Beyond the Conflict: Charting a Path to Sustainable Growth and Development in Sudan

Current Path Trends

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Current Path Trends

Demographic trend in the Current Path

Population distribution in Sudan

Sudan is the eighth-most populous country in Africa, the fourth-most populous country in East Africa after Ethiopia, Tanzania and Kenya, and the 30th globally. The Sudanese population is estimated at 52 million people, more than double the 22 million in 1990. Before the war, the country's population grew by 2.7% in 2022, making it the 14th-highest growth rate in Africa and the highest in East Africa. Sudan's population growth places significant pressure on government finances, as the government must increase its spending on essential social services, including education, healthcare and other amenities, to accommodate the growing population.

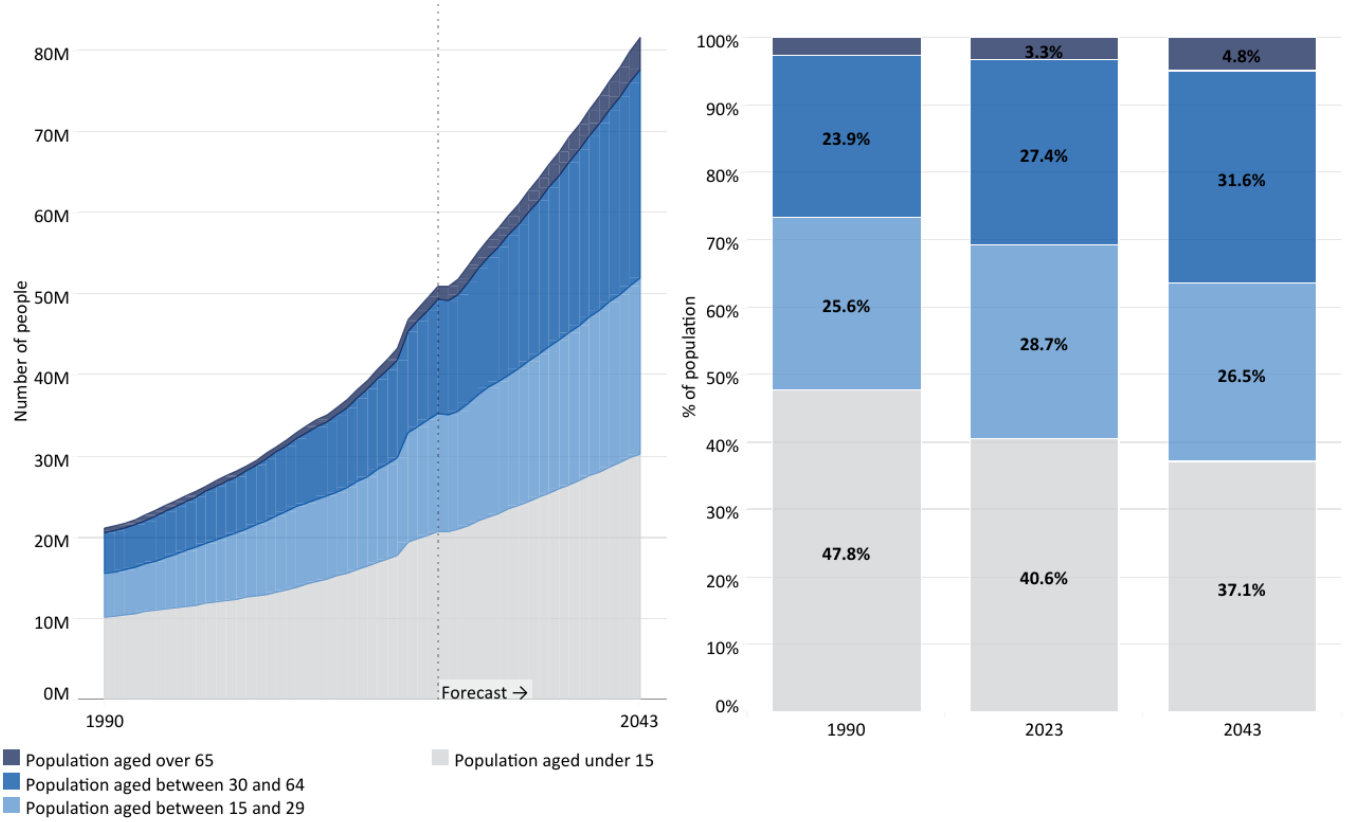
The war has had a devastating impact on demography and population, resulting in widespread displacement, loss of life and major disruptions to health, food security and infrastructure. As of mid-2025, nearly 12 million people had been forced to evacuate their homes as a result of the violence, with 7.7 million internally displaced persons (IDPs) and approximately 4.1 million crossing borders to seek refuge in neighbouring nations such as Egypt, South Sudan and Chad. The country now has the world's fastest-growing displacement crisis. Prolonged conflict will continue to influence Sudan's demographic and population profile for many years, affecting population density, age structure and urbanisation trends.

Sudan's fertility rate fell from 6.1 children per woman of reproductive age in 1990 to 4.3 in 2023. Despite this decline, it remains high and far above the replacement rate. Several factors contribute to this, including the age at marriage, limited levels of female education, low urbanisation, extremely low contraceptive use and cultural norms. On the Current Path, the total fertility rate will decline further to 4 children per woman by 2043. As a result of this high fertility rate, the country has a youthful population. In 2023, 57.2% of Sudanese were below the age of 15 years, 41.3% were in the 15-64 years age group (working age), and 3.4% were 65 years and older. Comparing this with the structure in the 1990s reveals that Sudan's population structure has not fundamentally changed over the past three decades. The high dependency ratio (population aged 15 and below and 65 and above) significantly affects the government's ability to generate the necessary revenue for development, as fewer individuals are in the working-age population. At the household level, families with more dependents typically save less, reducing overall domestic savings. This, in turn, limits the capital available for investment, impeding economic growth.

Sudan has the 5th-largest youth bulge (the ratio of its population aged 15-29 to the total adult population) in East Africa, after Uganda, Somalia, Eritrea and Ethiopia. The country's youth bulge stood at about 48.3% in 2023, close to the East African average of 48.9% and below the African average of 45.6%. The median age for Sudan is 18.5 years, which is close to Africa's median age of 19.3 years.

The large youth population in Sudan presents both opportunities and challenges. On the one hand, it can lead to a youthful labour force and drive positive political change and activism in the country. On the other hand, if the needs of the youth are not adequately addressed, it can increase the risk of criminal violence, conflict and instability, especially with relatively high youth unemployment, estimated to be 12% as of 2023. However, the country can harness the potential of its youthful population by making substantial investments in education and training, equipping young people with the skills they need, and creating opportunities through both government initiatives and private sector involvement.

Chart 4: Population structure in the Current Path, 1990-2043



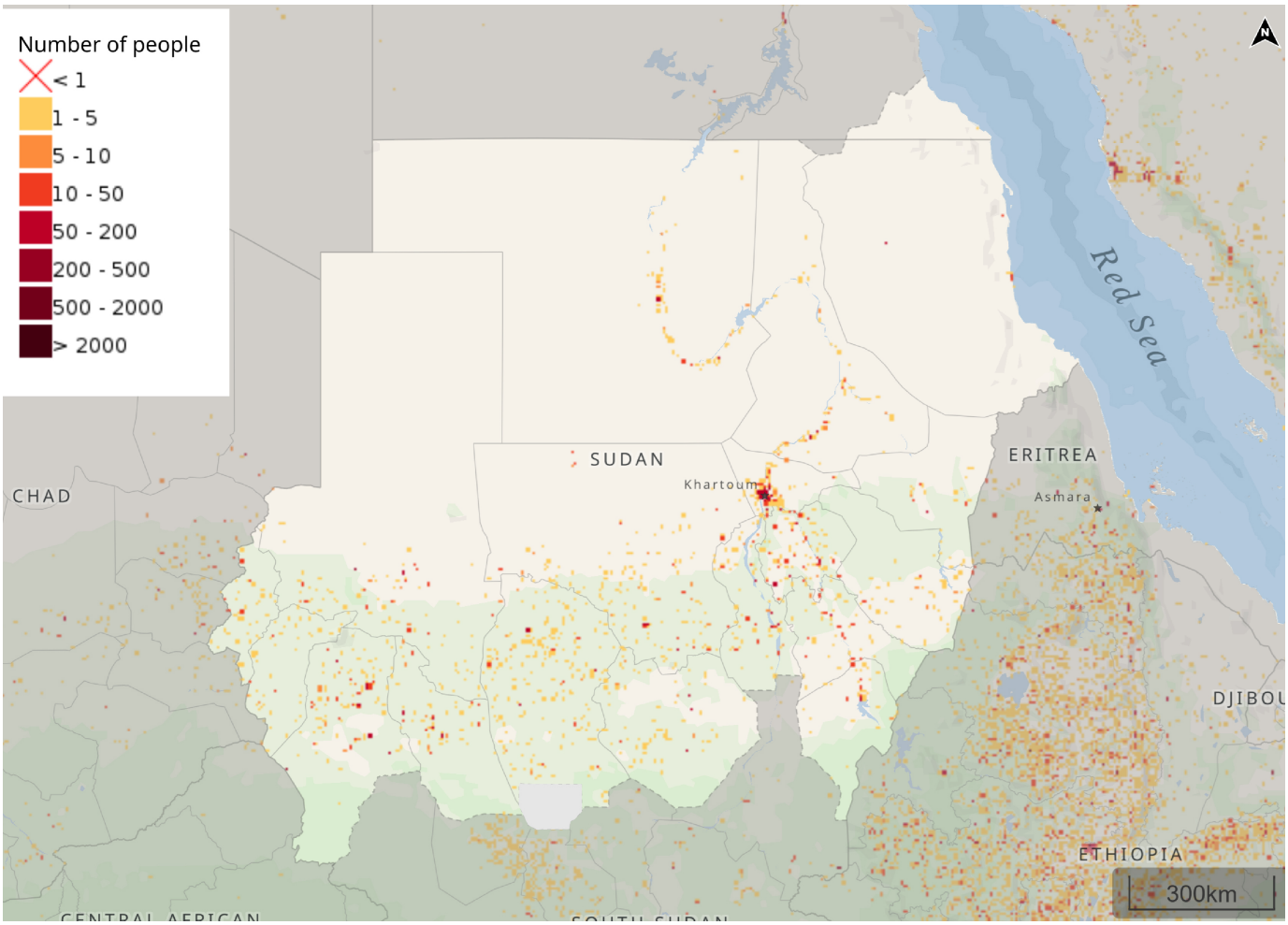
Source: IFs 8.38 initialising from UNPD population prospects estimate and WDI population data

The structure of Sudan's population will not change much across the forecast horizon to 2043. The country's population growth rate will increase to 2.3% by 2043, and the total population will rise to 81.7 million on the Current Path, making Sudan the sixth-most populous country in Africa. The median age will increase to 20.2 years by 2030 and 21.7 years by 2043, while the youth bulge will fall to 45.8% by 2030 and further to 42.1% by 2043. The proportion of people under 15 will decline slightly to 39.3% in 2030 and 37.1% in 2043. Consequently, the share of the working-age population and the population aged 65 and older will increase to 56.7% and 4.0% in 2030, and to 58.1% and 4.8% by 2043, respectively. Despite these shifts, the rapid population growth will continue to place pressure on development and limit improvements in average income, as the government will face significant challenges in addressing the needs of its rapidly expanding, youthful population.

Population Density in Sudan

Sudan has a population density of approximately 0.29 people per hectare, ranking 11th-least-populated country in Africa. Half of the population lives on just over 15% of the land because of inadequate water supplies in many parts of the country. One-quarter of Sudan is virtually uninhabited, including the deserts of the north and north-west.

Chart 5: Population density, 2019



Source: United Nations Environment Programme Sudan - The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the ISS or UNDP.

Khartoum and Omdurman are Sudan's most densely populated cities, with estimated populations of 6.8 million and 1.2 million, respectively. Its dense population is due to its role as a political, economic and cultural hub, hosting government institutions, businesses, trade centres and transport. Additionally, many internally displaced people seek refuge in Khartoum due to better security and services. Cities and regions in the arid and semi-arid western and southern parts of Sudan tend to be sparsely populated due to harsh climatic conditions that limit agricultural potential and water availability, ongoing conflicts and natural disasters that force population displacement, poor infrastructure and fewer economic opportunities, all of which discourage settlement. Some oil-producing border regions have displaced local populations due to concessions for exploration, contributing to a sparse population in those areas.

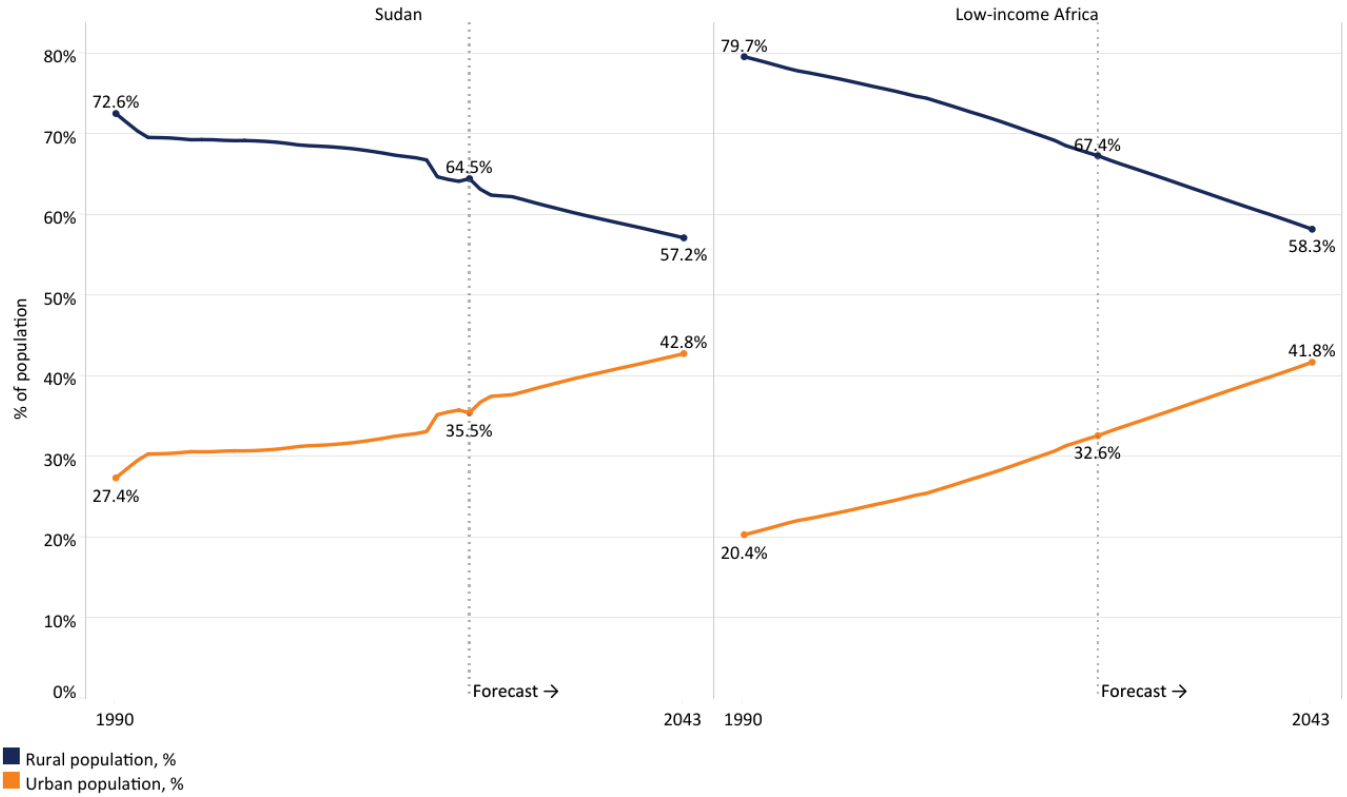
In the Current Path, Sudan's population density will reach 0.47 people per hectare by 2043. However, that will still be significantly lower than the average of 0.77 and 1.0 people per hectare for Africa and East Africa, respectively.

Urbanisation in Sudan

Urbanisation in Sudan is driven largely by conflict-induced displacement, environmental and economic challenges in rural areas, and the concentration of opportunities in a few key urban centres. In 1990, close to two-thirds of Sudanese lived in rural areas, making Sudan predominantly rural. The country has experienced relatively rapid urbanisation over the past three decades compared to its income peers in Africa. It ranked 8th among the urbanised countries in East Africa and 13th

among Africa's low-income countries. Now, over 18.2 million Sudanese, equivalent to 35.3% of the population, live in urban areas. This rate is above the 30.2% and 32.6% averages of low-income countries in Africa and East Africa, respectively.

Chart 6: Urban and rural population in the Current Path, 1990-2043



Source: IFs 8.38 initialising from UN World Urbanization Prospects data

Urbanisation has been more pronounced in areas of the country with better-developed trade. With few exceptions, all major cities and towns in Sudan are located along the Nile, and one of its tributaries or along the coast of the Red Sea. The largest urban areas are the capital, Khartoum, and Omdurman, located roughly in the centre of the country, along with other regional capitals such as Nyala, Port Sudan and Kassala.

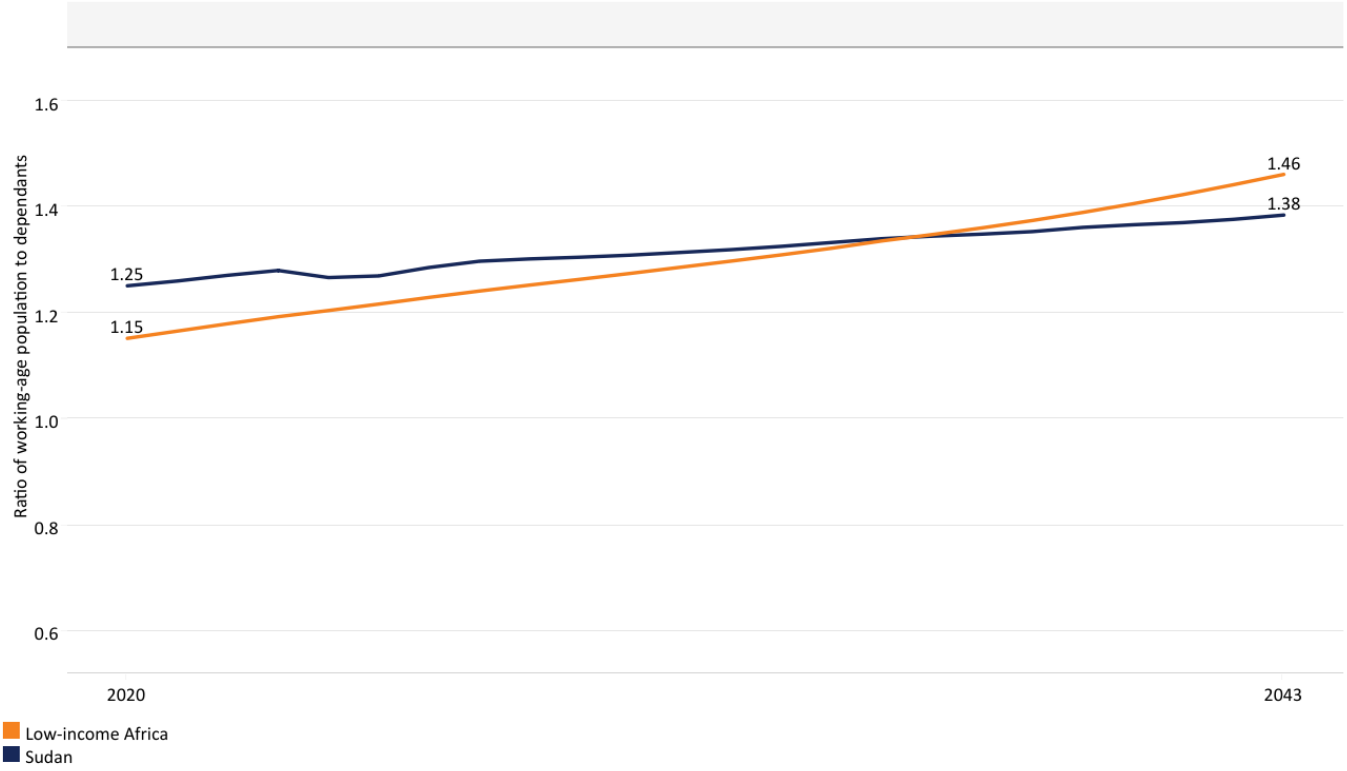
On the Current Path, Sudan's urban population will grow modestly, reaching 42.8% by 2043. Despite the country's overall slow pace of urbanisation, some cities, particularly the capital, are set to experience rapid growth due to the war's impact. As the SAF recaptures Khartoum in early 2025, it is likely to experience an influx of returnees. If not well managed, such urbanisation could lead to problems such as unemployment, poverty, inadequate healthcare, poor sanitation, the expansion of urban slums and environmental degradation. Already, a high proportion of the urban population lives in slums, estimated at 74% in 2022. This places considerable strain on public infrastructure, resulting in overcrowded roads, inadequate public transportation, and limited access to essential services such as healthcare and education. It thus requires careful planning and investment in sustainable development to ensure positive outcomes.

Demographic dividend

The demographic dividend is the potential of economic growth generated by changes in the population structure. It generally materialises when the ratio of the working-age population to dependants is at least 1.7 to one, meaning that for every dependant, there are 1.7 persons of working age. When there are fewer dependants to care for, it frees up resources for investment in both physical and human capital. However, the growth in the working-age population relative

to dependants does not automatically translate into rapid economic growth unless the labour force acquires the needed skills and is absorbed by the labour market. Without sufficient education and employment opportunities to harness their productive power, the growing labour force (especially in urban areas) could become increasingly frustrated by the lack of job opportunities, leading to social tension and even civil instability.

Chart 7: Demographic dividend in the Current Path and the Demographics and Health scenario, 2020-2043



Source: IFs 8.38 initialising from UNPD Population Prospects data

In 2023, the ratio of the working-age population to dependants in Sudan was 1.3 to one, which means that, on average, for every dependant in Sudan, there were only 1.3 persons of working age (15-64 years of age). This is slightly higher than the 1.2 to one average for low-income countries in Africa. The high dependency rate in Sudan can be attributed to the high fertility rate, as discussed previously. On the Current Path, Sudan's progress will lag and is unlikely to achieve the minimum ratio of 1.7 working-age persons per dependant required for the materialisation of the demographic dividend, even by 2043. Indeed, Sudan is likely only to achieve this minimum ratio by 2068.

Economic trend in the Current Path

GDP and GDP per capita in Sudan

The Sudanese economy was the fifth-largest in East Africa (after Ethiopia, Kenya, Tanzania and Uganda) and the fourth-largest among the 23 low-income countries in Africa (after Ethiopia, DR Congo and Uganda) in 2022. Its GDP measured in market exchange rates (MER) tripled from US$15.7 billion in 1990 to US$45.4 billion in 2010 before the secession of South Sudan. During this period, the average GDP growth was estimated at 5.0% per annum, above the average of 3.6% for low-income countries in Africa. This relatively stronger performance compared to its income peers can be attributed to its large volumes of oil export that spur growth in the country. The secession of South Sudan led to the loss of 75% of its oil resources, which accounted for more than half of Sudan's government revenue and 90% of its

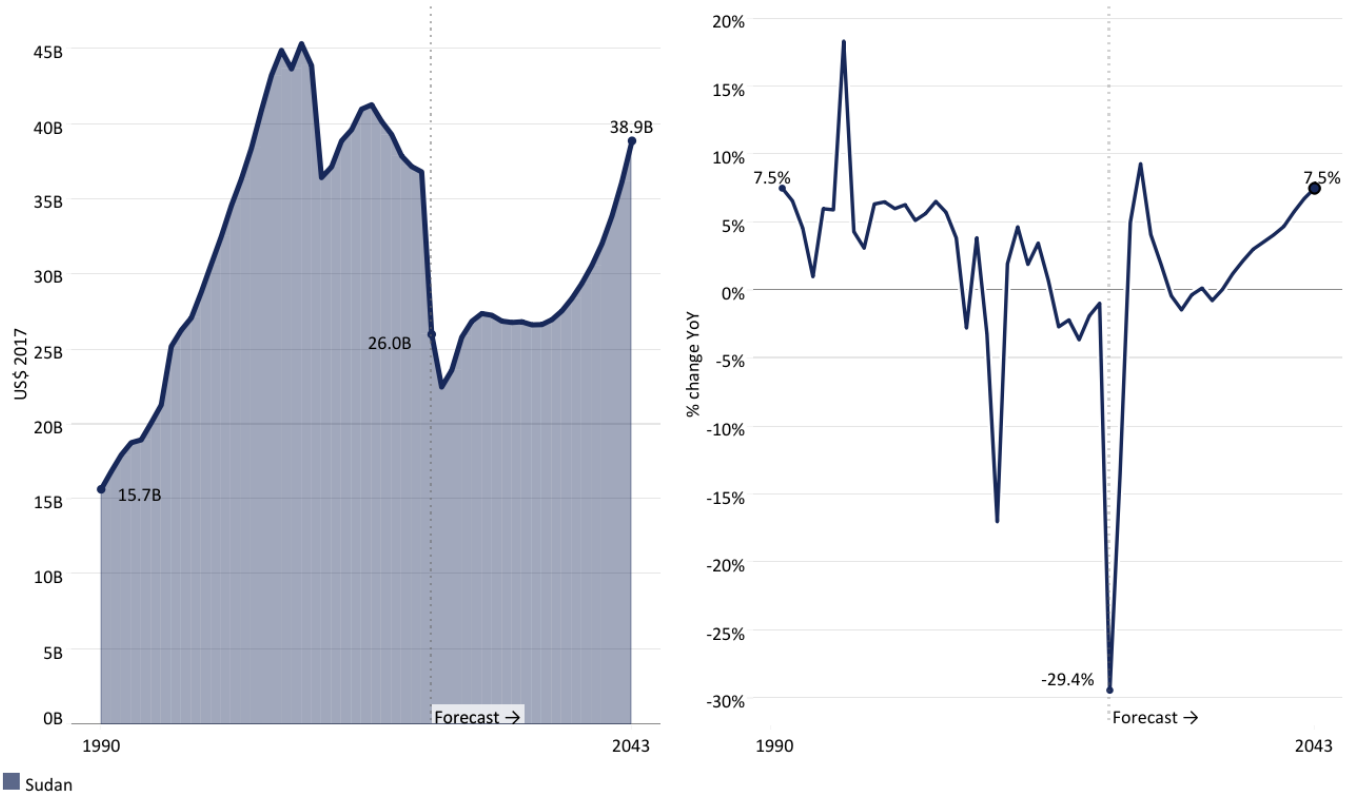
exports. This shock resulted in severe challenges, including double-digit consumer price inflation of over 40%, rapid exchange rate depreciation, and a significant trade deficit, which, together with increased fuel prices, triggered violent protests in the country. Ultimately, the economy contracted by 17% in 2012, reflecting the underlying macroeconomic shocks occasioned by the secession.

The economy began to recover in 2013 and continued a positive economic trajectory until 2017. The stable growth within this period was driven by increased exports of gold and oil and supported by government economic reforms. These reforms include the implementation of the Five-Year Economic Reform Program (2015-2019), exchange rate liberalisation and the Investment Encouragement Act (2013), which provided fiscal incentives and legal protections to attract investment. A modest attempt at fiscal consolidation through subsidy reductions and improved revenue mobilisation also reduced fiscal deficit and curbed inflation, all of which contributed to increased investment and donor support.

However, since the coup in April 2019, Sudan has been trapped in political instability, conflict and an economic mire with currency depreciation, crippling debts, rising inflation and food shortages. Multiple shocks to the economy have derailed Sudan's economic recovery and worsened macroeconomic conditions, leading the country to regress from a lower-middle-income to low-income status in July 2020. Within this period, three key factors underlie this economic contraction. The first is the recurrent political instability that has plagued the country. Continuous food price hikes led to the December 2018 demonstrations that resulted in the removal of President al-Bashir from power in April 2019. The October 2021 military coup that toppled the transitional government also constrained economic recovery. As such, even the removal of Sudan from the US State Sponsors of Terrorism list to end the 23-year sanctions, which was expected to open the door to aid, debt relief, trade, and investment badly needed to pull the country out of its severe economic crisis, did not materialise. Sudan's economic growth was further disrupted by the COVID-19 pandemic in 2020. The restrictive measures and protocols instituted to control the virus curtailed economic activities. This, coupled with Russia's invasion of Ukraine that led to a global food crisis, worsened the domestic economic vulnerabilities.

In 2023, Sudan's GDP stood at US$32.4 billion, a contraction of 12% from the previous year. It is estimated to have contracted further in 2024. Sudan's economy was already under severe strain before the current conflict, burdened by high debt levels, weak revenue generation, and stalled structural reforms. The outbreak of conflict has further exacerbated these vulnerabilities, leading to widespread institutional breakdown and economic dislocation. Monetary accommodation and rapid deposit growth have fueled persistent inflationary pressures and widened currency market disparities, prompting authorities to implement emergency measures—such as suspending corporate mobile money transactions—to curb speculative activity.

Chart 8: GDP (MER) and growth in the Current Path, 1990-2043



Source: IFs 8.38 initialising from IMF data

Annual inflation reached an all-time high of 360% in 2021. It was estimated at 170% in 2024, mainly driven by high food inflation, with soaring prices and foreign exchange shortages placing immense strain on households and businesses alike. High public spending is also resulting in a large fiscal deficit and public debt, largely financed by external borrowing. Public debt stood at about 148% of GDP by the end of 2024, with external debt constituting about 137% of total debt. While this is very high, it represents a decline from the 281% it recorded in 2020 during the COVID-19 pandemic.

The government continues to grapple with limited revenue mobilisation, large fiscal deficits and rising public debt, all of which constrain its policy response. External pressures have compounded the situation: the UAE's ban on Port Sudan's maritime and air operations and ongoing US sanctions have significantly restricted trade and access to international financing. Moreover, the emergence of a parallel government in Nyala poses a serious risk of further political fragmentation and an escalation of conflict, threatening to derail any prospects for economic stabilisation and recovery. The attacks in May 2025 on Port Sudan and oil facilities expanded the conflict to previously stable regions, increasing broader economic recovery risks.

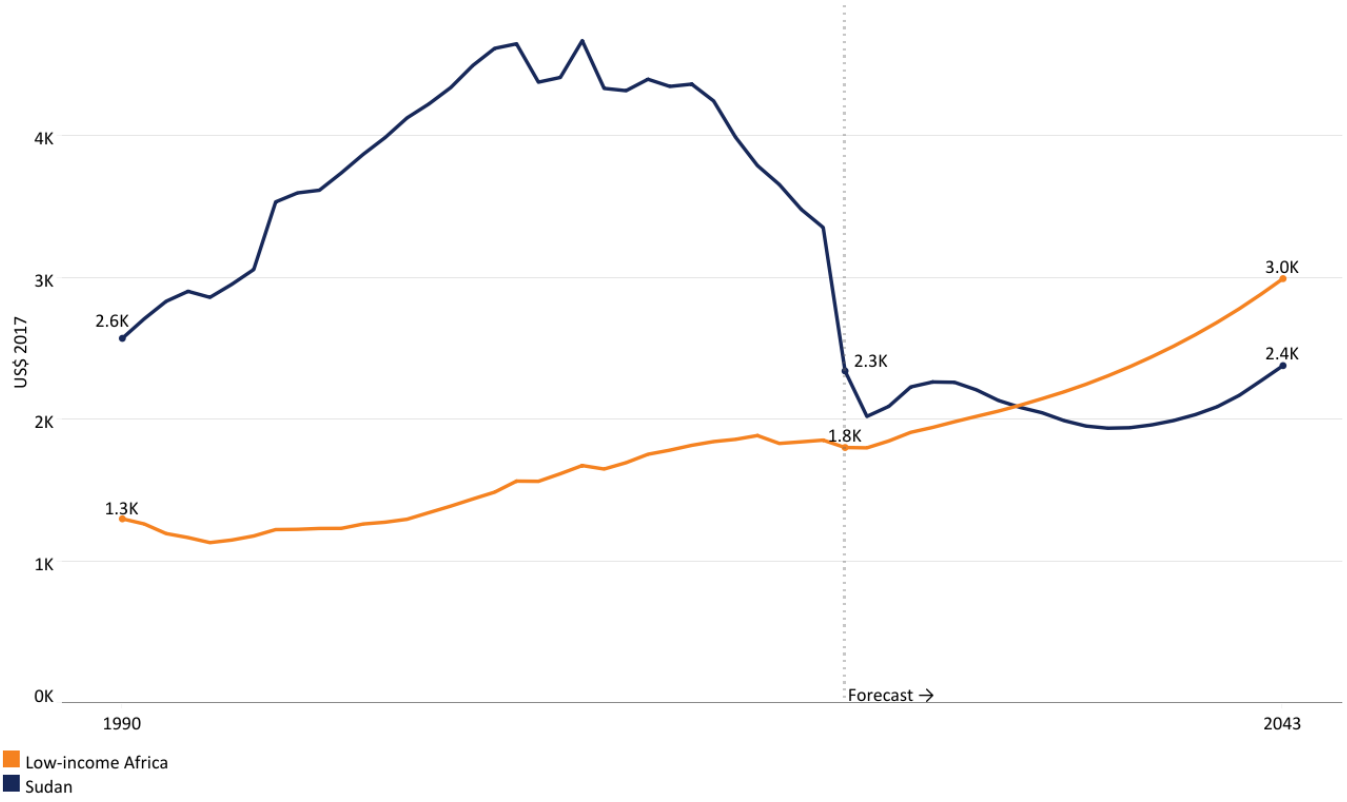
A nascent economic recovery is emerging in some urban centres, supported by the gradual return of displaced populations and government initiatives to reestablish key institutions. Satellite trade data indicate improving economic activity in less-affected states and a rebound in external trade during early 2025. Notably, inflation has begun to ease, with monthly inflation rates declining—primarily driven by lower housing and food prices.

On the Current Path, Sudan's GDP will reach US$38.9 billion by 2043. The average growth rate within this period (2024-2043) is estimated at 1.2%, far below the 6.2% estimated average for low-income countries on the continent. This suggests that Sudan's growth potential is hindered by recurrent conflict and political instability, even in the long term. The country, therefore, needs to rethink its economic development strategy to focus on economic diversification and value

addition to its main commodities. Its huge natural resource deposits, along with its agricultural and renewable energy potential, offer opportunities to grow and transform the economy. Nonetheless, the most pressing need is for peace and stability, which is *sine qua non* for any economic recovery agenda.

In terms of GDP per capita (using the purchasing power parity (PPP) measure for this analysis), Sudan's GDP per capita improved from US$2 868 in 1990 to US$4 884 in 2011 before the secession of South Sudan. Since then, Sudan has generally recorded a downward trend, with its GDP per capita dropping to US$2 961 in 2023. This represents a 54% contraction from the country's 2012 levels and sends Sudan back to the per capita income levels it recorded in 1992. This is a clear demonstration of the impact that the recurrent conflicts, political instability and the secession of South Sudan have had on the welfare of the Sudanese.

Chart 9: GDP per capita in Current Path, 1990-2043



Source: IFs 8.38 initialising from IMF data

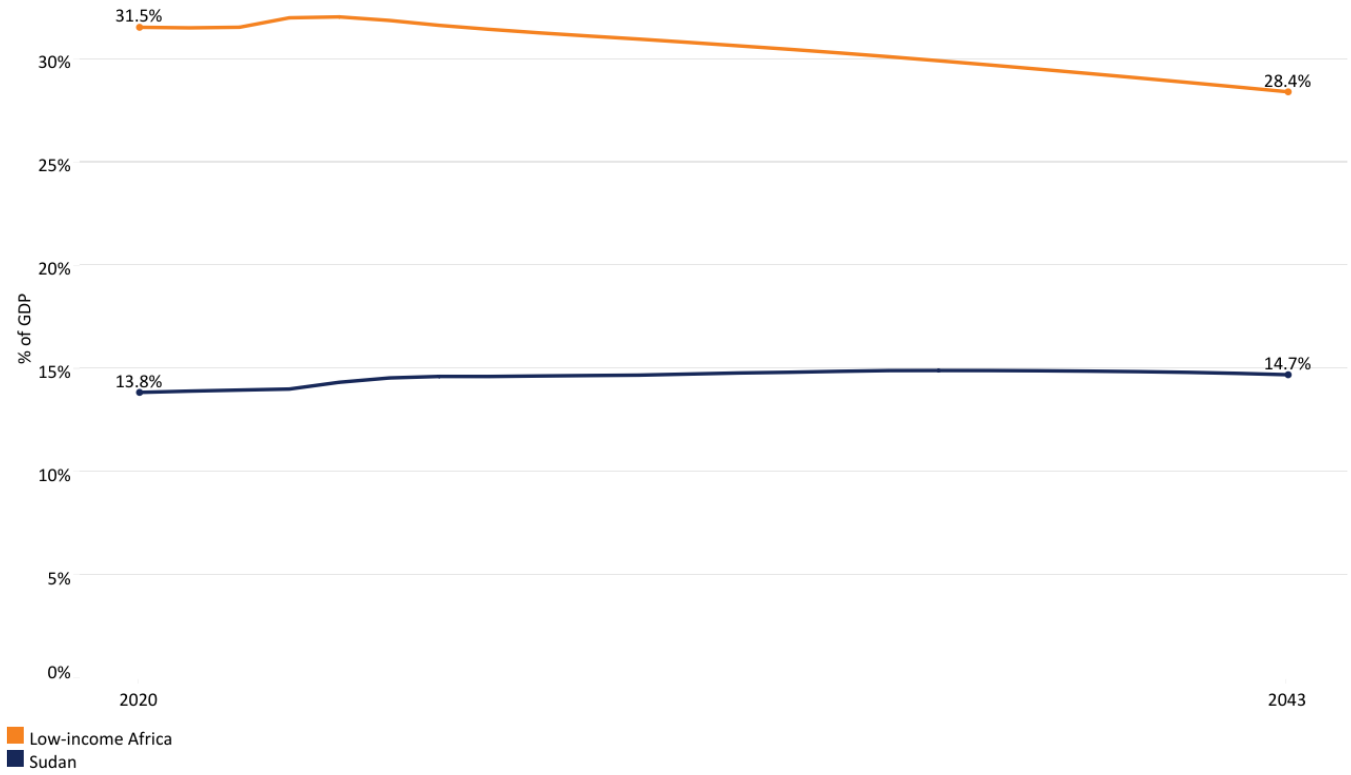
In the medium term (2035), per capita income in Sudan is set to drop further to US$1 941. However, after 2035, the country will begin to record modest improvement with its GDP per capita reaching US$2 384 by 2043. Despite this improvement, Sudan will lose ground to its income-group peers, as their average GDP per capita reaches US$2 998 by 2043, placing Sudan tenth among low-income African countries. The country's GDP per capita Current Path forecast for 2043 remains below the current levels and worse than the 1960s levels. Slower growth in GDP per capita can have several implications. First, it can lead to slower poverty reduction and limited improvements in living standards in Sudan. Additionally, slow GDP per capita growth may imply that the benefits of economic growth are not evenly distributed or broadly shared, thereby worsening inequality in the country. It may also constrain government revenue, limiting the ability to invest in critical areas such as education, healthcare and infrastructure.

Informal economy in Sudan

The informal sector in Sudan constitutes a significant portion of the national economy and exhibits several defining characteristics. The relatively low barriers to entry in the informal sector compared to those in formal industrial enterprises allow individuals to sustain livelihoods with minimal start-up capital. A large share of Sudan's workforce operates within this sector, with approximately 85% engaged in vulnerable employment and 60% working in subsistence agriculture. Informal enterprises are commonly characterised by low-cost, small-scale activities such as food preparation and sales, tea and coffee vending, tailoring, street vending, domestic services and small-scale manufacturing, including bread and charcoal production.

In 2023, the informal sector in Sudan accounted for approximately 14% of GDP, below the average of 32% for its income peers in Africa. This represents a significant drop from the 27.2% of GDP recorded in 1990. In the Current Path, the size of the informal sector will largely remain the same, even reaching 14.7% of GDP by 2043. The large contrast between its labour force share and contribution to GDP reflects the underlying low productivity, wages and inefficiency that characterise the sector.

Chart 10: Size of the informal economy in the Current Path, 2020-2043



Source: IFs 8.38 initialising from Elgin and Oztunali (2008), and Schneider and Enste (2012) data

Since the 1990s, informal economic activity has increasingly shifted toward urban areas as a result of internal migration driven by conflict, drought and economic hardship. Major cities such as Khartoum, Omdurman and Port Sudan now host substantial concentrations of informal businesses. Most of these enterprises remain unregistered, untaxed and outside formal legal frameworks, which limits their access to financial services, government support and legal protections. Workers in this sector often face precarious employment conditions, lacking social protection or employment benefits. Women are particularly disadvantaged, facing higher unemployment rates and lower wages than men.

Due to their exclusion from formal systems, informal workers often lack access to education, healthcare and social security. The sector's broad scope—spanning agriculture, trade and services—complicates the design and implementation

of targeted policy interventions. Moreover, microfinance institutions have largely failed to meet the needs of informal workers, frequently trapping them in cycles of debt rather than facilitating sustainable economic growth. The private sector has also shown limited engagement, with fragmented and uncoordinated initiatives that rarely address critical areas such as capacity development, credit access and institutional support. Macroeconomic instability and inconsistent policy frameworks further constrain efforts to formalise the sector. Many informal workers remain resistant to formalisation, fearing loss of flexibility or increased taxation, while government-led efforts have often emphasised tax collection over meaningful inclusion and support.

Several initiatives have attempted to extend protection and support to informal workers. The Sudan Family Support Programme (SFSP) and Zakat schemes sought to provide social safety nets, but their effectiveness has been limited by political instability. Programs such as Mobile Training Centers have offered vocational training in carpentry, electrical maintenance and automobile repair to enhance workforce skills. In contrast, organisations such as the Sudanese Women's General Union (SWGU) have provided health insurance to informal workers, particularly women tea sellers. However, these efforts face sustainability challenges due to limited resources and weak institutional capacity.

Expanding social protection coverage through simplified and inclusive systems can promote productivity and income growth in the informal economy, laying the foundation for gradual formalisation. It also encourages collective bargaining and worker representation through structured stakeholder dialogue. The International Labour Organization (ILO) advocates combining macroeconomic reforms with micro-level interventions, including entrepreneurship support, vocational training, improved access to microfinance and legal frameworks that incentivise formalisation.

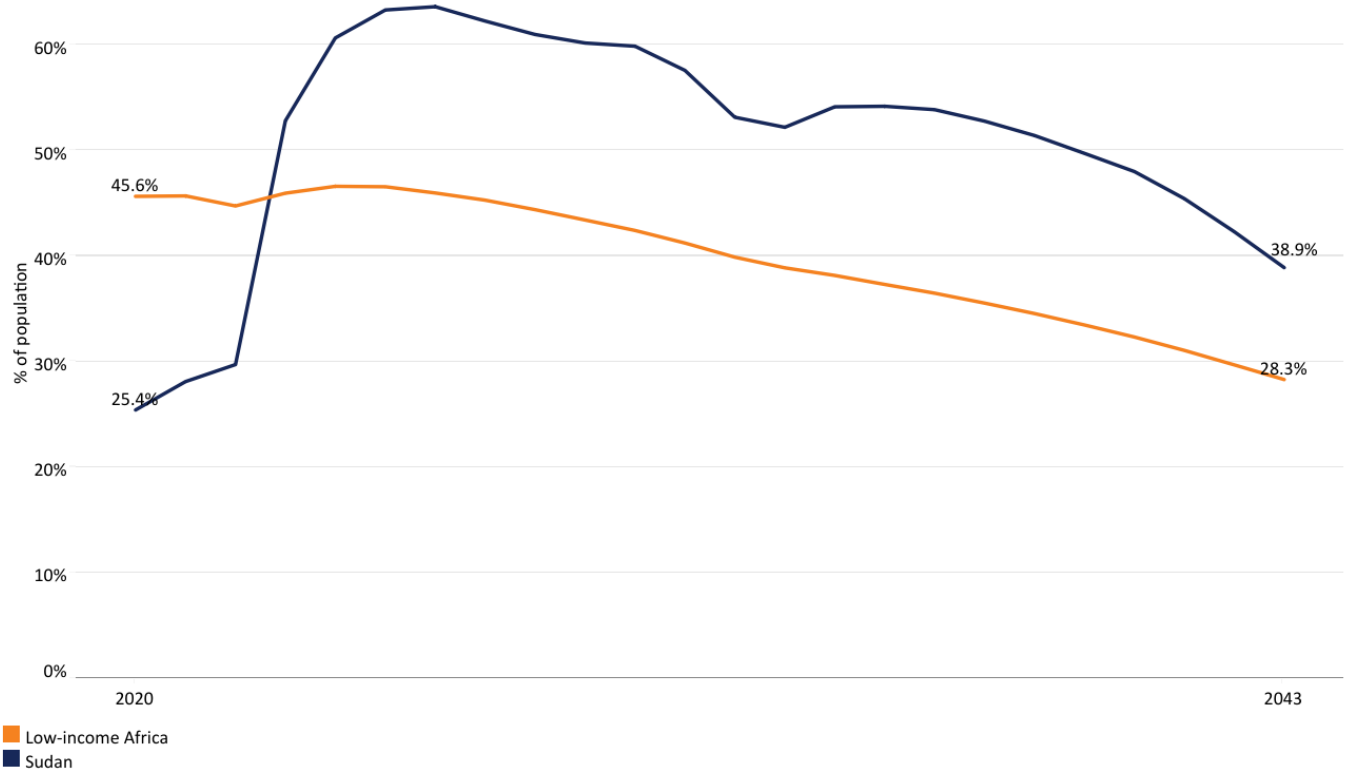
Despite ongoing initiatives to formalise the informal sector through training programs, social protection schemes and policy frameworks, persistent challenges—such as economic instability, poor coordination and worker resistance—continue to hinder progress. A comprehensive, multi-level strategy that addresses these systemic barriers is essential to promoting successful formalisation and inclusive economic transformation in Sudan.

Poverty and inequality in Sudan

The IFs forecasting platform projects international measures for extreme poverty. Thus, this study uses the US$2.15 per day poverty line (2017 PPP), unless otherwise specified, to remain consistent with international poverty analyses. As a result, the poverty rates reported here differ from those measured using the national poverty line.

Like many low-income countries in Africa, poverty in Sudan is widespread. In 1990, 8.4 million Sudanese, representing 38.1% of the population, lived below the poverty line of US$2.15, which was half the average rate of 66.6% for low-income countries in Africa. In the past two decades that followed, the country's efforts at poverty eradication have yielded results, as the poverty rate declined to 15.6% in 2011,far below the average of 50% for low-income countries in Africa. However, since then, Sudan has backslidden with poverty levels rising substantially over the last decade to reach 45% of the population, which corresponds to 22.8 million Sudanese living below the poverty line of US$2.15 in 2023. This takes the country back to extreme poverty levels higher than those it recorded in the 1980s.

Chart 11: Extreme poverty (US$2.15) in Current Path, 2020-2043



Source: IFs 8.38 initialising from UNPD population prospects estimate, WDI and PovcalNet data

Extreme poverty levels in Sudan are set to worsen, reaching nearly 60% of the population in 2030 under the Current Path, translating to almost 36 million people. Yet, the world is targeting to eliminate extreme poverty. However, beyond 2030, extreme poverty is projected to decline to 38.8% of the population by 2043, equivalent to 31.7 million. This means that Sudan will not meet either Sustainable Development Goal 1, which aims to eliminate extreme poverty below 3% by 2030, or the AU Agenda 2063 Goal 1, Aspiration 1, a feat that can only be achieved in 2088 if the current development trajectory persists.

To appreciate the full extent of poverty, one must look beyond monetary poverty, as it tells only part of the story. The Human Development Index (HDI), which measures the average achievement of countries in three main areas: health, knowledge and standard of living, is one such measure. Sudan's HDI score of 0.511 in 2023 ranks 170 out of 193 countries globally. The global Multidimensional Poverty Index (MPI) also measures acute multidimensional poverty by assessing each person's overlapping deprivations across 10 indicators in three equally weighted dimensions: health, education and standard of living. The MPI complements the international US$2.15-a-day poverty rate by identifying who is multidimensionally poor and by showing the composition of multidimensional poverty. The headcount or incidence of multidimensional poverty is often several percentage points higher than that of monetary poverty. This implies that individuals living above the monetary poverty line may still suffer deprivations in health, education and/or standard of living.[1]

According to the 2023 UNDP Multidimensional Poverty Index, about 52.3% of Sudanese were considered multidimensionally poor with an intensity of deprivation estimated at 53.4%. An extra 17.7% of the population was considered vulnerable to multidimensional poverty. Likewise, inequality is high in Sudan, although better than the average for Africa's low-income countries. In 2023, Sudan's Gini coefficient was 0.33 compared to the average of 0.40 for low-income countries in Africa. Given the devastating impact of the conflict, the actual levels of inequality may be much

worse than estimated. Such high levels of income inequality have many negative effects, including a breakdown of social structure and cohesion, which can result in instability. On the Current Path, income inequality in Sudan remains unchanged across the forecast horizon, only slightly declining to 0.30 by 2043.

Sudan has implemented a range of strategies and projects to address poverty and inequality, including Sudan's Poverty Reduction Strategy Paper (PRSP) for 2021-2023, which focused on macroeconomic stability, inclusive economic growth, human and social development, peace promotion and governance strengthening. The PRSP also integrated gender equity, emphasising job creation for women and youth. Complementary measures include expanding fiscal policies to mobilise domestic and external resources for public investment, improving access to credit for small-scale farmers and supporting microfinance initiatives to generate employment opportunities. Collectively, these strategies aim to reduce poverty and foster sustainable development nationwide. In addition, the World Bank approved US$182 million in 2025 for two key initiatives: the Sudan Health Assistance and Response to Emergencies (SHARE) Project and the Sudan Emergency Crisis Response Safety Net Project. These initiatives aim to enhance healthcare services, provide emergency safety nets and address food insecurity among vulnerable populations affected by conflict and natural disasters.

However, several structural and contextual factors continue to perpetuate poverty in Sudan. Prolonged conflicts have destroyed infrastructure, displaced millions and disrupted livelihoods. The secession of South Sudan in 2011 further deepened fiscal deficits by eliminating a major source of oil revenue, previously a cornerstone of Sudan's economy. In addition, droughts and desertification have severely reduced agricultural productivity, leading to food shortages and worsening rural poverty. Weak healthcare and education systems limit access to essential services, particularly in remote areas, while high illiteracy rates constrain economic opportunities, further entrenching poverty.

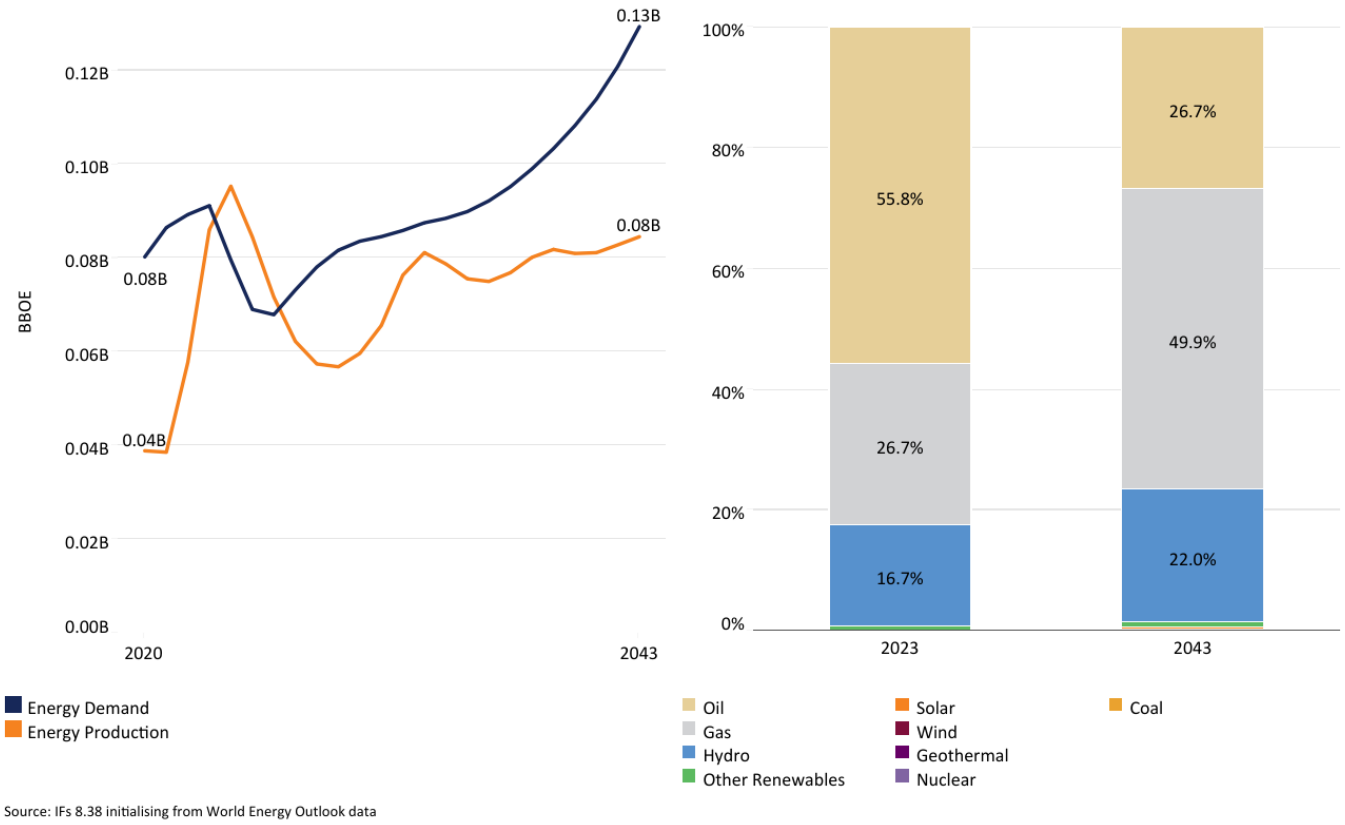
Ongoing political instability and security challenges have also undermined development efforts. The loss of oil revenues, coupled with a heavy external debt burden and restricted access to financing, limits the government's capacity to implement effective poverty reduction programs. Furthermore, pro-poor spending remains inadequate due to fiscal constraints and low execution rates for poverty-targeted expenditures. Poor infrastructure—especially in transportation, energy and communication—continues to hinder economic growth potential, while climate-related shocks exacerbate food insecurity and displacement. Addressing these challenges requires sustained international support, comprehensive structural reforms and enhanced governance frameworks to build resilience, stimulate inclusive growth and establish a stable foundation for sustainable development.

Energy and climate in Sudan

Energy in Sudan

The IFs model forecasts energy production in nine types: namely oil, gas, coal, hydro, nuclear, solar, wind, geothermal and other renewables. The data is converted into billions or millions of barrels of oil equivalent (BOE) to facilitate comparisons. In 2023, the total energy produced in Sudan was equivalent to 86.0 million BOE, while, in the same period, total energy demand was 91.1 million BOE. This signifies a significant energy deficit that the country must address. On the Current Path, total energy demand will outpace production so that the demand for energy will be equivalent to 129.3 million BOE in 2043.

Chart 12: Energy demand and production by type in the Current Path, 2020-2043



Source: IFs 8.38 initialising from World Energy Outlook data

The primary sources of energy in Sudan are oil, followed by gas and hydroelectric power. Before South Sudan's secession, Sudan as a whole was estimated to have 6 billion barrels of oil and 3 trillion cubic feet of natural gas reserves. As most oil blocks are in the territory of South Sudan, the oil-producing capacity of Sudan was heavily diminished by the secession. Crude oil production declined from about 130 000 barrels per day in 2013 to 72 000 barrels per day in 2019.

In 2022, the total amount of oil produced in the country was 17.6 million BOE, constituting 44.6% of total energy production. The total amount of oil produced will increase to 22.6 million BOE, with its share declining to 26.7% of total energy production on the Current Path by 2043. Gas production constituted 36.8% (almost 14.6 million BOE) of total energy production in 2022, but will rapidly rise to about 49.9% (valued at 42.2 million BOE) in 2043 on the Current Path.

Hydropower remains the country's most developed renewable energy source and continues to play a central role in electricity generation. The total hydroelectric potential from Sudan's major river systems is estimated at 4 860 megawatts (MW), with about 2 200 MW considered technically feasible by 2030. As of 2017, Sudan's installed hydropower capacity stood at 1 928 MW, generated from six large reservoir dams. In 2023, hydropower accounted for 17.5% of total energy production (6.9 million BOE), and is projected to increase slightly to 22.0% by 2043 under the Current Path.

Other renewable energies, such as geothermal, nuclear, solar, and wind, are very limited in Sudan despite their potential. Located within the Sunbelt region, Sudan receives some of the highest solar radiation levels in the world, with the potential to generate up to 15 gigawatts (GW) of solar power. The country has so far constructed only a 10-MW solar photovoltaic (PV) plant, of which 5 MW are grid-connected. Two additional 10-MW solar projects are currently under construction with an ambitious target to install a total of 2 190 MW of grid-connected solar PV and 50 MW of solar thermal capacity by 2035.

Likewise, Sudan's wind energy potential is large, estimated at up to 1.5 GW. However, this resource remains underutilised. Currently, only a single 0.8-MW wind turbine is connected to the national grid, with another 100-MW wind power project under construction, although the government envisions expanding total wind capacity to 1 550 MW by 2035. Despite the country's geothermal potential in the Red Sea region, no geothermal power plants have yet been installed. However, 54 MW of geothermal capacity is planned by 2030, signalling a step toward diversification. Sudan also has bioenergy capacity —mainly from sugar industry cogeneration—which totals around 199 MW, with less than 20 MW currently grid-connected. Plans call for increasing grid-connected bioenergy capacity to 270 MW by 2032.

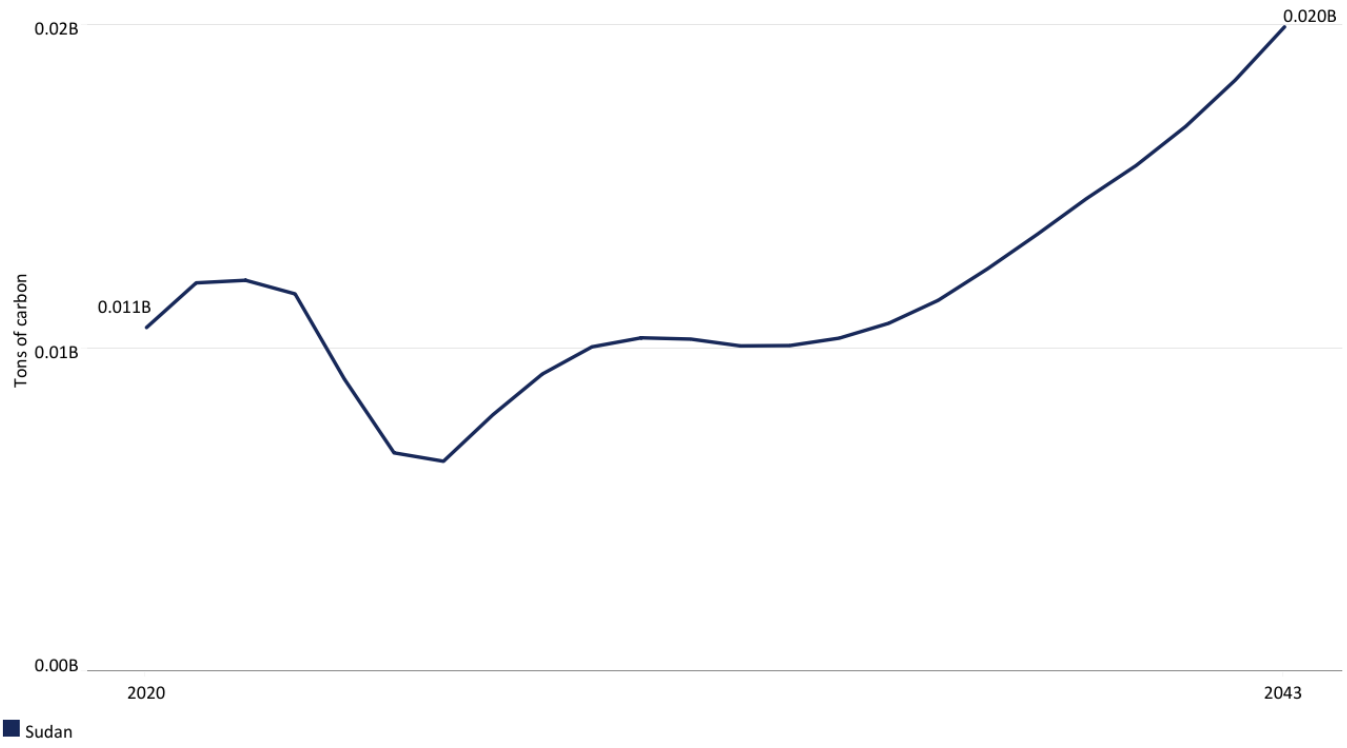
Despite these enormous potentials, the transition to renewables necessitates significant investment, political stability and infrastructure improvements. These challenges have been worsened by the ongoing conflict in the country, which has derailed progress in the energy transition.

Climate in Sudan

Like most African countries, Sudan's overall carbon emissions are very low compared to those of advanced economies. In 2023, Sudan released about 5.8 million tons of carbon from fossil fuel use, making it the largest emitter among low-income African countries, though. On the Current Path, carbon emissions from fossil fuels will increase to 8.6 million tons by 2043. The primary sources of carbon emissions in Sudan stem from the energy sector (electricity generation and fuel use), transportation (fossil-fuel-powered vehicles), agriculture (deforestation, land-use change, and livestock) and waste management (landfills and manure). Deforestation, overgrazing, inadequate irrigation practices and unsustainable land-use changes have been major contributors to carbon emissions in Sudan. Additionally, fossil fuel consumption, particularly in the electricity and transportation sectors, has significantly increased greenhouse gas output. The expansion of agriculture and the country's heavy reliance on wood fuel for energy further exacerbate emissions.

Chart 13: Carbon emissions in the Current Path, 2020-2043

Million tons of carbon (note, not CO2 equivalent)



Source: IFs 8.38 initialising from Carbon Dioxide Information Analysis Center data

Sudan has initiated several initiatives to reduce emissions and transition toward renewable energy, although these efforts face numerous challenges. The government has set ambitious targets to cut carbon emissions through projects to expand renewable energy capacity. Plans include connecting grid-scale solar and wind power plants with a total capacity of 2 140 MW, expected to avoid over 3.5 million tons of CO emissions. Furthermore, the deployment of standalone and mini-grid renewable solutions totalling 796 MW for residential, agricultural and industrial applications is projected to prevent an additional 1 million tons of CO.

Complementary strategies include upgrading transmission infrastructure to reduce grid losses and promoting energy-efficient technologies and appliances to enhance consumption efficiency. In the transport sector, Sudan aims to expand public transportation, implement a 10% biofuel blending policy and increase freight rail usage, all of which contribute to significant emissions reductions and support a transition toward a sustainable, low-carbon economy by 2030.

Despite these efforts, resource limitations, technical constraints and the ongoing conflict pose major barriers to progress. The war has intensified soil erosion, water scarcity and environmental degradation, while disrupting infrastructure maintenance and long-term planning. These challenges underscore the need for international support, institutional strengthening and sustained peace to achieve Sudan's climate and energy transition goals.

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Mr Enoch Randy Aikins joined the AFI in May 2021 as a Researcher. Before that, Enoch was a research and programmes officer at the Institute for Democratic Governance in Accra in charge of local governance reforms, poverty and inequality and public sector reforms. He also worked as a research assistant (economic division) with the Institute for Statistical Social and Economic Research at the University of Ghana. Enoch's interests include African politics and governance, economic development, public sector reform, poverty and inequality. Enoch is a Young African Fellow at the School of Transnational Governance, European University Institute in Florence and has an MPhil in economics from the University of Ghana, Legon.

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