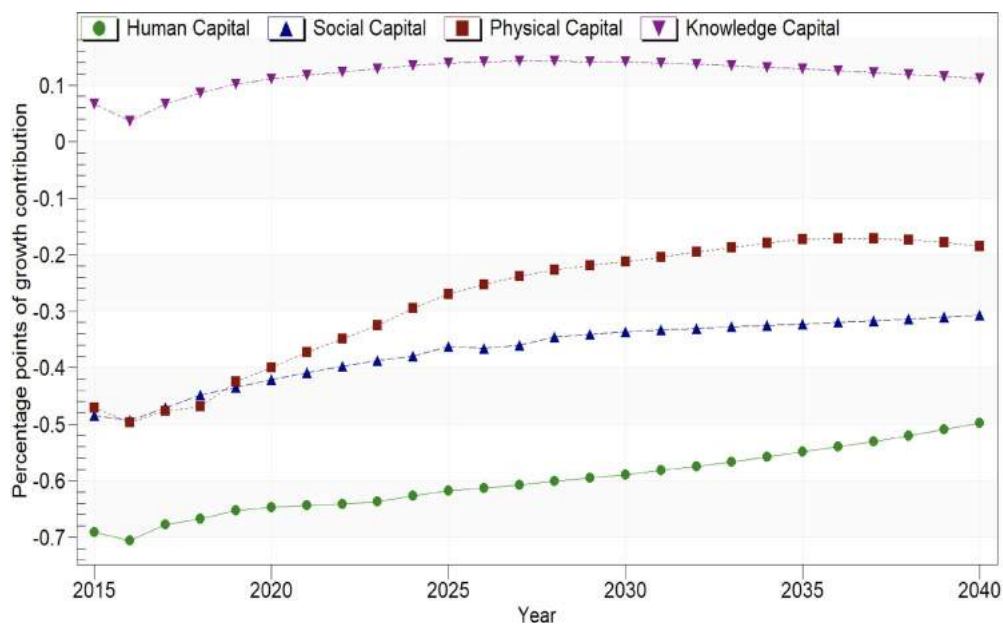

Source: IFs v. 7.33 initialised from World Bank, IMF and OECD data

However, this is not a global trend. Looking at the peer group of six countries, a lack of physical capital is still a drag on economic growth, but not nearly to the same extent as in Kenya. The largest drag on productivity in the comparison group is human capital, which in Kenya makes a positive contribution to growth. These two figures are not directly comparable because the indicators themselves are composites and made up of many different variables, so it is not possible to precisely determine what is driving a positive or negative contribution at a glance.

That being said, the comparison is made to draw attention to the general area, other things being equal, in which productivity is being lost in the respective country/group.

Figure 7.2: The four contributors to productivity represented in IFs for the peer group

Source: IFs v. 7.33 initialised from World Bank, IMF and OECD data

The Kenyan government identified improving physical infrastructure as one of the key pillars of national transformation in Vision 2030, and it is a highly visible component in subsequent strategic planning documents. The Concept Note for MTP 3 places most of its emphasis on improving the transportation

network and assuring a reliable supply of electricity.[176] In fact, the rollout of electricity is one of the resounding success stories in Kenya's recent history, although there are important trade-offs to consider going forward. The MTP 3 also includes a particularly aggressive target of increasing the country's generation capacity to about 5 500 MW during the five-year time period to 2022. In addition, the government devotes significant attention to the development of WASH infrastructure in the social pillar of MTP 2.

7.2   Clean water

According to the latest data (2015) from the UNICEF/WHO Joint Monitoring Project (JMP), access to improved water sources in Kenya (67%) is just a bit higher than in low-income African countries (66%) and well behind that in lower-middle-income African countries (82%) and the peer group used in this report (91%).

Figure 7.3: Clean water access
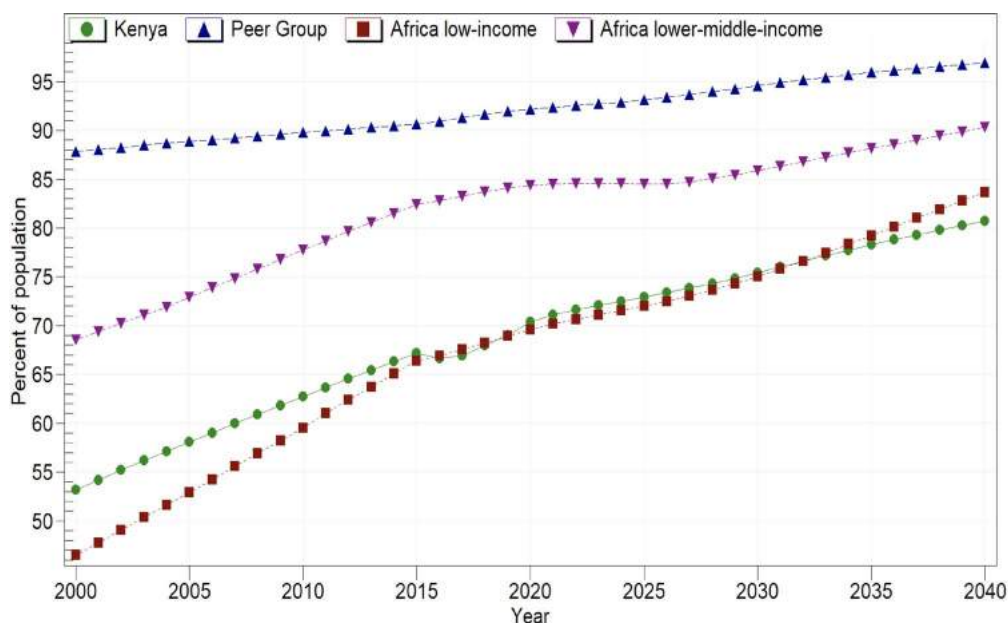
Source: IFs v 7.33 initialised from JMP data

Figure 7.3 shows not only that access to clean water is a large problem in Kenya today, but also that, on average, other low-income African countries have actually closed the gap with Kenya since 2000. While access to improved water sources[177] was about 6 percentage points higher in Kenya than in low-income African countries in 2000, it is roughly the same today and forecast to be about 3 percentage points lower by 2040. Although the gap between Kenya and other lower-middle-income Africa slowly decreases over time, in 2040 Kenya will still be trailing other lower-middle-income African countries by about 10 percentage points.

The comparison with the peer group is also instructive. While Kenyans had an access rate to clean drinking water that was on par with that in Cambodia (52%) in 2000, by the end of the MDG period in 2015 Cambodia had catapulted to more than 8 percentage points higher than Kenya. Looking ahead, Kenya is forecast to reduce the gap with its peer group from 24 percentage points in 2017 to 16 percentage points in 2040 in the Stuck in Traffic scenario. However, Kenya is able to close the gap, in part because three

---

176 IFs separates infrastructure into two broad categories: 'core' infrastructure (e.g. roads, electricity, sanitation) and 'other' more advanced types of infrastructure (e.g. airports, seaports, railroads). Much of the MTP 2 targets (e.g. aviation, shipping and maritime, railway transport) fall into the 'other' category.

177 The Joint Monitoring Project (JMP) of the WHO and UNICEF defines an improved source as 'one that by the nature of its construction and when properly used, adequately protects the source from outside contamination, particularly faecal matter'. WHO and UNICEF, Joint Monitoring Programme: improved and unimproved water sources and sanitation facilities, www.wssinfo. org/definitionsmethods/watsan-categories/

countries achieve universal access before 2040 (Bangladesh, Côte d'Ivoire and Pakistan) while another (Cambodia) is just on the cusp in the final year of the forecast.

Table 7.1: Access rate (% of population) to clean water

	Kenya	Bangladesh	Cambodia	Cameroon
2000	53.2	95.8	41.6	64.3
2015	67.2	98.5	75.54	75.5
2022	71.3	100	80	78.5
2027	73.3	100	82.4	80.5
2030	74.8	100	84.6	82.1
2040	80.1	100	96.2	89.6

Source: IFs v. 7.33 initialised from JMP data

Access to clean water is crucial for human development. Drinking contaminated water significantly increases chances of contracting a communicable disease, particularly for children, and is also a leading driver of diarrheal disease, which can lead to malnourishment and eventually stunting.[178] Not only are stunted individuals prevented from reaching their full physical potential but they also suffer cognitive impairment that can prevent them from developing fully mentally. (See Chapter 3 for more information on stunting.)

7.3   Improved sanitation

Kenya only fares slightly better (relative to clean water access) in terms of access to improved sanitation, as the country still falls below the average for other lower-middle-income African countries.[179] Furthermore, like access to clean water, Kenya failed to make any progress and actually experienced a slight regression during the MDG period.

Access to improved sanitation facilities in Kenya fell from about 31% in 2000 to just below 30% in 2015, while low-income Africa and the peer group both increased access by 5 and 20 percentage points respectively. In other words, since 2000 Kenya has made far slower progress in improving sanitation access than even low-income African countries, as shown in Figure 7.4.

Although Kenya is forecast to begin to close the gap in access to improved sanitation between itself and other lower-middle-income countries in Africa, in the Stuck in Traffic scenario only about 53% of Kenyans will have access to improved sanitation facilities in 2040. This will leave the country well short of the SDG and government targets of universal sanitation by 2030.[180] This trend will also leave more than 37 million people (in 2040) vulnerable to increased risk of contracting a communicable disease and the other negative health effects associated with a lack of access to adequate sanitation facilities.[181]

Kenya's position relative to the average for Africa is not much more favourable. Although the country is closer to the expected value,[182] as shown in Figure 7.5, it still falls well behind other countries at comparable

178 D Rothman et al., *Patterns of potential human progress volume 4: building global infrastructure*, Frederick S Pardee Center For International Futures, 2014, https://pardee.du.edu/pphp-4-building-global-infrastructure

179 According to the JMP, 'improved sanitation facilities are those that that hygienically separates human excreta from human contact'. WHO and UNICEF, Joint Monitoring Programme: improved and unimproved water sources and sanitation facilities, www.wssinfo. org/definitionsmethods/watsan-categories/

180 Government of Kenya, Ministry of Health, Kenya Environmental Sanitation and Hygiene Policy 2016–2030, 2016, xviii, http:// sanitationandwaterforall.org/wp-content/uploads/download-manager-files/KESH%20POLICY_1.pdf

181 D Rothman et al., *Patterns of potential human progress volume 4: building global infrastructure*, Frederick S Pardee Center For International Futures, 2014, https://pardee.du.edu/pphp-4-building-global-infrastructure

182 A bivariate regression is used to calculate an expected value using GDP per capita at PPP, which is then compared to the actual value for improved sanitation facilities from the WHO UNICEF JMP.

levels of economic development, such as Senegal. Lack of access to improved sanitation facilities is a significant barrier to educational attainment and can hinder productivity over the long run.[183]

Figure 7.4: Access to improved sanitation
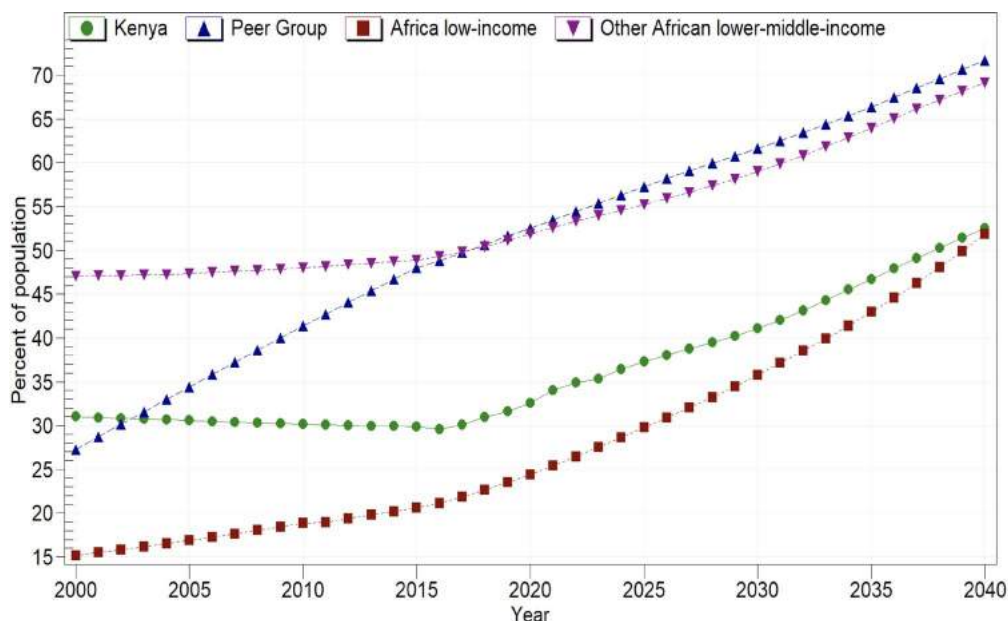
Source: IFs v 7.33 initialised from JMP data

Figure 7.5: Bivariate regression with GDP per capita (PPP) and improved sanitation access for all African countries in 2015
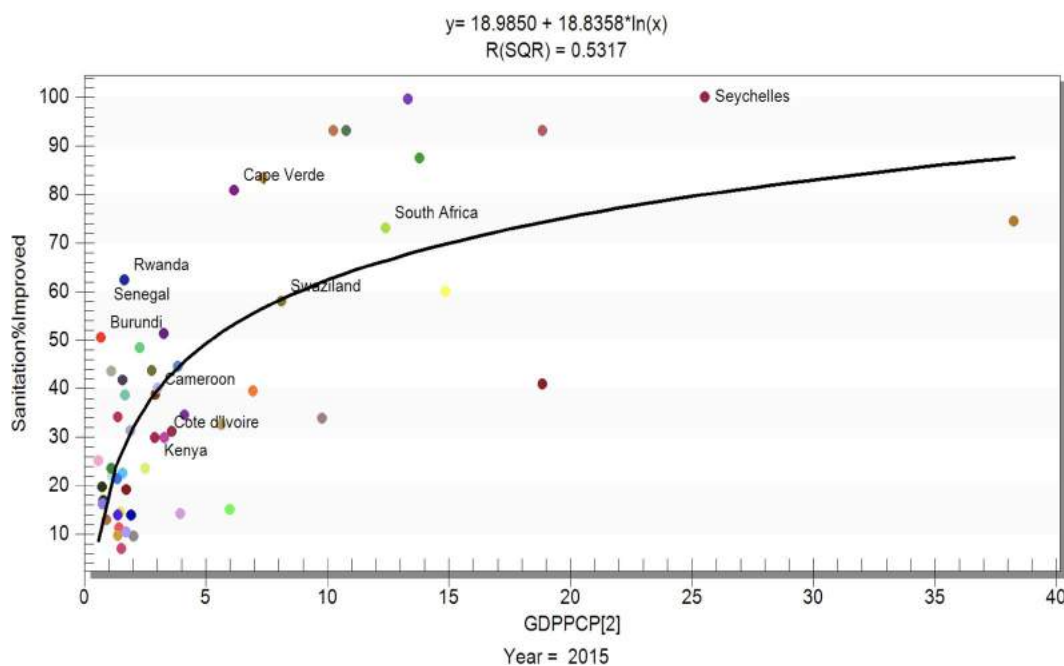
Source: IFs v. 7.33 using WB and JMP data

A lack of access to WASH facilities is correlated with increased rates of childhood malnutrition, stunting and infant mortality.[184] UNICEF estimates that half of the 1 600 or so children who die daily from diarrheal disease (a major burden in Kenya's health sector) do so because they cannot regularly access proper WASH

183 D Rothman et al., *Patterns of potential human progress volume 4: building global infrastructure*, Frederick S Pardee Center For International Futures, 2014, https://pardee.du.edu/pphp-4-building-global-infrastructure
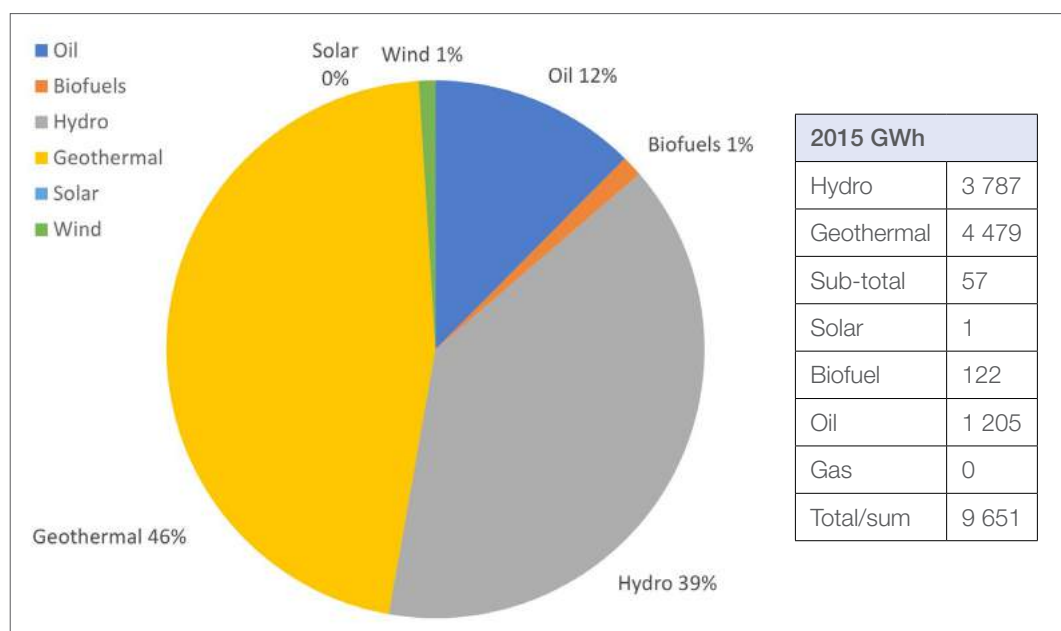
184 Ibid.

infrastructure.[185] Along with a negative impact on children, the lack of WASH infrastructure disproportionately harms women and perpetuates gender inequality.[186] In Africa, women are much more likely to suffer morbidity at the hands of a communicable disease, and to die from a communicable disease during childbearing years.[187] Apart from the immediate health effects of gender inequality, women are also often forced to leave school early because a lack of access to improved sanitation facilities prevents adequate menstrual hygiene.[188]

Expanding access to WASH infrastructure will be a major challenge for many African countries going forward, given the extremely low rates of access, large rural populations and lack of other basic infrastructure such as roads and electricity. That said, enormous gains in human and economic development can be achieved by a moderate improvement in access rates. A 2015 paper by the ISS found that Africa will not come anywhere close to achieving SDG 6.2 (universal sanitation access), but that substantial gains in economic and human development can be achieved from even a modest push to increase access.[189]

7.4   Electricity production

Because Kenya's power mix is dominated by renewables, the country's installed capacity (electricity) and total energy production figures vary slightly. Figure 7.6 shows electricity production by type in Kenya in 2015 according to the International Energy Agency (IEA).[190]

Figure 7.6: Kenya: electricity production by fuel type

2015 GWh	
Hydro	3 787
Geothermal	4 479
Sub-total	57
Solar	1
Biofuel	122
Oil	1 205
Gas	0
Total/sum	9 651

Source: IEA

185 UNICEF, Water, sanitation and hygiene, How WASH relates to health, education, and development, 30 June 2015, https://www.unicef.org/wash/index_healthandeducation.html

186 For examples of gender impacts see LM Harris, Water rich, resource poor: intersections of gender, poverty, and vulnerability in newly irrigated areas of southeastern Turkey, *World Development*, 36:12, 2008; T Wallace and F Porter, Introduction, *Gender & Development*, 18:1, 2010.

187 This is according to data from IFs obtained from the WHO for 2015. See also A-M Hildson and Z Donnenfeld, Why African health policy needs gender mainstreaming, *ISS Today*, 16 January 2018, https://issafrica.org/iss-today/why-african-health-policy-needs-gender-mainstreaming

188 A study from Malawi found that just 46% of girls who reached adolescence before age 14 finished primary school, against 70% who reached it after 16, owing to a lack of appropriate menstrual hygiene management resources. See M Sommer, Menarche: a missing indicator in population health from low-income countries, *Public Health Reports*, 128:5, 2013.

189 A Markle and Z Donnenfeld, Refreshing Africa's future: prospects for achieving universal WASH access by 2030, ISS, African Futures Paper 17, June 2016, https://issafrica.org/research/papers/refreshing-africas-future-prospects-for-achieving-universal-wash-access-by-2030

190 IEA, Statistics: Kenya, www.iea.org/statistics/statisticssearch/report/?year=2015&country=Kenya&product=ElectricityandHeat

Kenya is currently reliant on renewable energy, but the government is planning on moving toward a more mixed electricity production profile in the coming years, in part because the cost of electricity is currently extremely high, even by developing country standards. At roughly US$0.15/kwh, electricity in Kenya is a bit more costly than the African average of US$0.14/kwh, and far more than the averages of US$0.04/kwh and US$0.07/kwh in South Asia and East Asia, respectively.[191] Lowering the price of electricity will be crucial if the government hopes to substantially increase the share of manufacturing exports, particularly since neighbouring Ethiopia provides electricity at about US$0.04/kwh, even before having completed Africa's largest hydroelectric facility – the Grand Ethiopian Renaissance Dam.

The Kenyan government is currently planning on building a 1 000 MW coal plant in Lamu, which could supply much-needed baseload capacity for the grid.[192] However, the plant was originally built on the grounds that the country had coal reserves that it could exploit, which would also reduce dependence on imported fuel.[193] It now appears that Kenya will import coal from South Africa to run the plant, which could drive up energy costs and make it difficult to reduce the price of electricity in the long run. Further, the construction of the plant is currently being held up by a pending court case.[194] Nonetheless, in 2015 energy from renewable sources accounted for approximately 87% of Kenya's total electricity produced.

Lack of access to electricity in Kenya is a significant barrier to economic growth and human development.[195] Improved electricity access is also identified as an important component of the country's infrastructure plan and is regularly identified – along with generation capacity – as a critical development goal in the Vision 2030 document and the subsequent MTPs.

As noted, the country has made rapid progress recently, increasing national access from about 15% in 2000 to around 60% in 2018. However, this still places it behind countries such as Cameroon (64%) and Côte d'Ivoire (65%), and firmly behind global peers such as Pakistan (96%) and Bangladesh (73%). A lack of an affordable and reliable source of electricity can disincentivise investment into key sectors such as manufacturing and agro-processing and hamper broader efforts to further industrialise.

However, there has been significant uncertainty around this figure. USAID has increased the figure for total access from around 26% in 2011 and about 45% in 2014 to more than 70% in 2018.[196] For context, it took Bangladesh 23 years to move from 21% to 62% access. So, if these figures are accurate there will have been a nearly unprecedented rollout of electricity access. Kenya is also more than four times the size (in total land area) of Bangladesh, which makes the feat that much more impressive.

However, in the Stuck in Traffic forecast only about 80% of Kenya's total population is forecast to have access to electricity in 2040. This places Kenya relatively equal to other lower-middle-income African countries in 2040, but not quite at the level of the peer group used in the report. While access to electricity

191 AfDB, The high cost of electricity generation in Africa, 18 February 2013, https://www.afdb.org/en/blogs/afdb-championing-inclusive-growth-across-africa/post/the-high-cost-of-electricity-generation-in-africa-11496/

192 J Kamau, Power, politics and economy of the coal-fired plant in Lamu, *The Nation*, 10 April 2018, https://www.nation.co.ke/news/Power--politics-economy-of-coal-fired-plant-in-Lamu-/1056-4379590-112cm0xz/index.html

193 D Obura, As China has boosted renewable energy production it's moved dirty coal production to Africa, *Quartz*, 26 September 2017, qz.com/1087050/china-moved-coal-production-to-kenya-with-risky-environmental-impact/

194 S Sengupta, Why build Kenya's first coal plant? Hint: think China, *New York Times*, 27 February 2018, www.nytimes.com/2018/02/27/climate/coal-kenya-china-power.html

195 K Kandie, Lack of Energy Harms Economy, *The Star*, 11 January 2018, www.the-star.co.ke/news/2018/01/11/lack-of-energy-harms-economy_c1696166

196 USAID, Kenya Power Africa fact sheet, March 2018, https://www.usaid.gov/powerafrica/kenya
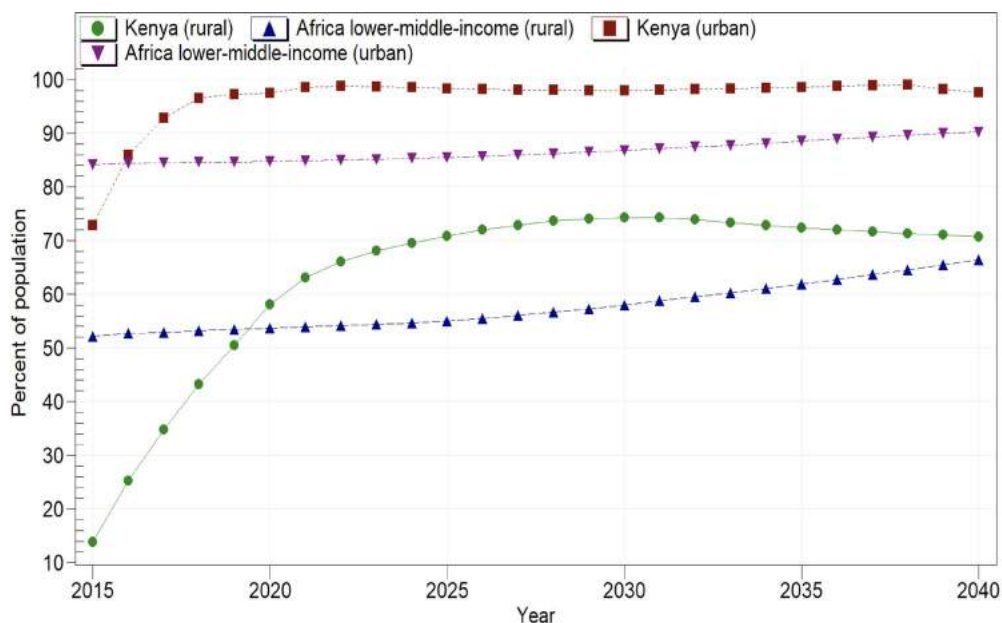
is a problem in general, that 45% figure is heavily skewed toward urban areas. IFs estimates that only about 35% of rural Kenyans have access to electricity in 2018, while the urban figure is 98%.[197]

Figure 7.7: Electricity access
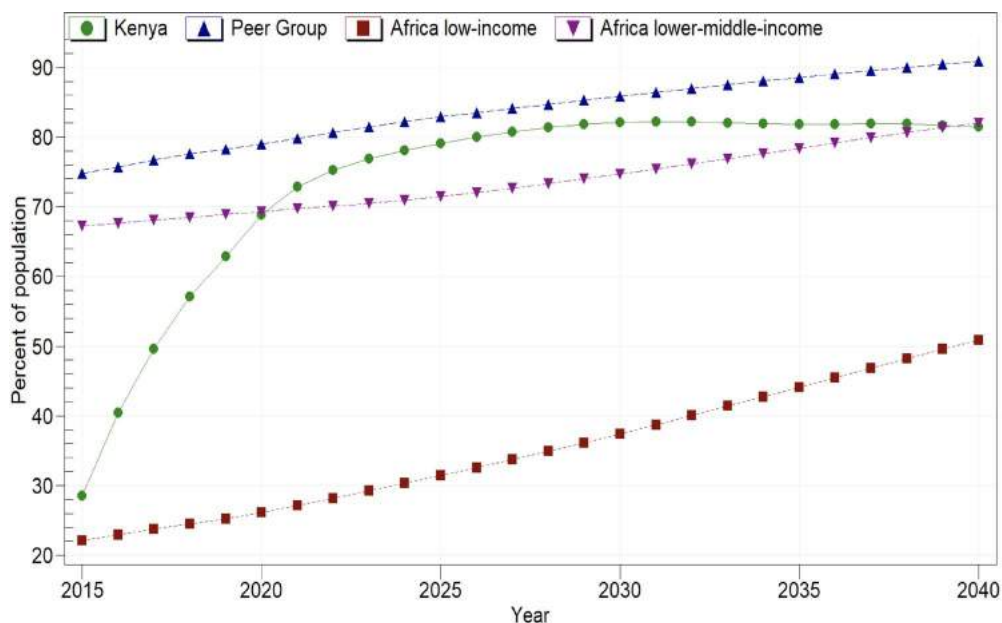
Source: IFs v. 7.33 initialised from WB data

Figure 7.8: Urban and rural electricity access rates

Source: IFs v. 7.33 initialised from WB data

In addition to its impact as a facilitator of economic activity, access to electricity can also minimise traditional fuel use in the home, which is a powerful driver of respiratory infections and other ailments, particularly among women. Moreover, insufficient and unreliable access to electricity can serve as a

---

197 Much remains to be seen about the recent expansion of electricity in Kenya, e.g. the distribution in terms of rural/urban, the reliability and source of the connections and even the reliability of the figures. Electricity data in IFs is taken from World Bank, World Development Indicators, Kenya, https://data.worldbank.org/country/kenya, supplemented with documents from USAID, Power Africa, *Development of Kenya's power sector 2015–2020*, https://www.usaid.gov/sites/default/files/documents/1860/Kenya_Power_Sector_report.pdf and USAID, Kenya Power Africa factsheet, March 2018, https://www.usaid.gov/powerafrica/kenya

deterrent to investment and can have harmful effects on economic growth and job creation.[198] Both of these elements – a healthy, productive workforce, and a strong incentive to attract investment, foreign and domestic – are crucial if Kenya hopes to realise its goal of becoming an upper-middle-income country by the end of the SDG period.

7.5   Roads and transportation

Road access is another facet of Kenya's Vision 2030 and various MTPs. MTP 2 set a target of an additional 65 400 km of 'well maintained and motorable roads'.[199] According to the most recent data in IFs (2011), Kenya had approximately 161 000 km of roads, of which about 11 200 km were paved. This translates into less than 10% of Kenya's total road network being paved, a similar level to that of Cambodia.

As a share of total roads, the percentage of paved roads in Kenya is significantly lower than in all of the peer countries (irrespective of geography), except for Cambodia. According to the IFs forecast, the percentage of paved roads in Cambodia will surpass that of Kenya in the mid-2020s, leaving Kenya with the lowest percentage of paved roads of any country in the forecast through 2040. By contrast, Pakistan, which is about 50% larger than Kenya in terms of landmass, has 262 000 km of total roads, more than 70% of which are paved.

Although the country struggles in terms of overall access to roads and the percentage of those roads that are paved, rural communities have about average access to roads, relative to global and continental peer countries. Moreover, expanding road access is a key pillar of the government's infrastructure strategy, with routes planned along the Northern Corridor as part of the LAPSSET initiative, as well as other large projects.

Figure 7.9: Percent of rural population with access to an all-season road
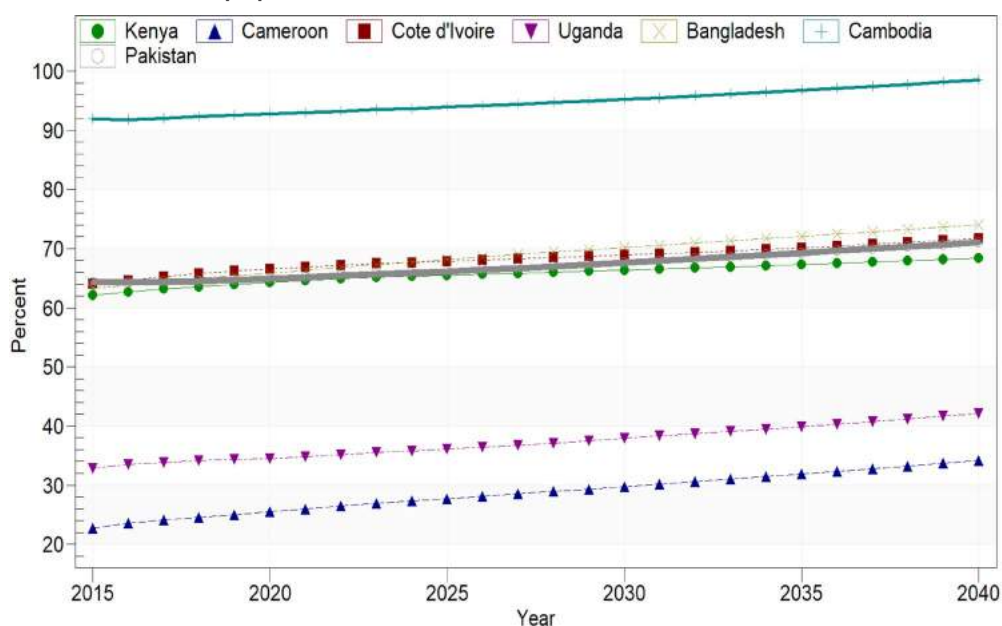
Source: IFs v. 7.33 initialised from WB data

Rural road access is important for both human and economic development. Improving the quantity and quality of rural roads can help mitigate post-production and pre-consumption agricultural losses, and improve food security and the livelihoods of individuals working in small-scale agriculture. Rural roads can

---

198 B Hughes et al., *Patterns of potential human progress volume 3: improving global health*, Frederick S Pardee Center for International Studies, 2011, www.pardee.du.edu/patterns-potential-human-progress

199 Government of Kenya, Second Medium Term Plan (2013–2017), 2012, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/Second%20Medium%20Term%20Plan%202013%20-2017.pdf

also facilitate the delivery of other basic supplies, including medicine, school supplies and foodstuffs not locally produced.

Another reason road networks are important in developing countries is that, with the rapid rise in disposable incomes, the absolute number of vehicles and other automobiles often increases faster than the road network's capacity to carry them, resulting in a rise in traffic fatalities. Kenya is forecast to suffer more traffic fatalities per 1 000 people than other countries when compared to the peer group and other low-middle income countries in Africa, although all show a steady increase out to 2040.

Figure 7.10: Traffic fatalities
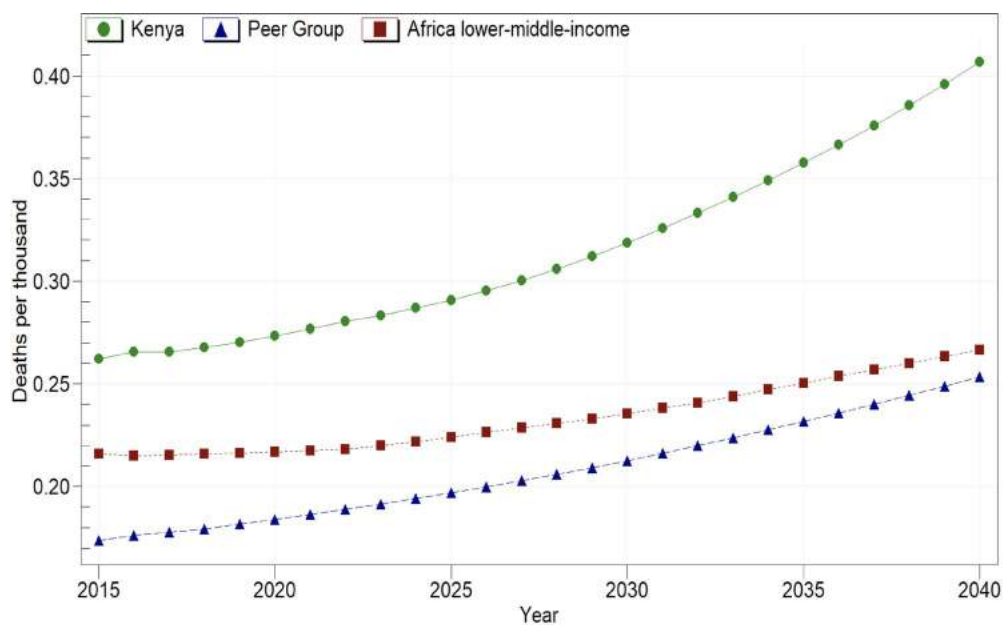
Source: IFs v. 7.33 initialised from WHO data

The Kenyan Ministry of Health estimates that between 50 and 70% of occupancy in hospitals nationwide can be attributed to some form of road accident.[200]

Along with roads, the country has also constructed the Standard Gauge Railway (SGR), connecting Nairobi and Mombasa with freight and passenger services. The Nairobi section was completed in 2017 but had to temporarily suspend freight transport owing to a lack of sufficient cargo volume.[201] The railway is only operating at about 10% of the anticipated volume and there have also been some rumblings that the alleged benefits from the railway are not accruing to the affected communities.[202]

7.6   Information and communications technology

Alongside infrastructure, information and communications technology (ICT) is listed as another key enabler in the MTP 3 and will presumably feature prominently in subsequent national development plans.[203] The ICT sector has been a phenomenal success story in Kenya, both socially and economically, with M-Pesa likely being the most widely cited example. A recent study of the mobile money service found that it had lifted nearly 200 000 people out of poverty since its inception in 2007.[204] Today, more than 95% of

---

200 Government of Kenya, Ministry of Health, Sector Plan for Health 2013–2017, 2013, www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/SECTOR%20PLAN%20FOR%20HEALTH%202013-2017.pdf

201 B Otieno, Kenya Railways insists importers must use SGR to transport cargo, *The Nation*, 24 February 2018, https://www.nation.co.ke/business/Kenya-Railways-insists-importers-must-use-SGR-to-transport-cargo/996-4317992-8132ma/index.html

202 A Olingo, Kenya's SGR cargo volumes cast doubt on its viability, *East African Standard*, 4 March 2018, http://www.theeastafrican.co.ke/business/Kenya-SGR-cargo-volumes-cast-doubt-on-its-viability-/2560-4327638-k1o6ya/index.html

203 Government of Kenya, The Presidency, The Third Medium Term Plan, (2018–2022) for Vision 2030, http://www.mtp3.go.ke/#

204 T Suri and W Jack, The long-run poverty and gender impacts of mobile money, *Science*, 354:6317, December 2016, 1288–1292.

households in Kenya have an M-Pesa account, and the service is now looking to expand aggressively to neighbouring countries.

That success notwithstanding, there is still significant potential to expand national ICT infrastructure and give all Kenyans the opportunity to access the world of possibilities that the Internet can provide.

Improving access to the Internet has been one of the remarkable success stories of the last 10 years in Kenya. While access rates began improving across the continent around 2005, in Kenya there was a dramatic acceleration beginning in 2009. In 2009 citizens of Uganda (13%) and Kenya (14%) had similar levels of access to the Internet. But by 2015 access rates in Kenya were more than twice that of any peer country. The phenomenal rate of uptake undoubtedly helped contribute to the 6% average GDP growth the country experienced during that time period, and will no doubt be a cornerstone of development planning going forward, as shown through the growth accounting in the economics section.[205]

Figure 7.11: Population with access to the Internet
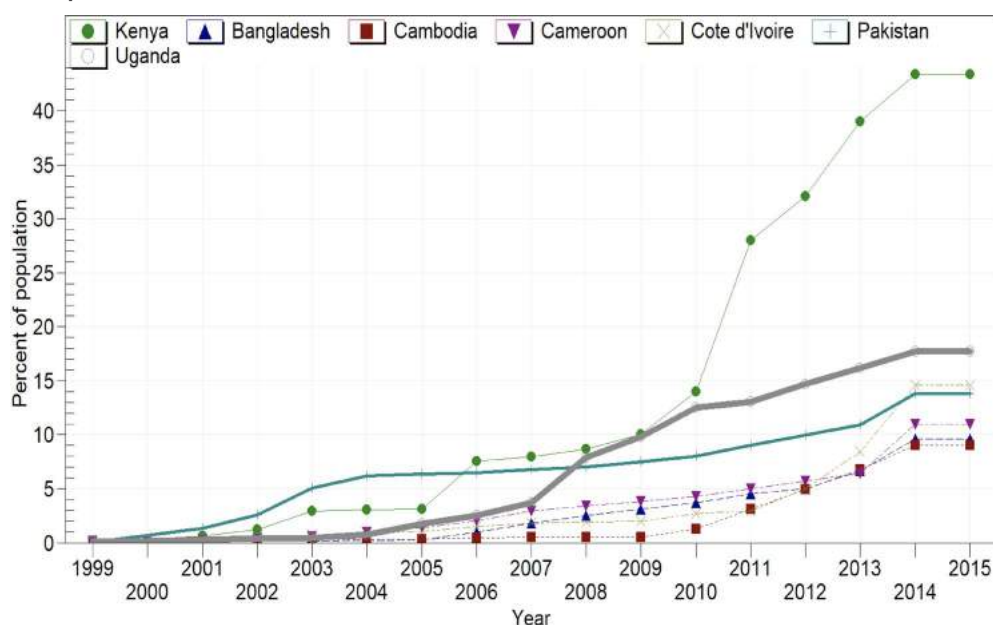
Source: IFs v 7.33 using data from the International Telecommunication Union (ITU)

Despite its reputation as an early adopter of mobile technology, Kenya has relatively average levels of mobile phone penetration relative to its African peer countries. Although the country did move quickly, from almost no mobile phone subscriptions per 100 people in 2000 to more than 60 per 100 in 2010, Côte d'Ivoire and Cambodia have both surpassed Kenya in the last five to seven years, while Bangladesh has more or less pulled even. Nonetheless, Kenya is on track to pass 100 subscriptions per 100 people around 2020 and is forecast to steadily outpace uptake in neighbouring Uganda.

However, because IFs measures access to various metrics of ICT in terms of subscriptions, it does not sufficiently account for the rise of pay-as-you-go telecommunications services over the last 10 to 15 years and likely underrepresents the extent of mobile broadband penetration over that time period.

Although the ICT industry has clearly been a success story for Kenya as a country, on an individual level, the government still has a lot of work to do until the opportunities presented by the next wave of technology are a reality for all of Kenya's citizens. Innovations such as M-Pesa and centres such as iHub will undoubtedly make an important contribution to economic growth, but they need to be fostered by a favourable regulatory environment, along with a sustained commitment to investing in different types of

---

205 J Manyika and C Roxburgh, *The great transformer: the impact of the Internet on economic growth and prosperity*, McKinsey Global Institute, October 2011, https://www.mckinsey.com/~/media/McKinsey/Industries/High%20Tech/Our%20Insights/The%20 great%20transformer/MGI_Impact_of_Internet_on_economic_growth.ashx
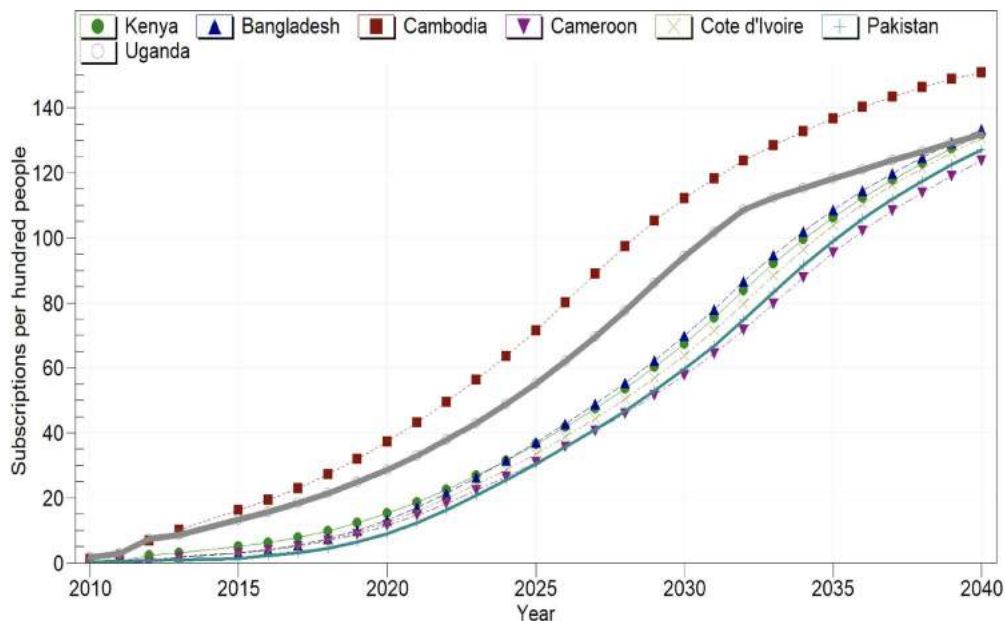
infrastructure, ICT included. Much like other areas of infrastructure, public–private partnerships will be critical, as the recent rollout of 4G mobile broadband has highlighted.[206]

Figure 7.12: Mobile phone subscriptions per 100 people
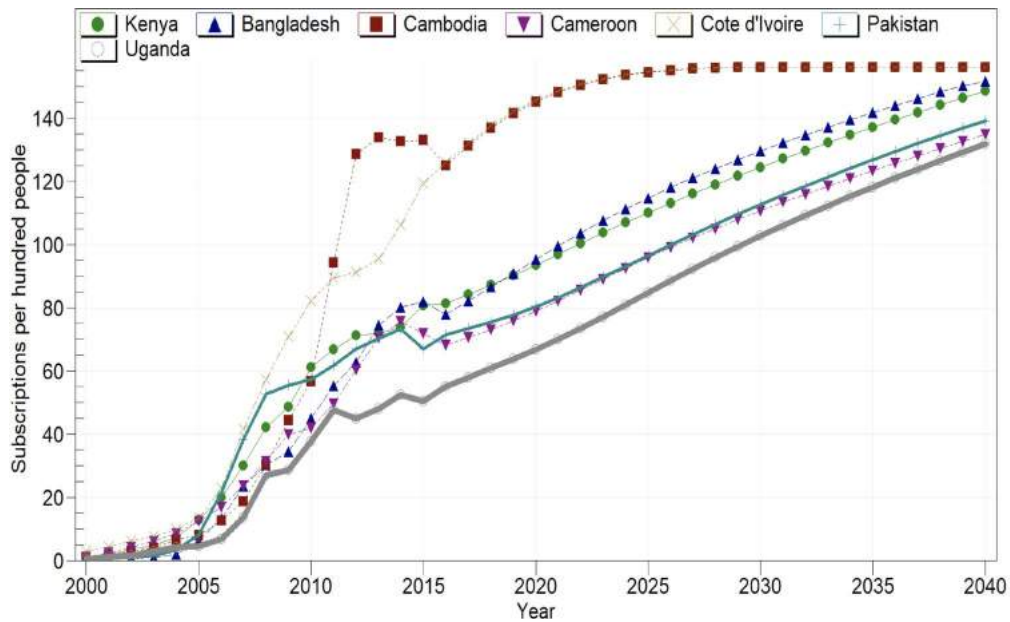
Figure 7.13: Mobile broadband subscriptions per 100 people

What's more, in January 2017 the Kenya ICT Authority won the award for Best Digital Institution at the seventh East Africa CIO 100 Awards.[207] Along with adopting ICT for transport management, civil registrations systems, financial management and land registration, many Kenyans are lobbying for the expansion of fibre infrastructure throughout the country.

---

206 M Mutegi, Airtel Kenya begins 4G Internet test run next week, *Daily Nation*, 27 January 2017, https://www.nation.co.ke/business/Airtel-Kenya-begins-4G-Internet-test-run-next-week/996-3789160-mhu4v5/index.html

207 K Abuya, Kenya's ICT authority bags gold mark award, plans to deploy hosting services for national and county governments, *TechWeez*, 17 January 2018, http://www.techweez.com/2018/01/17/ict-authority-gold-mark-award/

Not only will connecting more Kenyans to ICT infrastructure allow more people to explore their creativity and embrace the entrepreneurial spirit for which Kenya is, in part, famous, but it will also allow the country to take advantage of new technologies in science, education and medicine that can improve the lives of the economically and socially marginalised. Embracing public–private partnerships in ICT could see Kenya emerging as an economic and cultural leader in the region. In fact, progress in this area may serve as a template for success in other areas of national development.

7.7   The LAPSSET Corridor

Along with a sustained push on infrastructure across various national planning documents, there are also several flagship infrastructure projects in the pipeline that could prove transformative for the country and the region. The LAPSSET (Lamu Port, South Sudan, Ethiopia Transport) Corridor is perhaps chief among these. LAPSSET bills itself as East Africa's most ambitious infrastructure project that will ultimately integrate seven key infrastructure projects to connect Kenya, Ethiopia and South Sudan.[208] It is a part of Vision 2030 and funded through a hybrid of public–private partnerships and international assistance. If the project is implemented to scale it could significantly contribute to its stated goal of solidifying Kenya 'as a gateway and a transport and logistics hub to the East African sub-region and the Great Lakes region to facilitate trade, promote regional economic integration and interconnectivity between African countries'.[209]

In reality, LAPSSET is a collection of projects and some are already complete. For example, the 526 km Isiolo–Moyale road was completed in October 2016, and Isiolo International Airport was opened in July 2017.[210] However, some of the projects have suffered from fairly significant setbacks (e.g. the proposed crude oil pipeline) and the scope of the project is so grandiose (it includes three new resort cities) that it will be challenging to complete by 2030. Moreover, the governor of Isiolo has recently called for the airport's runway to be lengthened by more than 100%, as well as for better lighting to accommodate night flights, a shed to hold cargo planes, and improved air traffic control, in order to increase traffic from the one flight per day currently operating out of the new facility.[211]

Even if LAPSSET is only partially completed, a large push on infrastructure will facilitate trade and promote regional integration. If it is completed, Kenya will boast some of the most sophisticated infrastructure on the continent.

7.8   Infrastructure finance

Kenya has a dearth of infrastructure relative to other countries around the world at a similar level of income and development. This is because of a history of low spending and accusations that large-scale corruption has increased the cost of projects.[212] Kenya and the group of peer countries have historically spent on infrastructure at similar levels, albeit still below the average for other lower-middle-income countries.

However, the Kenyan government has plans to change that. According to the Stuck in Traffic scenario, the country will be spending significantly more on infrastructure (just over 5% of GDP) over the coming years, relative to the historical average of 4.5%. Many of the large infrastructure projects, such as the Lake Turkana Wind Farm and the Lamu coal plant, will take substantive investment and will likely draw money away from

---

208 Specifically, LAPSSET consists of a new 32-berth port at Lamu (Kenya); interregional highways from Lamu to Isiolo, Isiolo to Juba (South Sudan), Isiolo to Addis Ababa (Ethiopia), and Lamu to Garsen (Kenya); a crude oil pipeline from Lamu to Isiolo and onward to Juba; a product oil pipeline from Lamu to Isiolo and onward to Addis Ababa; an interregional standard gauge railway line from Lamu to Isiolo to Juba and Addis Ababa, and Nairobi to Isiolo; three international airports: one each at Lamu, Isiolo and Lake Turkana; three resort cities: one each at Lamu, Isiolo and Lake Turkana; and the multipurpose High Grand Falls Dam along the Tana River. See Government of Kenya, LAPSSET, http://www.lapsset.go.ke/#1461328856794-2dee9bba-e774

209 Government of Kenya, Office of the Presidency, Projects, http://www.president.go.ke/projects/lappset-projects/

210 A Abdi, Two projects under Lapsset in northern Kenya completed, *Standard Digital*, 4 January 2018, https://www.standardmedia.co.ke/business/article/2001264891/lapsset-opens-up-northern-kenya

211 D Dibondo, Isiolo Airport runway should be expanded – governor, *The Star*, 19 January 2018, www.the-star.co.ke/news/2018/01/19/isiolo-airport-runway-should-be-expanded-governor_c1699941

212 *The Economist*, Kenya's white elephant, 24 March 2018.

other development priorities. This may not be a bad thing, but it is a trade-off that policymakers should be aware of and try to mitigate.

Figure 7.14: Infrastructure spending in Kenya, peer group and other lower-middle-income African countries
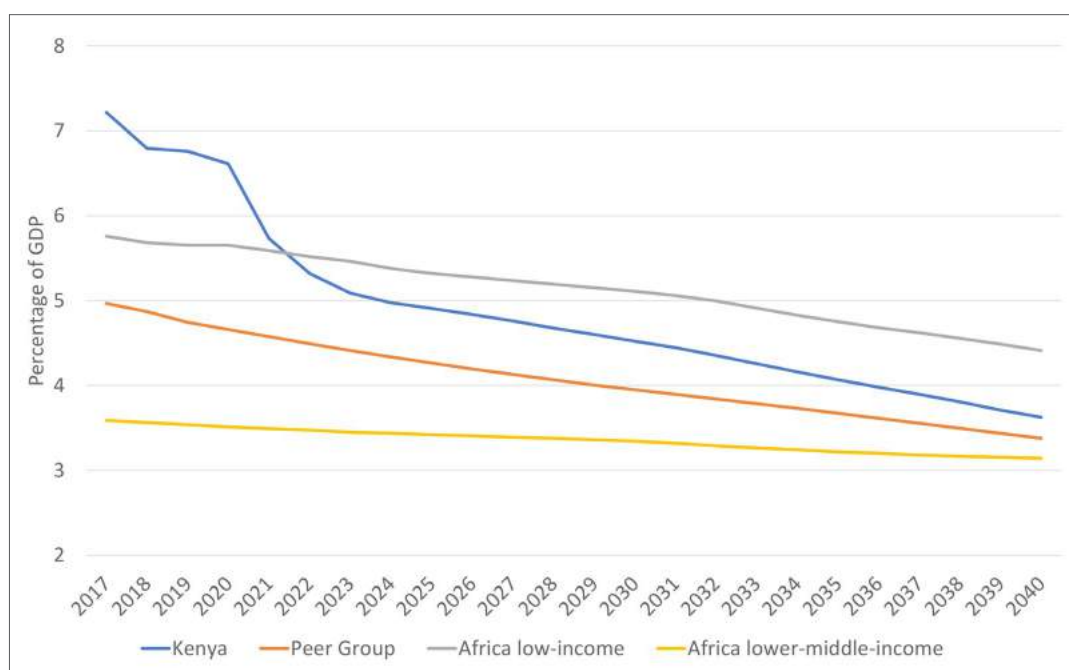
Source: IFs v 7.33

Sustained, high levels of spending on infrastructure in the group of other lower-middle-income countries have generated a sizeable stock of infrastructure and will allow them to spend less on core infrastructure over time, in line with global trends, as shown in Figure 7.14. This tendency to spend less on infrastructure as a percentage of GDP, even as absolute figures increase, is fairly consistent as countries become more affluent. Research suggests that most upper-middle-income countries 'have seen public spending on infrastructure as a percent of GDP decline or remain flat over the last few decades'.[213] Infrastructure has 'large start-up costs relative to the more modest incremental costs associated with their expansion and maintenance'.[214] In other words, core or basic infrastructure is expensive to construct, but compared to that start-up cost, relatively inexpensive to maintain. Given Kenya's infrastructure deficit, it is likely necessary to increase spending on the sector in the short term and allow it to taper off over the course of the forecast.

Core infrastructure spending can have significant benefits for the entire Kenyan economy, but there are always trade-offs that are difficult to measure. The IMF studied infrastructure spending in several countries from 1985–2014 and found that an unanticipated 1% increase in public infrastructure boosted GDP by 0.4% the following year, but by 1.5% four years later.[215] The Economic Policy Institute agrees, noting in a 2014 report that 'our analysis confirms with a large and growing body of literature persuasively arguing that infrastructure investments can boost even private sector productivity growth'.[216] But the opportunity cost of investing in different types of infrastructure is a counterfactual that cannot be pinned down.

213 D Rothman et al., *Patterns of potential human progress volume 4: building global infrastructure*, Frederick S Pardee Center For International Futures, 2014, 48, https://pardee.du.edu/pphp-4-building-global-infrastructure

214 Ibid., 48.

215 International Monetary Fund (IMF), Is it time for an infrastructure push? The macroeconomic effects of public investment, IMF, October 2014. http://www.imf.org/external/pubs/ft/weo/2014/02/

216 J Bivens, The short and long-term impacts of infrastructure investments on employment activity in the US economy, Economic Policy Institute, July 2014. https://www.epi.org/publication/short-long-term-impacts-infrastructure-investments/

Although the Kenyan government has identified the construction and maintenance of core infrastructure as a key enabler of economic growth and improved human development, it has taken that stance before. In its 2007 National Environmental Sanitation and Hygiene Policy, the government stated that '90 percent of households will have access to a hygienic affordable, and sustainable toilet facility, improved housing, food safety, usage of safe drinking water'.[217] However, by the conclusion of the MDG period only 63% of Kenyans had access to clean drinking water and just 30% had access to improved sanitation facilities. Moreover, in its analysis of Kenya the Economist Intelligence Unit noted that 'basic infrastructure suffers from poor management and lack of investment' and is one of the principal risk factors for the country in the near to medium term.[218]

7.9 Conclusion

Kenya has a deficit of core infrastructure that is currently inhibiting economic growth and human development. The government has plans to invest heavily in infrastructure over the medium term but it is unclear what the major priorities are going to be. While the recent gains in electricity access are a much-needed step, more must be done, particularly in the areas of clean water and improved sanitation.

The government must combine large infrastructure projects – aimed at attracting investment and stimulating economic growth – with more small-scale projects to provide the fundamentals of human development to the millions of Kenyans currently living without them.

The scenarios presented in Chapter 10 represent the potential impact of policy interventions that improve access to clean water and improved sanitation facilities between 2019 and 2023.

---

217 Republic of Kenya, Ministry of Health, National Environmental Sanitation and Hygiene Policy, 2007, https://www.ircwash.org/sites/default/files/824-KE07-19289.pdf

218 Economist Intelligence Unit, Quarterly report Kenya: August 2018.

Chapter 8: Economics

8.1   Introduction

Vision 2030 envisions the structural transformation of Kenya's economy into an upper-middle-income economy by 2030.[219] Central to this transformation is reaching an ambitious target of 10% annual GDP growth by 2022, largely by expanding the manufacturing sector from 13.4% (2017) to 15% of GDP by 2022, supporting exports and developing Kenya's oil and mineral resources.[220] The government has also set out a number of other ambitious macroeconomic targets as part of this plan, summarised in Table 8.1.

However, there are formidable obstacles to sustainable and shared economic prosperity in Kenya and it is unlikely that it will join the ranks of the world's upper-middle-income economies by 2030. High rates of poverty, unemployment (especially among youth), corruption, drought and periodic escalations in political uncertainty are among the country's most critical concerns.[221] Chapter 7 also highlighted how Kenya's infrastructure deficit poses serious challenges to human development, along with structural obstacles to further development of the manufacturing and oil and mineral resources sectors. Moreover, it is unlikely that Kenya will reach the first SDG of ending poverty in all its forms everywhere by 2030 in the Stuck in Traffic scenario (see section 8.9).

That said, the Stuck in Traffic scenario suggests that Kenya's growth rate will be above average for sub-Saharan Africa and other lower-middle-income African countries. The country's geography contributes to this growth in that it offers certain comparative advantages over many of the landlocked countries of the EAC. Kenya is the distribution and transportation hub of East Africa and the second largest supplier of ICT and financial services in sub-Saharan Africa.[222]

Continuing to develop port facilities and road and railway infrastructure connecting the Port of Mombasa to the rest of the country will help to bolster economic growth.[223] Along with these key infrastructure projects, there are also several special economic zones planned, which aim to contribute to Kenya's goal of becoming the continent's financial hub. Further development of the SGR as it progresses in Phase II, the construction of the Lokichar–Lamu crude oil pipeline and other elements of the LAPSSET initiative will also be key to this process.

---

219 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, 1, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

220 Ibid.

221 MS Kimenya et al., *African lions: Kenya country case study*, Brookings, Report, 16 May 2016, 1.

222 Ibid., 2

223 Ibid., 1.

Table 8.1: Key macroeconomic targets for MTP 2018–2022 (IFs values in parentheses)

Indicator	2018	2022
Real GDP growth	6.3%	10.0% (*6.5%*)
Investment/GDP	24.4%	27.2% (*21.5%*)
Domestic savings/GDP	18.3%	24.6% (*22.7%*)
Exports/GDP	19.2%	29.0% (*17.2%*)
Imports/GDP	31.5%	33.9% (*28.3%*)
Public debt/GDP	47.3%	49.1% (*59.6%*)

Source: MTP 2018–2022 Concept Note

Evident from Table 8.1 is that by 2022, the Stuck in Traffic forecast is for lower absolute growth, lower levels of foreign and domestic investment, fewer exports and more imports with a larger debt than the targets set out in the MTP 2018–2022.

The following sections will analyse Kenya's recent economic performance and likely trajectory within a regional and global context. The key dimensions reviewed include:

- GDP
- Sectoral breakdown of growth and output
- Growth accounting
- Investment and finance
- Trade
- Income
- Poverty and inequality

8.2   GDP

Kenya's economy has matured significantly since the turn of the century. Kenya's GDP at MER, which measures the economy's absolute size, more than doubled from 2000 (US$25.9 billion) to 2015 (US$51.7 billion).[224] This places Kenya as the eighth largest (out of 54) African economy and the 18th largest (out of 52) lower-middle-income economy globally in 2015. According to IMF projections, Kenya's GDP (MER) had increased to US$57.5 billion by 2017.

Kenya has long been the economic hub of East Africa. However, IFs projects that the Ethiopian economy will overtake Kenya in absolute size by 2023 and that the Tanzanian economy will overtake Kenya around 2030. By 2030 Kenya is forecast to have an economy of US$125.1 billion compared to US$158.9 billion and US$125 billion for Ethiopia and Tanzania respectively. This trend reflects the fact that Ethiopia's population is more than twice the size of Kenya's and is forecast to remain so until 2040, while Tanzania's population is slightly larger (about 14%) today but forecast to be more than 30% larger by 2040. This demographic pressure will allow both countries to experience sustained high levels of absolute economic growth over the forecast.

IFs projects that Kenya will not be able to reach the MTP 3's macroeconomic goal of 10% annual GDP growth in 2022.[225] Rather, IFs forecasts that the economy will grow by 6.5% in 2022 and achieve an average rate of growth of 6.2% for the period 2018–2030, and 6.6% in the period 2030–2040.

Although the GDP growth forecast in IFs falls short of the targets set forth in the MTP 3 and Vision 2030, they are still above average for sub-Saharan Africa and other lower-middle-income African countries. Figure

---

224 The World Bank estimates that Kenya's GDP per capita (in 2010 constant US$) was US$52.33 billion, which equals US$53.99 billion in 2011 US$ used in this report. The difference between these two values is US$1.63 billion.

225 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, 15, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

8.2 shows that after a period of depressed growth (1990–2010), the Kenyan economy has outperformed sub-Saharan Africa, recording an average GDP growth rate of 6% per year between 2010 and 2015. Further, the Stuck in Traffic scenario suggests that Kenya will continue to grow faster than the average for both sub-Saharan African and other African lower-middle-income countries for the duration of the forecast.

Figure 8.1: GDP (MER)
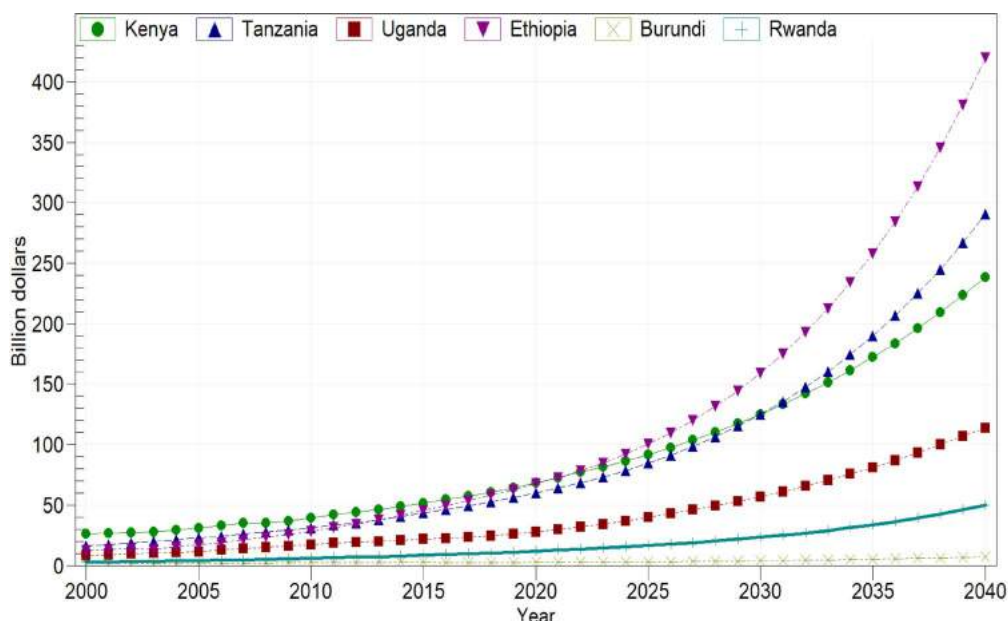
Source: IFs v 7.33 initialised from IMF data

Figure 8.2: GDP growth rate (using a five-year moving average)
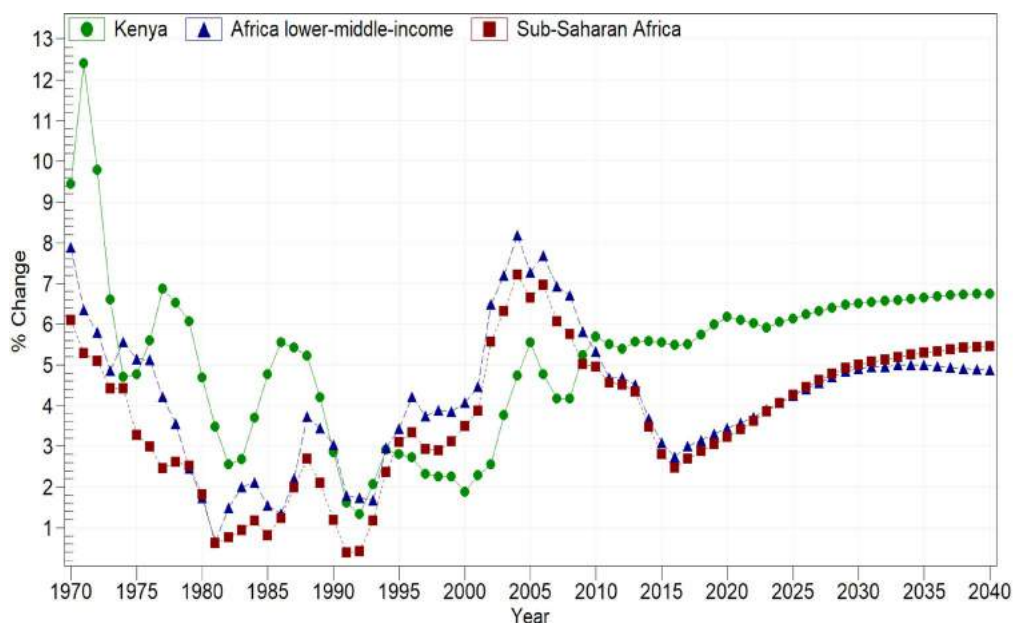
Source: IFs v 7.33 initialised from IMF data

The World Bank projects that the GNI per capita threshold for upper-middle-income economies in 2030 will be approximately US$5 600 measured by inflation in high-income economies.[226] Kenya's 2016 GNI per capita of US$1 380 (current US$) places the country toward the low end of lower-middle-income

---

226 B Handjiski et al., Kenya – Country economic memorandum: from economic growth to jobs and shared prosperity, World Bank Group, 2016, 5, http://documents.worldbank.org/curated/en/763771468197384854/Kenya-Country-economic-memorandum-from-economic-growth-to-jobs-and-shared-prosperity

economies, which have a GNI per capita of between US$1 006 and $3 955.[227] By one estimate, reaching the upper-middle-income threshold would require Kenya to increase GNI per capita by more than 400% over the next 13 years.[228]

8.3   Sectoral breakdown of growth

The MTP 3 asserts that 'the low and declining shares in manufacturing, industrial and exporting sectors in GDP constitute a major challenge [to economic growth'.[229] Increasing the size of the country's manufacturing sector with an emphasis on exported goods is one of the Big Four agenda items. Key to this effort will be strategic efforts to improve areas such as agro-processing, and other industries that sit at the cross-section between manufacturing and other sectors of the economy. Despite this effort, the value added of the manufacturing sector as a portion of GDP has decreased over the last decade, although it has still grown in absolute value. Manufacturing's value added accounted for 11.6% of GDP in 2000 but only 11.4% in 2015.[230]

In absolute terms, the manufacturing sector nearly doubled in size over that period, growing from US$3 billion to US$5.9 billion – but just barely outpacing growth in the rest of the economy.

From about 1975 until around 2005, Kenya's economic development trajectory looked relatively unremarkable. For economies to mature and become more productive, economic output needs to shift away from the agricultural sector towards higher value-added activities, i.e. manufacturing and higher-end services. In Kenya, the share of agriculture's value add contribution to GDP dropped from about 34% in 1975 to about 23% in 2007, while services increased from 46% of GDP in 1975 to 55% in 2007.[231]

However, since around 2007 Kenya's economic development has progressed counter to this prevailing narrative about how lower-middle-income countries should develop. Between 2007 and 2015 agriculture as a share of GDP increased from about 23% to 33%, reflecting a general recovery following the 2007 PEV, which had led to the forcible displacement of farmers in the Rift Valley. Meanwhile, services' value add contribution fell from 55% of GDP in 2007 to 48% in 2015.

The relative contribution of the manufacturing sector actually declined over this same period, from 15% of GDP in 2007 to 11% in 2015. This suggests that the government has not been successful in its attempts to expand the manufacturing sector, and does not bode well for the ability of the government to achieve some of the industrialisation goals outlined in the MTP 3 and Vision 2030.[232]

Figure 8.3 shows the likely future trajectory of value added by sector in manufacturing, services and agriculture in the Stuck in Traffic forecast to 2040.

This shows that most growth, in an absolute sense, is likely to come in the service sector, while the largest relative gains will come in the manufacturing sector. Agriculture is forecast to grow, but much more slowly than the economy as a whole, which will result in its share of value added declining over time.

227 World Bank, World Bank country and lending groups, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

228 B Handjiski et al., Kenya – Country economic memorandum: from economic growth to jobs and shared prosperity, World Bank Group, 2016, 5, http://documents.worldbank.org/curated/en/763771468197384854/Kenya-Country-economic-memorandum-from-economic-growth-to-jobs-and-shared-prosperity
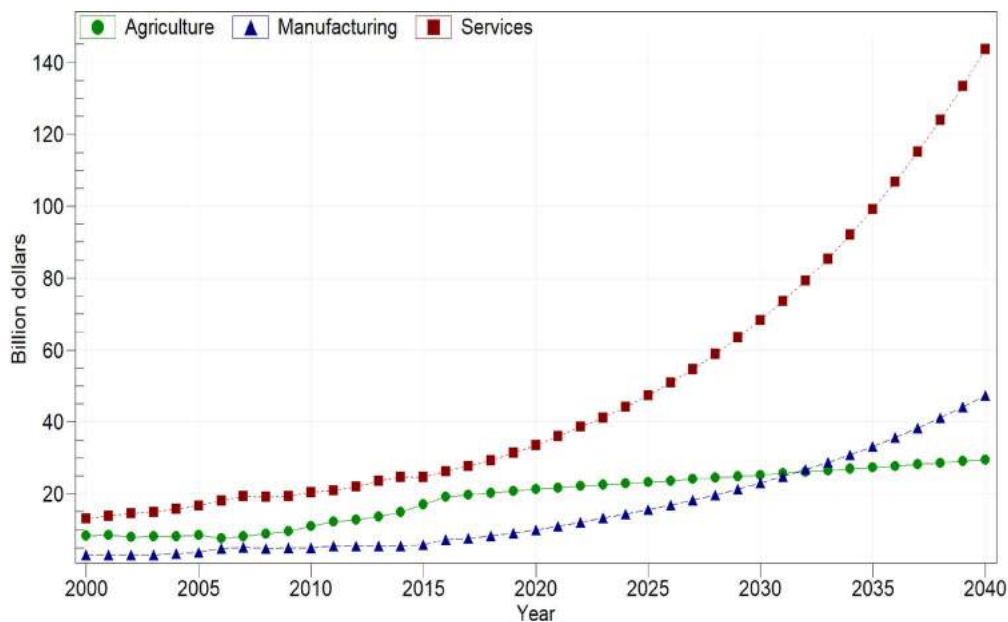
229 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, 11, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

230 The World Bank defines value added as 'the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.' This definition available under 'Detailed information' here: https://datamarket.com/data/set/15ad/industry-including-construction-value-added-of-gdp#!ds=15ad!hb9=5x.6r.6h.5t&display=line

231 Kenya was not able to successfully develop a manufacturing industry over this time period, as the share of GDP from manufacturing rose from about 12% to about 14%.

232 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, 15, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

Figure 8.3: Kenya: value added by sector, US$ billion

Figure 8.4 shows which sectors contributed the most to year-on-year economic growth in Kenya in 2016. As expected, the agriculture, forestry and fishing industry added the most to overall GDP, growing by more than 15% from the previous year. The manufacturing sector grew by about 6%, or just barely fast enough to keep up with overall economic growth of 5.8% in 2016. The services sector had a more disparate performance in 2016. While some sectors (e.g. real estate and transport and storage) performed well above the average for the Kenyan economy, other sectors, notably domestic trade, suffered a contraction relative to their 2015 value.

Figure 8.4: Kenya: contribution to GDP growth by sub-sector in 2016
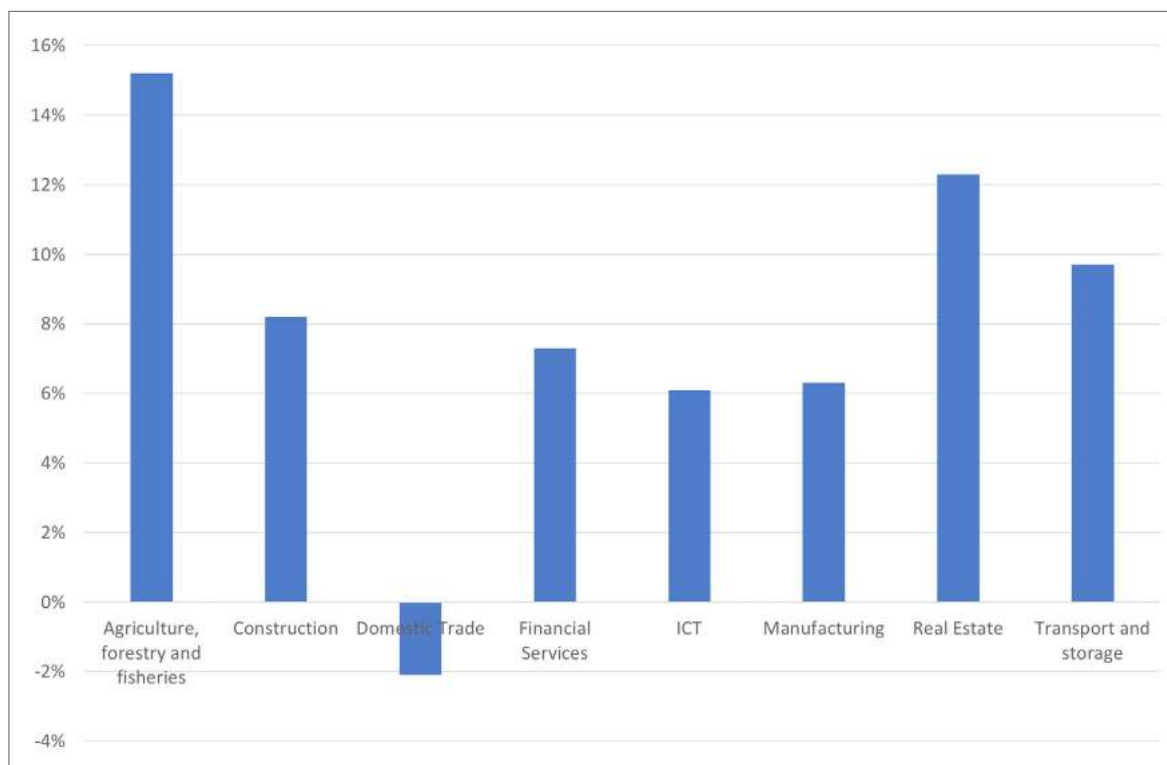
233 Kenya Institute for Public Policy Research and Analysis, *Kenya Economic Report 2017,* March 2017, kippra.or.ke/wp-content/uploads/2017/05/KER-2017-Popular-Version-1.pdf

Remittances from Kenyans abroad have in recent years become the top foreign exchange earner. (Diaspora remittances are reviewed in section 8.5.)

8.4   Growth accounting

In traditional growth accounting models, economic growth is driven by labour, capital and a technology (or multifactor productivity) base that drive and sustain a more productive economy over time.[234] Within IFs, multifactor productivity consists of four components: human, social, knowledge and physical capital. Broadly, human capital is a proxy for levels of health and education in a society; social capital refers to quality of governance; physical capital measures the relative development of core infrastructure; and knowledge capital refers to research and development spending, educational attainment in the science, technology, engineering and mathematics fields and technology transfers through trade.[235] Figure 8.5 shows the contributions of human, social, knowledge and physical capital to Kenya's economic growth from 2015 to 2040 beyond contributions from labour and capital.[236] A positive or negative score indicates that the contribution of that component is respectively above or below the expected value.[237]

Figure 8.5: Growth accounting forecast, contribution of the four components of MFP
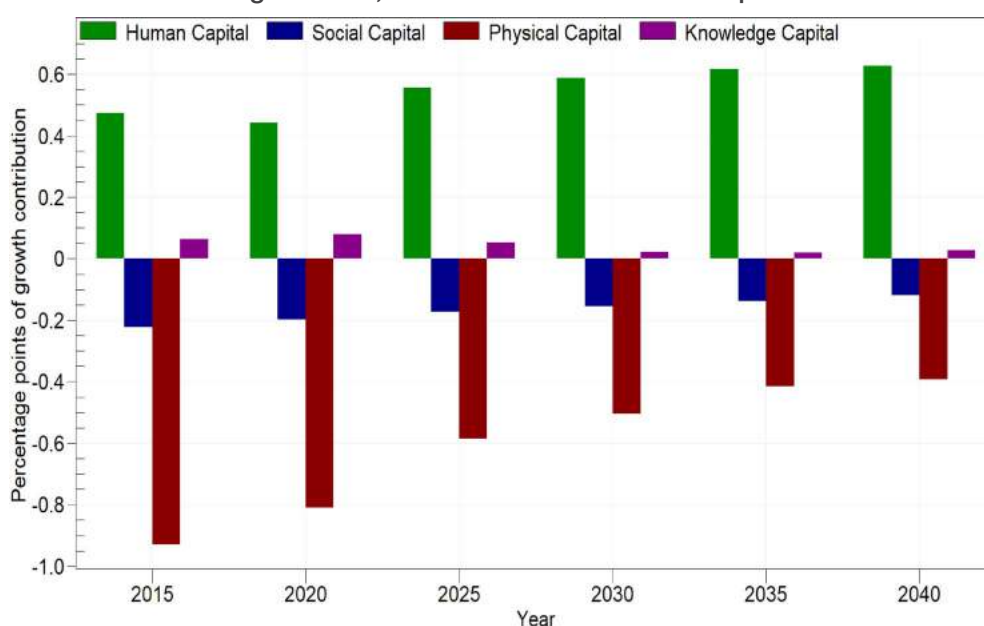
Source: IFs v. 7.33 initialised from World Bank data

Figure 8.5 illustrates that physical capital and social capital adversely impact Kenya's economic growth and will likely continue to do so throughout the forecast. The detrimental impact of Kenya's infrastructure deficit on growth is projected to lessen by more than half by 2040, but will still constitute a significant barrier to productivity in the period to 2040. Governance issues, represented by social capital, are also projected to continue to negatively impact growth, but much less so than the lack of infrastructure. Conversely, levels

---

234 The most famous of these is the Cobb-Douglas production function, which is the basis for the IFs formulation of multifactor productivity discussed in more detail later in this chapter. Also see Frederick S Pardee Center for International Futures, Multifactor productivity, https://www.du.edu/ifs/help/understand/economics/flowcharts/mfp.html

235 'Each cluster aggregates several variables that generally contribute to productivity. For each variable, such as average years of adult education in the human capital cluster, there is an expected value and an actual value. It is the difference between actual and expected values that gives rise to a positive or negative contribution to productivity and growth.' B Hughes, IFs economics documentation v21, Frederick S Pardee Center for International Futures, February 2014, 28, http://pardee.du.edu/ifs-economic-model-documentation; Frederick S Pardee Center for International Futures, Multifactor productivity, https://www.du.edu/ifs/help/understand/economics/flowcharts/mfp.html

236 Each sub-indicator has an actual (or observed) and an expected (or estimated) value. The expected value is calculated using a bivariate regression (with GDP per capita). The contribution to growth is measured as the difference between the actual and expected values.

237 B Hughes, IFs economics documentation v21, Frederick S Pardee Center for International Futures, February 2014, 28, http://pardee.du.edu/ifs-economic-model-documentation

of human capital and, to a much lesser extent, knowledge capital, are higher than would be expected based on Kenya's level of development, indicating that these two components contribute positively to economic growth.

This analysis suggests that Kenya's infrastructure deficit serves as a considerable drag on economic growth – more so than issues in governance such as corruption, effectiveness and regulatory quality.[238] In fact, Kenya is among the 30 countries globally where physical capital drags most heavily on productivity. Increasing investment in infrastructure (and, to a lesser extent, governance issues, discussed in Chapter 9) will be essential if Kenya hopes to achieve the high growth aspired to in its national development plans. Ensuring equitable access to infrastructure that positively impacts other development priorities, such as water and sanitation, is key to this goal.[239]

8.5 Investment and finance

The Kenyan government has focused heavily on attracting foreign investment and increasing domestic investment in recent years. The broad goal of using investment to stimulate economic growth features prominently in both MTP 2 and the Concept Note to MTP 3. The latter document states that there will be 'increased reliance on public–private partnership (PPP) arrangements' and other 'innovative financing' methods to boost investment in the economy.[240] Moreover, diaspora remittances have become a critical source of outside income, but do not represent a sustainable substitute for strengthening the country's export capacity.[241]

As part of Kenya's goal of becoming an upper-middle-income country by 2030, the government has targeted an investment-to-GDP ratio of roughly 27.2% by the end of the MTP 3 period in 2022.[242] This appears to be an ambitious if potentially reasonable goal given that the investment-to-GDP ratio in 2016 was around 17.2% of GDP, according to the World Bank, as shown in Figure 8.6.[243] Investment as a share of GDP is well below the average for other lower-middle-income countries globally (27% in 2016). Meanwhile, the Kenya Institute for Public Policy Research and Analysis (KIPPRA) estimates that Kenya would need to achieve an investment-to-GDP ratio of closer to 30% to achieve upper-middle-income status by 2030.[244]

Although Kenya has significant ground to cover to achieve parity with other lower-middle-income countries globally, it fares slightly better over the long run when compared to the group of peer countries selected for this report. The Stuck in Traffic forecast suggests that Kenya will maintain a similar level of gross capital formation throughout the duration of the forecast. However, the relative stagnation of investment as a share of GDP means that the government will likely fall short of its investment targets, which will further complicate efforts to achieve the growth rates necessary to achieve upper-middle-income country status by 2030.

---

238 In IFs, social capital represents freedom (as from the Freedom House and Fraser Institute measure of economic freedom, government effectiveness, democracy and conflict). For more information, see Frederick S Pardee Center for International Futures, Infrastructure, http://pardee.du.edu/wiki/Infrastructure.

239 Kenya's physical and social capital issues are expounded on in chapters 7 and 9 on infrastructure and governance respectively.

240 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

241 D Omondi, Diaspora remittances overtakes tea, coffee, tourism as Kenya's highest foreign exchange earner, *Standard Digital*, 28 October 2017, https://www.standardmedia.co.ke/business/article/2001258621/export-earnings-tumble-leaving-kenya-hanging-on-donations-from-abroad.

242 Ibid.

243 Figure 8.6 shows gross capital formation as a percentage of GDP. According to the OECD, 'Gross capital formation is measured by the total value of the gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables for a unit or sector' and is widely used as a proxy for investment. See OECD, Glossary of statistical terms, https://stats.oecd.org/glossary/detail.asp?ID=1158

244 Kenya Institute for Public Policy Research and Analysis, *Kenya Economic Report 2017,* March 2017, kippra.or.ke/wp-content/uploads/2017/05/KER-2017-Popular-Version-1.pdf

While it will be important to stimulate more domestic investment, there also appears to be ample potential to attract more foreign direct investment (FDI) as well. Historically, Kenya has not been able to rely on a steady inflow of international investment. Between 1970 and 2010 Kenya averaged FDI inflows of 0.6% of GDP compared to about 2.4% of GDP for other lower-middle-income countries in Africa.

Figure 8.6: Gross capital formation
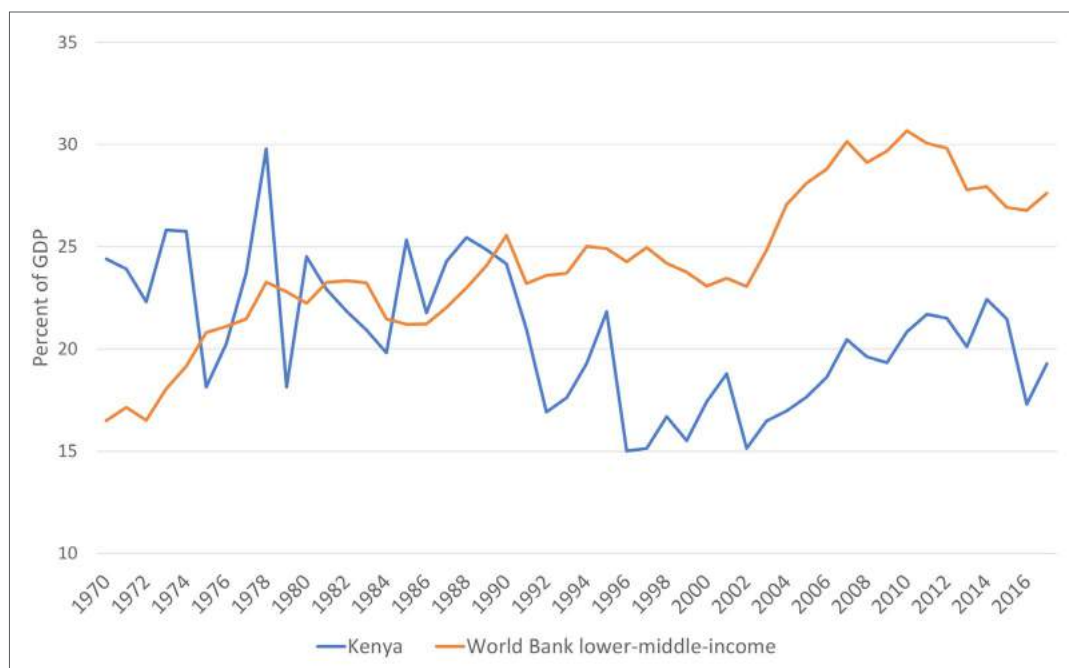
Source: World Bank WDI dataset

In 2015 FDI in Kenya remained lower than in other lower-middle-income countries in Africa and globally and, in the Stuck in Traffic scenario, is forecast to remain so until 2040. However, if Kenya is able to build on the progress in attracting FDI that was made between 2012 and 2015, when FDI increased by more than 1 percentage point of GDP, it will make it slightly easier to break into the ranks of the upper-middle-income countries by 2030.
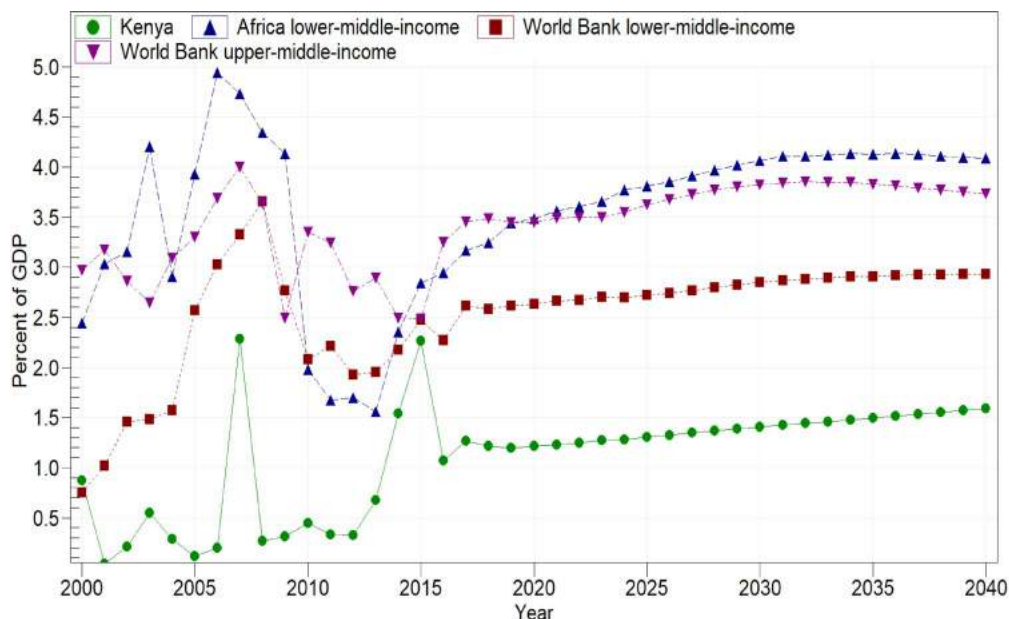
While Kenya has struggled to attract significant flows of private capital, the country has been a favourite of the donor community relative to its income peers. Between 1970 and 2010 Kenya received an average of roughly 6% of GDP in overseas development assistance (ODA), compared to about 3.5% in other lower-middle-income African countries. Until the mid-1990s Kenya actually tracked much closer to the average for low-income African countries, before falling back in line with its income peer group. Since 2002 the country has slowly increased its reliance on ODA, growing from about 2% of GDP in that year to about 6% in 2015.

In Kenya and in all of its comparison groups, the contribution of ODA as a share of GDP is projected to decline over time. ODA will still increase in absolute dollar terms, but it is unlikely to grow as fast as the economies of the majority of recipient countries and will therefore shrink as a relative contribution.

Remittances sent into the country from Kenyans abroad have also become an increasingly important source of money in the economy, surpassing tea, coffee and tourism.[245] According to the World Bank, Kenyans abroad sent roughly US$1.8 billion (in current 2010 US$) back to Kenya in remittances in 2016. This figure is more than double the US$686 million Kenya received from remittances in 2010.

---

245 D Omondi, Diaspora remittances overtakes tea, coffee, tourism as Kenya's highest foreign exchange earner, *Standard Digital*, 28 October 2017, https://www.standardmedia.co.ke/business/article/2001258621/export-earnings-tumble-leaving-kenya-hanging-on-donations-from-abroad.
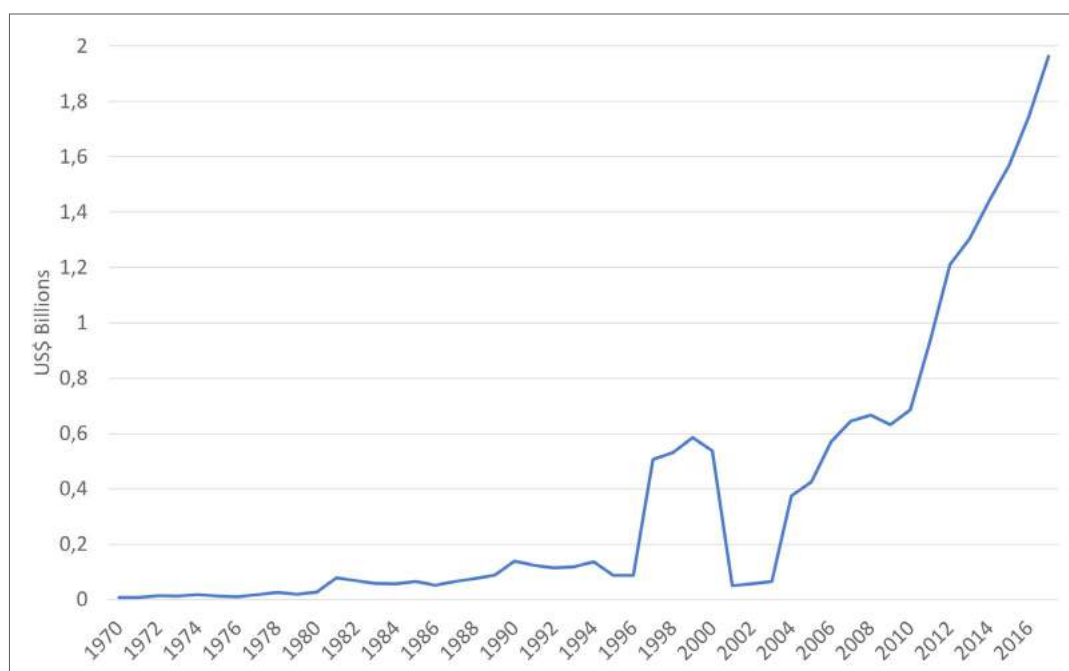
Figure 8.7: Foreign direct investment

Source: IFs v 7.33 initialised from World Bank data

This means that in 2016, remittances equalled nearly half of the US$4 billion in service sector exports from that same year, and more than half of the US$3.1 billion in agriculture exports.

Figure 8.8. Personal remittances received, Kenya (current 2010 US$)

Source: World Bank

While diaspora remittances are not a sustainable foreign exchange earner and cannot take the place of a strong export base, they have served to buoy the Kenyan economy while export earnings have suffered.[246]

Meanwhile, public debt in Kenya has been influenced by the fact that the government aims to channel more funding towards infrastructure projects. Historically, the government has spent more heavily on health and education than it has on infrastructure. The recent push to enhance the use of public–private partnerships and other innovative financing mechanisms is welcome given Kenya's infrastructure deficit (see Chapter

---

246 Ibid.

7), but also appears to be driving up debt. Efforts to expand the quality and quantity of infrastructure have pushed up public debt to roughly 60% of GDP (2017), well above the EAC convergence criteria of 50%.[247] This is likely to be complicated by the recent Eurobond issue, which will have implications – uncertain though they may be at this time – for macroeconomic stability and future spending priorities.

8.6 Trade

Vision 2030 prioritises the expansion of Kenya's export capacity. In the Concept Note on MTP 3, the government articulates its goal for the export sector to comprise 19.2% and 29% of GDP in 2018 and 2022 respectively. The Stuck in Traffic forecast suggests that the export sector will not reach these goals, although it will grow throughout the Vision 2030 period and perform on par with its global and sub-Saharan African peers.

8.6.1 Exports

According to the Stuck in Traffic scenario, Kenya will fall more than 10 percentage points short of the MTP 3 target of exports accounting for 29% of GDP. By 2022 exports are projected to contribute roughly 17%, while imports are projected to comprise about 29%. In addition, most of Kenya's exports are 'overwhelmingly primary in nature … and low in the technology component'.[248] In 2016 food and beverages, the largest manufacturing sub-sector, accounted for more than 45% of total export value; tea alone accounted for 25% of total export value.[249]

In 2015 exports accounted for only 15.8% of GDP (US$8.2 billion) – the lowest share of the peer group and the lowest share in Kenyan history. Moreover, exports' contribution to GDP in Kenya has declined over the last decade, falling from nearly 30% of GDP in 2005 to about 16% in 2015, which may be owing in part to rapid GDP growth over that period, a weak commodity market, lack of credit, and droughts.[250]

However, IFs forecasts that between 2015 and 2030 Kenya will have the highest average growth rate per year (1.3%) in the contribution of exports to GDP in its peer group (0.4%) and its regional income peers (-0.1%). At this rate, Kenya's exports will account for about 21% of GDP by 2030.

The government has highlighted the potential of agro-processing to help grow exports in the country. The agro-industry encompasses the processing, value addition and export of agricultural goods. The creation of special economic zones (SEZ) such as the Dongo Kundu in Mombasa is a key intervention intended to boost Kenya's manufacturing exports.

According to the Observatory for Economic Complexity, which analyses imports and exports in goods but not services, Kenya was the 107th largest export economy in the world and the 77th largest importer in the world in 2015.[251] Top exports included tea, cut flowers, refined petroleum, coffee and legumes, and the primary export destinations were the US, Uganda, the UK, the Netherlands and Zambia. Top imports included refined petroleum, cars, packaged medicaments, video displays and delivery trucks. The primary import origin countries were China, India, Japan, Tanzania and South Africa.[252]

Figure 8.9 shows the forecast of exports by sector, measured as a percentage of GDP. IFs forecasts that services will be the foremost driver of growth in exports, whereas agriculture exports will decline in terms of

---

247 Kenya Institute for Public Policy Research and Analysis, *Kenya Economic Report 2017,* March 2017, kippra.or.ke/wp-content/uploads/2017/05/KER-2017-Popular-Version-1.pdf

248 Kenya Association of Manufacturers, Manufacturing priority agenda 2018, 18, https://www.tralac.org/documents/resources/by-country/kenya/1751-kam-manufacturing-priority-agenda-2018/file.html

249 Ibid.

250 D Omondi, Diaspora remittances overtakes tea, coffee, tourism as Kenya's highest foreign exchange earner, *Standard Digital*, 28 October 2017, https://www.standardmedia.co.ke/business/article/2001258621/export-earnings-tumble-leaving-kenya-hanging-on-donations-from-abroad

251 Observatory for Economic Complexity, Kenya, https://atlas.media.mit.edu/en/profile/country/ken/.

252 Ibid.

contribution to GDP. Meanwhile, IFs expects manufacturing exports to grow at a slow pace, increasing by just over 1 percentage point of GDP from 2018 to 2030.

Figure 8.9. Exports as percent of GDP by sector
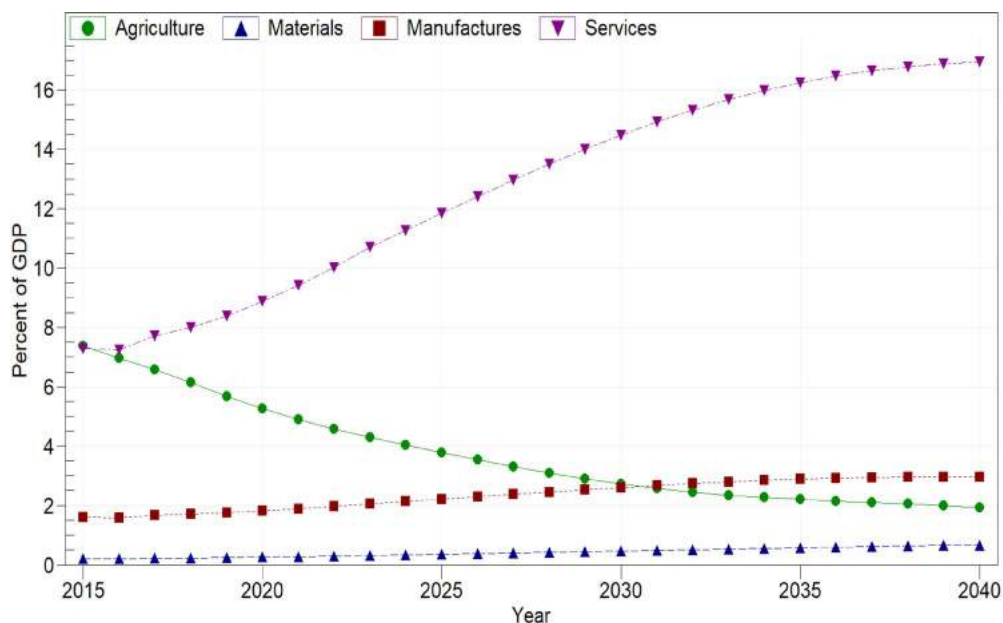
Source: IFs v. 7.33 initialised from World Bank data

Kenya appears to have a relative advantage in services given that it exports more services than other countries at the same level of development.[253] Service exports are expected to almost double between 2018 and 2030, evidencing Kenya's potential role as the distribution and transportation hub of East Africa. Services exports are largely concentrated in transport and travel, which together comprised three-quarters of exports in 2012 (US$3 billion).[254] ICT and financial services accounted for the next largest share of service exports.

8.6.2 Trade deficit

Kenya has historically had an unfavourable balance of trade, recording a trade deficit of at least 5.4% of GDP since 1995. In fact, Kenya has only recorded a trade surplus for a total of 10 years since independence.[255] Since 2002 Kenya's trade deficit has grown, reaching 17.3% (US$8.5 billion) of GDP in 2014.

However, there was a slight rebound in 2015 when the trade deficit shrank 4 percentage points to 13.3% (US$6.9 billion). IFs estimates that the trade deficit will shrink even further, to around 11% of GDP by 2022 and about 4% by 2030. In fact, the forecast suggests that Kenya will have the smallest trade deficit in terms of share of GDP of its regional and global income peers by the mid-2030s.

8.7 Income

Between 1965 and 2000 Kenya's GDP per capita measured at PPP grew from US$1 400 to just US$2 200. By contrast, Thailand's GDP per capita (PPP) grew from US$1 500 to more than US$9 000 over that same time period. By 2015 GDP per capita in Kenya had increased by only one-third, to US$2 900, climbing to 149th in the world and 26th in Africa.

---

253 G Serletis, Kenya's services output and exports are among the highest in sub-Saharan Africa, US International Trade Commission (USITC), Trade Briefing, December 2014, 1, https://www.usitc.gov/publications/332/executive_briefings/serletis_kenya_services_ebot_12-22.pdf

254 Ibid

255 Kenya recorded a trade surplus for 1963–1966, 1968–1969, 1976–1977 and 1993–1994.

IFs estimates that GDP per capita had increased to just over US$3 000 in 2017 – significantly less than the average GDP per capita of Kenya's regional and global income peers and upper-middle-income countries.

Figure 8.10: GDP per capita at PPP
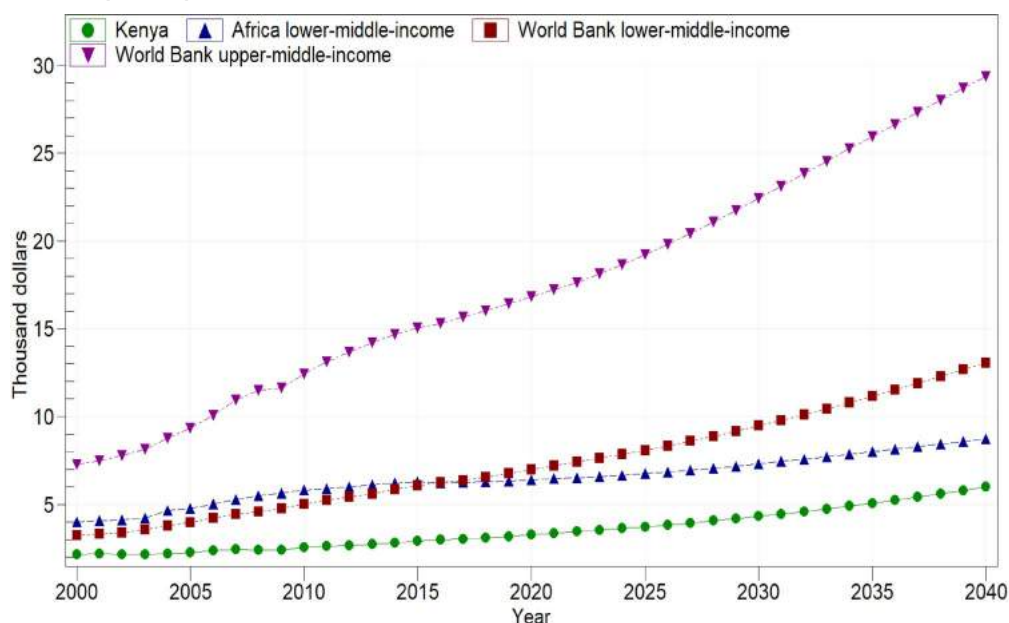
Source: IFs v 7.33 initialised from World Bank data

8.8   Poverty and inequality

Poverty is a multidimensional phenomenon concisely expressed as 'the inability to attain a "minimal" level of well-being'.[256] From a macroeconomic perspective, two variables drive a reduction in poverty rates: economic growth and a reduction in inequality.[257] While our analysis suggests that Kenya will experience above-average economic growth through 2040, deep and enduring inequality will prevent that growth from lifting many Kenyans out of extreme poverty.

With a Gini index of 0.49, Kenya is the 13th most unequal country in Africa and by far the most unequal country in the peer group used in the report. Using the World Bank's monetary definition of extreme poverty as earning less than US$1.90 per day, IFs estimates that Kenya had a poverty rate of about 28% in 2017, the 41st highest in the world and the 33rd highest in Africa.[258] This translates to nearly 14 million Kenyans living in extreme poverty – roughly the same size as the entire Kenyan population in 1976 or the current populations of Guinea or Somalia.

In the Stuck in Traffic scenario, the extreme poverty rate will remain high, hovering at around 25% through 2025 before declining slightly to about 21% by 2030. However, the absolute number of Kenyans living in extreme poverty will continue to increase, rising by nearly 1 million individuals by 2026.

Table 8.2 shows that in the Stuck in Traffic scenario, the number of Kenyans living in extreme poverty is projected to increase to 14.3 million in 2020 and 14.4 million in 2025 before decreasing slightly to 14.1 million by 2030. This still represents an absolute increase in the number of people surviving on less than US$1.90 per day from 2015 levels.

---

256 B Hughes et al., *Reducing global poverty*, Frederick S Pardee Center for International Futures, 2009, 1, https://pardee.du.edu/sites/default/files/PPHP1_Full_Volume.pdf

257 S Turner et al., *Reasonable goals for reducing poverty in Africa: targets for the post-2015 MDGs and Agenda 2063,* ISS, African Futures Paper 13, February 2015, 3, https://issafrica.s3.amazonaws.com/site/uploads/AF_Paper13.pdf

258 World Bank, Ending extreme poverty, 8 June 2016, http://www.worldbank.org/en/news/feature/2016/06/08/ending-extreme-poverty. The UN in 1995 defined extreme poverty as 'a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information'.

Table 8.2: Extreme poverty in Kenya

Year	% of population	Millions
2015	29.2%	13.8
2020	27%	14.3
2025	24.5%	14.4
2030	21.6%	14.1

Source: IFs v 7.33 initialised from World Bank data

Income inequality in Kenya negatively influences the ability of economic growth to reduce poverty.[259] Botswana, for example, experienced very high levels of economic growth but relatively modest reductions in poverty, while Ghana has had lower levels of economic growth but relatively more rapid poverty reduction.[260] This difference has been attributed to prevailing levels of income distribution, which have historically been more unequal in Botswana than in Ghana. A significant poverty gap, which indicates that most of the poor are living far below the poverty line, detracts from the ability of economic growth to translate into poverty reduction.[261]

8.8 Conclusion

The Kenyan economy is outperforming those of its regional income peers and the rest of sub-Saharan Africa and will likely continue to do so throughout the duration of the forecast. However, Kenya is projected to fall short of many of the macroeconomic targets established in the MTPs and Vision 2030. Moreover, achieving upper-middle-income status by 2030 would require a 400% increase in Kenya's current GNI per capita and is thus very unlikely.

Recent data suggests that Kenya is not undergoing the structural transformation often viewed as critical to moving from lower-middle-income to upper-middle-income status. In accordance with the Kenyan government's economic agenda, this transformation entails moving away from low-productivity sectors such as agriculture and towards manufacturing and other high-productivity sectors.

However, the increasingly important role of the service sector in Kenya expresses the country's role as the distribution and transportation hub of East Africa. Focusing on developing key enabling infrastructure such as the SGR will likely enhance Kenya's comparative advantage in this sector.

The interventions presented in Chapter 10 represent the potential impact of a housing subsidy programme and policies that facilitate more FDI between 2019 and 2023.

259 S Turner et al., *Reasonable goals for reducing poverty in Africa: targets for the post-2015 MDGs and Agenda 2063,* ISS, African Futures Paper 13, February 2015, 5, https://issafrica.s3.amazonaws.com/site/uploads/AF_Paper13.pdf

260 AK Fosu, *Growth, inequality, and poverty reduction in developing countries: recent global evidence,* WIDER Working Paper, Helsinki: UNU-WIDER, 2011.

261 Ibid.

Chapter 9: Governance

9.1   Governance and Vision 2030

Chapter 8 discussed how IFs conceptualises its growth accounting formula, consisting of labour, capital and total – or multifactor – productivity (MFP), which collectively help explain improvement (or deterioration) in economic growth outcomes. Within the four components of MFP conceptualized by IFs (human, social, physical and knowledge capital), Chapter 8 noted that physical capital (or lack of traditional infrastructure) is the most significant drag on growth in Kenya, followed by social capital. The latter includes various aspects relating to governance, the subject of this chapter.

The sections below provide an overview of the governance module within IFs, comparing its findings with that from other data sources in an effort to confirm the impact of corruption and democracy, and understand what other aspects of social capital serve as constraints or propel Kenya's future development.

According to the World Bank,

> governance consists of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them.[262]

The governance element of Vision 2030 that was released in 2007 set out to realise an 'issue-based, people-centered, result-orientated and accountable democratic system'[263] to be achieved by, among other means, continuity in governance reforms and improved security. The transformation of Kenya's political governance system subsequently needs to occur across six strategic areas: rule of law; electoral and political processes; democracy and public service delivery; transparency and accountability; and security, peacebuilding and conflict management. The political pillar is one of three main aspects of Vision 2030.

A key target of the political pillar of Vision 2030 was achieved when, in November 2009, a draft constitution was released for public consultation that included a clear separation of powers and significant devolution of power to local (county level) government. The final constitution was promulgated on 27 August 2010. That achievement implemented the commitment in Vision 2030 that 'Kenya will adopt a democratic decentralization process with substantial devolution in policy making, public resource management and revenue sharing through selected devolved funds'.[264]

The concept note for MTP 3 (covering 2018 to 2022) released in March 2017 summarised the achievements of MTP 2. It noted, among other accomplishments, the establishment of 47 county governments in line with the 2010 constitution and associated legislative amendments, while pointing to the issues encountered in interpreting the allocation of roles and functions between the national and county governments, the low

---

262 World Bank, Worldwide Governance Indicators, http://info.worldbank.org/governance/wgi/index.aspx#doc

263 Government of Kenya, Vision 2030: a globally competitive and prosperous Kenya, October 2007, vii, https://www.researchictafrica.net/countries/kenya/Kenya_Vision_2030_-_2007.pdf

264 Ibid., 158.

collection of own source revenues by county governments, and corruption and misuse of public funds as critical challenges.[265]

The MTP 3 concept note indicates that

> emphasis will ... be placed on preventing corruption and improving governance and accountability, deepening public sector reforms and strengthening the capacity of county governments as well as coordination between national and county governments.[266]

The first section below sets out the framework of the governance model within IFs before dealing with each of the three dimensions modelled in IFs (security, capacity and inclusion) and then comparing these findings with other data series. A final section concludes.

9.2   Governance in IFs

For the purposes of modelling and measuring governance in IFs, Hughes et al. use modernisation theory and the notion that governance historically develops along three sequential transitions: a security transition, followed by a capacity transition, and finally a transition towards greater inclusion. The security transition, they argue, 'begins with overcoming anarchy through the consolidation of territorial governing authority to establish sovereignty'.[267] After achieving sovereignty over a defined territorial area and a monopoly on the legitimate use of violence, governments typically shift their focus to creating and building capacity to effectively administer that territory. The third transition is one of inclusion, wherein a society develops the social contract required to sustain various dimensions of progress.

IFs uses these transitions as a conceptual framework for comparing countries along the three dimensions of governance and to forecast them over time. To this end IFs includes an index (0 to 1) for each dimension, with higher scores indicating improved outcomes. A composite governance index is composed of a simple average of the three.[268]

The conceptualisation of governance in terms of security, capacity and inclusion provides a useful lens to compare how countries progressed over time, as well as to compare the state of governance between countries and groups of countries.[269] While it can be helpful to think of these transitions as distinct phases, in the real world states are continually struggling to improve security, enhance capacity, and become more inclusive contemporaneously.

Figure 9.1 compares the composite IFs governance index for 2015 and a forecast for 2040 for Kenya alongside the averages for sub-Saharan Africa, the EAC (without Kenya), other lower-middle-income African countries and upper-middle-income countries in Africa. Kenya does well on the composite governance index, scoring significantly above other lower-middle-income countries in Africa, above the average for sub-Saharan Africa and better than its regional peers, although it does fall below the average for upper-middle-income countries in Africa.

---

265 Government of Kenya, Concept note on Medium Term Plan 2018–2022, March 2017, 12, http://www.mtp3.go.ke/portal/data/apis/uploads/site/downloads/CONCEPT%20NOTE%20MTP 3.pdf

266 Ibid., 14.

267 BB Hughes et al., *Patterns of potential human progress volume 5: strengthening governance globally*, Boulder: Oxford University Press, 2014, 6.

268 Ibid. IFs also forecasts several indices related to governance, including the World Bank measurement of government effectiveness and regulatory quality, but these do not drive the forecasts.

269 Generally, Africa did not follow this pattern of state formation, which largely reflects the European experience. In much of Africa the natural transitions of state formation described above were interrupted by colonisation (in the Kenyan case by Britain). Security was provided by a foreign occupying force (and the co-option of locals) that was, in its final years, severely resisted by the subjugated population (Mau Mau uprising) until independence at the end of 1963. The borders that were created during this period were subsequently frozen by the Cold War, with Africa serving as an important proxy battlefield, particularly within and between Ethiopia and Somalia, close to Kenya's northern border with Somalia.

**Figure 9.1: IFs composite governance index: 2015 and 2040 compared**
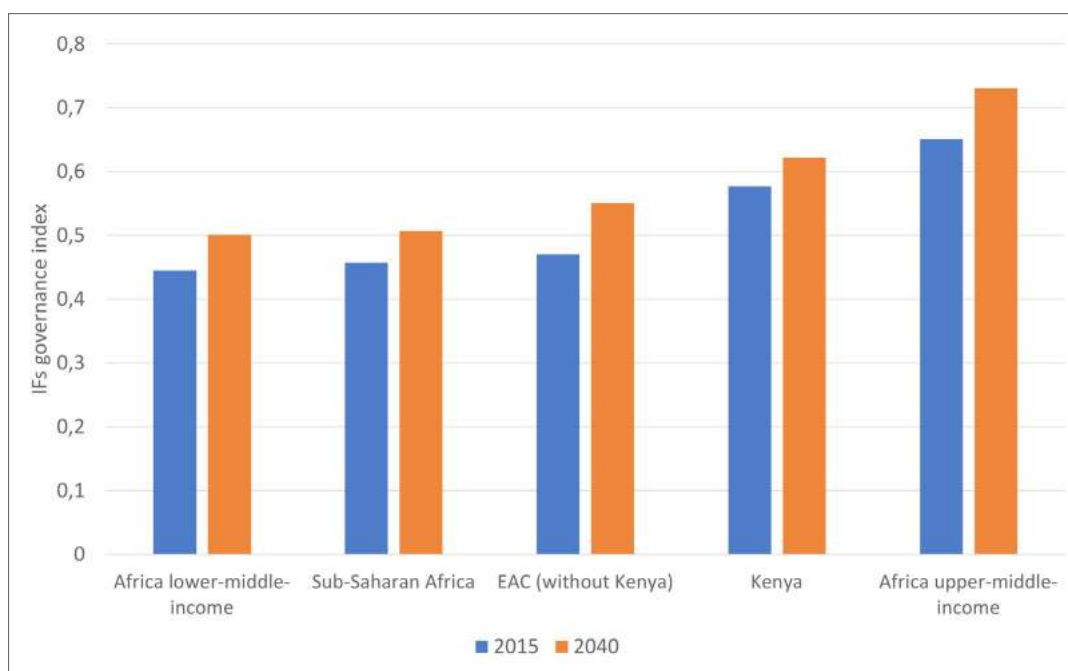
The reason for this positive picture is that Kenya does better on two of the three dimensions of the IFs conceptualisation of governance, namely security and inclusion.

Figure 9.2 shows Kenya's score across these three dimensions of governance in comparison with the average for other African lower-middle and upper-middle-income groups for 2015, and a forecast for 2040. Values closer to the outside indicate a higher, or more favourable, score. As a lower-middle-income country, Kenya does better in security than even the African average for upper-middle-income countries in 2015.

Kenya scores slightly below the average for other lower-middle-income countries on the IFs measure of capacity in 2015. On the inclusion dimension, it is roughly on par with upper-middle-income countries, and well above the average for other lower-middle-income countries in Africa in 2015.

Figure 9.2: IFs dimensions of governance: 2015 and 2040
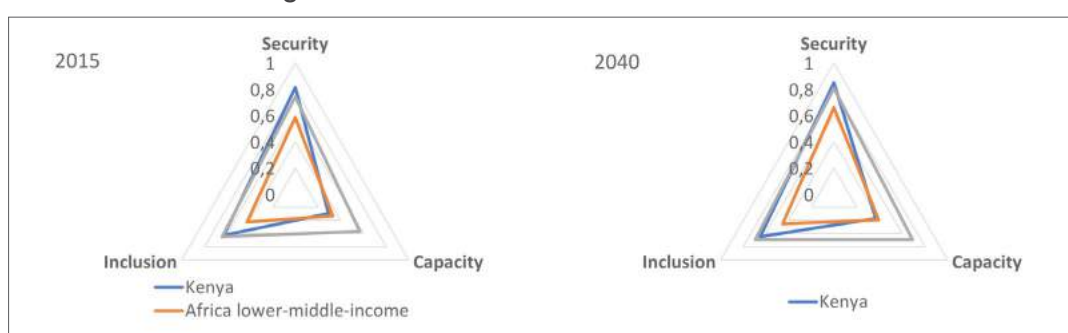
The picture does not change much when considering the IFs forecast to 2040. Kenya's high score on inclusion (relative to other countries) moderates slightly, while its score on capacity improves compared to the average for other African lower-middle-income countries. However, Kenya remains significantly below its aspirational peer group (upper-middle-income Africa). In fact, when comparing Kenya to the average for upper-middle-income countries, the capacity gap is actually forecast to increase by 2040.

The practical implication is that the Kenyan government will struggle to deliver on its stated commitments across various development systems in the Stuck in Traffic scenario. As the demographics section

demonstrated, the rapidly growing population will place significant pressure on the government to deliver basic services and provide employment opportunities for this growing population.

The next three sections expand on each of these dimensions of governance.

9.3   Security

Security is generally considered the foundational or first transition to be completed as part of the pathway towards state formation and eventual consolidation.

Figure 9.3 compares Kenya with a number of country groupings using the IFs security index, confirming its positive ranking. Apart from scoring higher (i.e. having better security) than the average for low-income Africa, other African lower-middle-income countries and the other members in the EAC, Kenya actually scores higher than the average for upper-middle-income countries in Africa.

Figure 9.3: IFs security index: Kenya compared to other groups
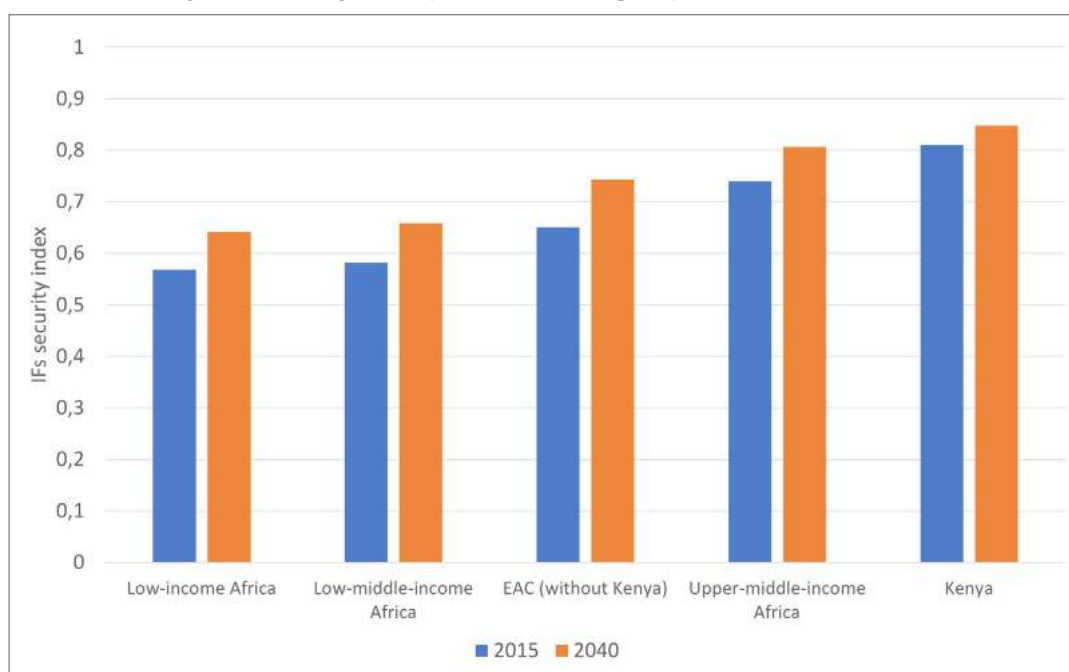
Source: IFs v 7.33 (see text for explanation of index)

Within IFs, security is driven by a performance and risk index, and state failure from internal event occurrence.[270] Each is in turn driven by a variety of other indicators. For example, state failure from internal event occurrence depends on levels of development (poor countries evidence more conflict), infant mortality (often used as a proxy for government capacity), size of the youth bulge (a larger youth bulge indicates greater propensity for turbulence), nature of the governance system (mixed regime types are more prone to instability), levels of education and integration into the global system (relationship of exports to GDP).

The security factors most relevant to Kenya appear to relate to the size of its youth bulge and location in a turbulent region, particularly instability in neighbouring Somalia and South Sudan.

A large youth bulge typically indicates a higher propensity towards social turbulence.[271] Kenya recently experienced a peak in the size of its youth bulge (see Figure 9.4). Although the relative size is declining, it has a larger percentage of youth compared to adult population than other lower-middle-income African

---

270 These data are taken from Center For Systemic Peace, Political Instability Task Force, http://eventdata.parusanalytics.com/data. dir/atrocities.html

271 RP Cincotta et al., *The security demographic: population and civil war after the cold war*, Washington DC: Population Action International, 2003. This study found that countries with a youth bulge of over 40% are more than twice as likely to experience conflict over a given time period.

countries. Currently almost half of Kenya's adult population is in the age bracket 15 to 29 and that portion will slowly decline to around 39% by 2040 (see Figure 9.4). The youth bulge is potentially most destabilising when it occurs alongside rapid expansions in education, amid rising unemployment (i.e. increased relative deprivation) and when political and economic opportunities have been concentrated around specific ethnic communities – a consistent feature of Kenya's political economy since independence.[272]

Figure 9.4: Youth bulge: percent of youth relative to adults
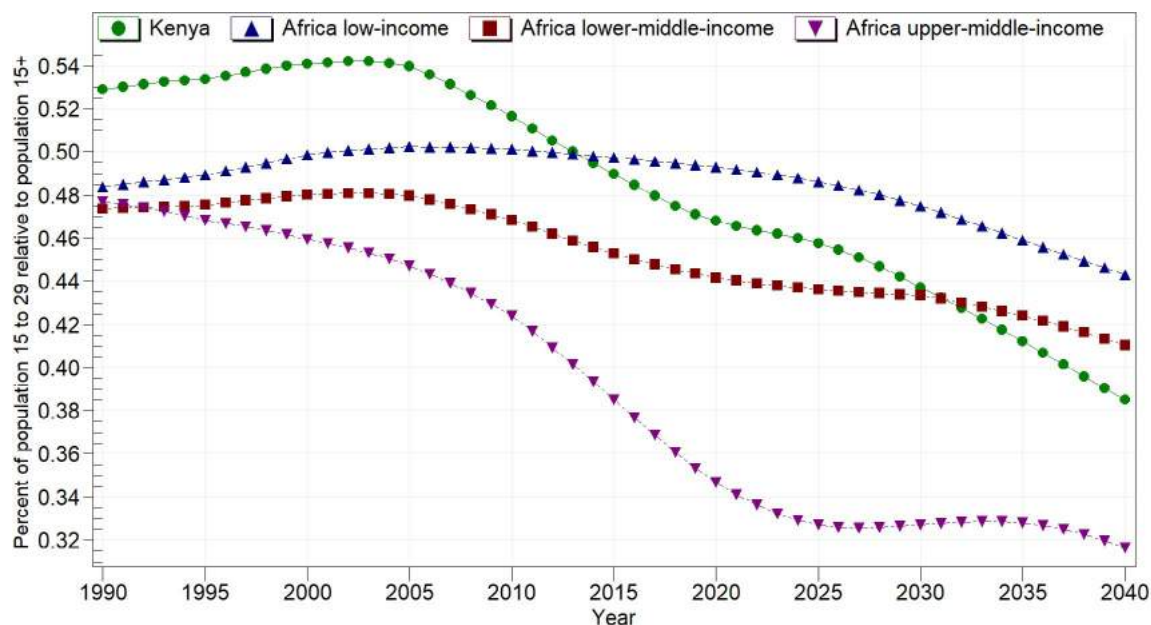
By 2040 Kenya's youth bulge is forecast to be below the average for other lower-middle-income countries in Africa. Its median age will have increased from a youthful 19 years to 26 years, at which point Kenya enters a sweet spot in relation to the size of its working-age population compared to the number of dependents.

When forecasting future levels of armed conflict, a legacy of war and instability tends to have a large carry-forward effect. According to the World Development Report, for example, '90 percent of the last decade's civil wars occurred in countries that had already had a civil war in the last 30 years'.[273] Cycles of war tend to repeat themselves in the same countries, inhibit development, and hinder others in the region.

Contrary to most of its neighbours, Kenya does not have a modern history of large-scale conflict, although it has experienced a number of terrorist incidents in recent years, such as the high-profile attack on the Westgate Shopping Mall in September 2013, and significant violence around elections. However, there are negative effects from proximity to other wars or countries with high rates of violent crime and illicit trafficking.

Time series data from the Uppsala Conflict Data Program (UCDP) confirms a picture of Kenya as something of an island of stability in an otherwise turbulent region. From 1989 to 2016, for example, the UCDP recorded 54 incidents of armed conflict in Ethiopia, where each incident is 'a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths in a calendar year'.[274] For Uganda, the UCDP has recorded 26 such incidents, Somalia 21, South Sudan seven and Kenya only two.

---

272 H Urdal, The devil in the demographics: the effect of youth bulges on domestic armed conflict, 1950–2000, Eldis, Social Development Papers 14, June 2004, 2, 4, http://www.eldis.org/vfile/upload/1/document/0708/doc14714.pdf. Also see H Urdal, A clash of generations? Youth bulges and political violence, UN Expert Group Meeting on Adolescents, Youth and Development, New York, 21–22 July 2011, http://www.un.org/esa/population/meetings/egm-adolescents/p10_urdal.pdf

273 World Bank, World development report 2011: conflict, security and development, Washington DC: World Bank, 2011, 2.

274 Uppsala Conflict Data Program (UCDP) and International Peace Research Institute, Oslo (PRIO), UCDP/PRIO Armed Conflict Dataset Codebook, version 17.2, http://ucdp.uu.se/downloads/ucdpprio/ucdp-prio-acd-172.pdf

The two incidents recorded by the UCDP in Kenya occurred in 2015 and 2016 respectively, both relating to al-Shabaab activities in the north-east of the country,

The spillover effect from conflict in Somalia and South Sudan detracts from Kenya's growth prospects and its internal stability. The 2011 World Development Report also found that a 'country making development advances, such as Tanzania, loses an estimated 0.7 % of GDP every year for each neighbour in conflict'.[275] Further, neighbouring countries at high risk of conflict are more likely to offer safe havens for rebel groups and insurgents.[276]

By the same measure, positive spillover effects accrue from being in a neighbourhood largely at peace, such as reduced defence expenditure and greater opportunity for regional trade. An end to the wars in South Sudan and Somalia will therefore impact positively on Kenya. Alternatively, an increase in the current instability in Ethiopia, which recently rescinded a national state of emergency, will have the opposite effect.

Figure 9.5 uses the Political Stability Index from the World Bank for Kenya and its neighbours, including a trend line for Kenya. According to this index (which captures 'perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism'),[277] Tanzania and Uganda are more politically stable and/or less likely to experience politically motivated violence than Kenya. The Kenyan trend is moderately negative, reflecting recent election-related turbulence (such as that in 2007/8) as well as terrorist attacks related to Kenya's involvement in Somalia.

Figure 9.5: Political stability and violence from World Bank (higher is more stable)
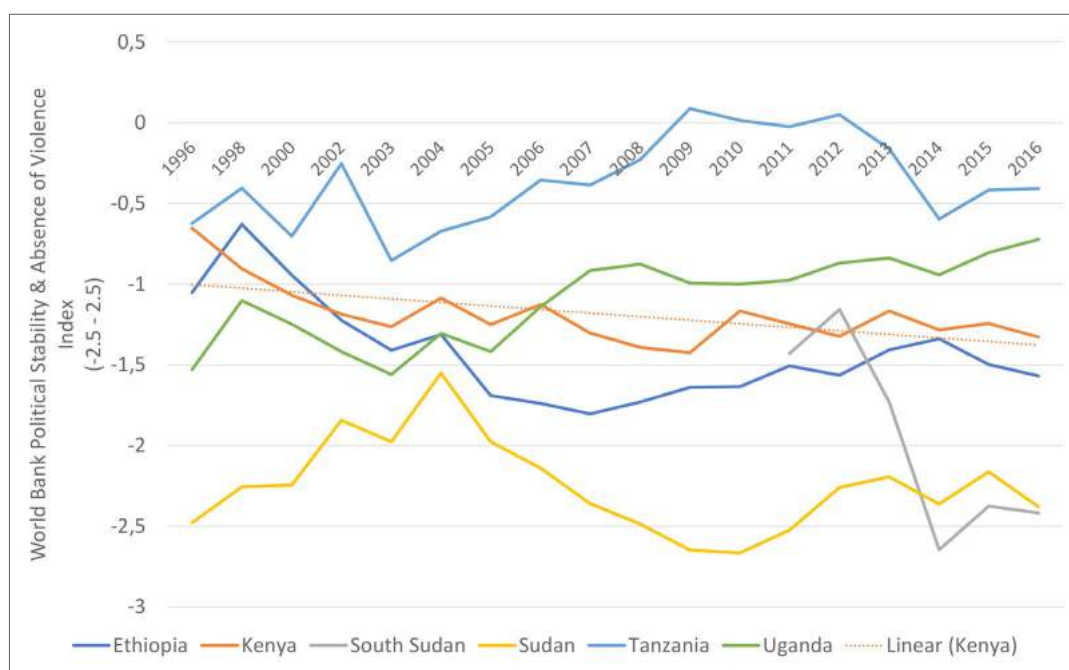
Source: World Bank Governance Indicators

Note that data for South Sudan only starts in 2011 and that Somalia and South Sudan score below the minimum, -2.5, in a number of years.

Figure 9.6 presents an extract of data from the UCDP that captures all 'incidents where armed force was used by an organised actor against another organised actor, or against civilians, resulting in at least one direct death at a specific location and a specific date', but at least 25 fatalities in a year. It makes a distinction between three types of events: where the state is involved (state-based conflict), where the state is not involved (non-state-based conflict) and one-sided violence.

---

275 World Bank, World development report 2011: conflict, security and development, Washington DC: World Bank, 2011, 5.

276 H Hegre et al., Predicting armed conflict, 2010–2050, *International Studies Quarterly*, 2012, 7.

277 World Bank, Worldwide Governance Indicators, Frequently asked questions, http://info.worldbank.org/governance/wgi/index.aspx#faq

Similar to the changing dynamics of violence elsewhere on the continent, elections have emerged as a major driver of riots and protests in Kenya, while the spillover of terrorism from Somalia is responsible for regular spikes in other fatalities.

The data covers the general elections in December 2007 and the violence that occurred in its wake. Recently, the invalidation of the results of the first round of the 2017 presidential election resulted in a notable spike in reported events, alongside a proportionally smaller spike in fatalities.

Figure 9.6: Kenya and region: fatalities
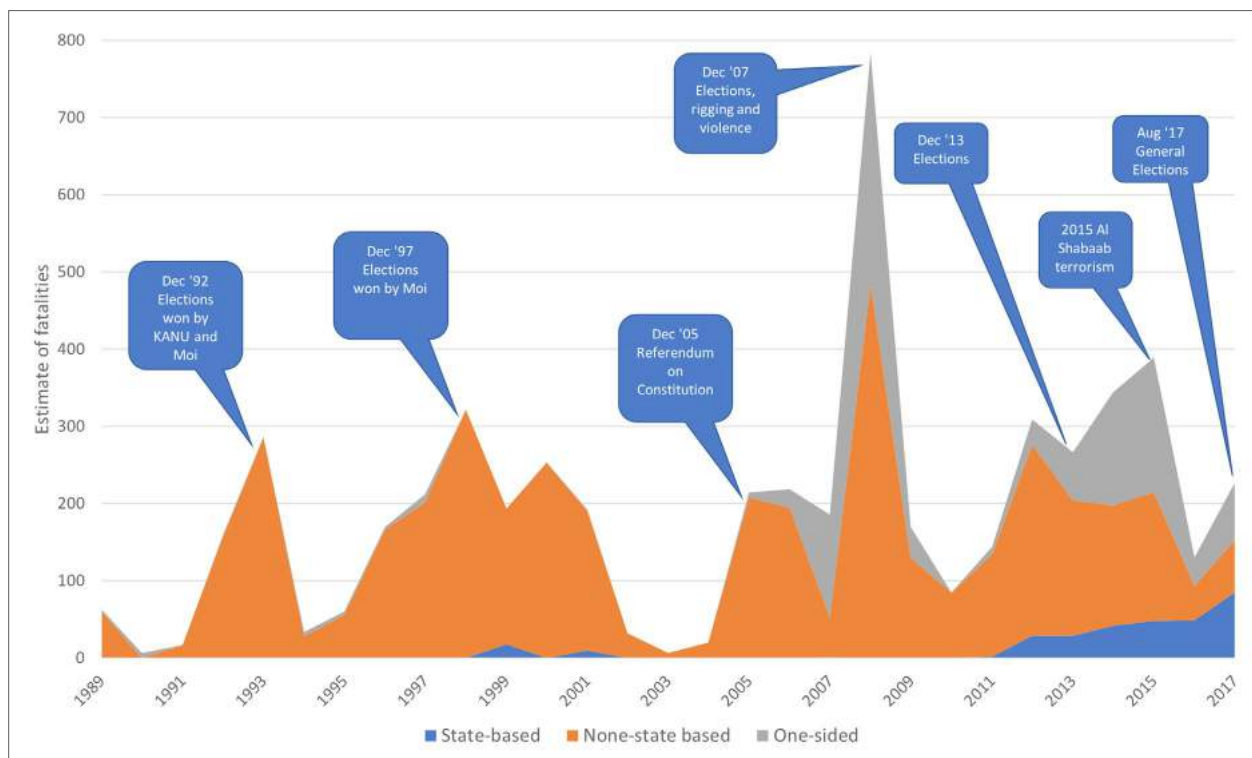
Source: UCDP 18.1

Kenya's population almost doubled during this period, increasing from 29 to 50 million people. It is thus clear that the risk of becoming a fatality owing to armed conflict in the country has steadily declined in a per capita sense, i.e. people are statistically less likely to experience political violence than in the past. However, the number of absolute events has increased and the threat of violent spillover from neighbouring Somalia remains a challenge. That trend is in accordance with the modest negative trendline in Figure 9.6.

9.4 Capacity

The IFs capacity index combines data on tax collection from the Organisation for Economic Co-operation and Development (OECD) and the World Bank's World Development Indicators (WDI) project, and uses the Corruption Perception Index from Transparency International as a proxy for capacity to manage those resources.[278]

When comparing state capacity (see radial graph in Figure 9.2), Kenya scores slightly below the average of other lower-middle-income African countries and significantly below its aspirational peer group of upper-middle-income African countries. In fact, it scores just above the average for African low-income countries.[279] In the Stuck in Traffic scenario, the gap between Kenya and the other country groupings remains relatively constant until 2040.

278 IFs calculates state capacity on a 0 to 1 scale, with higher scores indicating better overall government capacity.

279 The IFs capacity index is driven by levels of corruption (from Transparency International), net aid receipts, GDP and government revenue. Data on tax revenue is limited, with the result that the IFs preprocessor estimates tax rates in some instances.

Figure 9.7: IFs state capacity index: Kenya compared to others
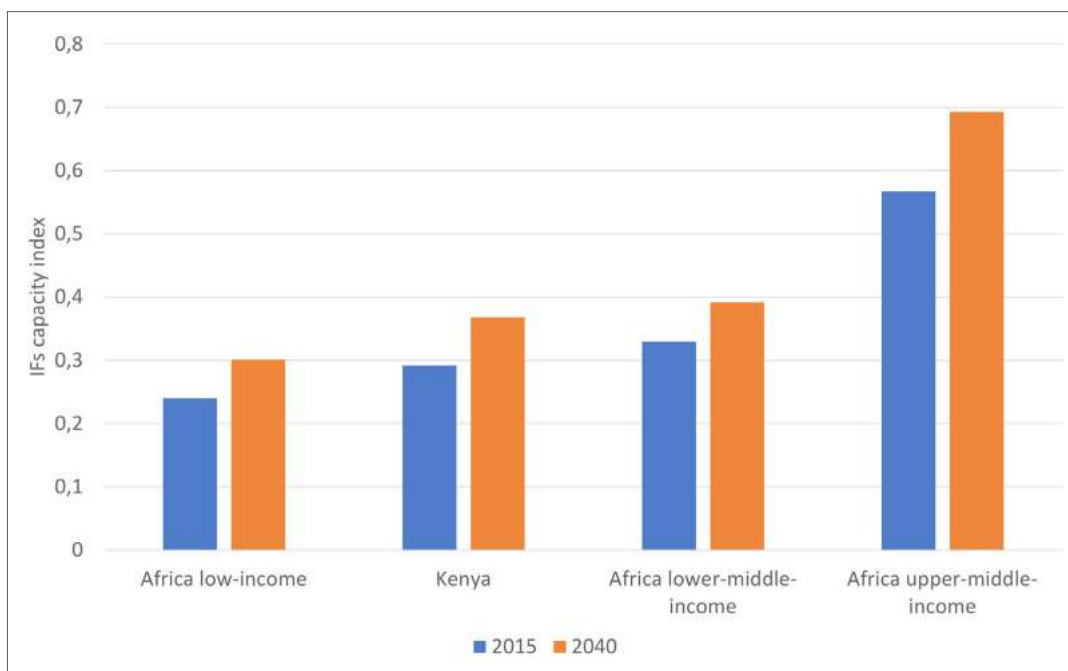
Source: IFs v 7.33 (see text for explanation of index)

As countries develop, Wagner's law posits that governments require more revenue (as a share of GDP) to invest in the provision of services such as health, education and infrastructure. As a result, state spending steadily increases, suggesting a strong relationship between governance capacity and GDP per capita. Kenya has historically been very dependent on ODA and has struggled to effectively collect and disburse tax revenues domestically. This is likely to be compounded going forward, as aid as a share of GDP is forecast to decline across most recipient countries over time.

Figure 9.8: Tax rates
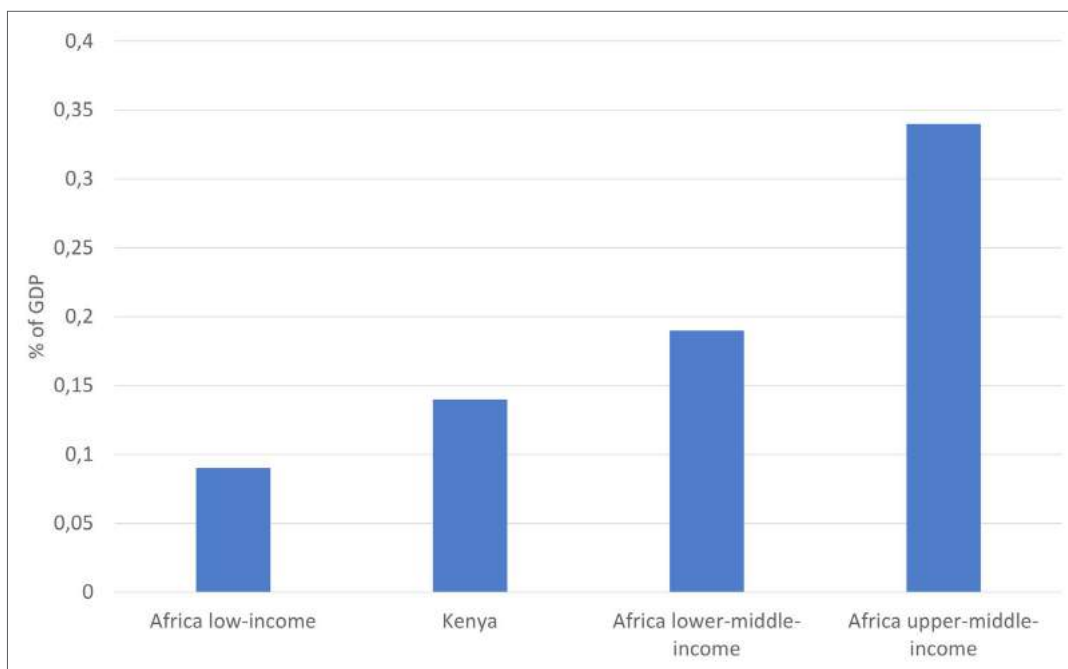
Source: IFs v 7.33, initialising from IMF World Economic Outlook

On average, tax revenue as a percent of GDP in low-income African countries is about 10%. In other lower-middle-income African countries the figure is about 19%, and in upper-middle-income countries it is roughly 34%. In Kenya, domestic tax collection only equals about 15% of GDP. This points to either Kenya's having

a relatively low effective tax rate or else an inability on the part of government to effectively collect taxes from the economically active population.[280]

Kenya has received significant levels of ODA over the years that serve to augment government revenues. Figure 9.9 shows foreign aid as a percent of GDP and indicates that for Kenya, rates have averaged around 6% of GDP in recent years, roughly 4.5 percentage points higher than the average for other lower-middle-income countries in Africa. Aid dependency in Kenya has steadily grown since around 2003, although with some annual fluctuations.

This needs to be put in context, since East African countries generally receive larger amounts of aid (as a percent of GDP) than other regions in Africa owing to the high poverty burden and the strategic importance of countries such as Ethiopia and Kenya. Concerns about the effective use of aid and widespread corruption do, however, constrain the willingness of donors to provide continued aid.

Figure 9.9: Net aid as a percent of GDP (five-year moving average)
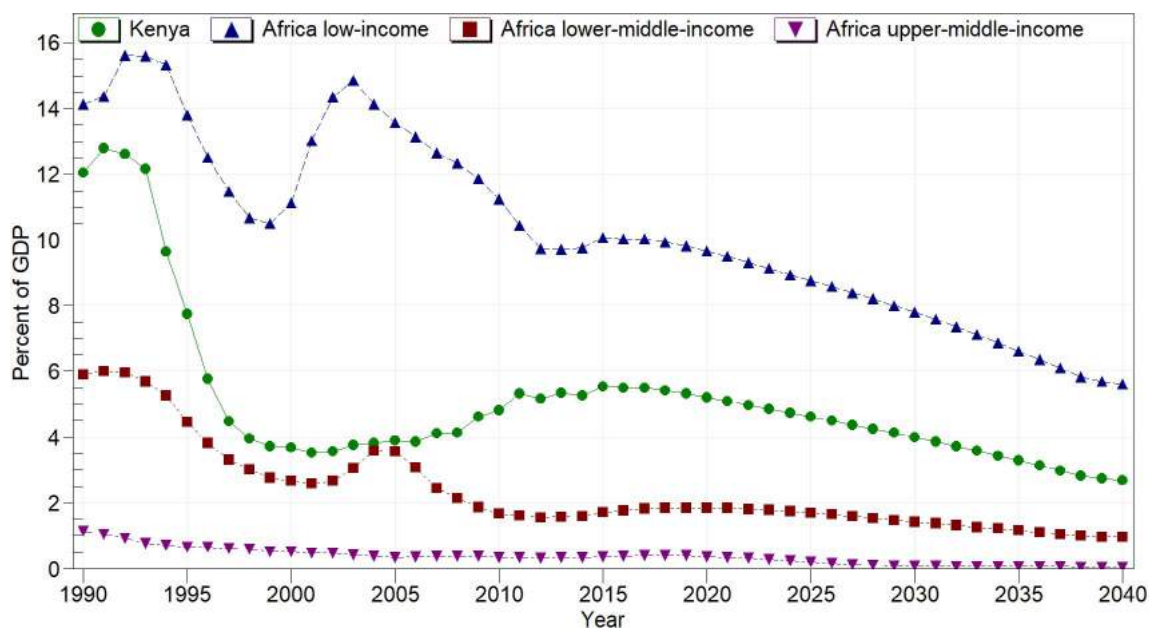
Source: IFs v. 7.33, historical data from IMF World Economic Outlook

Aid boosts Kenya's government revenues to 21% of GDP, similar to the average for other lower-middle-income African countries. In the absence of comparable tax rates or an expanding tax base, aid therefore makes an important contribution to government finances in Kenya.

Transparency International released the latest Corruption Perception Index (for 2017) in February 2018. Although Kenya improved two places in the global rankings, now at 143 out of the 180 countries included in the index, it achieved a score equivalent to that for low-income Africa, therefore scoring below other lower-middle-income countries in Africa. When considering the fact that social capital is only second to physical capital as a drag on growth (see section 9.2) high levels of corruption serve as a major constraint to Kenya's achieving upper-middle-income status.

The World Bank Index on Control of Corruption (i.e. the extent to which a country is able to respond to corruption) presents a similar picture.[281] It illustrates a growing gap between the limited ability (or willingness) of the government to effectively respond to corruption compared with the rest of lower-middle-income Africa (see Figure 9.10).

---

280 This latter explanation could have its roots, at least in part, in Kenya's large informal sector.

281 This reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests; -2.5 indicates weak and 2.5 strong governance performance.

Figure 9.10: World Bank Index on Control of Corruption
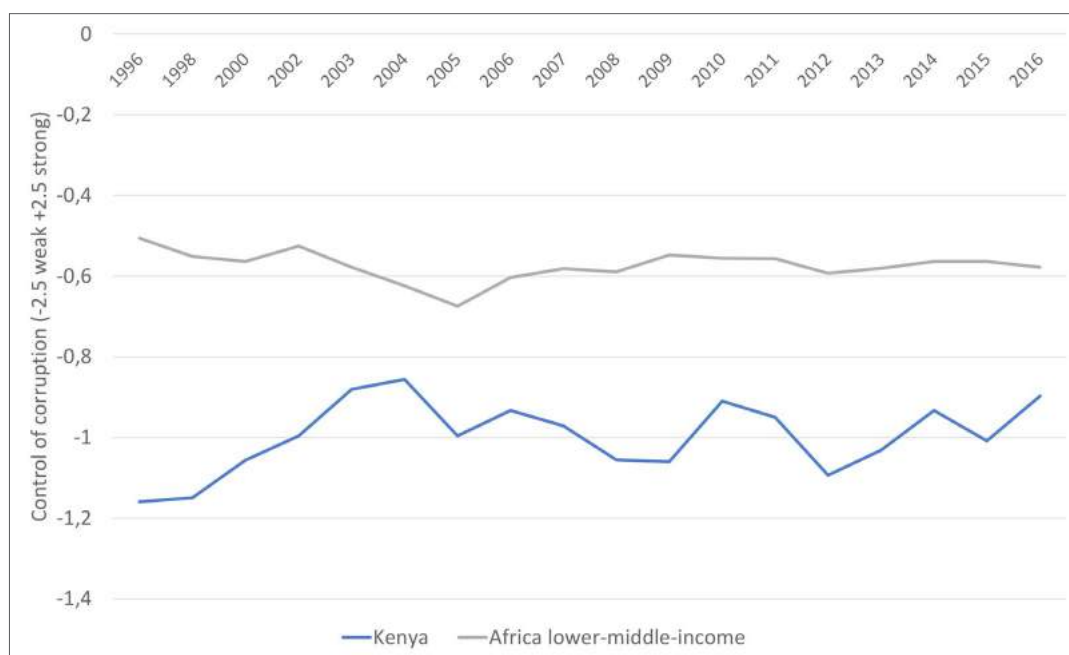
Source: Worldwide Governance Indicators

9.5 Inclusion

Once governments achieve a minimum degree of security and have developed appropriate capacity, pressure mounts for greater inclusion in political and economic structures and processes as part of an emerging social contract between government and its citizens. The IFs model forecasts its inclusion index based on regime type (using Polity IV data) and a measure for gender empowerment as a proxy for horizontal inclusion.[282]

Kenya does significantly better on the IFs inclusion index than the average for other African lower-middle-income countries, as shown in Figure 9.11.[283]

Using the Polity IV data on political regime characteristics, Kenya is scored at an average of 8 over the period 2000–2017, with 10 indicating a full, stable multiparty democracy.[284] The average for other lower-middle-income countries in Africa for that period is 1.5 and for upper-middle-income countries is 5. Kenya is therefore significantly more democratic than its peers, as well as most of Africa.

This high a level of democracy, at low levels of economic development, is often associated with higher levels of corruption and even social turbulence.[285]

---

282 Earlier Hughes et al. found that the Gender Empowerment Measure (GEM) to have an advantage over the two highly correlated long-term development variables that are traditionally associated with measures of expected democracy, namely GDP per capita and average years of educational attainment by adults. See BB Hughes et al., *Patterns of potential human progress volume 5: strengthening governance globally*, Boulder: Oxford University Press, 2014, 92. The formulation used in IFs to forecast GEM is at 95.

283 The IFs inclusion index is driven by the democracy score from the Polity index and the gender empowerment measure from the UNDP.

284 IFs uses the Polity IV index as an important subsidiary measure within its governance index. The index categorises states according to authority characteristics, with attention to six component measures: regulation of executive recruitment, competitiveness of executive recruitment, openness of executive recruitment, constraints that exist on executive action, regulation of political participation, and competitiveness of political participation. The Polity IV project provides the following definitions: 'A mature and internally coherent democracy, for example, might be operationally defined as one in which (a) political participation is unrestricted, open, and fully competitive; (b) executive recruitment is elective, and (c) constraints on the chief executive are substantial.' Practically, the nature of a regime, including its measurement as autocratic/democratic, is relative to its level of development such as level of income per capita and education that, in IFs, is conceptualised as a democratic deficit or surplus. 'In mature form, autocracies sharply restrict or suppress competitive political participation. Their chief executives are chosen in a regularized process of selection within the political elite, and once in office they exercise power with few institutional constraints.' MG Marshall, TR Gurr and K Jaggers, *Polity IV Project: political regime characteristics and transitions, 1800–2016, Dataset users manual*, Center for Systemic Peace, 25 July 2017, 15, http://www.systemicpeace.org/inscr/p4manualv2016.pdf

285 See J Cilliers, The future of democracy in Africa, ISS, African Futures Paper 19, 20 October 2016, https://issafrica.org/research/papers/the-future-of-democracy-in-africa

Figure 9.11: Polity index for 2016 and 2040
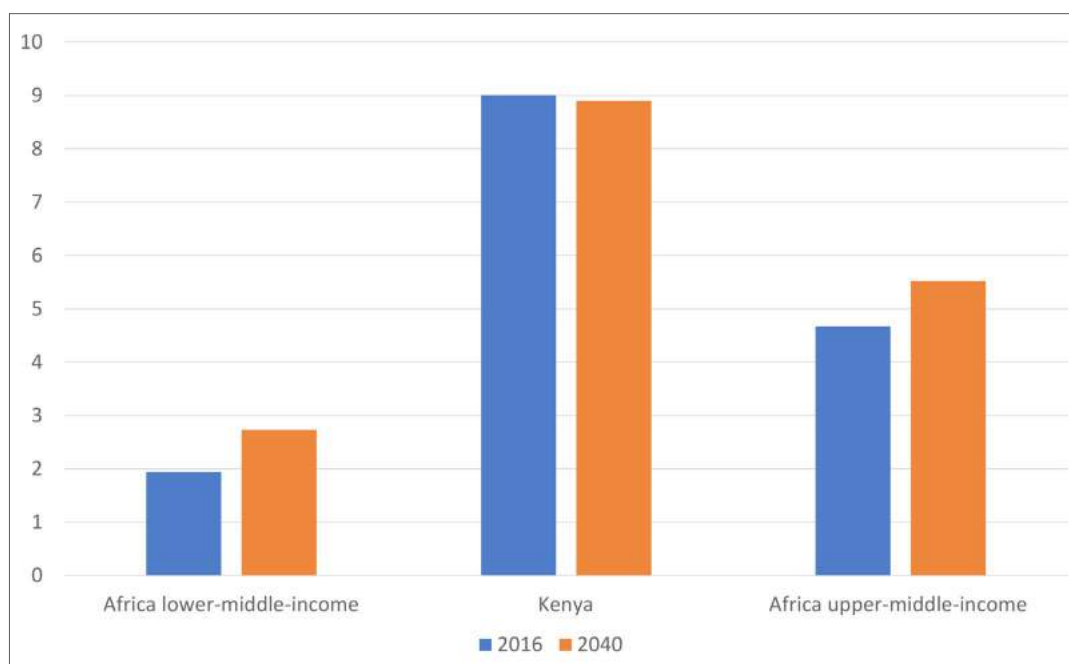
The analysis that Kenya has a higher level of democracy than others at the same level of development is supported by other data sources such as the Voice and Accountability Index from the World Bank Worldwide Governance Indicators (see Figure 9.12). Again, Kenya is rated significantly above the average for other lower-middle-income countries in Africa.[286]

Figure 9.12: World Bank Voice and Accountability Index
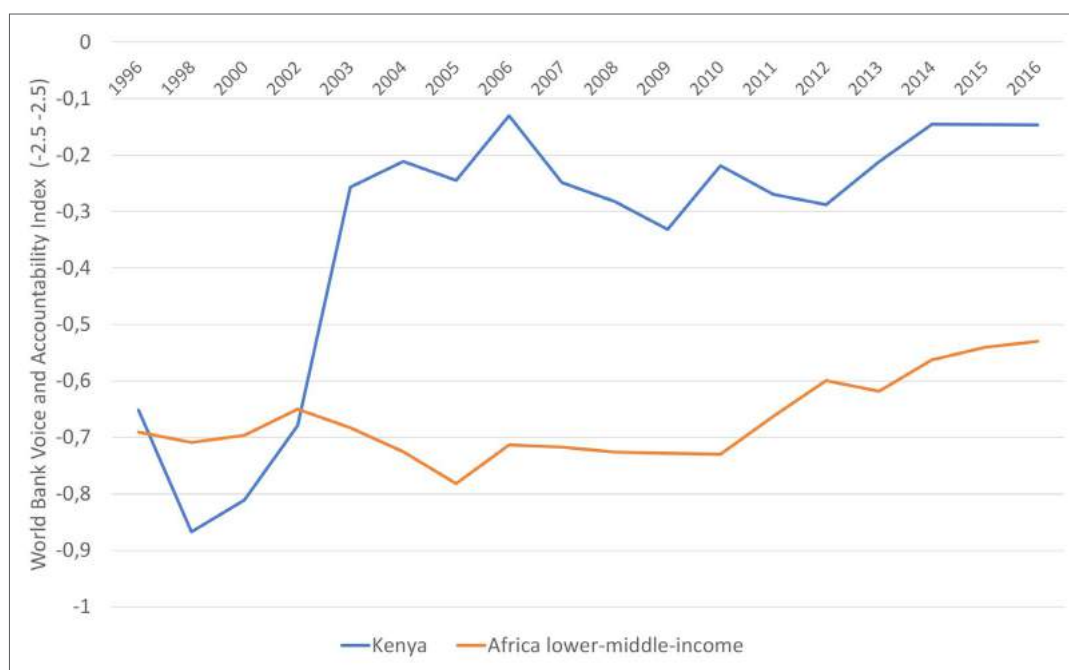
Figure 9.13 presents four indicators and serves as a summary of the evolution of governance and income in Kenya since independence in 1963. The main graph contains three measurements of regime type/

---

286 According to the World Bank, voice and accountability measures 'perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media'. World Bank, World Governance Indicators, Frequently asked questions, http://info.worldbank.org/governance/wgi/index.aspx#faq

democracy. The Polity dataset (right-hand scale) measures the institutional characteristics of regime type on a spectrum that spans from fully institutionalised autocracies (-10 to -6 on the index) through mixed authority regimes ('anocracies') to fully institutionalised and consolidated democracies (+6 to +10). The Varieties of Democracy (V-Dem) dataset (left-hand scale) includes two indices of democracy, namely electoral democracy[287] and liberal democracy,[288] and measures these on a scale of 0 to 1. The window presents annual levels of income (in constant 2011 US$).

Although democracy and income are poorly related at low levels of income, it is clear that Kenya has experienced more rapid growth in income levels with the end of single-party domination and subsequent introduction of competitive politics.

Figure 9.13: Regime characteristics, democracy and income in Kenya 1963–2017
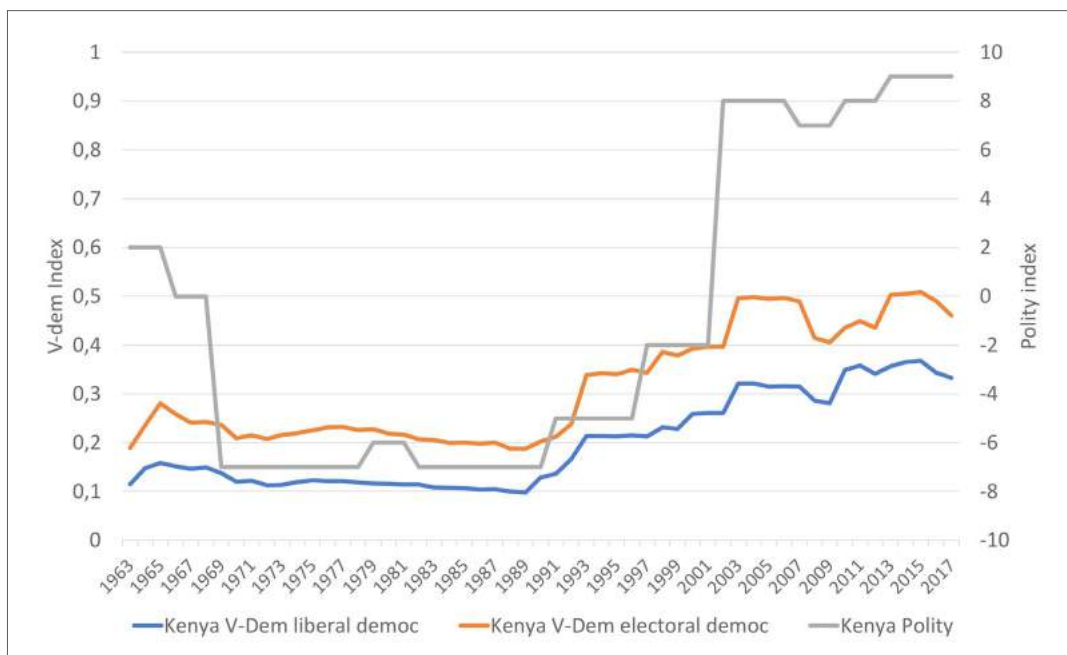
Source: V-Dem, Polity IV and IFs v 7.33

9.6   Alternative measures of governance

The Ibrahim Index of African Governance (IIAG) measures governance in Africa across four pillars: safety and rule of law, participation and human rights, sustainable economic opportunity, and human development. The four pillars are aggregated to provide an overall governance performance score. The four pillars consist of 14 sub-categories and 100 indicators.

With a score of 59.3 out of a possible 100 on the IIAG, Kenya ranked 13th out of 54 African countries in 2016, doing the best on human development and the worst on safety and rule of law, where it generally scores slightly below the average for Africa. Kenya's overall governance score declined marginally year-on-year from 2000 to 2008/2009 (to 52.6) before a moderate improvement to 59.3 in 2016. Although it has moved up by 10 positions since 2007 on the overall governance index, improvements across the continent

---

287 According to Varieties of Democracy (V-Dem), the 'electoral principle of democracy seeks to embody the core value of making rulers responsive to citizens, achieved through electoral competition for the electorate's approval under circumstances when suffrage is extensive; political and civil society organizations can operate freely; elections are clean and not marred by fraud or systematic irregularities; and elections affect the composition of the chief executive of the country. In between elections, there is freedom of expression and an independent media capable of presenting alternative views on matters of political relevance. In the V-Dem conceptual scheme, electoral democracy is understood as an essential element of any other conception of representative democracy – liberal, participatory, deliberative, egalitarian, or some other.' See V-Dem, V-Dem dataset – version 8, https://www.v-dem.net/en/data/data-version-8/

288 For V-Dem, liberal democracy is measured as the existence of electoral democracy in combination with three additional components: rule of law ensuring respect for civil liberties, constraints on the executive by the judiciary, and constraints on the legislature.

have been slow and, in some instances, even negative. Therefore Kenya's current 13th position is partly the result of poor performance by others.

Looking at sub-index level within the IIAG, the particularly large positive improvements are evident in the infrastructure, welfare and personal safety indicators since 2007. Minor negative scores occurred in human rights, public management, national security and human development in rural areas.[289]

According to the World Bank, Kenya's government effectiveness and regulatory quality is significantly better than the average for other lower-middle-income African countries.[290] Figure 9.14 presents World Bank data on government effectiveness, comparing Kenya with the average for other lower-middle-income countries in Africa.

Figure 9.14: World Bank Index on Government Effectiveness
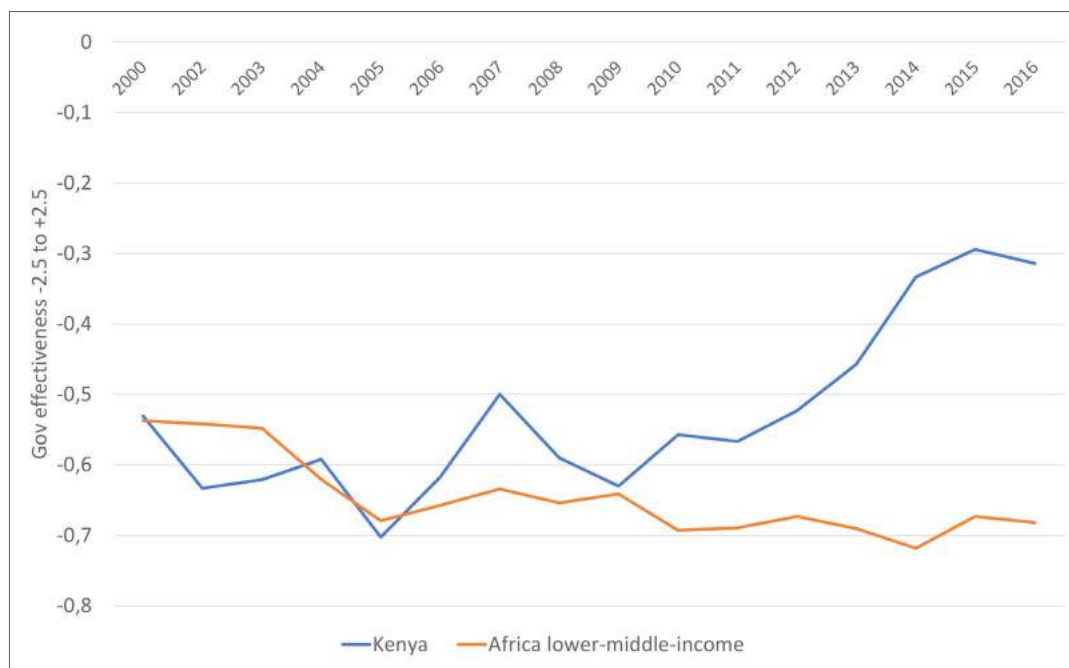
Source: Worldwide Governance Indicators

A less direct but important indicator of government capacity would be the extent to which the rule of law applies.

The Rule of Law Index is part of the World Bank's Worldwide Governance Indicators. It attempts to quantify 'the perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence'.[291] Figure 9.15 compares Kenya's score with the average for its peer group. According to this index, perceptions of the application of the rule of law in Kenya improved dramatically until 2014, with a concerning fallback thereafter.

After several years during which its rule of law score had deteriorated, Kenya started to improve its ranking from 2008, particularly rapidly from 2011 to 2014. The improvements followed a series of judicial reforms in 2011 after the 2010 constitution. Changes included the establishment of the supreme court, environmental and land court and employment and labour relations court. There was also a deliberate move to reduce

---

289 Ibrahim Index of African Governance (IIAG), iiag.online

290 The bank describes government effectiveness as 'capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies'. World Bank, World Governance Indicators, Frequently asked questions, http://info.worldbank.org/governance/wgi/index.aspx#faq

291 Ibid.

backlogs in cases and improve service delivery through computerisation and digitisation of the judiciary and its records. However, by 2016 Kenya had reverted to the average rule of law score for other African lower-middle-income countries as political competition increased and the constraints of government power, particularly the executive, weakened.[292]

Figure 9.15: World Bank Rule of Law Index
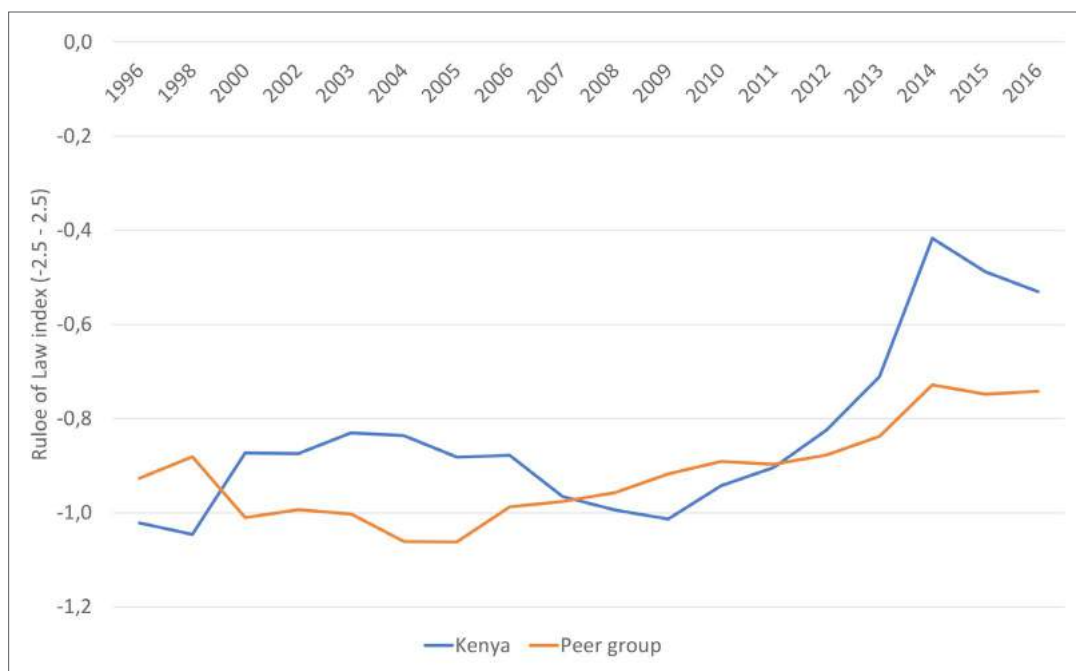
Source: Worldwide Governance Indicators

9.7   Conclusion

In general, the comparative picture of governance in Kenya as presented in IFs is positive, only trailing the average for upper-middle-income countries in Africa. Kenya maintains that positive relationship to 2040, although losing some of its comparative advantage over time. This positive evaluation should be tempered by the fact that governance in Kenya has suffered from high levels of ethnic mobilisation (with the attendant challenges to stability) and high levels of corruption (which has detracted from the effective delivery of services).

Although Kenya therefore does well on the composite IFs governance index, it is more inclusive than other countries at similar levels of income and education and has a moderate capacity deficit relative to other lower-middle-income countries, largely as a result of high levels of corruption. There is likely a relationship between these two results.

In the positive Tuko Kazi scenario, corruption in Kenya decreases to the same level as in other low-middle-income countries/peers/upper-middle-income countries in Africa. Conversely, the Bila Hopes scenario shows increased instability, decreased capacity, and decreased democracy.

Chapter 10: Alternative scenarios

10.1 Introduction

The preceding chapters traced Kenya's history across a number of important measures of economic, human and social development. In the report, several indicators were highlighted as areas where Kenya was underperforming relative to its level of economic development – and where the government could focus over the next five years to improve livelihoods in the country. This chapter will reintroduce some of those leverage points, and present two alternative scenarios out to 2040.

A central theme that has emerged from this analysis is that, over the coming years, the government must focus on expanding access to basic services in areas where the country is lagging, without sacrificing progress made in other important areas in recent decades. Levels of access to health and education services in Kenya have historically been well above the average for other African countries. In 2015 the average Kenyan over the age of 25 had about one year of additional education relative to the average for the continent as a whole. The average Kenyan can also expect to live about 4.5 years longer than people born elsewhere in Africa.

Kenya is able to achieve these outcomes despite the fact that GDP per capita (PPP) is more than 33% lower in Kenya than the average for Africa as a whole. This difference between Kenya and the rest of Africa in health and education outcomes has been fuelled by historically high levels of public spending on those sectors. Therefore, a core priority going forward will be to preserve the gains made in those areas, while simultaneously expanding service delivery in other areas. The recent declines across a number of education indicators hint at some of the trade-offs facing the government in the years ahead and underscore the importance of strategic planning over the long term.

Another story that emerged prominently in this report is that Kenya has a significant deficit in core infrastructure. Although there have recently been substantial improvements in some areas – most notably access to electricity – levels of access to other basic services are well below those in other lower-middle-income African countries, and even the average for the continent as a whole. In 2015 people across Africa were about 13% more likely to have access to clean water and about 27% more likely to have access to an improved sanitation facility than individuals living in Kenya. The figures are even starker when compared to other lower-middle-income African countries.

Kenya is currently investing heavily in infrastructure, but most of the emphasis appears to be on expanding the road network, extending the electricity grid and building SEZs to attract foreign direct investment and promote manufacturing. While water and sanitation do feature in government plans, they are not a core feature of the Big Four initiative, and seem to be attracting considerably less attention than other forms of infrastructure.[293] In fact, the goals under the health umbrella of the Big Four tend to focus on attracting new investment into the sector, extending coverage and constructing new facilities, rather than on building out the core infrastructure that can act to improve health in the country in a preventative sense.

---

293 Republic of Kenya, National Treasury, The 2018 budget policy statement, February 2018. http://www.treasury.go.ke/component/
    jdownloads/send/195-budget-policy-statement/732-2018-budget-policy-statement.html?option=com_jdownloads
    The budget has hard targets for health services, manufacturing and food security, but only three passing mentions of sanitation.

The challenge in Kenya, as in many African countries, is to figure out how to balance a move toward a 21st century economy while crafting policies that address deficits in basic service delivery. For instance, while the LAPSSET initiative could stimulate regional economic growth and provide a much-needed boost to the local economy, the project is primarily focused on big-ticket infrastructure projects such as roads, coal plants and resort cities, rather than on clean water, improved sanitation and affordable housing.

There are no blanket solutions to economic or human development, and this report intends to assist the government to think strategically about the trade-offs inherent in various policy decisions. To that end, the following section will present two broad scenarios and their impact across a number of important development indicators to help frame the range of potential outcomes facing the Kenyan government between now and 2040.

10.2 Tuko Kazi

The Tuko Kazi scenario is one in which, from 2019 to 2023, Kenya makes strategic investments in the areas highlighted in this report. It improves the quality of governance and continues to make progress in areas where the country is performing better than expected relative to its level of economic development – specifically in health and education. While Kenya does not achieve its headline goal of becoming an upper-middle-income country by 2030 in the Tuko Kazi scenario – and also falls well short on many SDGs – this future does create noticeable improvements in the country's trajectory.

Although GDP per capita (MER) does improve to nearly US$3 700, it still falls shy of the US$5 600 that the World Bank projects will be the upper-middle-income threshold in 2030.[294]

The country will also fall substantially short of other SDG targets, such as universal access to improved sanitation facilities (62%) and clean water (87%), and is also unlikely to meet the target for universal secondary completion (achieving a completion rate of only 75% of at-age children). That said, if the government is able to channel investment into productive sectors of human and economic development while fostering inclusive economic growth by improving efficiency in agriculture and attracting more foreign investment, Kenya's future could be significantly brighter than the Stuck in Traffic scenario would suggest.[295]

In the Tuko Kazi scenario, Kenya maintains its investments in health and education, focusing on improving family planning and alleviating bottlenecks in the education system. The country also improves the efficiency of its agricultural sector by improving total yields and reducing food loss during the post-production, pre-consumption phase, makes a push to improve access to WASH infrastructure and implements a housing subsidy programme. Finally, the government is able to reduce corruption and effectively manages incoming oil revenues – modest as they are. Owing to these policies the country sees more FDI and experiences a sustained period of high economic growth.

Relative to the Stuck in Traffic forecast, Kenya's GDP growth rate is, on average, more than half a percentage point higher – over the duration of the forecast – in Tuko Kazi, as shown in Figure 10.1. The sustained levels of high economic growth that Kenya experiences in this scenario translate into an additional US$34 billion in GDP in 2040 alone, and a cumulative total of more than US$273 billion in overall economic output over the duration of the forecast.

Along with growth in the overall economy, there are also significant gains in human well-being in this scenario. Compared to the Stuck in Traffic scenario, the average individual in Kenya has about US$770 (measured at PPP) more money in his or her pocket in 2040, there are over 4.5 million fewer people

294 B Handjiski et al., Kenya – Country economic memorandum: from economic growth to jobs and shared prosperity, World Bank Group, 2016, 5, http://documents.worldbank.org/curated/en/763771468197384854/Kenya-Country-economic-memorandum-from-economic-growth-to-jobs-and-shared-prosperity

295 For details on the specific indicators targeted in the scenarios and the benchmarks used to calibrate the interventions, please see the annexes.

surviving on less than US$1.90 per day and infant mortality declines by more than 20% in the Tuko Kazi scenario.

Figure 10.1: GDP growth rates in Stuck in Traffic and Tuko Kazi (five-year moving average)
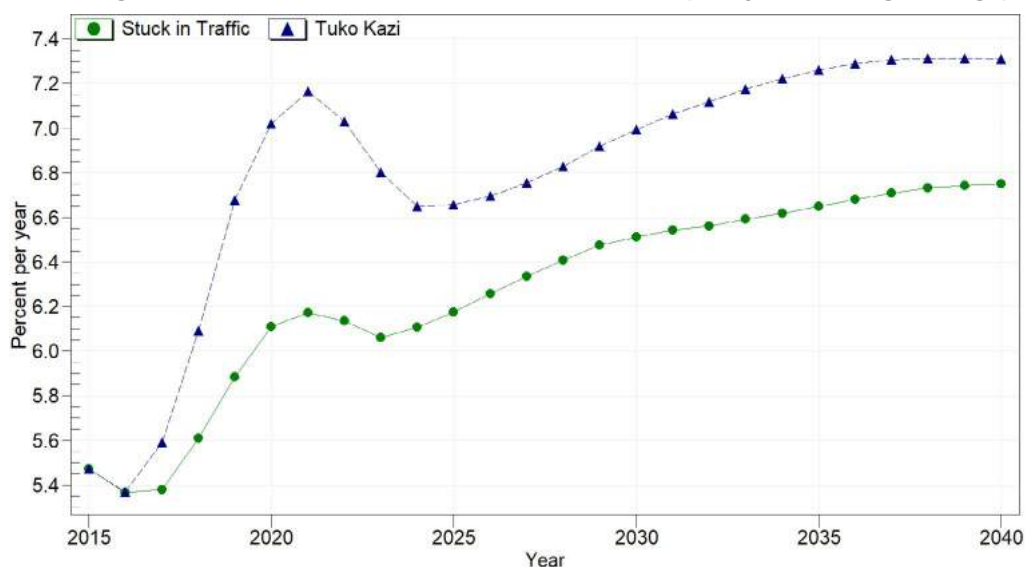
Source: IFs v. 7.33 initialised from IMF data

The country will also be less dependent on food and energy imports than in the Stuck in Traffic scenario, reducing Kenya's vulnerability to international commodity price shocks. Moreover, there are improvements in the drag on multifactor productivity (and hence on economic growth) from physical and social capital, without a significant change in the positive contribution from human capital or knowledge capital.

Moreover, extending the forecast horizon a bit further allows some of the other interventions to really take shape – particularly those around family planning and education. In the Tuko Kazi scenario, the average Kenyan over the age of 15 still has about the same level of education as his or her peers in other lower-middle-income countries in Africa. In 2040 average levels of education in Kenya improve to a little more than an extra half-year of education in the Tuko Kazi scenario. However, by 2075 he or she can expect to have about 1.2 years of additional education relative to people in other lower-middle-income African countries.

Additionally, the Tuko Kazi scenario has significant effects on both the magnitude and the timing of the demographic dividend. For one, it brings the onset of the peak of the demographic dividend forward by roughly 10 years, from around 2060 to closer to 2050. More importantly, it increases the peak from a high of about 210 workers for each 100 dependents to more than 220 workers per 100 dependents.

Figure 10.2 shows the earlier onset of the demographic dividend caused by the interventions in the Tuko Kazi scenario. As discussed in the demographics section, the earlier Kenya improves the ratio of its working-age population to dependents, the sooner it can unlock higher rates of economic growth, provided that this is accompanied by improvements in access to health, education and other basic services.

The interventions imposed in the Tuko Kazi scenario clearly result in a more favourable future for Kenya, relative to the Stuck in Traffic forecast. The scenario forces a sizeable reduction in the number of people living in extreme poverty, improves food security and grows the overall economy. However, achieving this future will take a coordinated and well-executed set of policies across all tiers of government. This involves carefully managing the process of devolution, prioritising the sequencing of investment in infrastructure and balancing human development goals against economic ones.

Figure 10.2: Demographic dividend in Kenya and other lower-middle-income African countries
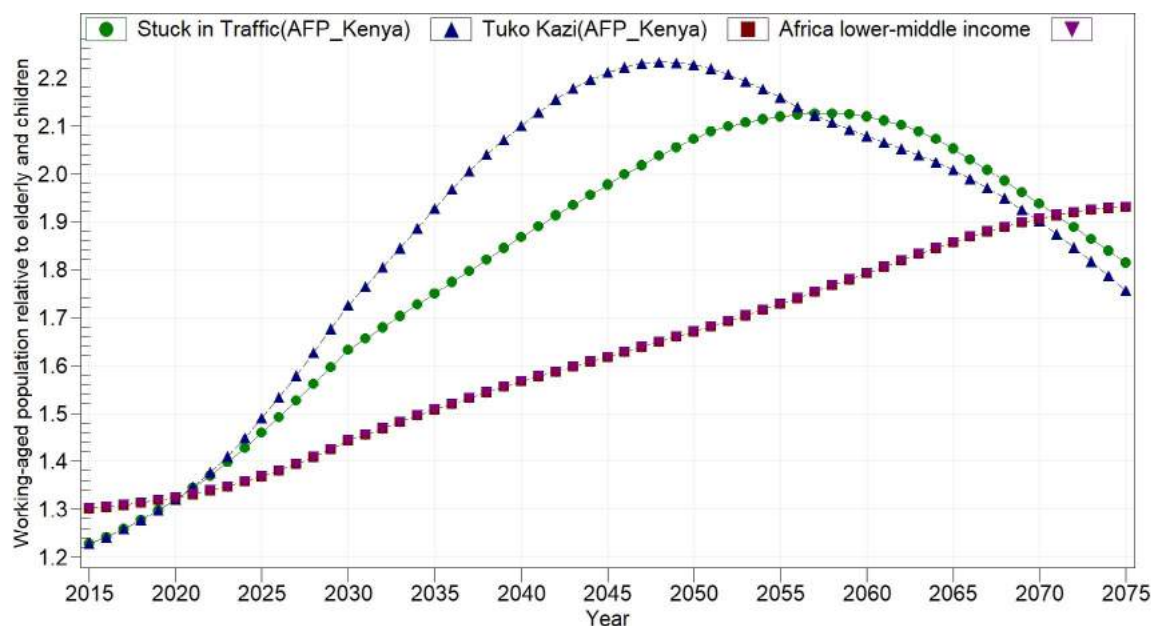
Source: IFs v. 7.33 initialised from UNPD data

10.3 Bila Hopes

Although Kenya does have significant potential, the country may face a less stable future if complacency sets in. The consistent violence surrounding elections – although it has varied considerably – is a primary cause for concern. However, the country also has a consistent problem with corruption that could be exacerbated by the mismanagement of oil revenues. Furthermore, recent declines in a number of education indicators highlight the reality of trade-offs in government planning.

The Bila Hopes scenario is a future where progress in key dimensions of human development stalls relative to the Stuck in Traffic forecast. Health and education outcomes fall below the Stuck in Traffic forecast, i.e. access rates still improve, but at a slower rate. There is also a less significant improvement in access to water and sanitation facilities, and family planning initiatives are not implemented as quickly as in the Stuck in Traffic scenario, causing the population to grow more rapidly and the demographic dividend to be postponed.

In this scenario, the quality of service delivery deteriorates over the next five years and social tensions mount in the run-up to the 2022 election, after which there is an increased risk of internal violence. Additionally, the presence of oil revenue increases rent seeking and deepens the level of corruption in the country. Along with its poor infrastructure, corruption is one of the most significant impediments to Kenya's future development prospects.

Corruption penetrates every sector of the economy. An ineffectual, weak and small judicial system and persistent demands for bribes by public officials hinder the ease and cost of doing business for both local and foreign investors. Corruption scandals in Kenya have taken many forms and have permeated many aspects of public life. The high-profile scandals in public service include Anglo Leasing, Eurobond, NYS and Afya House scams, to name a few.[296]

In 2016 PricewaterhouseCoopers (PwC) reported that corruption in public procurement was Kenya's leading economic crime.[297] Fraudulent tender awards are happening at the highest level of government, siphoning off billions of shillings that could otherwise be used to improve the livelihoods of all Kenyans.

---

296 GAN Business Anti-Corruption Portal, Kenya corruption report, 2017, https://www.business-anti-corruption.com/country-profiles/kenya/

297 PricewaterhouseCoopers, *2016 Global Economic Crime Survey: Kenya Report*, Adjusting the lens on economic crime: preparation brings opportunity back into focus, https://www.pwc.com/ke/en/assets/pdf/gecs2016-report.pdf

There are also reports of corruption in tax administration, which eventually leads to tax evasion and further erodes Kenya's capacity for economic growth.[298] In this scenario, corruption continues to be a drag on development in Kenya and is actually exacerbated relative to the Stuck in Traffic forecast.

In the Bila Hopes scenario, agricultural production also stalls, widening the gap between imports and exports. This is a future where Kenya ceases to be an anchor of stability in East Africa and becomes, for lack of a better description, more like its neighbours have been historically.

The Bila Hopes scenario has a negative impact on economic growth rates, relative to the Stuck in Traffic scenario, as shown in Figure 10.3. In this scenario Kenya grows, on average, about 0.7 percentage points slower per year than in the Stuck in Traffic scenario. In Bila Hopes Kenya's economy is about US$30 billion smaller in 2040, with a cumulative loss of around US$240 billion over the course of the forecast relative to the Stuck in Traffic scenario.

Figure 10.3: GDP growth rates in Stuck in Traffic and Bila Hopes (five-year moving average)
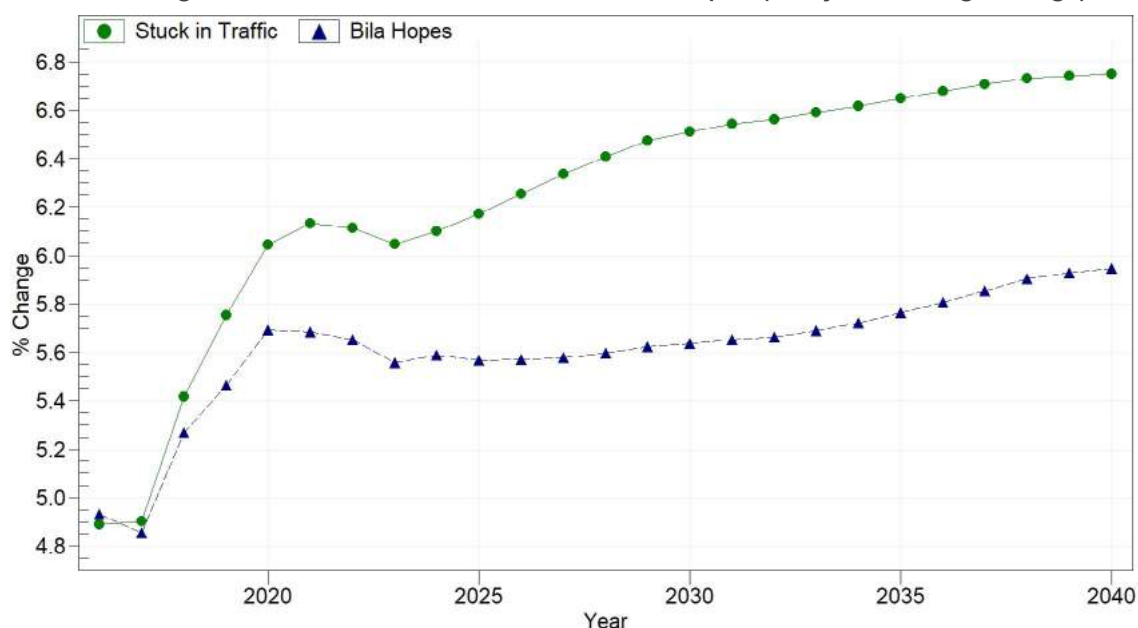
There are also negative consequences for human development. In the Bila Hopes scenario the average Kenyan earns about US$700 (measured at PPP) less per year in 2040 than in the Stuck in Traffic scenario. There is also a 5 percentage point increase in the number of people living in extreme poverty (approximately 4 million people), a 2% decline in Kenya's score on the HDI, and about 200 000 more undernourished children in 2040 compared to the Stuck in Traffic forecast. Agricultural import dependence increases by about 8 percentage points, relative to the Stuck in Traffic scenario, infant mortality increases by about 20% by 2040 and the demographic dividend peaks much later (around 2070) and is much lower (around 1.95) than in the Stuck in Traffic forecast.

This is a future where GDP per capita (PPP) falls from 11th highest among Africa's 18 lower-middle-income countries in the Stuck in Traffic forecast in 2040, to 13th in the Bila Hopes scenario. Kenya also falls from sixth to seventh among lower-middle-income African countries on the HDI in 2040 and there are negative consequences on all four drivers of multifactor productivity relative to the Stuck in Traffic forecast.

---

298 Ibid.

10.4 Comparison

The Tuko Kazi and Bila Hopes scenarios frame a band of possibilities facing the future of Kenya, and there is clearly a wide range of potential outcomes. This section will compare the two scenarios against the Stuck in Traffic scenario to get a better sense of the various possible futures the country may experience.

At the absolute level, Kenya's economy (measured by GDP at MER) is nearly US$72 billion larger in the Tuko Kazi scenario than in the Bila Hopes scenario in 2040 alone. Over the course of the forecast, Kenya's GDP is more than US$550 billion larger in the Tuko Kazi scenario. Figure 10.4 shows total GDP growth, in billions of US$, in Kenya in the three scenarios.

Figure 10.4: GDP (MER) in Kenya in the three scenarios
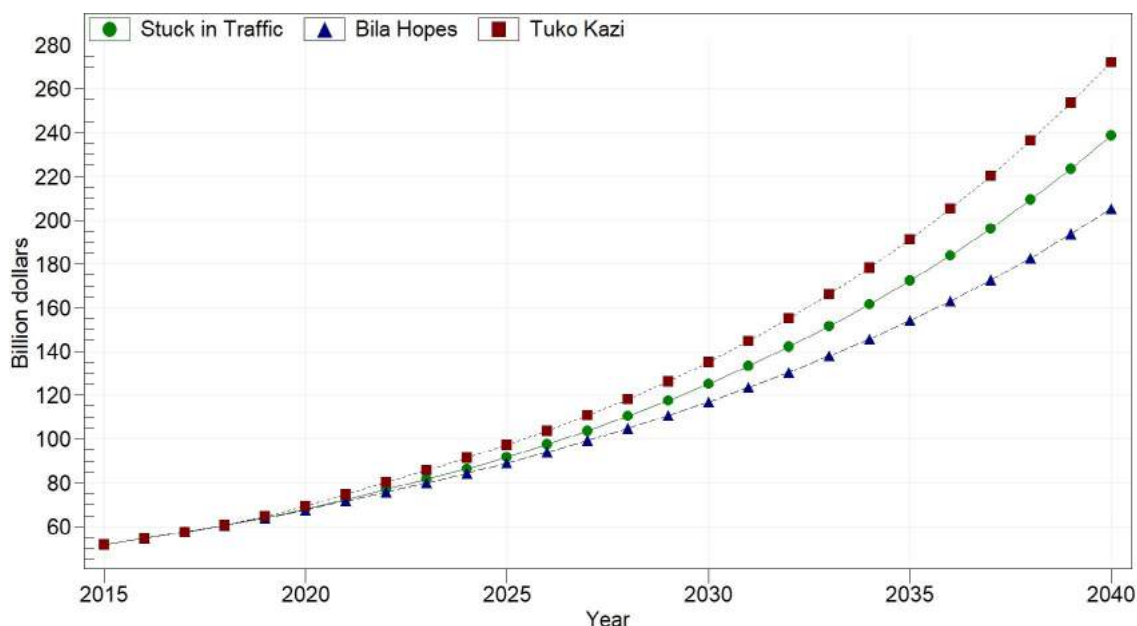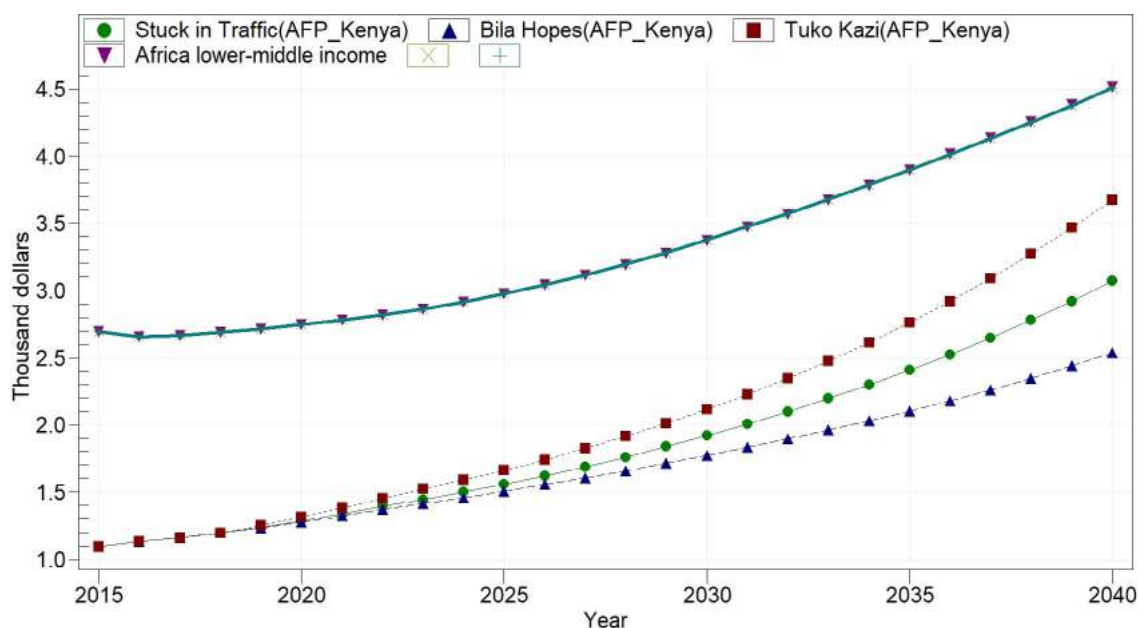

Source: IFs v. 7.33 initialised from IMF data

Furthermore, there are significant differences for individuals in Kenya between the two scenarios. In Tuko Kazi, GDP per capita (PPP) is nearly US$1 600 larger than in the Bila Hopes scenario. That difference is equivalent to about 50% of total GDP per capita (PPP) in Kenya in 2017. Figure 10.4 shows the difference in GDP per capita in the three scenarios and again highlights the wide range of potential outcomes the country could experience. However, it also shows that, even in the Tuko Kazi scenario, average income levels in Kenya will remain well below the average for other lower-middle-income countries in Africa.

There is also a large gap in the impact on poverty between the two scenarios, as shown in Figure 10.6. It shows that the Bila Hopes scenario has a higher poverty rate (of approximately 12 percentage points) relative to Tuko Kazi, which in 2040 will translate into a difference of nearly 9 million people. In the Bila Hopes scenario there are also about 400 000 additional children suffering from undernutrition than in the Tuko Kazi scenario and the infant mortality rate is more than 50% higher in 2040.

In the Tuko Kazi scenario, Kenya's score on the HDI is about 5% higher than in Bila Hopes, while agricultural import dependence declines by 13 percentage points from 34% of total demand in Bila Hopes to 21% in Tuko Kazi.

Lengthening the forecast to 2075 also reveals some interesting discrepancies between the two forecasts. For instance, the rate of stunting is about 1.2 percentage points lower in the Tuko Kazi scenario than in Bila Hopes, which translates into about 1.3 million people in the Stuck in Traffic population forecast for 2075. By 2075 the number of average years of education for the age group over 15 is a nearly a year higher in the Tuko Kazi scenario than in Bila Hopes.

Figure 10.5: GDP (MER) in Kenya in the three scenarios and the average for other lower-middle-income African countries

Source: IFs v. 7.33 initialised from IMF data

Figure 10.6: Poverty in Kenya in the three scenarios
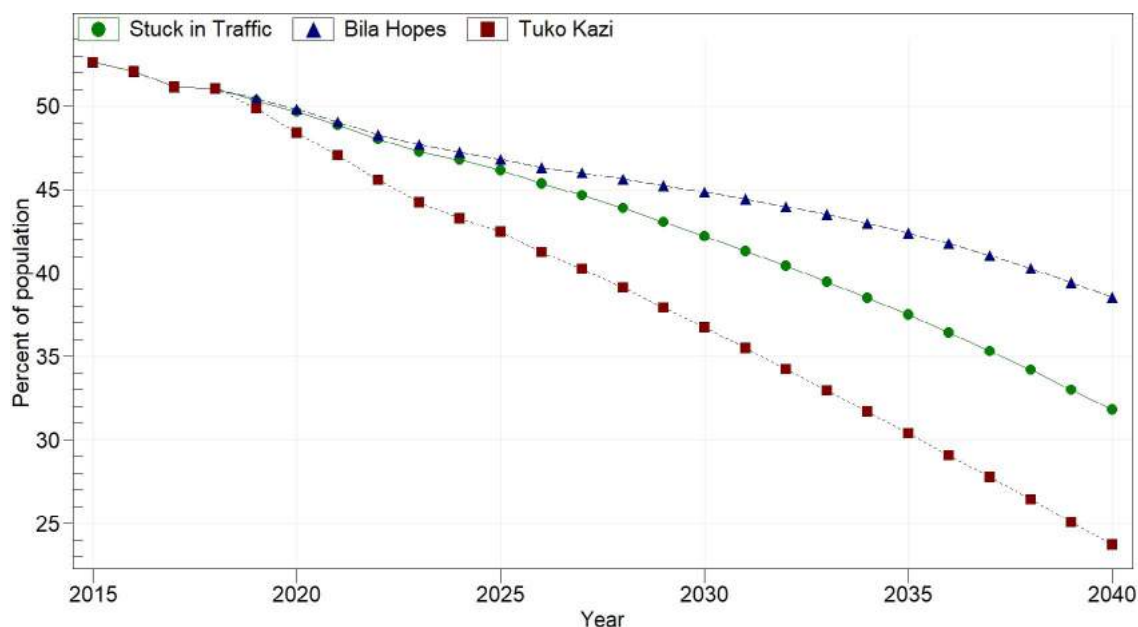
Source: IFs v. 7.33 initialised from World Bank data

10.5 Conclusion

It will be difficult for Kenya to maintain its relatively favourable ranking in the areas where it currently performs well, while also moving swiftly to address areas where the country is underperforming relative to its level of economic development. As recent declines in a number of education metrics indicates, balancing these competing priorities will likely be the defining challenge for the Kenyan government in coming years.

To realize the vision outlined in Tuko Kazi, the government must improve family planning and extend health services, address the bottleneck in lower secondary education and improve access to basic infrastructure. Additionally, the government must improve the quality of governance and reduce corruption. This includes the transparent and effective management of oil revenues along with an inclusive rollout of government services – including housing – that cuts across regional and ethnic lines.

This report has made general suggestions about what areas the government can focus on to foster better development outcomes in Kenya. However, the exact policies and means of implementation should be discussed among a heterogeneous group of stakeholders before coming to more detailed recommendations. There are various ways to provide access to clean drinking water (boreholes, piped water connection, rainwater collection, etc.) or boost agricultural yields, for example, and what works in Marsabit County may not be the most appropriate solution for Nairobi. Especially considering the implications of devolution, it is vital that a broad array of stakeholders – with a thorough understanding of the local context – are consulted and permitted to debate among themselves in a process culminating in more precise policy recommendations.

Annex A: Kenya's demographic outlook by county

County	Male	Female	Total	Households	Area in km²	Density
Nairobi	1 605 219	1 533 150	3 138 369	985 016	695	4 515
Kakamega	800 977	859 674	1 660 651	355 679	3 018	550
Kiambu	802 603	820 679	1 623 282	469 244	2 543	638
Nakuru	804 577	798 748	1 603 325	409 836	7 495	214
Bungoma	671 548	703 515	1 375 063	270 824	3 032	453
Meru	670 656	685 645	1 356 301	319 616	6 933	196
Kisii	550 451	601 831	1 152 282	245 029	1 318	875
Kilifi	535 531	574 204	1 109 735	199 764	12 610	88
Machakos	543 138	555 446	1 098 584	264 500	6 208	177
Mandera	559 938	465 818	1 025 756	125 497	25 991	39
Kitui	481 283	531 426	1 012 709	205 491	30 497	33
Kisumu	474 756	494 153	968 909	226 719	2 086	465
Homa Bay	462 450	501 344	963 794	206 255	3 183	303
Murang'a	457 860	484 721	942 581	255 696	2 559	368
Mombasa	486 924	452 446	939 370	268 700	219	4 292
Migori	444 358	472 812	917 170	180 211	2 596	353
Uasin Gishu	448 990	445 189	894 179	202 291	3 345	267
Bomet	442 830	449 005	891 835	174 914	2 792	319
Makueni	430 708	453 819	884 527	186 478	8 009	110
Turkana	445 071	410 328	855 399	123 191	68 680	12
Narok	429 027	421 893	850 920	169 220	17 933	47
Siaya	398 650	443 654	842 304	199 034	2 530	333
Trans-Nzoia	407 170	411 587	818 757	170 117	2 496	328
Nandi	376 488	376 477	752 965	154 073	2 884	261
Busia	356 119	387 827	743 946	154 225	1 695	439
Nyeri	339 724	353 834	693 558	201 703	3 337	208
Kajiado	345 143	342 169	687 312	173 464	21 901	31
Wajir	363 775	298 166	661 941	88 574	56 686	12
Kwale	315 994	333 937	649 931	122 047	8 270	79
Garissa	334 941	288 119	623 060	98 590	44 175	14
Nyamira	287 045	311 207	598 252	131 039	899	665
Nyandarua	292 152	304 116	596 268	143 879	3 245	184
Kericho	298 878	291 812	590 690	127 581	2 158	274

County	Male	Female	Total	Households	Area in km²	Density
Baringo	279 081	276 480	555 561	110 649	11 015	50
Vihiga	262 718	291 904	554 622	123 347	564	983
Kirinyaga	260 628	267 426	528 054	154 220	1 479	357
Embu	254 302	261 910	516 212	131 683	2 818	183
West Pokot	254 826	257 864	512 690	93 777	9 169	56
Laikipia	198 625	200 602	399 227	103 114	9 462	42
Elgeyo-Marakwet	183 736	186 262	369 998	77 555	3 030	122
Tharaka	178 447	186 883	365 330	88 803	2 639	138
Marsabit	151 110	140 056	291 166	56 941	70 961	4
Taita Taveta	145 333	139 324	284 657	71 090	17 084	17
Tana River	119 857	120 218	240 075	47 414	38 437	6
Samburu	112 003	111 944	223 947	47 354	21 022	11
Isiolo	73 693	69 601	143 294	31 326	25 336	6
Lamu	53 045	48 494	101 539	22 184	6 273	16

Source: KNBS, 2013

Annex B: Specific parameters used in IFs for Stuck in Traffic scenario

Parameter	Parameter definition	Intervention target value
edsecupprtranm[i]	Education, upper secondary, transition rate, multiplier	Multiply by 1.125 for duration of forecast
enml	Energy imports, limit - billion barrels of oil equivalent	Increased coal imports from 2015 to 2040
ldcropm	Crop land, multiplier	Multiply by 0.9 in 2017 and 2018, interpolate from 0.9 in 2018 to 0.65 by 2040
infraelecgencapm	Electricity generation capacity per person, multiplier	Multiply by 1.225 in 2018 and 2019; reduce to 1.0104 by 2028; increase to 1.0269 by 2033; reduce back to 1 by 2040. Note that these values are not interpolated; look to the Current Path .sce file for exact values
infraelecaccm	Electricity access, multiplier (both urban and rural)	Multiply by 2 in 2015, interpolate to 2.75 by 2020, interpolate to 1 by 2040
infraelecaccm	Electricity access, multiplier (rural)	Multiply by 2.25 in 2015, interpolate up to 2.75 by 2020, interpolate down to 1 by 2040
eprodr	Energy production (coal), growth rate	Interpolate to 0.5 by 2040
enpm	Energy production (coal), multiplier	Interpolate to 2 by 2065
enpm	Energy production (other renewable), multiplier	Interpolate to 0.925 by 2050
sanitationm	Percent of population with access to improved sanitation, multiplier	Interpolate to 0.85 by 2023, maintain for duration of forecast
GOVDEBT[ii]	Solvency – government debt as percent of GDP, initial condition	Set at 60.5 in 2015, maintain through time horizon

Annex C: Tuko Kazi benchmarks and scenario interventions

Tuko Kazi scenario			
Series	**2018 value**	**Target value (2023)**	**Benchmark**
Lower secondary transition	77%	86%	Ghana achieved a similar increase between 2003 and 2008
Upper secondary graduation	53%	60%	Turkey achieved a similar increase between 2005 and 2010
Infrastructure			
Clean water	68%	79%	Ethiopia and Laos achieved similar increases between 2010 and 2015
Improved sanitation	31%	42%	Cambodia achieved a similar increase between 2010 and 2015
Energy			
Oil production	0	25.5 million barrels per year (70 000 per day)	These interventions are benchmarked against expected oil production in Kenya (see infrastructure section)
Governance			
Corruption	2.3	3	This intervention was benchmarked against the average value for lower-middle-income African countries in 2018
Economy			
Housing subsidy			This intervention is estimated to cost about US$2.6 billion (cumulatively) over the course of the intervention
FDI	12% GDP	15% GDP	This intervention increases FDI by about 1% of GDP over the forecast; Cambodia increased FDI by 4% of GDP between 2008 and 2014 relative to the period 1994–2000
Health			
Under-5 mortality		15% decrease	Several African countries (Niger, Malawi, Angola) equalled this feat between 2010 and 2015
Maternal mortality		20% decrease	A similar feat was achieved by Tanzania between 2010 and 2015
Demographics			
Contraceptive use (benchmarked to fertility rates)	3.7 births per woman	3.2 births per woman	Malawi achieved a similar decrease between 2015 and 2010
Agriculture			
Yields	4.2 MMT	5.3 MMT	Bangladesh achieved a similar increase between 2009 and 2013
Loss	19.8% (total food production)	19.2%	This was benchmarked to approximate the level of food loss in peer group countries (see endnote 10)
Effective demand		14%	This intervention shifts demand for food by about 14% over five years

Specific parameters used for the Tuko Kazi scenario

Scenario	Parameter	Intervention length/magnitude
Yields	ylm	Interpolated from 2018 (1) to 2023 (0.9). Change repeat to 2040
Contraception use	Contrusm	Interpolated from 2018 (1) to 2023 (0.95455). Change repeat to 2040 (0.8)
Maternal mortality	hlmortcdadltm	Interpolated from 2018 (1) to 2023 (1.07). Change repeat to 2040
Under-5 mortality	hlmortmcdchldm	Interpolated from 2018 (1) to 2023 (1.0725). Change repeat to 2040
Upper secondary vocational share	edsecupprvocadd	Interpolated from 2018 (0) to 2023 (-1). Change repeat to 2040
Lower secondary vocational share	edseclowrvocadd	Interpolated from 2018 (0) to 2023 (-1). Change repeat to 2040
Upper secondary transition rate	edsecupprtranm	Interpolated from 2018 (1) to 2023 (1.02841). Change repeat to 2040
Upper secondary graduation	edsecupprgram	Interpolated from 2018 (1) to 2023 (0.99384). Change repeat to 2040 (0.97)
Transparency	govcorruptm	Interpolated from 2018 (1) to 2023 (0.875). Change repeat to 2040
Agricultural loss from producer–consumer	aglosstransm	Interpolated from 2018 (1) to 2023 (1.1). Change repeat to 2040
Access to safe water (unimproved)	watsafem	Interpolated from 2018 (1) to 2023 (1.07). Change repeat to 2040
Improved sanitation	sanitationm	Interpolated from 2018 (1) to 2023 (0.725). Change repeat to 2040
Democracy level	democm	Interpolated from 2018 (1) to 2023 (0.7). Change repeat to 2040

Specific parameters used for the Bila Hopes scenario[iii]

Scenario	Parameter	Intervention length/magnitude
Yields	ylm	Interpolated from 2018 (1) to 2023 (0.9). Change repeat to 2040
Contraception use	Contrusm	Interpolated from 2018 (1) to 2023 (0.95455). Change repeat to 2040 (0.8)
Maternal mortality	hlmortcdadltm	Interpolated from 2018 (1) to 2023 (1.07). Change repeat to 2040
Under-5 mortality	hlmortmcdchldm	Interpolated from 2018 (1) to 2023 (1.0725). Change repeat to 2040
Upper secondary vocational share	edsecupprvocadd	Interpolated from 2018 (0) to 2023 (-1). Change repeat to 2040
Lower secondary vocational share	edseclowrvocadd	Interpolated from 2018 (0) to 2023 (-1). Change repeat to 2040
Upper secondary transition rate	edsecupprtranm	Interpolated from 2018 (1) to 2023 (1.02841). Change repeat to 2040
Upper secondary graduation	edsecupprgram	Interpolated from 2018 (1) to 2023 (0.99384). Change repeat to 2040 (0.97)
Transparency	govcorruptm	Interpolated from 2018 (1) to 2023 (0.875). Change repeat to 2040
Agricultural loss from producer–consumer	aglosstransm	Interpolated from 2018 (1) to 2023 (1.1). Change repeat to 2040
Access to safe water (unimproved)	watsafem	Interpolated from 2018 (1) to 2023 (1.07). Change repeat to 2040
Improved sanitation	sanitationm	Interpolated from 2018 (1) to 2023 (0.725). Change repeat to 2040
Democracy level	democm	Interpolated from 2018 (1) to 2023 (0.7). Change repeat to 2040

---

i   Although the intervention targeted lower secondary transition, the parameter used increased upper secondary enrolment and was used to minimise the amount of interventions in the combined scenario.

ii   GOVDEBT is what is known as an 'initial condition' in IFs and is not a true parameter. Initial conditions allow for the adjustment of the 2015 data point (year is subject to version of IFs being used). After 2015, IFs computes subsequent values internally. Conversely, parameters allow for the specification of the exact relationship between independent and dependent variables.

iii   Because there is, very generally speaking, little precedent for a significant stagnation in service delivery, these scenarios are not benchmarked as precisely as those in the Tuko Kazi scenario. The interventions in this scenario reduce progress below the Stuck in Traffic scenario although, in some cases, they still result in overall improvements to the selected indicator.

About the authors

Dr Jakkie Cilliers is the founder of the Institute for Security Studies (ISS), chairman of the ISS Board of Trustees and head of African Futures and Innovation at ISS Pretoria. He is an Extraordinary Professor in the Centre of Human Rights and the Department of Political Sciences, Faculty Humanities at the University of Pretoria and a well-known author and analyst.

Zachary Donnenfeld is a senior researcher with the African Futures and Innovation programme and has worked at the ISS since 2015. Before that, Zach worked at the Frederick S. Pardee Center for International Futures, and the Environment Food and Conflict Laboratory at the University of Denver.

Stellah Kwasi is a researcher in the African Futures and Innovation programme at ISS, Pretoria. Before joining the ISS she was a research affiliate at the Frederick S. Pardee Center of International Futures at the Josef Korbel School of International Studies, University of Denver, Colorado.

Sahil SR Shah is the Project Lead of the Kenya Business Guide. Prior to this he worked as a research analyst based out of the Strathmore Business School supporting numerous client projects across East Africa on the areas of strategy, private sector development, governance and political economy.

Lily Welborn is a researcher with the African Futures and Innovation programme. Before joining the ISS, Lily worked at the Frederick S. Pardee Center for International Futures, conducting forecasts on human security issues and writing reports on development trends and transnational crime.

About the ISS

The Institute for Security Studies (ISS) partners to build knowledge and skills that secure Africa's future. The ISS is an African non-profit with offices in South Africa, Kenya, Ethiopia and Senegal. Using its networks and influence, the ISS provides timely and credible research, practical training and technical assistance to governments and civil society.

About the African Futures Project

The African Futures Project is a collaboration between the ISS and the Frederick S. Pardee Center for International Futures at the Josef Korbel School of International Studies, University of Denver. The African Futures Project uses the International Futures (IFs) model to produce forward-looking, policy-relevant analysis based on exploration of possible trajectories for human development, economic growth and socio-political change in Africa under varying policy environments over the next four decades.

About the Kenya Business Guide

The Kenya Business Guide is a think-tank that seeks to support the improvement and strengthening of the business environment in Kenya by providing access to information on key features of both the private and public sector prerequisites in the effective functioning of business. The KBG works in the intersection of the private and public sectors developing curated and value-added information to assist leaders in making more effective decisions.

Acknowledgements

ISSN 1026-0404

Cover images: Daniel Dickinson/EC/ECHO, Frode Bjorshol/Flickr, Neil Palmer/CIAT, Ninara/Flickr

9 771026 040004