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OECD Green Growth Policy Review of Egypt 2024

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Foreword

The OECD Green Growth Policy Review (GGPR) of Egypt is part of the Egypt-OECD country programme, which was officially launched by OECD Secretary-General Mathias Cormann and Dr Mostafa Madbouly, Prime Minister of the Arab Republic of Egypt, in October 2023. The report aims to review Egypt's policy framework for green growth and provide recommendations to help the country move towards a green and sustainable economy.

The GGPR was developed within the same peer review framework applied to the OECD Environmental Performance Reviews. The principle aim of this programme is to help member and selected partner countries improve their individual and collective performance in environmental management by:

- helping governments evaluate progress in achieving their environmental goals
- promoting continuous policy dialogue and peer learning
- stimulating greater accountability from governments towards each other and the public.

This report examines the state of Egypt's environment and reviews the country's green growth performance since 2015. Progress in meeting domestic objectives and international commitments provides the basis for assessing the country's environmental and green growth performance. Such objectives and commitments may be broad aims, qualitative goals or quantitative targets. A distinction is made between intentions, actions and results. To the extent possible, assessment of environmental and green growth performance is based on the OECD Environment Statistics and OECD Green Growth Indicators. The assessment is also placed within the context of Egypt's geography, endowment in natural resources, socio-economic conditions and demographic trends.

The OECD is indebted to the government of Egypt for its co-operation in providing information; for the organisation of the kick-off mission (19 March 2023), the fact-finding mission to Cairo and Alexandria (19-22 June 2023), and the policy mission to the New Administrative Capital (20 February 2024) and to Cairo for the policy dialogue with urban planning and development stakeholders (21 February 2024). Particular thanks are due to the Ministry of Environment, which co-ordinated the review from the Egyptian side under the leadership of Mohamed Moatamed, assistant minister for planning, investment and institutional support with the support of Zainab Zaki. We are also grateful to officials and experts from the other ministries involved in the GGPR review process: the Ministry of Planning and Economic Development, the Ministry of Petroleum and Mineral Resources, the Ministry of Finance, the Ministry of Water Resources and Irrigation, the Ministry of Agriculture and Land Reclamation, the Ministry of Transport, the Ministry of Housing, Utilities and Urban Communities, the Ministry of Local Development, the Ministry of International Co-operation, the Central Agency for Public Mobilisation and Statistics, the Governorate of Alexandria, the Egyptian Environmental Affairs Agency, the Waste Management Regulatory Authority, the New Urban Communities Authority, the Urban Development Fund and other specialised agencies.

The review process was co-ordinated by Julia Wanjiru Nikiema-Schwarz under the strategic guidance of Nathalie Girouard, Head of Division of the Environmental Performance and Information Division of the OECD Environment Directorate. Kathleen Dominique provided oversight within the context of the broader Environmental Performance Review programme.

The authors of this report are Julia Wanjiru Nikiema-Schwarz (main author); Insa Handschuch, Astrid Tricaud and Alessandra Celani who drafted the sections on taxation and on environmentally harmful support (Chapter 2) under the guidance of Assia Elgouacem. Abenezer Aklilu provided inputs on air pollution and waste management (Chapter 1); Ivana Capozza provided contributions to Chapter 2, and Ahmed Zaazaa provided input on the institutional framework and the building sector (Chapter 3). Judy Baker prepared best practice examples from Ecuador, India and Indonesia. Amany Aly conducted desk research, provided inputs on corporate social responsibility and facilitated translations from Arabic information sources into English. Abenezer Aklilu and Carla Bertuzzi provided statistical support; Lydia Servant, Jennifer du Crest, Gabriella Scaduto-Mendola and Elizabeth Duckett Dell Osso provided administrative support; Mark Foss copy-edited the report and Natasha Cline-Thomas provided communications support. OECD Environment Deputy Director Mathilde Mesnard led the policy mission to Cairo in February 2024.

The preparation of the GGPR benefitted from a broad consultation process. The OECD is grateful to the representatives of the two examining countries: François Menguelé, Tamer Elshayal (Germany), and Alexandra Lamotte and Mohammed Fangary (France). Several colleagues in the OECD Secretariat provided comments and feedback, including Jesus Anton, Alexandre Banquet, Florence Bossard, Ivana Capozza, Charlotte Denise-Adam, Kathleen Dominique, Luisa Dressler, Bram Edens, Manon Epherre Iriart, Jane Ellis, Giorgio Gualberti, Yosuke Jin, Katia Karousakis, Moongyung Lee, Xavier Leflaive, Paulina Lopez Ramos, Michaël Maes, Tadashi Matsumoto, Eugene Mazur, Mauro Migotto, Edward Perry, Jibran Punthakey, Kilian Raiser, Mohammed Saffar, Deger Saygin, Katarina Svatikova, Ania Thiemann, Simon Touboul, Kurt van Dender, Sho Yamasaki, Ji Soo Yoon and Frédérique Zegel. We are also grateful to contributions from Sandrine Gamblin and Mohamed Hegazy, as well as international partner organisations, including the Centre for Economic, Legal, and Social Studies and Documentation (CEDEJ), Transport for Cairo, the French Agency for Development (AFD), German Development Co-operation (GIZ), the International Monetary Fund and the World Bank Group.

This report was made possible through voluntary contributions from Egypt as part of the country programme. The OECD Working Party on Environmental Performance discussed the draft Green Growth Policy Review of Egypt at a special session on 28 May 2024 in Paris. The review was also discussed by the OECD Environmental Policy Committee at its meeting on 29 May 2024.

Table of contents

Figures

Tables

Reader's guide

The following signs are used in figures and tables:

.. : not available

– : nil or negligible

. : decimal point

Country aggregates

OECD: This zone includes all 38 member countries of the OECD, i.e. the countries of OECD Europe plus Australia, Canada, Chile, Colombia, Costa Rica, Israel*, Japan, Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

Currency

Monetary unit: Egyptian Pound (EGP)
In 2022, USD 1 = EGP 19.16
In 2021, USD 1 = EGP 15.65

Cut-off date

This report is based on information and data available up to 15 April 2024.

Disclaimer

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Basic statistics of Egypt

2022 or latest available year (OECD values in parentheses)[a]

PEOPLE AND SOCIETY					
Population (million)	111		Population density per km² [c]	938	
Share of population by type of region[b]			Population compound annual growth rate, latest 5 years	1.7	(0.5)
Predominantly urban (%)	66	(49)	Income inequality (Gini coefficient)	0.32	(0.32)
Intermediate (%)	27	(28)	Poverty gap at USD 3.65 a day (2017 PPP, %, 2019)	3.4	
Rural (%)	7	(23)	Life expectancy	70	(81)
ECONOMY AND EXTERNAL ACCOUNTS					
Total GDP (National currency, billion)	7 843		Imports of goods and services (% of GDP)	22	(29)
Total GDP (USD, billion, current prices and PPP)	1 675		Main exports (% of total merchandise exports)		
GDP compound annual real growth rate, latest 5 years	4.9	(1.7)	Mineral fuels, lubricants, and related materials	38	
GDP per capita (1 000 USD current PPP)	15	(54)	Chemicals and related products, n.e.s.	17	
Value added shares (%)			Manufactured goods	15	
Agriculture	11	(2)	Main imports (% of total merchandise imports)		
Industry including construction	35	(23)	Mineral fuels, lubricants and related materials	19	
Services	54	(75)	Machinery and transport equipment	17	
Exports of goods and services (% of GDP)	17	(29)	Chemicals and related products, n.e.s.	17	
GENERAL GOVERNMENT Percentage of GDP					
Expenditure	23	(43)	Education expenditure (public and private spending, % of GNI)	4.4	(4.4)
Revenue	17	(40)	Health expenditure (public and private spending, % of GNI)	4.4	(13.9)
Gross financial debt	90	(124)	Environmental taxes: (% of GDP)	0.6	(1.4)
Fiscal balance	-7	-(8)	(% of total tax revenue)	4.3	(4.6)
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate (aged > 15, %)	39.8	(56.1)	Unemployment rate (Labour force Survey, aged >15, %)	7.4	(6.2)
Men	65.2	(64.2)	Youth (aged 15-24)	17.6	(12.8)
Women	12.9	(48.5)	Tertiary educational attainment (aged > 25, %) (2017)	6.2	(28.5)
Participation rate (aged > 15, %)	43.0	(60.2)	Gross expenditure on R&D, % of GDP	1.0	(2.7)
ENVIRONMENT					
Energy intensity: TES per capita (toe/cap.)	0.89	(3.75)	Passenger cars stock (vehicles/100 inhabitants)	5	(49)
TES per GDP (toe/1 000 USD, 2015 PPP)	0.07	(0.08)	Renewable water resources per capita (m³)	562	(8 251)
Renewables (% of TES)	6	(12)	Water abstraction per capita (m³)	794	(735)
Carbon intensity (energy-related CO_2):			Municipal waste per capita, (kg/capita)	251	(534)
Emissions per capita (t/cap.)	1.89	(7.8)	Material productivity (USD, 2015 PPP/DMC, kg)	1.6	(2.5)
Emissions per GDP (t/1 000 USD, 2015 PPP)	0.15	(0.18)	Land area (1 000 km²)		
GHG intensity: [d]			% of arable land and permanent crops	4	(11)
Emissions per capita (t/cap.)	2.7	(10.9)	% of permanent meadows and pastures	-	(23)
Emissions per GDP (t/1 000 USD, 2015 PPP)	0.21	(0.25)	% of forest area	0.1	(33)
Mean population exposure to air pollution ($PM_{2.5}$), µg/m³	35	(14)	% of other land (built-up and other land)	96	(33)

a) Values earlier than 2017 are not taken into consideration. OECD value: where the OECD aggregate is not provided in the source database, a simple OECD average of the latest available data is calculated where data exist for a significant number of countries.

b) Data from the internationally harmonised definition of cities: 66% of Egyptians lived in urban centres and 27% in semi-dense urban areas; according to national statistics, 42.8% of Egyptians lived in urban areas in 2020.

c) Population density in inhabited areas. The areas were calculated by the Egyptian General Authority for Urban Planning. The inhabited area represented about 12% of total land area in July 2023.

d) Excluding emissions/removals from land use, land-use change and forestry. Egypt: 2015 data.

Source: Calculations based on data extracted from databases of the OECD, IEA/OECD, EUROSTAT and the World Bank.

Executive summary

Green growth and sustainable development are high on Egypt's political agenda. Egypt's Vision 2030 promotes an integrated approach towards sustainable development. The government is committed to promoting an investment-friendly climate to turn environmental challenges into opportunities. It aims to allocate all its public investments to green projects by 2030. Over the past decade, Egypt has made progress towards achieving the Sustainable Development Goals, but challenges remain. The country is among the best economic performers in the Middle East and North Africa region. However, economic growth has not benefited all Egyptians equally. High population growth, land-use change, pollution and climate change are increasing pressure on the country's natural environment. Further progress will require stronger transformative efforts to advance towards a greener economy.

Egypt has stepped up climate action but needs to further strengthen institutional capacity. While Egypt's per capita emissions are low in international comparison, its total greenhouse gas (GHG) emissions increased at a much faster rate than the world average and are projected to grow over the next decades. The government set three sector-specific targets to reduce emissions: -37% for electricity, -7% for transport and -65% for oil and gas by 2030 compared to business-as-usual, conditional on more international financial support. It has started operationalising the National Climate Change Strategy 2050. However, it is facing implementation challenges related to financial resources to expand capacity at all levels. More regular GHG emissions updates are needed to help analyse the impacts of mitigation and adaptation measures. The adverse effects of climate change increasingly affect all economic sectors. The government is planning to complete its National Adaptation Plan in 2025.

There is significant potential to accelerate the clean energy transition and limit car dependency. The government aims to increase the contribution of renewables to 42% of the generation mix by 2030. It plans to close 5 GW of inefficient oil and gas power generation capacity and facilitate private investment to create 10 GW of new renewable energy capacity. In parallel, Egypt is continuing to upgrade transmission and distribution networks, and invest in digital technology and storage infrastructure. It aims to become one of the largest exporters of low-carbon hydrogen. It also plans to complete its first nuclear power plant in 2030. There are immense opportunities to leapfrog towards a low-carbon transport system. New urban settlements could be more compact to guarantee easy access to transport links. The electric public transport system is expanding (e.g. Cairo Monorail). The government also advanced plans to develop a 2 000 km high-speed rail network linking 60 cities across the country. Egypt has taken steps to accelerate its fleet renewal, but electric mobility is in its infancy.

Air pollution is a serious health concern. Over the past decade, the government has taken several measures to improve air quality by regulating industrial emissions, improving solid waste management, upscaling public transport and, more recently, introducing electric buses. It also helped establish a collection system for rice straws, preventing the burning of agricultural waste that leads to toxic emissions (black clouds). Developing an integrated air pollution reduction strategy, including timebound and more stringent targets for major air pollutants, would be an important next step.

Waste infrastructure and services need to be strengthened to address rising waste flows. The government achieved an important milestone with the ratification of the Waste Management Law in 2020. The law introduces measures to reduce single-use plastic bags, a “Green Label” certification to reduce industrial waste and extended responsibility for producers. The government has set ambitious goals to upgrade solid waste management infrastructure. It will need to further enforce implementation. This requires better information and waste data to monitor progress towards targets.

A stronger use of economic instruments could help address water scarcity. Egypt is moving towards absolute water scarcity with less than 500 m^3 per capita of annual water supply. Economic incentives are needed to rationalise water use in agriculture. The 2021 Water Resources and Irrigation Law is a major step forward to unify attempts to improve water use and protect the quality of water bodies. It includes provisions for water user associations and climate change adaptation. Water and sanitation services need to better reflect the full financial cost.

Egypt has been committed to protecting biodiversity, but better implementation is needed across all sectors. While pressures on biodiversity are growing, knowledge about the health of species and ecosystems has improved overall. The government has started an update of its National Biodiversity Strategy and Action Plan to reflect the new commitments under the Kunming-Montreal Global Biodiversity Framework. However, implementation of commitments still faces some challenges in many areas due to limited financial and human resources. Local expertise also needs to be strengthened. The government revised the fee system for protected areas to raise additional revenues. It intends to declare the coral reef habitat of the Red Sea stretching over 1 800 km as protected areas in 2024.

Egypt is upgrading its long-standing environmental policy and legal framework. Environmental considerations are increasingly integrated into many sectoral policies. A proposed new Environment Law provides an excellent opportunity to set a unifying legal framework for environmental protection and climate action. The effectiveness of environmental impact assessment (EIA) is constrained by weak technical and financial capacity, limited consideration of cumulative effects or alternatives, insufficient enforcement and lack of public participation. Environmental expertise needs to be enhanced through training and capacity building at all levels. In 2024, the government started publishing online executive summaries of EIA reports for highly polluting projects.

Environmental information and data have improved, but major gaps remain. The monitoring capacity for air, water and soil has expanded but still requires efforts to align with international standards. Implementing the System of Environmental-Economic Accounting would provide a robust basis to inform the plans for greening national accounts. Environmental data and information remain scattered across various ministries. It is critical to improve data sharing between national entities, as well as between Egypt and stakeholders. Beyond awareness-raising campaigns, public participation in environmental decision making needs to be further enhanced.

A comprehensive green fiscal reform should be prioritised. Environmentally related tax revenue has increased, but its share in gross domestic product remains low. The bulk of this tax revenue comes from energy products, mainly excises on petroleum products used for transport. Egypt has neither taxes on pollution and resources nor an explicit carbon tax to directly address GHG emissions. Emissions from electricity production and industry sectors remain largely unpriced. The government could consider introducing a climate component in vehicle taxation and increase the use of road pricing. Gas prices for different industrial activities need to be adjusted more regularly. Despite increases in electricity prices, Egypt did not meet its target of full cost recovery by 2023. Adopting a more cost-reflective pricing model would help address wasteful consumption, reduce fiscal costs and foster energy security. Green investment could be better prioritised when providing corporate income tax incentives. In 2022, the Special Incentive was expanded to include projects of strategic interest, namely green hydrogen and green ammonia, waste management, e-mobility and alternatives to single-use plastic. However, it is also available for non-green projects, which may weaken incentives for green investment.

Cities play a pivotal role in supporting the green transition but face multiple challenges. Cities are the engines of Egypt's growth and can support its green transition by stimulating urban economic activity, green innovation, jobs, skills and more inclusive development. At the same time, cities are major sources of pollution and are also exposed to multiple climate-related hazards, especially heatwaves, flash floods, dust storms and rising sea levels for coastal cities. Current urban policies have been unable to keep pace with population pressures, which has led to uncontrolled urban expansion, environmental degradation and precarious living conditions. Meanwhile, many new urban communities built on desert land adjacent to existing cities struggle to attract new residents. In 2023, the government adopted a National Urban Policy to promote positive transformative change in cities.

Administrative reforms are needed to better consider the rural-urban continuum. The binary categories of urban and rural areas no longer reflect Egypt's urban realities with its dense settlement patterns. The 2026 national population census is an opportunity to reconsider administrative divisions and review the definition of urban areas to ensure that policies and funding address the specific needs of its populations, as well as challenges associated with urban sprawl. Egypt needs to simplify the current land-use planning and registration system and pursue development of an integrated information system to streamline the land allocation process and improve transparency.

Tailored place-based policies would support sustainable urban development. The institutional framework for urban planning faces several challenges: a disconnect between national plans, the planning of local infrastructure and local development needs; weak horizontal co-ordination between different government entities; bureaucratic complexities; and limited local capacity and financial resources. Fragmented sectoral investment planning impedes an integrated development vision at subnational level. Environmental considerations need to be systematically mainstreamed into all urban development plans and land-use planning tools. Despite many guidelines, a substantial gap between strategic plans and green measures persists in local development plans. In line with the National Climate Change Strategy 2050, governorates should develop their own subnational climate change strategies. Moving to more participatory approaches would help better align urban policies with local development needs. This will require strengthening competences, capacities and financial autonomy of subnational governments.

Egypt needs to pursue efforts to promote climate-smart, resilient and inclusive cities. Despite stated green and inclusive principles, new cities continue to be constructed in an expansive manner. The building code requires important updates to support climate and environmental goals. This could include the definition of national standards for low-carbon construction material, minimum energy efficiency standards, provisions for use of renewable energy sources and minimum requirements for green public spaces in residential areas. The government can further green its own public buildings and social housing programmes and develop a holistic approach to cooling policy. The central government needs to pursue efforts to downscale climate risk assessments at subnational level and develop appropriate city-level early warning systems. Egypt upscaled nature-based coastal protection solutions in the Nile Delta. Cities have much scope to increase their green spaces. The government has made major strides in addressing unsafe areas. However, few efforts have been directed towards establishing mitigation and adaptation plans for existing urban areas, where most Egyptians live.

Assessment and recommendations

The Assessment and recommendations present the main findings of the OECD Green Growth Review of Egypt and identify 40 recommendations to help Egypt make further progress towards greening its economy. The OECD Working Party on Environmental Performance reviewed and approved the Assessment and recommendations on 28 May 2024.

1. Key environmental trends

Addressing key environmental challenges

Egypt is a rapidly growing emerging economy and a demographic heavyweight on the African continent. Located at the crossroads between Africa, Europe and Asia, the country is a natural bridge between people and goods around the world, notably through the Suez Canal.

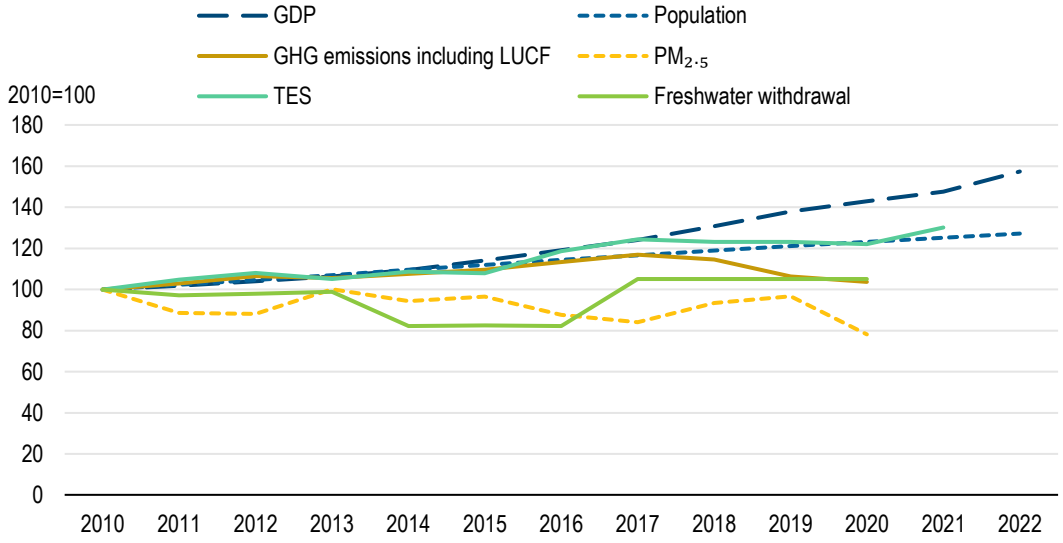
Egypt is among the best economic performers in the Middle East and North Africa (MENA) region, with a five-year average real growth rate of 4.8% between 2018 and 2022, compared to 1.7% in OECD countries (OECD, 2024[1]). The unemployment rate has nearly halved since 2014, reaching 7.2% in 2022. However, female labour participation is weak, below the average of MENA countries (Government of Egypt, 2021[2]). The Decent Life, or Haya Karima presidential initiative, greatly contributed to improving livelihoods of most vulnerable people but more needs to be done to reduce the number of people living below the national poverty line.

High population growth is increasing pressure on Egypt's natural environment, especially on its rich biodiversity (Government of Egypt, 2016[3]). Given the country's vast deserts, people are concentrated along the Nile River and its Delta. Urbanisation is advancing rapidly, which has led to urban sprawl in the past decades despite efforts to build new urban communities in desert areas (Section 3). The government has taken several measures to improve air quality (Figure 1), including the Greater Cairo Air Pollution Management and Climate Change Project. The country has also begun to tackle waste but a larger population will require more sustainable use of natural resources to advance towards a circular economy.

The country has recorded a gradual decline in greenhouse gas (GHG) emissions since 2017 (Figure 1). It managed to partially decouple GHG emissions from economic and population growth, thanks notably to efficiency gains in energy industries and support for renewable energy projects. However, Egypt remains one of Africa's leading oil and gas producing countries. Scaling up use of renewable energy could further advance decoupling trends, given the country's large potential.

The Ministry of Environment (MoE) aims to develop a new Environment Law to cover climate action, biodiversity and pollution management. This proposed update from the 1994 edition of the law provides an excellent opportunity to set a unifying legal framework for environmental protection and climate action to support the achievement of Egypt's national and international commitments, alongside private sector investment. The process, to take place within the next three years, will gain from involving relevant sectoral ministries at an early stage to build consensus and foster a whole-of-government approach to environmental issues.

Figure 1. Egypt has made some progress in decoupling environmental pressures from economic growth



Note: GDP: gross domestic product (constant prices); GHG: greenhouse gases; LUCF: land-use change and forestry; $PM_{2.5}$: particulate matter of 2.5 µm size; TES: total energy supply.
Source: EC (2022), Emission Database for Global Atmospheric Research (EDGAR) v6.1, https://edgar.jrc.ec.europa.eu/dataset_ap61; FAO (2024), FAOSTAT (database), www.fao.org/faostat/en/#data; AQUASTAT (database); World Bank (2024), World Development Indicators (database), https://databank.worldbank.org/source/world-development-indicators; World Resources Institute (2022), Climate Watch Historical GHG Emissions, www.climatewatchdata.org/ghg-emissions.

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Addressing climate change requires strengthening institutional capacity

The National Climate Change Strategy 2050, launched in 2022, provides a comprehensive framework for Egypt's climate mitigation and adaptation priorities. It articulates links between its main goals and the climate change goals in Egypt's Vision 2030 (Government of Egypt, 2022[4]).

Egypt has started operationalising the National Climate Change Strategy 2050. However, it is facing implementation challenges related to financial resources to expand capacity at all levels of government. The launch of the domestic measurement, reporting and verification system is conditional on funding. At this stage, selected action plans are being developed and capacity building workshops at sectoral and governorate level conducted. For instance, an action plan for improving climate action governance is under development. Activities of the Centre of Excellence for Research and Applied Studies of Climate Change and Sustainable Development at the National Research Centre have been strengthened.

The National Council for Climate Change (NCCC), headed by Egypt's Prime Minister, is well positioned to facilitate inter-ministerial co-ordination. The NCCC should better communicate on its activities, decisions and outcomes. A co-ordination mechanism for subnational governments could help create opportunities for mutual learning across governorates. Drawing on the experience of other countries, an independent scientific body of climate experts could monitor progress and advise the NCCC.

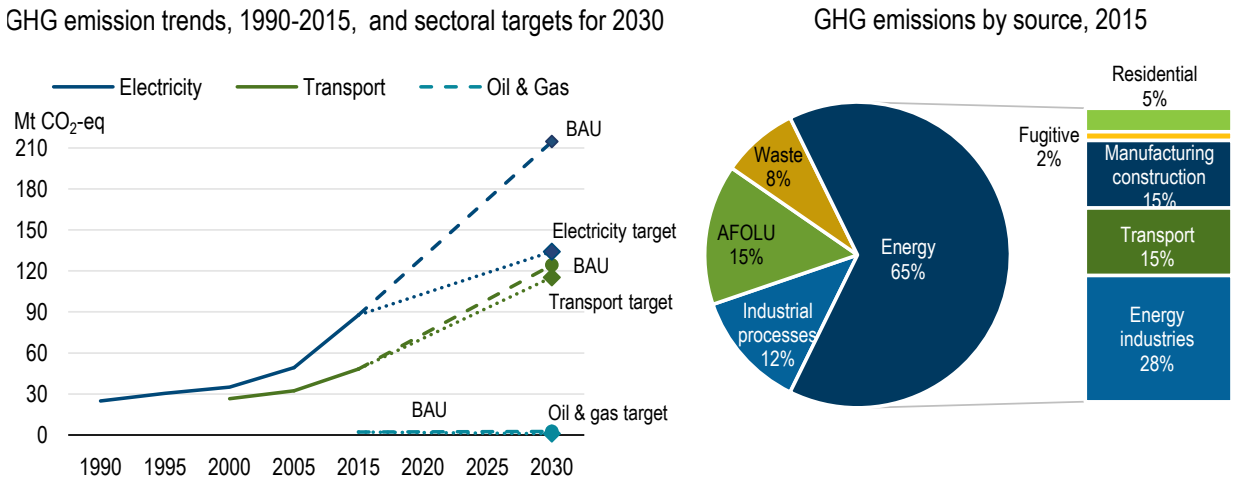
Egypt last submitted official GHG emissions data to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015. At the time of writing, it was about to finalise its fourth communication to the UNFCCC, including updated GHG emissions data. In line with the commitments under the Paris Agreement's Enhanced Transparency Framework, more regular GHG emissions updates are needed to help analyse the impacts of mitigation and adaptation measures. Achieving this requires strengthening capacity of the Egyptian Environmental Affairs Agency (EEAA) and Egypt's Central Agency for Public

Mobilisation and Statistics (CAPMAS). Efforts to incorporate a Climate Change GHG Unit within CAPMAS go in the right direction.

Egypt needs to step up its climate ambition, as the global 1.5 °C goal is falling out of reach

Egypt's total GHG emissions increased at a much faster rate than the world average. In 2015, the energy sector was responsible for 65% of total emissions (Figure 2). Egypt's emissions per capita were estimated at 2.8 tonnes in 2020. This was less than half the global average of 6.3 tonnes and more than three times below the OECD average of 10.5 tonnes in 2021 (OECD, 2024[5]).

Figure 2. Egypt set three sector-specific targets to reduce emissions



Note: AFOLU: agriculture, forestry and other land use; BAU: business-as-usual; GHG emissions and targets for electricity, oil and gas, and transport sectors are provided in Egypt's first and second updated Nationally Determined Contributions (NDC). Official data are available up to 2015 from Egypt's UNFCCC Biennial Update Report. Oil and gas data are available for 2015 only. Data are shown in solid lines, while linear projections are represented by dotted lines.
Sources: Government of Egypt (2023), Egypt's second updated NDC; Government of Egypt (2019), Egypt Biennial Update Report.

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Over the past decade, Egypt has considerably increased its national and international climate commitments. As host of the 27th Conference of Parties (COP27) to the UNFCCC, Egypt's climate commitment gained international attention. COP27 also raised awareness within Egypt, catalysing its domestic climate agenda. Many new initiatives have been launched with the support of development partners (e.g. Nexus of Water, Food and Energy Platform) (NWFE, 2022[6]). Egypt should continue to capitalise on this political momentum by updating policies, revising sectoral strategies and upgrading programmes through a climate lens while strengthening subnational capacity.

The first updated Nationally Determined Contributions (NDC), published ahead of COP27 in 2022, was a major step forward. For the first time, the government set tangible national GHG emissions reduction targets for three sectors: -33% for electricity, -7% for transport and -65% for oil and gas[1] by 2030 compared to business-as-usual, conditional on more international financial support (Figure 2), (Government of Egypt, 2022[7]). The electricity target was tightened to -37% in the second updated NDC in 2023. These three sectors cover less than half of Egypt's GHG emissions. As in many emerging economies, Egypt's climate targets are not legally binding.

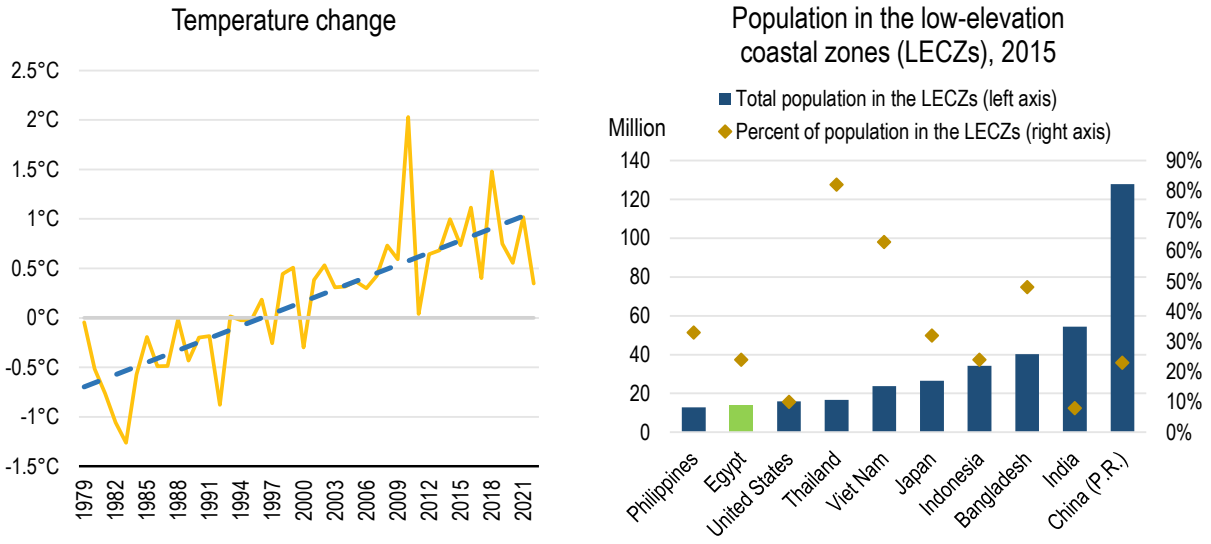
Egypt could progressively introduce more ambitious targets and broaden the scope of its emission reductions targets to cover other sectors. Setting a projected peak year for GHG emissions, along with

intermediate targets, would inform long-term planning and send strong price signals in favour of low-carbon investment. This would prevent further investment in stranded high carbon assets and help reduce dependence on fossil fuel.

Egypt has stepped up action on adaptation

People are increasingly exposed to longer periods of extreme temperatures, and they will likely worsen this century (Figure 3). If climate change is not mitigated, a large proportion of the northern part of the Nile Delta and Sinai will likely be lost due to rising sea levels, which will affect a large share of Egypt's coastal population. Extreme weather events such as heatwaves, flash floods, and sand and dust storms, exacerbate the impacts of an already arid climate. A national plan to tackle extreme weather events was adopted in 2021. A joint working group led by the Ministry of Water Resources and Irrigation aims at actions preventing damage and addressing the impacts of extreme weather events on Egypt's north coast. Several projects have been implemented to build climate resilience in coastal areas (Section 3).

Figure 3. Egypt is significantly affected by climate change and projected sea level rise



Note: Low elevation coastal zones (LECZs) are areas below 10-metres.
Sources: Left panel, IEA/OECD calculations using ERA5 Reanalysis data (Copernicus Climate Data Store) and methodology from Maes et al. (2022), "Monitoring exposure to climate-related hazards: Indicator methodology and key results", OECD Environment Working Papers, No. 201. Right panel, OECD/European Commission (2020), Cities in the World: A New Perspective on Urbanisation, OECD Urban Studies.

StatLink https://stat.link/ulajem

Egypt is planning to complete its National Adaptation Plan in early 2025. The cost of adaptation programmes is estimated at USD 113 billion, with a funding gap of USD 94.7 billion (Government of Egypt, 2022[4]). The second updated NDC indicates USD 50 billion as conditional financing requirements for adaptation measures until 2030 (Government of Egypt, 2023[8]). The NDC does not indicate either the share of government funding for adaptation or the estimated cost of loss and damage related to climate change impacts. Adaptation projects are usually less attractive to private investors than mitigation projects (Green Climate Fund and Government of Egypt, 2022[9]). However, climate adaptation measures ultimately cost less than responding to loss and damage from extreme weather events (OECD, 2023[10]). Therefore, the government should continue to mainstream adaptation concerns into all sectors, while building capacity to tap into international climate finance.

The adverse effects of climate change increasingly affect all of Egypt's economic sectors, in particular agriculture. Saline water intrusion already affects soil fertility in the Nile Delta (El-Kiki, 2018[11]). More evaporation will place additional pressure on scarce water resources. Rising energy demand for cooling during the summer will also affect the resilience of the energy sector (Section 3). Egypt recognises the need to mainstream climate change adaptation into all policy sectors, but implementation remains at an early stage. Mainstreaming adaptation is particularly relevant for new infrastructure projects and local development plans. Poor people generally have fewer resources for adaptation and require targeted support measures.

Air pollution is a serious health concern

In the context of Egypt's growing population, increasing industrial activities, road traffic and congestion, emissions of nearly all air pollutants are high. Egypt met its 2020 target of reducing PM10 emissions by 15% compared to 2015 levels in the Greater Cairo area and exceeded the target in the Delta region (CAPMAS, 2023[12]). The Greater Cairo area remains an air pollution hotspot. The country still has a way to go towards achieving its goal of halving PM10 emissions by 2030 (Government of Egypt, 2023[13]). According to national statistics, annual average concentration of PM2.5 has decreased over the past decade and dropped below Egypt's national limit value of 50 µg/m3 in 2022.

The government launched the six-year Greater Cairo Air Pollution Management and Climate Change Project in 2021. Key objectives include the modernisation of Egypt's air quality management system, the construction of integrated waste management facilities and the rollout of electric buses (World Bank, 2022[14]). Over the past decade, the government has taken several other measures to improve air quality by regulating industrial emissions, improving solid waste management, upscaling public transport and, more recently, introducing electric buses. The government also helped establish a collection system for rice straws, preventing the burning of agricultural waste that leads to toxic emissions (black clouds) while creating new economic opportunities for farmers.

Developing an integrated air pollution reduction strategy, including timebound targets for major air pollutants, would be an important next step. The maximum limits of outdoor air pollutants, defined in Egypt's Environmental Law no. 4 of 1994, would need to become more stringent to approach international standards (Government of Egypt, 1994[15]). The government started expanding its network of air quality monitoring stations (Government of Egypt, 2023[16]) and some stations have real-time monitoring capacity. Other stations require upgrades so they can monitor all types of pollutants. Information on air quality and related health risks will need to become more easily accessible for citizens on relevant websites or apps.

Accelerating the clean energy transition

Egypt has great potential to accelerate its clean energy transition

Fossil fuels continue to dominate Egypt's energy mix. Oil and gas accounted for 92% of total primary energy supply in 2021, while coal represented less than 2% (IEA, 2023[17]). Renewable energy sources made up 6% (IEA, 2023[17]). Egypt has significant untapped potential for expanding renewable energy from solar, wind and hydrogen. In 2021, renewables accounted for about 12% in electricity production (IEA, 2024[18]), The share of renewables is set to grow substantially (IEA, 2023[19]). By 2030, the government aims to generate 42% of its electricity with renewable energy sources (five years earlier than initially planned). This will require modernising and upgrading transmission and distribution networks to better absorb renewables, invest in digital technology and storage infrastructure.

To further diversify its energy mix, Egypt plans to complete its first nuclear power plant in 2030 (in El Daaba, 250 km west of Alexandria). The plant aims to cover about 3% of projected power generation. Egypt joined several international initiatives to help reduce emissions related to oil and gas production

(e.g. Zero Routine Flaring Initiative, Global Methane Pledge). Within COP27, Egypt's Ministry of Petroleum and Mineral Resources organised the first "Decarbonisation Day" to highlight success stories in the decarbonisation of the oil and gas sector.[2]

Efforts to improve energy efficiency are under way

The Integrated Sustainable Energy Strategy 2035 sets a national goal of reducing energy demand by 18% by 2035. It counts on greater efficiency from both upgraded generation and transmission infrastructure, and new technologies. Egypt is developing its third National Energy Efficiency Action Plan. The petroleum sector developed an Energy Efficiency Strategy 2022-35 (Government of Egypt, 2023[20]) that focuses on major energy consumers. The government has started establishing energy efficiency units in ministries and plans to develop a digitalised, sector-wide monitoring system. The transport sector has untapped potential to improve energy efficiency by setting minimum fuel efficiency standards and energy labelling schemes for vehicles. Tightening energy efficiency standards of housing will help save more energy (Section 3).

Promoting sustainable mobility

Egypt needs to prevent car dependency and make its vehicle fleet cleaner

Egypt has an immense opportunity to leapfrog towards a low-carbon transport system. All new urban settlements could be developed in a more compact, transport-oriented way that guarantees easy access to transport links, including a network of safe walking and cycling routes to prevent car dependency (Section 3). However, multiple government bodies plan infrastructure, which are resulting in complex governance. Rather than focusing on individual outcomes, government entities should work together to develop an integrated nationwide sustainable mobility strategy.

As elsewhere, transport-related emissions have been growing quickly over the past decade. This growth reflects a larger population and urban sprawl that has triggered rapidly increasing demand for mobility. The sector's CO_2-eq. emissions are projected to more than double to reach between 115-124 million tonnes by 2030 (Government of Egypt, 2023[8]). The government should consider tightening its target for reducing emissions in the transport sector, while pursuing efforts to scale up affordable, inclusive and secure public transport options.

Egypt's vehicle stock remains comparatively small, with Cairo and Giza recording 5.2 million cars in 2022, representing nearly half of all licensed vehicles. This situation leads to traffic congestion with adverse effects on air quality, public health, climate and economic activity. Despite high urban density, walking and cycling remain marginal. Investment in active transport modes is limited in urban planning (Mousa, 2022[21]).

Egypt has taken some steps to accelerate its fleet renewal. In 2021, the country initiated a programme to encourage use of dual-fuel vehicles, which run on both petrol and compressed natural gas (CNG). This initiative features scrapping schemes designed to retire old vehicles from the road, along with incentives to facilitate conversion of vehicles to dual-fuel systems.[3] By 2023, Egypt recorded 540 000 CNG vehicles and about 1 000 CNG fuelling stations (Government of Egypt, 2023[20]).

In line with the cities-first approach, the government should consider measures to enforce diesel fuel standards in Greater Cairo and other densely populated cities (Ahmed El-Dorghamy, 2021[22]). The introduction of low-emission zones in densely populated urban areas would help reduce air pollution. This would require further measures to increase the number of low-emission vehicles in the vehicle fleet.

In the absence of vehicle deregistration, one-quarter of all circulating vehicles are likely more than 30 years old (Harun et al., 2023[23]). Egypt has banned the import of second-hand passenger vehicles older than

one year and implemented several nationwide vehicle scrapping programmes (World Bank, 2021[24]). However, capacity to recycle end-of-life vehicles in a safe and environmentally sound manner is insufficient and needs to be strengthened.

Electric mobility is in its infancy

The EV industry faces many challenges related to the country's foreign currency crunch, as new EVs are offered only in US dollars. Affordability and the absence of adequate charging infrastructure represent other major barriers for promoting electric mobility. The government's 2019 e-mobility strategy aims to increase the share of private EVs to 50% by 2040 (World Bank, 2022[25]). It launched the first domestically produced EV in February 2023, and plans to ban new sales of internal combustion engine vehicles by 2040. As in other emerging economies, use of electric two-three wheelers and a coherent network of urban buses would be more cost effective (OECD, 2023[26]).

Transitioning to a resource-efficient economy

Waste infrastructure and services need to be strengthened to address rising waste flows

Egypt produced about 251 kg of municipal waste per capita in 2021 (Government of Egypt, 2021[27]), which is less than half of the OECD average (OECD, 2023[28]).[4] The waste sector contributed to 8% of total GHG emissions in 2015 (Government of Egypt, 2018[29]), above the OECD average of 3%. As in many emerging economies, significant portions of waste are not yet properly managed. Most waste goes to landfills or illegal dumping sites. Collection rates vary widely across governorates from less than 40% to nearly 100% (CAPMAS, 2023[30]).

Egypt achieved an important milestone with ratification of the Waste Management Law in 2020, which mainstreams regulations previously scattered across many laws and decrees. The law introduces measures to reduce single-use plastic bags, a dedicated fund for municipal waste collection in each governorate, a "Green Label" certification to reduce industrial waste and extended responsibility for producers. A new Waste Management Regulatory Authority under the auspices of the MoE covers a wide range of responsibilities. Master plans at governorate level will complement a national master plan for municipal waste management.

Egypt's updated Vision 2030 aims to enhance waste management efficiency and promotes an economy-wide shift towards circularity (Government of Egypt, 2023[13]). In the second updated NDC, the government aims to reduce waste directed to landfills to 20% by upgrading its solid waste management infrastructure, increase the amount of collected waste from 55% in 2022 to 95% by 2025, and expand recycling and energy recovery rates (Government of Egypt, 2023[8]). The government also intends to turn 20% of collected waste into energy by 2026.

To achieve these ambitious targets, the government will need to increase public financial resources considerably and incentivise private investment. Beyond goal setting, the government will need to further strengthen its regulatory framework and enforce implementation. This requires better information and waste data to monitor progress towards targets. Standardised waste profiles at governorate level would be useful. Meanwhile, a digital platform could provide access to key information and promote mutual learning among municipalities.

Agriculture needs to become more sustainable, especially through reduced fertiliser use

Agricultural productivity has increased significantly over the past decade. The sector faces increasing pressure to feed a larger number of people given limited areas of arable land. Fertile agricultural land is confined to the Nile Valley and its Delta ("old land"), as well as a few oases and some arable land in Sinai. Egypt depends heavily on food imports, mainly wheat. This makes the country vulnerable to international

trade disruptions as witnessed by the impacts of the war of aggression against Ukraine by the Russian Federation.

The Agriculture, Forestry, and other Land Use (AFOLU) sector represented about 15% of national GHG emissions in 2015, resulting from enteric fermentation, manure management, field residuals burning, agriculture soil and rice cultivation (Government of Egypt, 2018[29]). The updated NDCs do not include any climate mitigation measures for the agricultural sector (Government of Egypt, 2023[8]). Many governorates do not monitor key indicators from diffuse pollution from agriculture (e.g. nitrogen and phosphorus concentration).

Egypt has one of the world's highest rates of nitrogen fertiliser use per hectare of crop. In 2021, it used on average 310 kg per ha (FAO, 2022[31]). This has major negative impacts on soil and water quality. The government foresees cutting back on use of mineral/chemical fertilisers and expanding use of organic and biological fertilisers. Rather than subsidising the use of fertilisers, policies would better focus on improving the knowledge and skills that could help farmers optimise use of fertilisers, including through extension services.

With nearly 85% of farms averaging no more than 0.6 ha per unit, land fragmentation remains an obstacle to the rollout of climate-smart technologies (Santos Rocha, 2023[32]). While much agricultural support is spent on large-scale projects, better targeting support could accelerate the transition to more sustainable and productive agriculture. Smallholders usually struggle to access financing for investments in climate resilience. Like newly created associations that benefit water users, independent associations for small-scale farmers could provide advice, mutualise investment costs and create new economic opportunities along supply chains. Awareness of quality seed and new varieties, as well as access to climate-resilient varieties, needs to be improved and promoted, for instance, through mobile applications.

Managing the natural asset base

A stronger use of economic instruments could help address Egypt's water scarcity

Egypt is among the world's most water-scarce countries. In the context of rapid population growth and limited availability of freshwater resources, the per capita share of water has been declining. The country is moving towards absolute water scarcity with less than 500 m^3 per capita of annual water supply (FAO, 2021[33]). Current water demand largely exceeds Egypt's available freshwater supply and is estimated to reach nearly double the available water resources by 2050 (Government of Egypt, 2021[34]). While agriculture makes up the bulk of water consumption with about three-quarters of total water use (CAPMAS, 2023[12]), the share of household water consumption is increasing rapidly.

Currently, Egyptian farmers only bear the on-farm irrigation costs and do not pay for water used in their farms (Enas Moh, 2018[35]). Economic incentives are needed to rationalise water use in agriculture, alongside measures to increase use of agricultural drainage water, rainwater harvesting and treated wastewater in agriculture (ReWaterMENA, 2021[36]). Old lands continue to apply traditional irrigation methods. Current efforts to upgrade and rehabilitate canals in the Delta regions go in the right direction. The government also pursues efforts to encourage farmers to switch to modern irrigation systems, including smart irrigation systems, which consider the degree of soil moisture, the level of salinity and temperature when calculating water requirements. Agricultural water allocation reform could help incentivise adoption of climate-smart technologies (World Bank, 2022[25]).

The 2050 Water Strategy, supported by the National Water Resources Plan 2017-2037, sets out the main goals and frameworks for water management. The Water Resources and Irrigation Law, ratified in 2021, is a major step forward to unify attempts to improve water use and protect the quality of water bodies. It includes provisions for water user associations and climate change adaptation. As in many other countries,

various government entities address water issues. Much water-related data and information remain scattered across government bodies, making them difficult for the public to access.

Water quality could be further enhanced by applying the polluter pays principle

Water quality indicators for the Nile River met most of the national limits in 2021 (CAPMAS, 2023[12]). However, many governorates still lack values for nitrogen and phosphorus concentration. Access to safe drinking water has greatly improved thanks to the Haya Karima Initiative.

Over the past decade, pollution in the Nile River has decreased, thanks notably to increased control of industrial wastewater and growing wastewater management capacity. The government is reinforcing the polluter pays principle by tightening the penalty for factories whose waste discharge, whether liquid or solid, leads to pollution of waterways (Government of Egypt, 2021[34]). This would require enhanced compliance monitoring and enforcement. Egypt aims to ensure compliance with the Law of Environment for 85% of surface water subsystems by 2037 (Government of Egypt, 2021[34]).

The share of treated wastewater grew from 50% to 74% between 2015-22 (UN Water, 2023[37]). This is better than many other countries in MENA. Egypt invested in a series of mega projects to enhance its water treatment and reuse capacity (e.g. Bahr El-Baqar treatment plant, West Delta El Dabaa plant, Elmahsama plant). At the same time, Egypt will need to speed up completion of wastewater treatment solutions in villages (Government of Egypt, 2021[34]).[5]

Water and sanitation services need to better reflect the full financial cost

Egypt achieved nearly universal access to safe drinking water over a decade ago and is working to ensure the sustainability of drinking water in accordance with national laws and regulations. It is also one of the rare African countries on track to achieve universal basic sanitation by 2030 (UN, 2023[38]). Much of these achievements are related to the Haya Karima Initiative. Disparities between urban and rural areas have been reduced.

The government appointed authorities to operate and manage drinking water and sewage treatment plants. This triggered several reforms to raise water tariffs for water and sanitation services (WSS) and make the sector more financially viable. A progressive water tariff system guarantees a low tariff rate to cover essential household water needs. High-use consumers pay nearly five times more on their water bills, cross-subsidising the reduced-rate bracket. Water tariffs are also adjusted to different sectors (e.g. commercial, industry, tourism).

Despite these increases, WSS tariffs do not reflect the full financial cost of services and continue to be subsidised by the government. Experience in OECD countries shows that tariffs are best designed if they manage to secure sustainable financing for service provision; complementary social measures can target vulnerable groups (Leflaive and Hjort, 2020[39]). Greater predictability and transparency of tariff increases could make them more socially acceptable (Alternative Policy Solutions, 2019[40]). Government efforts to increase cost recovery should also be informed by long-term strategic financial planning for water infrastructure investment, including climate adaptation. Raising citizens' awareness of the value of water must also remain a priority.

Pressures on Egypt's rich biodiversity are growing

The Red Sea is one of the world's most important repositories of marine biodiversity, and the coastline also offers a variety of habitats. Population growth, land-use change related to urban and agricultural expansion, pollution, desertification and climate change are among the major drivers of biodiversity loss. The conversion of natural land area along coastal areas has had a large impact on coastal and marine

species and habitats. Houthi attacks on cargo ships represent a new risk for oil spills and other leaks in the Red Sea as witnessed in early 2024 (Goodman, 2024[41]).

According to national estimates, over 40 species are under pressure in Egyptian coastal and marine environment, including marine mammals (17 species), marine turtles (4 species), sharks (more than 50 species), sea cucumber, special bivalves, coral reefs, mangrove trees and many birds (Government of Egypt, 2016[3]). Many fish species are in decline, mainly due to unsustainable use of marine resources and coastal pollution (e.g. marine litter). Restoration activities will be required to recover certain economically important fish species (Government of Egypt, 2016[3]). Enforcement of regulations for wildlife protection and prevention of overfishing needs to be stepped up.

While several national lists on different species exist, Egyptian scientific institutions and IUCN have not jointly adopted an official national Red List of species. Over the past decade, knowledge about the health of species and ecosystems has improved overall. Several research programmes aim to assess the status of species in terms of density and prevalence rate across Egypt's natural habitats. Among others, monitoring activities focus on Egyptian gazelles, crocodiles, waterfowls, coral reefs, sharks and desert plants. A solid evidence-based analysis is necessary to help set priorities for conservation action plans for protection of species and ecosystems. A monitoring system to regularly update assessment criteria can further support the decision-making process.

Egypt has been committed to protecting biodiversity, but better implementation is needed across all sectors

Egypt launched its first National Biodiversity Strategy and Action Plan in 1998 (Government of Egypt, 1997[42]), and developed an updated strategy and action plan in 2016 covering 2015-30 (Government of Egypt, 2016[3]). The government has started another update to reflect the new commitments under the Convention on Biological Diversity's (CBD) Kunming-Montreal Global Biodiversity Framework. Egypt is a party to the CBD and signed many international conventions (e.g. Ramsar Convention on Wetlands, Convention on the Conservation of Migratory Species of Wild Animals and the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention), African-Eurasian Migratory Waterbird Agreement and the Gulf of Aden Environment "Jeddah Convention").

However, implementation of commitments still faces some challenges in many areas due to limited financial and human resources. Local expertise needs to be further strengthened to ensure sustainability of actions and better consider local contexts. Plans to update the legal and institutional frameworks go in the right direction. This could help create an enabling environment for implementation of the national strategy and related biodiversity conservation, sustainable use and restoration activities. In addition, economic incentives for biodiversity conservation and its sustainable use could help better protect terrestrial, marine and aquatic ecosystems on which species depend, and address the pressures on biodiversity loss.

There is an urgent need to mainstream biodiversity into all sectors. This would also help mobilise additional investment in biodiversity conservation and sustainable use measures. Efforts to accelerate its clean energy transition should be pursued without compromising biodiversity (OECD, 2024[43]). Environmental impact assessment (EIA) of renewable energy projects considers bird migration routes. The government implemented several projects to promote radar-assisted shutdown on demand of wind farms and developed new green job opportunities for female bird watchers. The government has also started working towards the expansion of ecotourism through a nationwide campaign, called ECO EGYPT. However, other sectors have struggled to integrate biodiversity concerns. For example, the agricultural sector has so far paid little attention to agrobiodiversity (Government of Egypt, 2020[44]). Therefore, Egypt should continue to raise awareness and strengthen capacity of relevant governmental agencies. It should provide economic incentives for key stakeholders to adopt ecologically sustainable management practices.

Egypt increased financial resources for protected areas and has plans to further expand marine protected areas

Egypt counts 30 protected areas, covering about 14% of its total land area, which is close to the 2020 Aichi Target of 17%. This is a higher share than in many other MENA countries. The government intends to declare the entire coral reef habitat of the Red Sea stretching over 1 800 km as protected areas through a prime ministerial degree in summer 2024. This will be a milestone given the global importance of coral reefs in the Red Sea area by raising the share of protected marine areas, currently at 5%.

For a long time, the performance of protected areas has been hampered by weak operational, administrative and management capacity, as well as by lack of trained staff and financial resources. In 2015, less than half of protected areas had proper management plans, and many were outdated (Government of Egypt, 2016[3]). However, the government revised the fee system for protected areas, especially in the Red Sea, which attracts up to 10 million tourists per year. This contributed to increasing considerably the revenue collected from entry fees of protected areas, reaching about EGP 500 million in 2023. About 25% of the total revenues of protected areas is dedicated to their management; the remainder is used for other environmental protection programmes. These additional resources allowed increasing the number of scientific staff and experts who support the management of protected areas.

At COP28, Egypt announced it will join the Blue Partnership Agreement, which supports multilateral co-operation for the development of a sustainable blue economy in the Mediterranean region. Egypt will have additional opportunities to strengthen its national commitments as host of the COP24 for the Protection of the Marine Environment in 2025. The government of Egypt has developed a marine litter management plan and aims to prevent and reduce marine litter pollution in the Mediterranean. Several voluntary initiatives are under way; local stakeholders generally drive action.

Recommendations to address key environmental challenges

Climate mitigation

- Work progressively towards setting more ambitious emissions reduction targets across various sectors and raise Egypt's contribution to face the adverse impact of climate change; further mainstream climate into various sectors using a policy mix and associated tools such as budgetary planning, and market and non-market based instruments.
- Improve GHG monitoring and reporting capacity and develop a consolidated nationwide environmental and climate monitoring system; expand the capacity of CAPMAS, EEAA and other relevant institutions; develop sectoral monitoring tools; consider the establishment of an independent scientific body of climate experts.

Climate adaptation

- Develop localised climate risk assessments and consider adaptation priorities in local planning systems and development plans; promote capacity building to increase implementation capacity at subnational level and strengthen local ownership.
- Mainstream adaptation in sectoral strategies and action plans, including dedicated budgets for adaptation priorities; build administrative capacity to better tap into international climate and development finance, including at subnational level.

Air pollution

- Formulate an integrated nationwide air pollution reduction strategy, including timebound targets for major air pollutants across governorates; raise awareness of air quality and related health impacts, and develop alert systems for citizens.

Energy

- Pursue development of a robust regulatory framework and financing mechanisms with clear incentives to catalyse private investment for deployment of renewable energy sources; decommission inefficient thermal plants and pursue decarbonisation of the oil and gas sector and hard-to-abate industries, according to a planned timeline.
- Make energy audits mandatory for major consumers of electricity, gas and petroleum products and develop a sector-wide standardised monitoring and reporting system; set Minimum Energy Performance Standards for industrial equipment with appropriate labelling schemes.

Sustainable mobility

- Develop an integrated national mobility strategy, including intermediary targets at subnational levels (e.g. share of active transport modes and related investment levels); regularly assess nationwide progress through an annual sustainable mobility report covering key priorities (e.g. increased use of public transport and active transport modes, and related investments).
- Introduce enforceable solid fuel quality requirements and vehicle emission standards; conduct pilot projects to experiment with low-emission zones in densely populated urban areas; upgrade the vehicle registration system, collect climate-relevant information (e.g. fuel efficiency, CO_2/km, air quality certificates) more systematically, mandate deregistration of scrapped or unused vehicles and progressively introduce an age limit for vehicles in circulation to phase out most polluting vehicles within the next decade.

Waste

- Pursue efforts to establish a nationwide waste collection system, including waste sorting at source; close unmanaged open dumps; upgrade waste management infrastructure through a stronger use of economic instruments (e.g. pay-as-you-throw and deposit-refund schemes); develop a National Information and Data Management System with accurate statistics on different waste streams and waste treatment modes to monitor progress (in line with provisions of the Waste Management Law no. 202).

Agriculture

- Better target support to farmers, including economic incentives for investment in climate-smart and nature-based solutions; leverage scalable solutions in support of sustainable agriculture; reconsider input subsidies and rationalise use of fertilisers and pesticides; update the seed policy periodically and raise awareness of climate-resilient varieties.

Water

- Set clear principles for water allocation to ensure sustainable use of available water resources and encourage water is allocated to higher value uses; reform agricultural water allocation and pursue efforts to modernise irrigation systems in old lands; implement effective cost-recovery mechanisms for WSS, combined with targeted measures for vulnerable groups.
- Make information on water quality more easily available to water users; reduce point source effluent emissions from local communities and industry through enhanced compliance monitoring and enforcement; pursue efforts to expedite the expansion of WSS in rural areas.

Biodiversity

- Expand coverage of terrestrial and marine protected areas to reflect the more ambitious targets agreed upon in the Kunming-Montreal Global Biodiversity Framework under the UN Convention on Biological Diversity; follow through with plans to protect the Red Sea's coral reefs and surrounding coastal ecosystem, and monitor and assess the impact of protection measures; set up a standardised national monitoring system to improve efficacy of protected areas through better management practices.
- Enhance contribution of tourism to biodiversity management and related conservation measures (e.g. tourism tax, increased entry fees for protected areas for foreigners); enforce existing laws and regulations to minimise the negative impacts of tourism on biodiversity; monitor the impact of recreational activities on fragile ecosystems, especially in coastal areas.

2. Towards green growth

Strengthening environmental governance and management

Green growth and sustainable development are high on Egypt's political agenda

Advancing towards a green economy has received significant traction as part of Egypt's commitment to achieving the Sustainable Development Goals (SDGs). In 2016, the country launched its first national Sustainable Development Strategy: Egypt's Vision 2030, which aligns national priorities with the SDGs. Several other initiatives – such as the 2016 national strategy for a green economy, sovereign green bonds, the Nexus of Water and the Food and Energy Platform – aim to advance Egypt's green transition as a driver of investments, innovation and, in turn, new economic opportunities. Under Egypt's green financing framework, half of public investment should be green by 2025.

To monitor progress towards implementing the SDGs, the government prepared three voluntary national reviews in 2016, 2018 and 2021, as well as localised assessment reports at governorate level. It has started mainstreaming the SDGs into sectoral action plans. The government has also established a dedicated national monitoring and evaluation system and set up a centralised co-ordination body under the auspices of the Prime Minister's Office. SDG focal points ensure co-ordination at sectoral level and within the 27 governorates at subnational level.

Enforcement and co-ordination of environmental policy remain challenging

Egypt has a long-standing environmental policy and comprehensive legal framework addressing various aspects of environmental protection and natural resource management. The right to a "sound healthy environment" is enshrined in Egypt's Constitution of 2014. The Constitution also sets for each citizen the "right to healthy and sufficient food and clean water" (Article 45). Article 46 stipulates that "the State shall take necessary measures to protect and ensure not to harm the environment, ensure a rational use of natural resources so as to achieve sustainable development; and guarantee the right of future generations thereto". Specific provisions are set to guarantee every citizen "The right to enjoy the River Nile" (Article 44). The country will need to further strengthen capacity to enforce provisions of the environmental law and its executive regulations.

Egypt's highly centralised governance system extends to environmental policy. The country has made progress in adapting a whole-of-government approach to environmental management and sustainable development. To date, environmental considerations are increasingly integrated into many sectoral policies and implemented by different government bodies (e.g. Ministry of International Co-operation, Ministry of Trade and Industry, Ministry of Tourism, Ministry of Agriculture and Land Reclamation, Ministry of Water Resources and Irrigation). This, however, creates growing co-ordination challenges. The institutional framework needs to be further strengthened; policy coherence needs to be improved by better aligning environmental and sectoral policies.

Environmental impact assessment could be further improved

Although EIA was introduced 30 years ago, its effectiveness is constrained by weak technical and financial capacity, limited consideration of cumulative effects or alternatives, insufficient enforcement and lack of public participation. Environmental expertise needs to be further built through training and capacity building at all levels (e.g. structures and roles, research, staff and facilities, skills, tools). The Environmental Law no. 4 of 1994 makes a full EIA mandatory for high-risk projects as identified during a screening process. The administrative process for EIA approval has been streamlined, which considerably shortened review periods.

Strategic environmental assessment (SEA) could help Egypt better address cumulative environmental impacts and connect major projects to high-level decision making (Hossam and Hegazy, 2015[45]). However, Egypt does not have any legal provisions for SEA and has rather limited experience in this area (MER, 2019[46]). In 2019, the government used SEA as a tool to improve tourism planning and development in relation to biodiversity conservation in the Red Sea area. It is equally important to monitor estimated environmental impacts and compare them with actual outcomes over time with a view to adjusting mitigation measures.

Public participation in the EIA review process needs to be enhanced. Public hearings are only mandatory for projects with highly adverse environmental impacts (MER, 2019[46]), and should be expanded to other relevant categories. In 2024, EEAA has started publishing online executive summaries of EIA reports for highly polluting projects opening up opportunities for citizens to provide comments (EEAA, 2024[47]). These efforts to increase transparency go in the right direction and should be pursued.

Speedier permitting procedures should not undermine the quality of the review process

In 2022, the government added new measures to accelerate the issuance of licences for industrial facilities. It transferred responsibility for issuing new licences from relevant administrative units at governorate level to the Industrial Development Authority (IDA). EEAA remains responsible for issuing an environmental opinion and related environmental permits, which are mandatory within the licensing procedure. The review process was shortened to 20 business days for licences that require prior approvals (15% of total industrial activities). It dropped to seven business days for licences obtained through the notification system (85%), which is applied to industries with limited hazards to the environment. The new measures contributed greatly to accelerating the start-up phase of new businesses.[6]

As elsewhere, much shorter timeframes risk undermining the quality of the environmental permitting process, especially for high-risk industrial facilities. Administrative capacity and technical expertise of the permitting authorities need to be enhanced. This requires training and upskilling of staff to improve understanding of new technologies and their sustainability impact, among other priorities.

The government introduced measures to legalise unlicensed factories and facilities, also called informal economic projects. Law no. 19 of 2023 mandates IDA to grant one-year provisional operation permits to unlicensed factories. The move intends to legalise unlicensed factories to better control their environmental impacts. This example shows the need to enhance regulatory enforcement through regular inspections before infringements occur. Regularisation measures need to remain exceptional and be combined with tighter controls to enforce accountability.

Non-compliance calls for proactive inspections and stronger enforcement

The EEAA plays a key role in environmental monitoring and enforcement. The agency has a central department for environmental inspections and compliance and 17 regional branches for inspections across the territory. Regular performance assessment would help judge the effectiveness of compliance assurance activities and ultimately improve environmental outcomes. An annual assessment, for example, could report inspection outcomes, including the number of inspections, compliance rates, pollution incidents, measures of recidivism and duration. In case of violations, the environmental law forces the polluters to remedy violations and submit a time-bound environmental compliance action plan. In addition, the polluter remains legally liable for its action.

Non-compliance with environmental legislation (e.g. open burning of waste, illegal wastewater discharges in the Delta) calls for proactive inspections and stronger enforcement mechanisms. The government set up an integrated digital platform that allows citizens to submit complaints electronically. Citizens submitted more than 2 700 complaints by the end of 2023, including close to 800 environmental complaints

(Government of Egypt, 2023[48]). Further digitalisation will play a key role in enhancing the compliance monitoring and enforcement system and could also help improve transparency.

Public participation in environmental decision making needs to be enhanced

Civil society played a key advocacy role in the foundation of the Egyptian environmental policy and legal framework in the early 1980s at a time when environmental concepts were largely unknown by most people in Egypt. However, civil society organisations (CSOs) play an active role in the implementation of many local projects. Local action is supported by the Small Grants Programme of the Global Environment Facility (GEF), which provides financial and technical support to civil society and community-based organisations. The MoE played a role in defending the level of this contribution to support local action.

The government has implemented several awareness-raising campaigns. These include “Live Green” to encourage environmentally friendly behaviour, ECO Egypt to promote sustainable tourism, e-Tadweer to encourage the recycling of electronic waste or the “Return Nature to its Natural State” initiative to raise public awareness of climate change and its consequences. The government has also updated its school curriculum and prepared comprehensive educational packages for teachers in various environmental areas. These efforts can help fill the gap of environmental expertise and create a new generation of Egyptian environmental and climate experts, reducing reliance on international consultants.

Although Egypt’s Constitution guarantees civic associations the “right to practise their activities freely” (Article 75), NGOs face many obstacles, notably lack of funding and administrative hurdles. The NGO Law of 2019 shortened the review period for external funding to 60 days and abolished sanctions of incarceration. A central unit has been established within the Ministry of Solidarity to monitor NGO matters.

Environmental information and data have improved, but significant gaps remain

The monitoring capacity for air, water and soil has expanded but still requires efforts to align with international standards. Nearly half of SDG indicators are available, making Egypt one of Africa’s top performers in terms of SDG data provision. The MoE has published annual reports of the state of the environment since 2004. The Annual Bulletin on Environmental Statistics, produced by CAPMAS, includes useful environmental data and information. However, more work is needed to expand the scope of data and indicators to better support policy analysis and evaluation. It would be equally important to implement the System of Environmental-Economic Accounting. This would provide a robust basis to inform Egypt’s plans to greening its national accounts.

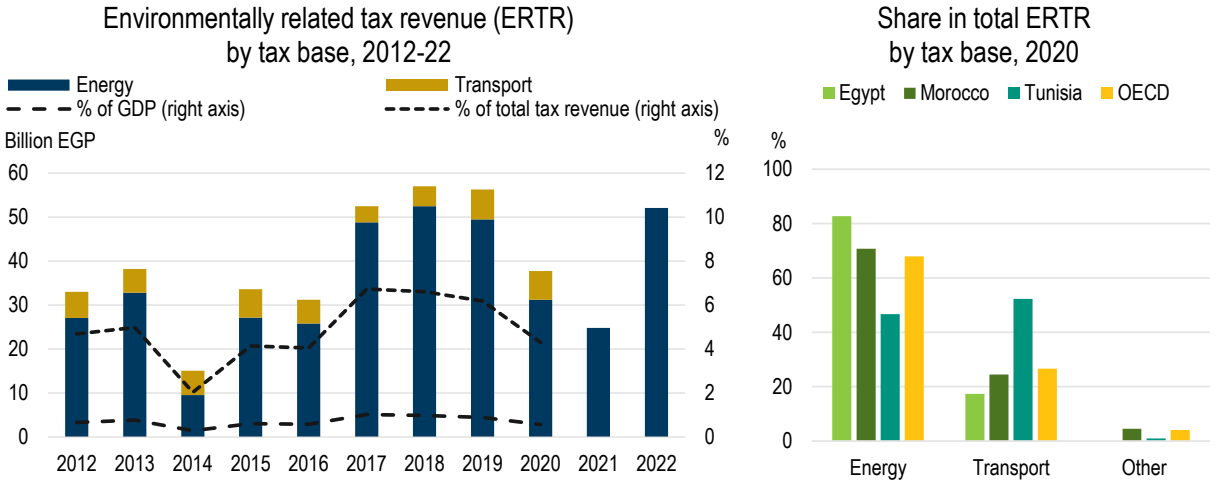
Environmental data and information remain scattered across various ministries. It is critical to improve data sharing between national entities, as well as between Egypt and development partners. This will require substantial upscaling of human, financial and technical resources for data management. Moreover, data and key documents such as sectoral strategies, action plans and policies should be systematically published on line.

Greening the system of taxes and charges

Egypt should prioritise a comprehensive green fiscal reform

Considering Egypt’s overall low tax base, the role of environmentally related taxation in public revenues is limited, representing 0.6% of gross domestic product (GDP) in 2020 (Figure 4). As in many countries, the bulk of environmentally related tax revenue comes from energy products (83% in 2020), mainly excises on petroleum products used for transport. The remainder stems from vehicle-related taxes. Egypt has neither implemented taxes on pollution and resources nor an explicit carbon tax to directly address GHG emissions.

Figure 4. Environmentally related tax revenue has increased, but its share in GDP remains low



Note: Billion EGP (2021, real prices). For 2021 and 2022, information on transport-related tax revenue was not available as of April 2024; data points for energy-related tax revenue stem from Egypt's Ministry of Finance.
Source: OECD (2022), "Environmental policy: Environmentally related tax revenue", OECD Environmental Statistics (database), https://doi.org/10.1787/df563d69-en; Egyptian Ministry of Finance.

StatLink https://stat.link/lvgric

The absence of explicit carbon pricing means that fuel excise taxes are the sole mechanism, providing a direct price signal to encourage reducing fuel use and, in turn, emissions. The resulting Effective Carbon Rate amounts to 46 EGP/tCO_2e, covering half of combustion-related GHG emissions, well below a conservative benchmark for a net zero-aligned carbon price of 60 EUR/CO_2 (OECD, 2023[49]). Emissions that were priced mainly originated from the road transport sector, yet low rates have stalled progress in limiting the increase in CO_2 emissions from road transport. Emissions from electricity production and industry sectors remain largely unpriced. Other GHG emissions (e.g. CH_4, N_2O, F-gases) are not priced either.

Egypt's current fuel taxation system offers an opportunity for better alignment with climate objectives by connecting tax rates to the carbon content of the fuels. Such an approach would increase taxes on higher carbon-emitting fuels (e.g. diesel) to discourage their use, thereby applying the polluter pays principle.

Egypt has made substantial improvements in its tax policy in recent years, including far-reaching reforms of its value-added tax (VAT) and energy subsidy schemes. The government can build on these experiences to further develop its framework of environmental taxation. In addition, broadening the tax base could create new revenue streams that, in turn, could be used to unlock and accelerate green growth. For instance, Egypt could consider expanding its VAT system to cover relevant energy carriers such as petroleum products, natural gas or electricity.

Egypt has also considerable scope for expanding taxes on resources and pollution (Figure 4). Undesired distributional outcomes from increase in the cost of fuels could be offset through expansion of targeted support for vulnerable groups (e.g. increased coverage and effectiveness of the Takaful and Karama Cash Transfer programmes) (World Bank, 2023[50]). This can help support green fiscal reform and ensure its public acceptability while contributing towards the provision of reliable and affordable energy.

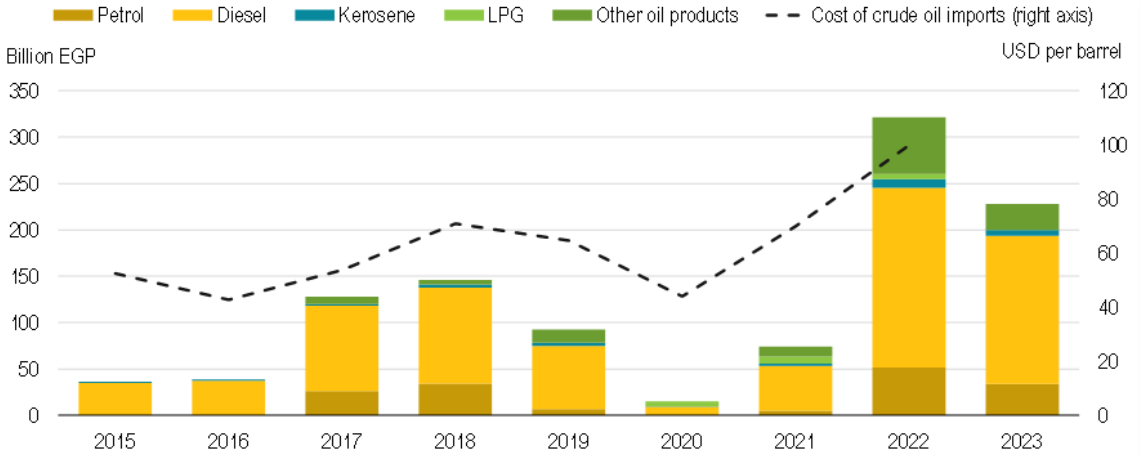
Efforts to reduce energy consumption subsidies need to be pursued

In MENA countries, energy support for fossil fuel consumption and production, especially for households, has been common practice for decades. This support has been offered primarily by providing businesses and households with energy products below market value. The approach has been integral to industrialisation strategies and to social policies that aim to make basic energy accessible to all and shield domestic consumers from fluctuating energy prices.

Subsidies emanating from underpricing of fossil fuels encourage excessive demand for such fuels, as well as electricity. They are also untargeted and disproportionally benefit wealthier individuals and impose significant fiscal pressures. Spending on energy support regularly exceeded revenues from energy taxes and represented a significant share of GDP. Therefore, this is not a cost-effective tool to alleviate poverty.

Fiscal costs related to these subsidies led Egypt to undertake a wide-ranging reform of its support system in 2014, which significantly reduced public spending on energy subsidies in the following years. In 2019, the government introduced a fuel price adjustment mechanism. Petroleum product prices undergo quarterly adjustments based on a pre-set and communicated formula, which incorporates the impact of international oil prices and exchange rates, ensuring transparency and predictability for consumers and businesses alike. To mitigate abrupt fluctuations, a smoothing mechanism is implemented, capping the magnitude of quarterly adjustments at 10%. This approach aims to strike a balance between reflecting changes in global market conditions and providing stability in local fuel prices.

Figure 5. Egypt's petroleum subsidy expenditure fluctuates with global oil prices



Note: Billion EGP (2021, constant prices); LPG: liquified petroleum gas; cost of crude oil imports is calculated as the unweighted average of average annual cost of total crude imports across 26 exporting countries.
Source: IMF (2023), IMF Fossil Fuel Subsidies Data: 2023 Update; IEA (2024), "Crude oil import costs and index", IEA Energy Prices and Taxes Statistics (database), https://doi.org/10.1787/eneprice-data-en.

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Despite these efforts, Egypt's petroleum subsidy expenditure fluctuates with global energy price. Subsidies decreased substantially in 2020 as a result of lower international oil prices and a lower consumption level to 0.3% of GDP. However, they surged again driven by a strong increase in petroleum prices on international markets and a rebound in domestic oil consumption, reaching 5.7% of GDP in 2022 (Figure 5). Diesel consistently accounts for the largest share in petroleum subsidies (70% in 2023).

Egypt needs to implement cost-reflective energy pricing

Egypt's increasing electricity demand underscores the urgent need for fully cost-reflective energy pricing. Between 2014 and 2019, Egypt comprehensively reformed the power sector to restructure electricity price-setting mechanisms and responsibilities. This enhanced the role of the country's independent power sector regulator, which recommends tariffs based on a newly developed "Cost of Service" methodology. However, the regulator's recommendations are not binding. Despite these efforts at restructuring the pricing system and increases in electricity prices, Egypt did not meet its target of full cost recovery by 2023.[7] Adopting a more cost-reflective pricing model would promote more efficient use of electricity, addressing wasteful consumption, as well as reducing the fiscal costs for the government.

In 2019, Egypt established a ministerial committee to review gas prices for different industrial activities every six months. It suggests price adjustments to Cabinet based on global price changes and economic and social variables. In early 2024, applicable gas prices for the industrial sector had not been updated for at least a year (Gas Regulatory Authority, 2024[51]).

Shifting to an energy pricing system that accurately reflects costs of electricity and natural gas production and supply is crucial for Egypt's environmental performance, energy security and long-term economic growth. In light of recent spikes in electricity demand, transitioning towards full cost recovery becomes ever more pressing.[8] Ensuring a reliable and affordable energy supply for all citizens should remain a priority. Therefore, Egypt could consider options to expand and increase the efficiency of social protection measures for vulnerable consumers.

Egypt is advancing a voluntary carbon market

Egypt's involvement in voluntary carbon markets, demonstrated by the establishment of a carbon trading platform within the Egyptian Stock Exchange, represents a positive step towards engaging the private business sector in climate action. This initiative aims to facilitate the trading of carbon emissions reduction certificates, encouraging Egyptian companies to invest in GHG mitigation projects. The potential of Egypt's voluntary carbon credit market is highlighted by its active promotion of GHG mitigation projects and establishment of the EgyCOP investment fund in 2022. Egypt is fostering a domestic market for carbon offsets. The Egyptian Financial Regulatory Authority has issued carbon credit verification and certification standards for issuing voluntary carbon certificates. Ensuring the environmental integrity and high-quality of offsets in voluntary carbon markets more generally remains a great challenge and can undermine the viability of such an approach for reducing emissions.

Vehicle taxation should be better aligned with the polluter pays principle

Egypt has significant scope for expanding vehicle-related taxation for environmental purposes. In the fiscal year 2019/20, revenue generated from vehicle-related taxes and fees, excluding VAT, import tariffs and schedule tax, reached about USD 367 million. This represents approximately 0.75% of Egypt's total tax revenues, less than levels observed in Morocco or Tunisia (Figure 4). Vehicle taxation in Egypt is complex, encompassing various taxes and fees on different types of vehicles throughout their lifecycle (from import to annual use). These taxes primarily aim to raise government revenue, but they can also encourage adoption of environmentally friendly vehicles. Beyond import taxes, vehicles face schedule taxes, which are specific rates based on vehicle type, age and engine capacity.[9]

As in many countries, transport-related and fuel taxes do not fully account for the societal costs associated with environmental harm due to road usage, GHG emissions, air pollution, traffic congestion, and road wear and tear. Therefore, Egypt's transport-related taxes would benefit from a thorough review and adjustment to better consider externalities linked to road use and pollution. For example, Egypt could consider introducing a climate component in vehicle taxation. Through a feebate system, vehicles with high CO_2 emissions or poor fuel efficiency (low fuel economy) pay a fee. Meanwhile, those with low CO_2

emissions or better fuel efficiency (high fuel economy) receive a rebate. Such a system can be revenue-neutral to avoid adding a burden to public finances.

Egypt could also further increase the use of road pricing to make drivers pay more directly according to use and environmental damage. Road tolls are relatively well developed, but no congestion pricing is in place. Some urban tolls have been introduced, mainly in new cities. As the central government in Egypt collects nearly all taxes, this leaves little opportunity for local authorities to collect transport-related taxes and charges at subnational levels.

Promoting green investment

Egypt has an ambitious green financing framework and climate investment plan

The government is committed to creating an investment-friendly climate to support a green transition.[10] Egypt has become the first MENA country to issue a sovereign green bond in 2020 with a value of USD 750 million in 2021 (Government of Egypt, 2021[52]).[11] Under its green financing framework, the government defined sustainability criteria to prioritise green investment. It aims to allocate 50% of public investments to green projects in the fiscal year 2024/25 and to achieve 100% by 2030 (Government of Egypt, 2023[53]). Efforts could be further supported by setting climate-specific objectives for state-owned enterprises to ensure that public assets and investments comply with climate change requirements, including disaster and risk assessments. Corporate social responsibility reports should be enhanced.

Egypt's Climate Investment Plan outlines priorities for low emissions and climate-resilient development (GCF, 2022[54]). The government also established the Renewable Energy Financing Framework to unlock Egypt's renewable energy potential (GCF, 2017[55]). Between 2015 and 2022, Egypt attracted over USD 40 billion in international finance for renewable energy ranking among the top ten development economies. This makes it the second most popular host country for renewable energy projects on the African continent, after South Africa (UNCTAD, 2023[56]).

Green investment could be better prioritised when providing corporate income tax incentives

Corporate income tax (CIT) incentives aim to reduce business investment costs and shape investment choices, including for the innovation and adoption of green technologies. However, they may lead to significant forgone tax revenues and economic distortions. This may generate limited investment and be largely redundant (subsidising investments that would have taken place without support), especially if poorly designed.

In 2018, Egypt introduced a Special Incentive, which allows deductions of 30% or 50% of investment costs. The Special Incentive targets expenditures rather than income, which is a positive feature. Expenditure-based incentives reduce investment costs more directly and are thus considered more effective at incentivising investment than income-based incentives. Renewable energy and green manufacturing sectors, including machinery producers, can use the Special Incentive. In March 2022, the Special Incentive was expanded to include projects of strategic interest, namely green hydrogen and green ammonia, waste management, e-mobility and alternatives to single use plastic.

The Special Incentive is also available for non-green projects, so it may not specifically encourage green investment. Providing incentives to both green and non-green segments in the same market may weaken the preference for green investments.

Egypt should define criteria for Special Incentive approval more precisely. Currently, a committee decides on a case-by-case basis, involving discretion. A rules-based system, potentially using a points-based evaluation may enhance transparency, despite added administrative costs. Focusing CIT incentives on

green and energy-efficient technologies could better align investment decisions with Egypt's climate goals and limit revenue forgone. This would also increase the competitiveness of energy efficiency initiatives.

Renewable hydrogen offers new opportunities

Egypt aims to become one of the largest exporters of low-carbon hydrogen. Its National Strategy for Low Carbon Hydrogen, approved by the Supreme Energy Council in February 2024, aims to reach a tradable share of 5-8% in the global hydrogen market, a reduction of 40 million tonnes of CO_2-eq. emissions per year and an estimated GDP increase of USD 10-18 billion by 2040. At the same, it seeks to create more than 100 000 jobs along the supply chain (Ahmed, 2023[57]). Egypt will need to strike the right balance between low-carbon hydrogen exports and domestic demand to advance local decarbonisation priorities.

Egypt has attractive regulations for investing in low-carbon hydrogen production.[12] The National Council for Green Hydrogen and its Derivatives aims at fostering a competitive, investment-friendly business climate (Government of Egypt, 2023[58]). By mid-2023, Egypt had signed 8 framework agreements and nearly 30 memoranda of understanding for a project pipeline estimated at USD 83 billion (Parkes, 2023[59]). As elsewhere, most planned projects have not yet reached final investment decision.

While Egypt has a competitive advantage in producing and transporting low-carbon hydrogen, scaling up production faces several challenges related to affordable financing, technological expertise, infrastructure development and stable policy. To gain investor confidence, Egypt will need to define a transparent certification process for low-carbon hydrogen[13] and its derivatives. Securing demand is among the most critical factors to support the early stage of low-carbon development projects. Therefore, a clear signal from major import markets such as the EU, would help unlock private sector investment.

Environmental and safety concerns need to be carefully considered in EIAs. Hydrogen export projects should not place additional strain on already scarce resources such as water, energy and habitable land (Dagnachew et al., 2023[60]). In this regard, seawater electrolysis could be an interesting option. However, this technology is not yet mature and may require more energy-intensive processes (Dargin, 2023[61]). It will also be important to further develop local expertise.

Recommendations on green growth

Improving environmental governance and management

- Pursue efforts to enhance administrative capacity and technical expertise of the permitting authorities; strengthen capacity of EEAA and of competent administrative authorities with executive powers in the EIA process; enhance linkages with environmental enforcement agencies; require meaningful public participation in all EIAs.
- Make the use of SEA mandatorily to integrate environmental considerations into policies, plans and programmes, evaluate the interlinkages with economic and social considerations, and analyse cumulative environmental impacts.
- Increase financial resources to promote compliance focusing on small businesses; introduce annual reports of inspection outcomes (including the number of inspections, compliance rates, pollution incidents, measures of recidivism and duration) and make inspection reports publicly available; accelerate digital transformation and open public access to EIA reports and other compliance-related information.
- Work towards strengthening Egypt's Environmental-Economic Accounting using international standards (System of Environmental Economic Accounting); consolidate public sources of environmental information and data; make access to data more user-friendly; engage citizens more actively in environmental decisions at local levels.

Greening the system of taxes and charges

- Advance the just transition from fossil fuels in energy systems through robust and transparent automatic fuel price adjustment mechanisms for petroleum products and pursue efforts to reach full cost recovery of energy production and supply. In parallel, continue to pursue the expansion, and increase the efficiency, of social protection programmes.
- Ensure the environmental integrity of the voluntary carbon market and assess the pros and cons of introducing a compulsory carbon market.
- Consider the introduction of pollution taxes and charges; conduct a comprehensive reform of the transport-related tax system to make it environmentally and fiscally sustainable; introduce a climate component in vehicle taxation; increase the use of road pricing (e.g. nationwide toll system, urban toll rings; parking fees in urban areas).

Promoting green investment

- Monitor information on the share of green investment in public investment plans to track progress towards national targets; set climate-specific objectives and align investment of state-owned enterprises with Egypt's climate agenda.
- Align corporate income tax incentives with environmental outcomes; prioritise green investment and energy-efficient technologies under the Special Incentive to increase the comparative advantage for clean technologies; clarify approval criteria of the Special Incentive and evaluate its impact on the uptake of clean technologies.
- Enforce mitigation measures for low-carbon hydrogen export projects based on EIAs and make sure that energy and water requirements are met without compromising domestic use; prevent the depletion of natural resources; invest in developing local expertise along the hydrogen supply chain.

3. Building climate-smart, resilient and inclusive cities

Enhancing urban governance

Cities can play a pivotal role in supporting Egypt's green transition but face multiple challenges

Cities are the engines of Egypt's growth and among the largest contributors to the country's GDP, estimated at 75% (UN-Habitat, 2024[62]).[14] They can support Egypt's green transition by stimulating urban economic activity, green innovation, jobs, skills and more inclusive development. About 80% of employment occurs in Egyptian cities (UN-Habitat, 2024[62]). At the same time, cities are also major sources of pollution. They need to contribute more strongly to national climate mitigation efforts. Moreover, the effects of climate change in urban areas are increasingly visible. Egyptian cities are exposed to multiple climate-related hazards, especially heatwaves, flash floods, dust storms and sea level rise for coastal cities (Goyal and Sharma, 2023[63]). It is vital for Egyptian cities to strengthen climate resilience and protect the most vulnerable populations.

In the face of multiple opportunities and challenges, the government has set a new ambition to build climate-smart, resilient and inclusive cities in line with Egypt's Vision 2030. These three dimensions are overlapping and mutually reinforcing. For example, green spaces contribute at the same time to climate mitigation and adaptation efforts while making cities more liveable for citizens.

Egypt's fast-growing population is projected to reach 160 million people in 2050, doubling its population compared to 2010 levels (UN, 2022[64]). Specifically, the Greater Cairo area and Alexandria have been growing at a fast pace. Most of the Egyptian population is concentrated in urban areas on about 10% of the territory, mainly along the Nile Valley and its Delta, and to a lesser degree around the Suez Canal. Given the limited availability of habitable land, some agglomerations are among the world's densest with more than 20 000 inhabitants/km². Greater Cairo hosts with about 23 million inhabitants nearly one-quarter of Egypt's population, making it one of the world's largest metropolitan areas (OECD/European Commission, 2020[65]). Every year, the population increases by at least 1.6 million people (CAPMAS, 2020[66]), placing additional strain on already scarce natural resources, housing and public services.

Current urban policies have been unable to keep pace with population pressures, which has led to uncontrolled urban expansion, environmental degradation and precarious living conditions. Informal and unplanned expansion absorbed most of the demand for affordable housing close to city centres. Meanwhile, many new urban communities (NUCs), built on desert land adjacent to existing cities designed to accommodate the increasing urban population, struggle to attract new residents (Zaazaa, 2022[67]). Addressing Egypt's chronic shortage of affordable housing remains a key challenge. Egyptian cities also face increasing challenges with waste management, air pollution and wastewater discharge.

In 2023, the government adopted a National Urban Policy (NUP), which aims to promote positive transformative change in cities.[15] The NUP could play an important role to better manage urban growth and make cities more competitive and liveable. It proposes a new urban system based on six clusters of cities acknowledging different paces of urbanisation (UN-Habitat, 2024[62]). It will be key to integrate sustainability aspects in all NUP measures and establish sustainability criteria to monitor progress. It is equally important to rapidly develop action plans, accompanied with adequate finance and institutional mechanisms, to ensure effective implementation of the NUP.

Administrative reforms are needed to better consider the rural-urban continuum

According to national statistics, 42.8% of Egyptians lived in urban areas in 2020 (CAPMAS, 2020[66]). Oddly, this has been the same reported share for several decades, although the population has more than doubled since 1990. Egypt uses a purely administrative definition of "urban", which does not relate to the

actual size of the agglomeration's population. The binary categories of urban and rural areas no longer reflect Egypt's urban realities with its dense settlement patterns. As a result, highly urbanised areas are categorised as "rural" while facing many challenges related to increased pressure on infrastructure, environmental degradation and social inequalities.

Data from the internationally harmonised definition of cities show that in 2015, about 66% of Egyptians lived in urban centres and 27% in semi-dense urban areas, accounting for 93% of the population (OECD/European Commission, 2020[65]). The discrepancy with national statistics merits consideration towards an approach that more accurately reflects settlement patterns and the resulting implications for effective urban and socio-economic planning (UN-Habitat, 2012[68]).

Some governorates such as Giza share highly urbanised areas alongside large unpopulated desert areas. Egypt also has many satellite cities near a large city or metropolitan area. They are less dense but connected with the economy of the main city; dwellers usually adopt urban lifestyles and commute to their workplace in the main city. This has major impacts on economic activity of previously rural areas. Considering the rural-urban continuum is paramount for regional development planning to ensure policy coherence and integrated action across the territory (e.g. transport, services, administration).

Drawing on OECD methodology, Egypt could consider defining functional urban areas (FUA) using population density and travel-to-work flows as key information (OECD, 2022[69]) to better understand its urban systems. FUAs comprise a densely inhabited city and its commuting zone whose labour market is highly integrated into the city. This would help Egypt create a harmonised definition of cities and their areas of influence that could better represent the reality of settlement patterns and support policy analysis on topics related to urban development.

The next national population census, scheduled for 2026, is an opportunity for Egypt to reconsider administrative divisions and review the definition of urban areas. This could better reflect the actual size of cities and related infrastructure needs, drawing on an analysis of different urban typologies (e.g. formal versus informal; urban, peri-urban, rural). In so doing, it would ensure that policies and funding address the specific needs of its populations, as well as challenges associated with urban sprawl.

The institutional framework for urban planning remains complex and fragmented

The Prime Minister chairs the Supreme Council for Urban Planning and Development (SCUPD). The General Organisation for Physical Planning (GOPP) under the Ministry of Housing, Utilities and Urban Communities is responsible for regional planning. Concomitantly, the New Urban Communities Authority (NUCA) plans and implements any development of new cities in desert regions. The Urban Development Fund (UDF), a successor of the Informal Settlements Development Fund is in charge of upgrading cities. Several sectoral ministries are involved in urban development, which has top-down processes.

The institutional framework for urban planning and development faces several challenges: a disconnect between national plans; the planning of local infrastructure and associated service delivery, and local development needs; weak horizontal co-ordination between different government entities across all levels; bureaucratic complexities; limited local capacity and insufficient financial resources (Alhowaily, 2021[70]). Stronger co-operation among key stakeholders would contribute to building mutual trust, improving the effectiveness of urban planning. For instance, key stakeholders such as GOPP, NUCA and UDF could review legislative and regulatory tools to identify sustainability gaps and propose amendments for legal frameworks.

The government developed a two-pronged approach to urban development. Urban governance differs depending on whether a city is classified as "new" (since the government started building NUCs in the 1970s). Once well established, NUCs should be integrated under respective governorates as initially planned. This would facilitate coherent regional strategies and enhance the role of local councils. A common framework would also enable better co-ordination among relevant government bodies, streamline

decision-making processes and provide clear guidance for urban planning and development projects. Increased resources would be needed for compliance monitoring and enforcement of laws and regulations. Moreover, institutional gaps need to be filled to improve implementation. Monitoring and evaluation of urban projects and their respective environmental impacts could be improved by better linking institutions in charge of planning such as GOPP with local authorities in charge of implementation at governorate level.

Tailored place-based policies would support sustainable urban development

While national frameworks can drive local action, subnational governments are well positioned to develop tailored place-based policies to tackle the risks and seize the opportunities presented by the green transition (OECD, 2024[71]). Experience in many OECD countries illustrates the importance of a territorial approach to climate action and resilience (OECD, 2023[72]). As the impacts of climate change vary significantly within countries, local actions can complement national and global efforts. Moreover, climate risks are highly context-specific, depending on a combination of hazard, exposure and vulnerability. A heatwave, for example, will have a different impact on people living in an oasis like Al-Kharga compared to densely populated areas within Cairo (OECD, 2023[73]).

Moving to more decentralised, participatory approaches would help Egypt better align urban policies with local development needs. This will require strengthening competences, capacities and financial autonomy of subnational governments. In line with provisions of Egypt's Constitution (Articles 176 and 177), each local administration unit should have an independent budget. As such, it should be entitled to collect its own revenue through subnational taxes and fees, which would also strengthen accountability. Nearly all taxes and fees are collected at the national level, leaving local authorities with close to no financial autonomy (Hemaily et al., 2022[74]). Meanwhile, it is essential to develop ways to better channel funding from development partners and national governments to support subnational governments, including cities, in addressing climate priorities (Matsumoto et al., 2019[75]).

Fragmented investment planning by sectors impedes an integrated development vision at subnational level.[16] The Ministry of Local Development could play a more significant role once empowered local councils participate actively in decision-making processes.[17] The forthcoming Local Administration Law could further strengthen the role of local councils. NUP may also offer opportunities to develop a more flexible financial system that entitles local councils to increase their own financial revenues.

Many citizens already play an active role in the implementation of local climate initiatives. However, public participation and active community engagement in environmental decision making need to be enhanced. This would help create a sense of ownership, enhance social acceptability of policy measures and facilitate effective implementation. Raising environmental awareness, especially among young people, is critical. Engaging with a wide range of stakeholders can help governments identify specific needs and adapt policy responses more effectively (Matsumoto and Ledesma Bohorquez, 2023[76]). The central government and local authorities both need to pursue efforts to create the conditions for empowering citizens and building effective forms of public participation (EEA, 2023[77]).

Environmental considerations need to be systematically mainstreamed in urban development plans and strategies

In line with Egypt's Vision 2030, environmental considerations need to be systematically mainstreamed into all urban development plans and related urban and land-use planning tools. Over the past decade, the MoE and the Ministry of Planning and Economic Development have undertaken several initiatives. "Guidance for Building Sustainable Cities", issued in 2017, offers advice on various aspects of urban planning and development, including land use, infrastructure, energy efficiency, waste management and transportation. However, the guidance remains optional. Another example is the Environmental Sustainability Standards Guide prepared within the Strategic Framework for Green Recovery in 2021. Still,

there continues to be a substantial gap between strategic plans and green measures in local development plans. Information and data on the links between urban development, environmental degradation and climate change impacts remain scattered across various policies and strategies.

SEA could help improve policy coherence by ensuring that environmental considerations are adequately considered in sectoral policies and major urban development projects. This includes, for example, the mandatory use of localised climate risk assessment in urban planning to prevent the construction of new buildings in high-risk flood zones (section below). Stronger co-operation between environmental and urban authorities would help raise environmental awareness and develop expertise in sectoral ministries and at subnational level.

Land governance needs to become simpler and more transparent

Land fragmentation and informal land use remain a challenge. Urban planning tools have been unable to keep pace with the demand for affordable housing, which is mainly satisfied by the informal sector. This situation has led to continued encroachments on agricultural land and unplanned urban expansion beyond city boundaries. According to government estimates, more than 2 million informal buildings were constructed between 2011 and 2020 (Samir, 2020[78]).

Egypt's land management is complex, involving multiple government entities in land allocation. Outdated land surveys, bureaucratic registration methods, the large number of different permits needed and limited accountability of key stakeholders contributed to the expansion of unplanned informal settlements. Egypt needs to simplify land planning and registration and make it more transparent, as well as better enforce laws.

In 2020, the government launched the National Centre for Spatial Data Infrastructure which aims to establish an integrated national planning system to prevent future land encroachments. This could provide an opportunity to integrate climate systematically in land-use planning. In this way, Egypt could strengthen climate-smart spatial development (e.g. green zoning, land-use change for climate risk mitigation). Plans to streamline land allocation, notably through a "one-stop-shop", go in the right direction. Such efforts would help improve transparency in the land allocation process and the overall investment climate for private sector actors (IMF, 2023[79]).

Promoting climate-smart cities

New cities strive towards greener principles, but sustainable development issues remain

Since the 1970s, the government has used expansion policy to reclaim desert land and build new cities to relieve pressure from already saturated urban areas in the Nile Valley and Delta. Within three generations, 23 NUCs have been built; another 23 NUCs – known as the "fourth generation" – are under way. These aim to accommodate about 30 million residents by 2030, further increasing the share of inhabited land to 14.5% (Government of Egypt, 2021[2]).

The fourth generation of cities strives to incorporate green and inclusive principles in urban planning, but implementation varies. Egypt has no official definition of fourth generation cities or smart cities (Waisová, 2022[80]). The labelling of smart cities should include mandatory sustainability requirements and promote social inclusiveness (Waisová, 2022[80]). Smart cities offer new opportunities to establish city-level climate mitigation and adaptation plans and measure progress towards these targets. To date, the carbon footprint of Egyptian cities remains largely unknown (Government of Egypt, 2022[4]).

Nonetheless, fourth generation cities are generally branded as sustainable, environmentally friendly, eco cities. For instance, new cities dedicate larger areas to green spaces and gardens. New Alamein City

would be mainly operated with renewable energy sources. Several pilot projects have been implemented to help cities promote sustainable tourism (e.g. Green Sharm el Sheikh, Green Hurghada).

At the same time, new cities struggle to attract dwellers and remain largely below target population, partly due to commuting distance. In 2017, less than 2 million people lived in new cities, far below the targeted 3.6 million inhabitants for 2006 (Shawkat, 2013[81]). The high vacancy rate is a concern and should lead the government to draw lessons from the first three generations of NUCs. New cities may not match demand for affordable housing and may unnecessarily increase environmental costs related to the construction of unoccupied buildings. An assessment of the viability of new cities, their attractiveness and respective environmental footprint is essential to guide future policy making (UN-Habitat, 2012[68]).

Despite stated green and inclusive principles, new cities continue to be constructed in an expansive manner without adequately addressing issues related to urban density and mobility. This contributes to structural problems. New cities are characterised by wide lanes, expressways and a lack of dedicated pedestrian and bicycle paths or safe crossings. Affordable housing is not located near employment opportunities, and public transport provisions within these cities are insufficient, exacerbating a reliance on cars. Prioritising compact, transit-oriented development, including a network of safe walking and cycling routes, will help create green and inclusive cities. While efforts are being made to develop inter-city connections and public spaces, many challenges remain to ensure that a broader range of citizens can benefit from sustainable urban development.

The building code requires important updates

The building sector is a major GHG emitter given the high carbon footprint of construction material and energy consumption of buildings. Egypt's building code provides detailed provisions for many sectors. However, the code is not enforced in many cases. Moreover, the building stock has limited focus on green building (Goyal and Sharma, 2023[63]). An update of the code is urgently needed to reflect new standards that support climate and environmental goals. The Housing and Building National Research Centre develops and issues technical codes, including the building code.[18] More research into green construction materials could help reduce the material costs of green buildings. Given the high up-front costs of green building design, economic incentives to encourage its application are essential.

The government has many opportunities to integrate tighter building standards and green building practices into its building code. This could include the definition of national standards for low-carbon construction material, minimum energy efficiency standards for all new buildings, provisions for use of renewable energy sources and minimum requirements for green public spaces in residential areas. Energy efficiency labels and green building certificates could further incentivise green practices in the building sector. The Green Pyramid Rating System (GPRS), a national environmental rating system for buildings, has potential to become a nationwide standard. More cost-reflective electricity pricing (Section 2) would also provide more incentives for developers and house owners to invest in energy-efficient buildings.

The government also has much scope to focus on greening its own public buildings and social housing programmes through mandatory application of building certificates and energy efficiency standards and enhanced green public procurement. In 2022, Egypt's National Social Housing Programme adopted green building practices in social housing units for the first time (World Bank, 2022[82]). Some 7 000 GPRS-certified units have been completed during the pilot phase; another 25 000 units are forthcoming. Guidelines for retrofitting building stock could be tailored to different urban typologies (formal, informal, rural). For instance, buildings in the informal sector that apply these guidelines could benefit from a reduced reconciliation fee.

More energy efficient cooling policies are warranted

As in other countries, Egypt's demand for space cooling will continue to grow in the coming years. It will generate peak electricity demand during summer, putting enormous strain on electricity systems, particularly in densely populated cities (IEA, 2023[83]). Cairo already consumes about half of its electricity demand for air conditioning compared to 20% at the global level (UNEP, 2022[84]). In many areas, diesel-powered generators fill energy supply gaps with detrimental effects on human health and the environment. Therefore, in the short term, implementing policies to improve equipment efficiency is paramount to curb the ever-growing energy demand for cooling.

Improving energy efficiency in existing buildings will require considerable support for retrofitting. Low-income households cannot afford major investments and are more vulnerable to heatwaves. About three-quarters of existing households are not equipped with air conditioning (Cool Up, 2022[85]). Egypt would benefit from developing national cooling action plans, including support to help vulnerable groups cope with extreme weather conditions.

Egypt has an opportunity to develop a holistic approach to cooling policy for NUCs through a combination of regulations, information and incentives. Passive design strategies, including proper insulation, and nature-based solutions (e.g. green roofs and façades), could provide climate-friendly alternatives to air conditioning (e.g. district cooling systems), while reducing energy consumption and GHG emissions and strengthening climate resilience. For example, a feasibility study for development of a seawater air-conditioning system has been developed for New Alamein City (UNEP, 2022[84]).

Strengthening climate resilience

Building climate resilience requires a better understanding of localised climate risks

Many governorates and cities do not have a solid understanding of the adverse impacts of climate change in their respective areas. They are unable to protect their citizens from climate-related hazards. In line with recommendations made in the National Climate Change Strategy 2050, governorates should develop their own subnational climate change strategies to identify localised climate risks and adequately address them in local and regional planning processes (Government of Egypt, 2022[4]). Giza, with the support of MoE and development partners, has been the first governorate to formulate a framework for such a strategy in 2018; however, implementation has been lagging.

The government is finalising an interactive map of climate change risks by 2100. It would be helpful to share this mapping tool with cities and governorates to inform climate-sensitive local planning and implementation. This represents an opportunity to develop strategic foresight in support of future policy making. The central government will need to downscale climate risk assessments at subnational level and develop appropriate city-level early warning systems (e.g. floods, heatwaves). This also requires support for capacity building at subnational level.

Egypt needs to consider climate risk assessments systematically when developing new cities to ensure integrated and risk-informed planning. According to different sea level rise scenarios, New Mansoura is built in a high-risk area. Similarly, the Al-Alamein Towers, a series of 170-m skyscrapers, will be constructed just 300 m from the shoreline. GOPP co-operation with the United Nations Development Programme (UNDP) on developing sustainable spatial planning, resulting in guidelines for SEAs in urban plans, is a step in the right direction.

Nature-based solutions should be scaled up

Many efforts to protect coastal cities against flooding focus on building grey coastal defence infrastructure to halt coastline erosion and protect coastal cities from storms. For instance, about 2.5 km of Alexandria's shoreline has been transformed into a vast concrete landscape (Bonnefoi, 2022[86]). Submerged

breakwaters were installed offshore in the east of Alexandria to limit the height of waves before they reach the shore. These measures have so far been relatively effective in protecting the densely populated coastal areas from marine submersion, while raising awareness about the impacts of climate change. In the long term, however, hard infrastructure may not be enough to protect built-up areas against the consequences of sea level rise. The ongoing construction boom in coastal areas further increases built-up area and the value of assets exposed to climate change, while reducing natural protection offered by vegetation.

Green buffers such as dunes could provide natural barriers against erosion and sea level rise (Bonnefoi, 2022[86]). Within a multi-year project funded by the Green Climate Fund, Egypt upscaled nature-based coastal protection solutions in the Nile Delta using a dyke system in the five most vulnerable hotspots (GCF, 2022[87]). These efforts need to be sustained. In addition, the project supports the development of an Integrated Coastal Zone Management (ICZM) plan for the whole North Coast. A stronger use of nature-based solutions can enhance Egypt's systemic resilience to extreme weather events and address water scarcity, while yielding well-being and environmental co-benefits (OECD, 2020[88]).

Cities have much scope to increase their green spaces

Green spaces in cities play a vital role by providing shade, absorbing water and cooling the local environment, thereby reducing the urban heat island effect. They also contribute to improving air quality and urban biodiversity, making cities more liveable. Little green space is available in Egypt. Greater Cairo lost 900 000 m^2 of greenery between 2017 and 2020 (UDF, 2023[89]). While the WHO recommends that all people reside within 300 m of green space, this is the case for only 8% of citizens in Alexandria (Anderson, Patiño Quinchía and Prieto Curiel, 2022[90]).

Egypt's 2030 Vision sets a target of creating 3 m^2 of greenery per person, compared to 0.74 m^2 per person in Cairo in 2020 (Dimitrijevic, 2022[91]). Its second updated NDC foresees to "increase green spaces and sustainable parks in new cities that are irrigated with treated wastewater to act as carbon sinks" (Government of Egypt, 2023[8]). It intends to increase the per capita share of public green areas in existing cities. All Egyptian cities would benefit from setting their own green cover targets and measuring progress.

As in other countries, green space is less available in lower-income neighbourhoods. Moreover, some newly created parks and walkways have entry fees, limiting access to citizens who can afford to pay. Providing more equitable access, including minimum proximity standards for accessibility to social housing would be important for inclusion. Improving data on green spaces could be a starting point towards more integrated planning and management of green spaces (Dimitrijevic, 2022[91]).

Prioritising policies for inclusive cities

Upgrading existing urban areas is important for achieving spatial justice

Despite the size of the informal building stock and significant surface area, few efforts have been directed towards establishing mitigation and adaptation plans for existing urban areas, where the majority of Egyptians live. Development partners implemented some adaptation projects, which rarely moved beyond the pilot phase. Achieving spatial justice will require a fair share of public resources between different income groups across space. Some precarious areas still lack basic services and require urgent infrastructure upgrades. While UDF has implemented many successful projects to upgrade existing buildings, its finances remain insufficient. As an agency, it now has opportunities to develop its own financial resources. For instance, UDF could start building a pipeline of feasible urban upgrading projects, including adaptation measures, with a view to attracting climate and development finance.

Some progress has been made in tackling informal settlements

The past decades have witnessed a significant transformation in the shape and character of Egyptian cities, driven primarily by the growth of informal settlements. According to different estimates, between 40-60% of Egypt's housing stock is informal. This means that more than 3 million housing units were constructed without permits (UN-Habitat, 2016[92]).

Over the past decade, Egypt has made major strides in addressing unsafe areas. According to government estimates, the share of people living in unsafe areas was halved from 10.6% in 2015 to 5.2% in 2019 (Government of Egypt, 2021[2]). The government declared Egypt to be free of unsafe areas in 2022. By the end of 2023, it completed nearly 1 million social housing units within its large-scale programme on "Housing Units for all Egyptians" (Government of Egypt, 2023[93]).

However, actions to address unsafe areas were accompanied by colossal demolitions of urban housing and displacement of residents for investment or infrastructure projects. In some cases, upgrading slums rather than destroying them could provide an alternative. This approach would reduce significant environmental impacts related to construction and demolition waste. At the same time, it would prevent isolation of displaced populations in informal areas (Alternative Policy Solutions, 2023[94]). Given the long commutes, many households chose cash compensation and settled in other informal areas rather than accept a unit in public housing projects.

Efforts have been made to prevent new unplanned settlements and encroachment on agricultural land, including a six-month suspension of construction within the governorates of Cairo, Giza and Alexandria. The Reconciliation Law for Construction Violations of 2019 was an important step to legalise the informal housing stock under certain conditions. However, high reconciliation fees and technical requirements undermined implementation. In 2023, the government adopted a new law that intends to make it easier for citizens to settle construction violations with state authorities.

Public transport and shared mobility can help tackle congestion and need to become more gender equitable

Congestion has major economic, environmental and social costs. Widening roads has proven to be inefficient as the newly created space has been quickly filled with an ever-growing number of vehicles. Therefore, promoting modal shift from private cars to sustainable integrated public transport needs to become a priority.

The government implements many flagship projects to support mass transit (e.g. expansion of Cairo Metro, NAC-Cairo monorail project, Alexandria tram development). Several projects are also ramping up use of electric buses in the Greater Cairo area and other major cities. In the context of COP27, government entities worked together to set up a fully electrified bus transit network composed of 140 electric buses in Sharm El Sheikh within half a year (Hegazy, 12 March 2023[95]). This example illustrates that speedy implementation is possible, underlining the importance of strong political commitment and early stakeholder participation.

The use of public transport is undermined by a lack of security particularly for women. Surveys have reported that some women feel unsafe on public transportation. (UN Habitat, 2021[96]; World Bank, 2021[97]). The government has already taken many specific measures to promote gender-equitable transport. For instance, the National Council of Women, with the support of AFD, supported the development of gender-focused action plans in major urban transport projects such as the renovation of the Alexandria Tram and Cairo Metro Line 1. Every new transportation project, plan or policy should be screened to check if it incorporates a gender-inclusive perspective. Systematic collection of relevant gender-sensitive data could help analyse the impact of measures. Similarly, geolocalised data on modal share would be a starting point to better understand mobility patterns and related transportation needs.

Efforts to formalise the waste sector go in the right direction

Waste management operations continue to rely heavily on the informal sector, relying on more than 100 000 poor, mostly young workers as the backbone of the industry (UNDP, 2021[98]). New efforts to formalise the sector are under way. Through training, for example, rubbish collectors and recycling workers are able to integrate into formal waste management companies. This move recognises their profession on Egyptian identity cards, providing them with social protection coverage. The government plans to connect household waste collection fees to the well-established electricity billing system. These efforts to integrate informal workers and enhance public waste management services have much potential for improving waste management services overall.

Recommendations on building climate-smart, resilient and inclusive cities

Enhancing urban governance

- Reconsider Egypt's administrative divisions to better reflect the actual size of cities and related infrastructure needs; analyse urban typologies and define functional urban areas to ensure that policies and funding address specific needs of populations.
- Clearly define roles and responsibilities of the central government, its specialised agencies and local administrative units under a unifying framework for sustainable urban development policies; enhance co-operation between stakeholders such as GOPP, NUCA and UDF to identify sustainability gaps; monitor the environmental impacts of urban projects and increase resources for compliance monitoring and enforcement.
- Develop tailor-placed policies and promote participatory approaches to better align urban policies with local development needs; strengthen competences, capacities and financial autonomy of subnational governments; consider integrating NUCs under respective governorates to facilitate coherent regional strategies; enhance the role of local councils and citizen engagement.
- Mainstream environmental considerations in local development plans; introduce strategic environmental assessment for major urban development projects; strengthen the role of SCUPD as green energy hub; promote stronger co-operation between environmental and urban authorities and the National Council for Climate Change.
- Simplify the current land-use planning and registration system; pursue development of an integrated information system to streamline the land allocation process and improve transparency.

Promoting climate-smart cities

- Define smart cities as climate-smart cities based on common sustainability standards and develop and implement city-level climate mitigation and adaptation plans for all NUCs; assess the viability and environmental footprint of the first three generations of NUCs to guide policy making.
- Encourage the building of cities that guarantee easy access to a network of safe walking and cycling routes and public transport; pursue efforts to develop inter-city connections and public spaces.
- Expedite flagship projects to support expansion of mass transit; collect geolocalised data on modal share (across space and time) to advance towards smart travel demand management.
- Upgrade the building code and the Building Law and strengthen enforcement mechanisms; apply GPRS certification systematically on social housing programmes; update green building guidelines along with adequate training for administrations and economic incentives for real estate investors and the green building industry; encourage retrofitting of informal housing through reduced reconciliation fees.
- Develop a holistic approach to cooling policy for NUCs through a combination of regulations, information and incentives; expand labelling of air conditioners, refrigerators and other appliances, along with easy access to incentives to encourage demand for higher efficiency products.

Strengthening climate resilience

- Improve understanding of climate change impacts at subnational levels; downscale climate risk assessments at subnational level; prevent construction of new buildings in high-risk flood zones through tighter provisions in the building code and local development plans; develop city-level early warning systems (e.g. floods, heatwaves, sand storms) and targeted protection measures for vulnerable populations (e.g. cooling action plans).
- Promote stronger use of nature-based solutions to protect citizens from floods and the consequences of sea level rise; increase green spaces by setting green cover targets for cities; ensure proximity to accessible green public spaces within social housing programmes; improve data on green spaces to monitor progress.

Prioritising policies for inclusive cities

- Increase capacity and funding of UDF to support urgent infrastructure upgrades in informal settlements; scale up social housing programmes complying with minimum environmental standards; track progress on creating more affordable housing for more inclusive cities and ensuring spatial justice for different income groups.
- Promote gender-equitable transport by screening new transportation projects, plans or policies for a gender-inclusive perspective; collect relevant gender-disaggregated and gender-sensitive data to identify gender-specific transportation needs.
- Pursue efforts to formalise the waste sector by integrating rubbish collectors and recycling workers into formal waste management companies; enhance public waste management services and improve cost recovery; improve construction waste management.

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Notes

[1] Instead of flaring, the petroleum gases will be directed to gas processing facilities to produce LPG, natural gas and condensates (Government of Egypt, 2023[8]).

[2] Other activities include the expansion of natural gas connections to households, promotion of the switch to compressed natural gas in the transport sector, energy efficiency measures, reduction of carbon intensity of oil and gas resources and promotion of renewables, bio-based products and low-carbon hydrogen.

[3] The Green Incentive component of the Presidential Ageing Vehicle Replacement Initiative provides extended credit facilities and a subsidy equivalent to 10% of the vehicle price for private cars. Taxis benefit from a 25% subsidy (Khalid, 2023[102]).

[4] However, these figures need to be taken with caution as Egyptian estimates of waste data are inconsistent. Uncertainty highlights the need for harmonised definitions, calculation techniques and weighting facilities at disposal sites. (Nassar, Biltagy and Safwat, 2023[103]).

[5] Several projects are under way (e.g. Sustainable Rural Sanitation Services Project, depollution of the Kitchener Drain in the Delta region, wastewater development in Upper Egypt).

[6] Between October 2022 and February 2023, IDA issued 126 licences for high-risk industrial facilities (Government of Egypt, 2023[58]).

[7] The initial Tariff Restructuring Plan (2014-19) aimed to increase cost recovery from 57% to 100% but achieved only 83%. A second Plan (2019-25) targeted full cost recovery by 2023, but this goal remains unmet.

[8] In response to the global energy crisis and to tackle electricity shortages, the government implemented a nationwide energy consumption rationing plan, which contributed to making substantial energy savings.

[9] The annual rates vary according to cubic capacity, with lower charges for smaller vehicles.

[10] For instance, the Ministry of Environment established a specialised unit for environmental and climate investment and organised its first annual Environment-Climate Investment Forum in 2023. A new online investment platform showcases environmental and climate investment opportunities (Government of Egypt, 2023[104]).

[11] Egypt issued USD 750 million in green bonds in 2021; about 46% was disbursed for clean transportation and 54% for sustainable water and waste management. Flagship projects include the Cairo Monorail, the El Dabaa Desalination Plant and the Eastern Alexandria Sludge Treatment Facility (Government of Egypt, 2021[52]).

[12] In 2024, Parliament passed a green hydrogen subsidy scheme offering tax credits of up to 55%; VAT exemptions on equipment and exports; discounts for the use of seaports, maritime transport and ship servicing; and other non-tax incentives for project developers. In turn, 70% of investment costs need to be sourced from foreign sources; operations must start within five years; and foreign workers are limited to 30% within ten years (Martin, 2024[105])

[13] The government envisages the establishment of an independent electricity transmission grid parallel to the current grid to transfer the capacities generated by renewable energy for use in the production of renewable hydrogen.

[14] There is no official data on the share of cities in national GDP.

[15] The New Urban Policy is based on five pillars:1) managing urban growth; 2) connectivity within and between cities; 3) integrated system of cities; 4) urban governance and land management; 5) local economic development.

[16] Currently, governorates submit sectoral investment plans to relevant sectoral ministries, impeding development of synergies across sectors.

[17] The Ministry of Local Development could monitor progress across different governorates and municipalities and make sure the objectives of national strategies are applied in subnational plans and disseminate funding accordingly.

[18] Many codes and guidelines have been issued such as the smart city code and energy codes. Guidelines for bicycle infrastructure and green building are under development. An update of the energy code is under way to make it more applicable to the real estate market.

1 Key environmental trends

This chapter provides a snapshot of Egypt's environmental trends related to climate change, air, waste, water and biodiversity, highlighting some of the major achievements, remaining challenges and key policy responses. Drawing on OECD green growth indicators and national information sources, the chapter reviews national policy objectives and targets, as well as international commitments. Beginning with an overview of the main socio-economic developments, the chapter presents the country's progress in moving towards i) a low-carbon, climate-resilient and energy-efficient economy; ii) a resource-efficient economy; and iii) sustainable management of its natural capital.

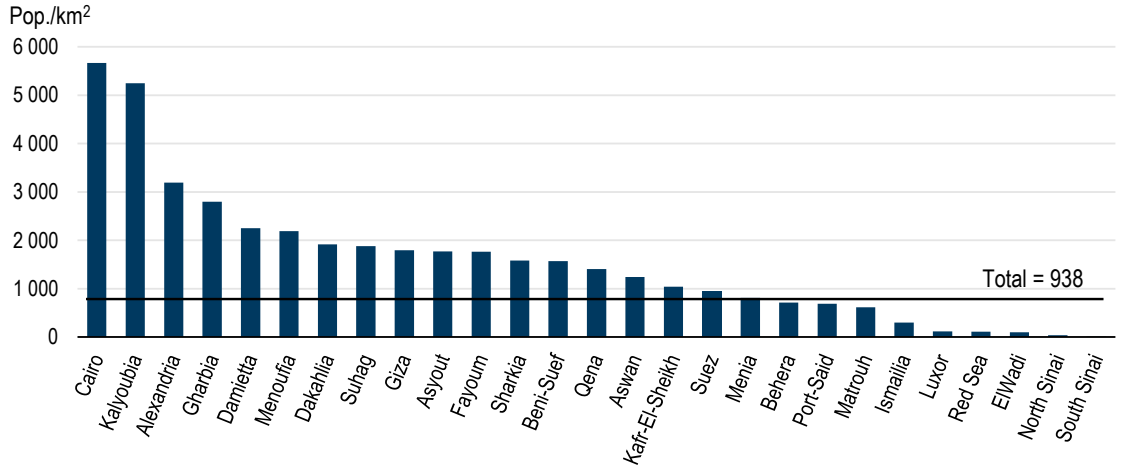
1.1. Main economic and social developments

1.1.1. A demographic heavyweight with a fast-growing population

With over 110 million people, the Arab Republic of Egypt has the third largest population in Africa, following Nigeria and Ethiopia. Nearly 1 out of 12 Africans is Egyptian. Egypt has a sizeable diaspora of some 9 million, making it the fifth largest remittance recipient in 2020 (World Bank, 2023[1]). The country is a top tourism destination with 14.9 million tourists in 2023, ranking first in Africa.[1] Rapid demographic growth amplifies Egypt's multifaceted environmental challenges. On the one hand, it puts additional pressure on already scarce natural resources such as arable land and water. On the other, it increases pollution levels due to increased human activity. Egypt is projected to become one of the most populous countries in the world by 2050. The areas along the Nile River and its Delta are among the world's most densely populated. In contrast, the vast desert areas are sparsely populated or uninhabited (Figure 1.1). Urbanisation is advancing rapidly, with 66% of Egyptians living in urban centres and 27% in semi-dense urban areas in 2015, accounting together for 93% of the population (OECD/European Commission, 2020[2]).

Figure 1.1. Egypt's fast-growing population is concentrated along the Nile River and its Delta

Population density of inhabited areas by governorate, 2023



Note: The areas were calculated by the Egyptian General Authority for Urban Planning. The inhabited area represented about 12% of total land area in July 2023.
Source: CAPMAS (2024), Egypt in numbers, population density, https://www.capmas.gov.eg/Pages/StaticPages.aspx?page_id=5035.

StatLink https://stat.link/3xpesa

As typical for many African countries, Egypt's population is young. The country will reach a median age of just above 25 years by 2025, compared to 31 years in Asia and South America, 35 years in North America and 42 years in Europe (Desjardins, 2019[3]). The population is growing at 1.9% annually, with a fertility rate of 2.85 children per women in 2021 (Government of Egypt, 2023[4]). This is below the African average of 4.2 (AfDB, 2022[5]), but Egypt accommodates more than 1.6 million additional people every year (CAPMAS, 2023[6]). This rapid population growth creates major economic and social challenges related to food security, health, education, employment and quality of life (Box 1.1). It also creates daunting challenges for the housing sector in Egypt's fast-growing cities (Chapter 3). National policies need to keep pace with both demographic growth and increased demand from higher living standards that exert growing pressure on Egypt's natural resources. Responding to the needs of a larger population will require more sustainable use of natural resources in the economy.

Box 1.1. The Haya Karima Initiative, a cornerstone of Egypt's social protection efforts

In 2019, Egypt launched Decent Life, or Haya Karima, a presidential initiative to improve livelihoods of most vulnerable people in rural areas and unsafe settlements in urban areas. Key objectives include eradicating poverty, promoting economic empowerment, creating job opportunities and fostering community development. Haya Karima is a cornerstone of Egypt's social protection efforts, in line with Egypt's Vision 2030. It also contributes to achieving the 2030 Agenda for Sustainable Development. A digitalised monitoring system assesses progress towards achieving the Sustainable Development Goals at local level. These efforts will need to be sustained over time to assess the impacts of measures and the efficiency of public spending.

The initiative has three phases. The first phase targets the most vulnerable areas in which the national poverty rate exceeded 70%. The second and third phases focus on locations with a poverty rate of 50-70% and 50%, respectively. The first phase, which has been completed, supported 1 500 villages across 20 governorates, benefiting 18 million Egyptians (17% of its population). With a budget of EGP 350 billion, 23 000 projects were implemented, making the initiative one of the world's largest social protection programmes. Two-thirds of the funds were allocated to governorates in Upper Egypt.

The initiative achieved impressive outcomes within a short time, contributing to various sectoral policies. About half the projects focused on delivering water and sanitation services with a view to providing decent housing. Haya Karima created 170 drinking water stations and 24 000 domestic water connections, expanding the network by 7 500 km. In addition, it built 290 000 sewage connections and nine sewage treatment plans. In the health sector, it increased significantly medical coverage in rural areas. Close to 200 villages were connected to the optical fibre network; over 1 000 mobile towers were built to strengthen Egypt's communications network and thus support its digital transition.

Haya Karima also includes some green elements, notably introduction of green building standards, rehabilitation of irrigation canals, promotion of organic agriculture and use of renewable energy sources. Within the Green Village Initiative, the government targeted 175 villages, including pilot projects across 20 governorates. These projects promote eco-friendly practices such as solar-powered lighting for government buildings and energy-efficient LED street lighting. According to government estimates, green investment accounted for 30% of funding allocated to Haya Karima.

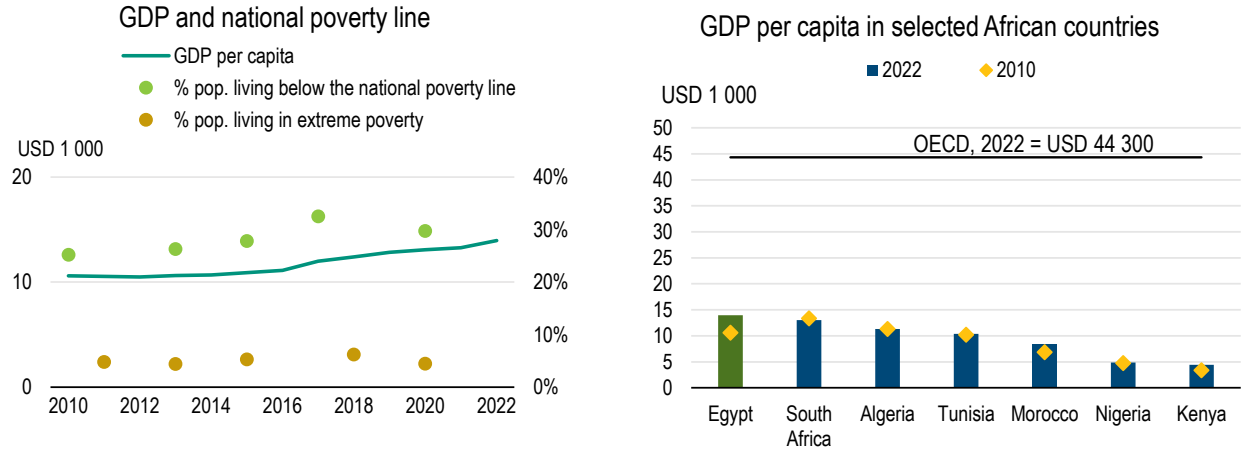
Source: (Government of Egypt, 2023[7]).

The government recognises the critical challenges related to the country's high population growth (Government of Egypt, 2021[8]). In 2023, it launched its first National Population and Development Strategy 2023-30 (Government of Egypt, 2023[4]). Its strategic goal is to reduce the fertility rate to 2.1 children by 2030. The scope has been progressively broadened from family planning and birth control (e.g. "Two Is Enough" initiative) to the economic empowerment of women.[2] The National Project for the Development of the Egyptian Family, launched in 2021, represents a step change.[3]

1.1.2. Economic performance

Egypt is among the best economic performers in the North Africa region. It had a five-year average real growth rate of 4.9% between 2018 and 2022, compared to 1.7% in OECD countries (OECD, 2024[9]). Egypt's gross domestic product (GDP) per capita reached USD 14 600 (current PPP) in 2021, approaching the level of some recent OECD members (e.g. Colombia, Costa Rica). However, 29.7% of the population were living below the national poverty line in 2020 (Figure 1.2). Regional and spatial inequalities persist. The informal economy plays an important role in nearly all economic sectors.[4]

Figure 1.2. Economic growth has not benefitted all Egyptians equally



Note: On the left panel, the left axis shows GDP per capita. The right axis shows the percentage of population living in poverty using data provided by CAPMAS. GDP data are expressed in 2015 PPP.
Source: (Government of Egypt, 2021[8]); Government of Egypt (2021), Egypt's 2021 Voluntary National Review; World Bank (2023), World Development Indicators (database), https://databank.worldbank.org/source/world-development-indicators.

StatLink https://stat.link/zgqmh2

Over the past decade, Egypt has undergone structural reforms to restore macroeconomic stability and sustainable public finance. The overall budget deficit declined, but the central government gross debt is projected to remain high (80.6% of GDP in 2025/26) (OECD, 2024[9]); the resulting heavy interest burden significantly reduces the country's fiscal space. Egypt committed to a flexible exchange rate under an International Monetary Fund (IMF) agreement. The Egyptian pound has been devaluated several times and lost half of its value against the dollar in 2022/23 in light of tightening financial conditions in international financial markets.

Egypt is highly vulnerable to global shocks. Inflation surged to record highs (39.7% of core inflation and 74.2% for food and non-alcoholic beverages prices in September 2023). This undermined purchasing power and triggering high costs of living (OECD, 2024[9]). While the country managed to maintain growth and mitigate the social impacts of the COVID-19 pandemic remarkably well, it has been hard hit by the impacts of the war of aggression by the Russian Federation (hereafter "Russia") against Ukraine. As the world's largest importer of wheat, Egypt depends heavily on wheat from both countries. It imported 11.3 million tonnes of wheat in 2021, representing nearly half of its total wheat consumption (OECD, 2024[9]). About 40% of food needs are covered through imports. The government announced plans to expand wheat cultivation and scaled up social protection to reduce the impact of high food and energy prices on vulnerable households.

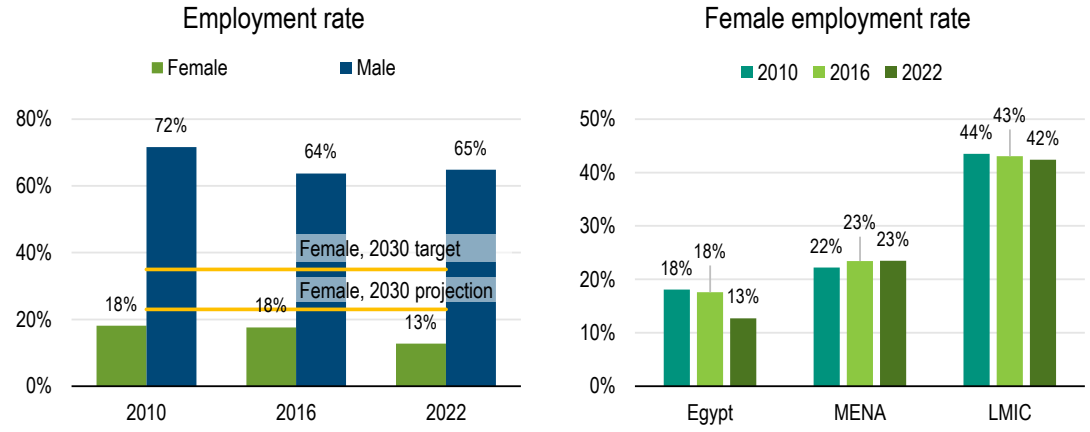
1.1.3. Structure of the economy and employment

Egypt's economy is among the most diversified of the Middle East. Its strong service sector accounts for over half of national GDP (53.9%). Industry, including the booming construction sector, has been growing rapidly. It represented about 34.6% in 2022, above the OECD average of 26.6% (2021) (OECD, 2024[9]). The agricultural sector accounted for about 11.5% of GDP and continues to provide livelihoods for rural populations. The tourism sector represents an important source of income, alongside the Suez Canal transit revenue.

Employment patterns are evolving, but the employment market failed to create sufficient additional jobs, particularly for a growing number of educated youth. Many new jobs are irregular and informal. The total employment rate (39.8%) has been shrinking and is below the OECD average (56.1%) (OECD, 2024[9]). Agriculture continues to be the largest employer with about 19% of total employment, but its share has declined. According to government estimates, public administration represents about 6% of employment. Employment in the retail, transport, accommodation and food sector has increased rapidly due to urbanisation and will soon become the largest sector in terms of employment (OECD, 2024[9]).

The rate of unemployment has been cut in half since 2014, reaching 7.2% in 2022. Employment has been boosted by mega projects in the construction sector, also absorbing many informal workers. However, more than 800 000 young Egyptians enter the job market every year and struggle to find employment in the formal sector (CAPMAS and IOM, 2024[10]).. Informal employment was estimated at 62.5% in 2023, slightly below the MENA average (Lopez-Acevedo, 2023[11]). With raising educational attainments, Egypt will need both more and better jobs (OECD, 2024[9]). Unemployment is high among highly educated people as high-skills sectors such as information and communication technology, finance and other professional services remain weak. The quality of jobs remains poor, indicating a growing mismatch between skills and labour market requirements.

Figure 1.3. Female labour participation is weak, below the MENA average



Note: Employment rate is employment to population ratio. MENA: Middle East and North Africa; countries include Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates and Yemen. LMIC: lower middle-income countries; the LMIC group includes 54 countries classified as lower middle-income economies by the World Bank.
Source: Government of Egypt (2021), Egypt's 2021 Voluntary National Review; World Bank (2024), World Development Indicators (database, https://databank.worldbank.org/source/world-development-indicators.

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Female labour participation is weak, below the average of MENA and other lower middle-income countries (Figure 1.3). The share of female participation in industry and entrepreneurship is particularly low. In contrast, women represent about 40% of employees in the informal sector, which usually provides limited social benefits (OECD, 2024[9]). Women are increasingly present in public administrations and the political empowerment of women is advancing. The government projects it could reach a female labour participation of 23% by 2030 with an SDG push (Government of Egypt, 2021[8]). This is far below the national target of 35% set under the economic empowerment pillar in Egypt's National Strategy for the Empowerment of Egyptian Women 2030 (Government of Egypt, 2017[12]). Broader participation of women in the labour force could considerably boost Egypt's economic performance. Expanding childcare facilities, access to health care and transport facilities could help women participate in the work force. However,

cultural barriers and social norms and practices also impede women's entry into the job market. More gender-equitable transport could help remove additional barriers.

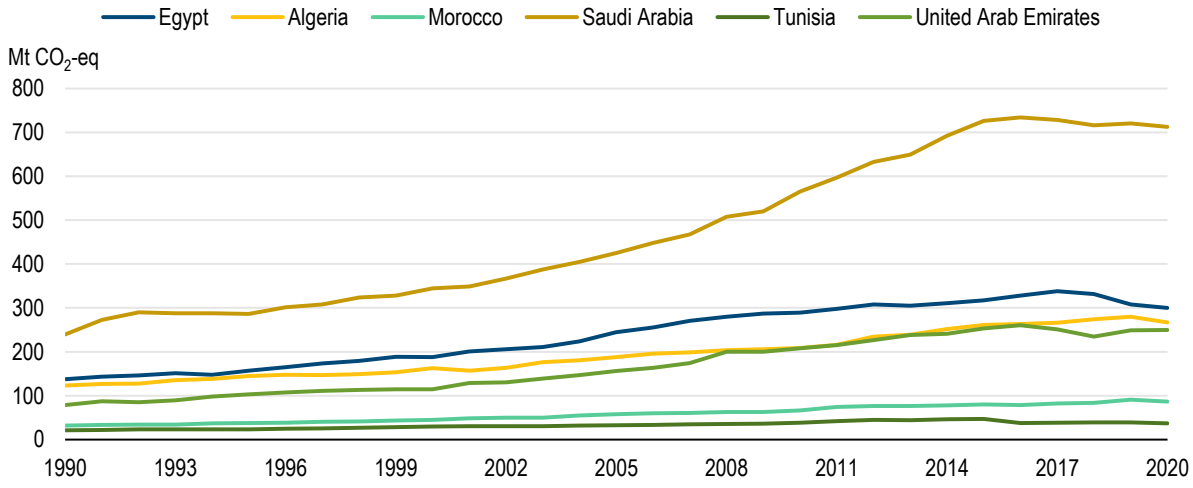
1.2. Transition to a low-carbon, climate-resilient and energy-efficient economy

1.2.1. Greenhouse gas emissions profile and trends

Egypt's greenhouse gas (GHG) emissions more than doubled from 116 million tonnes of carbon dioxide equivalent (CO_2-eq.) in 1990 to an estimated 325 million tonnes of CO_2-eq. in 2015 (Government of Egypt, 2018[13]). Emissions increased at a much faster rate than the world's average. The country recorded a gradual decline in emissions since 2017. It achieved relative decoupling of GHG emissions from economic and population growth, notably thanks to efficiency gains in energy industries (e.g. power plants) and support for renewable energy projects (Figure 1.4).

Figure 1.4. Egypt's GHG emissions grew rapidly over the past decades

Total GHG emissions, including LUCF



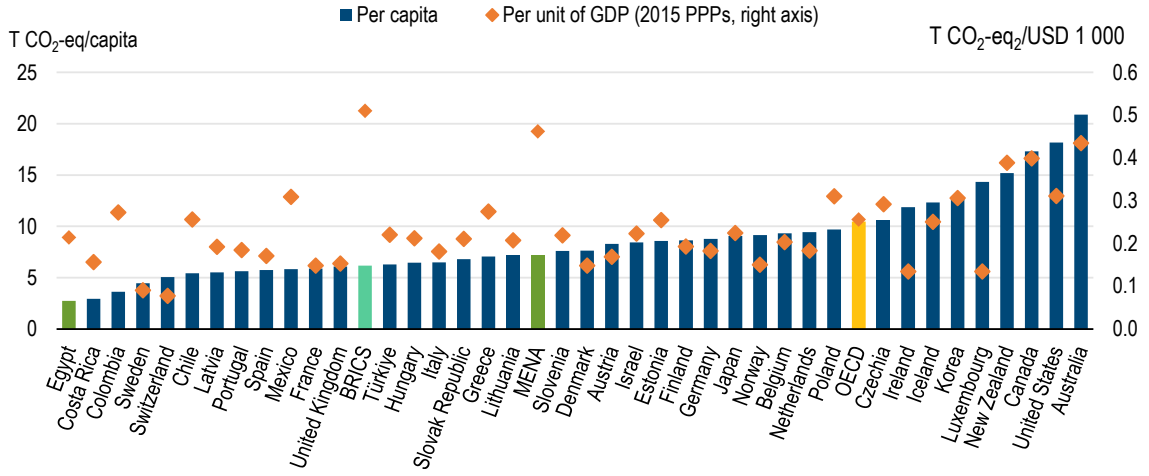
Note: LUCF: land-use change and forestry.
Source: World Resources Institute (2022), Climate Watch, Historical GHG Emissions, www.climatewatchdata.org/ghg-emissions.

StatLink https://stat.link/7bt3jo

With less than 0.7% of total global emissions, Egypt remains a small emitter by international comparison. Its annual emissions per capita are estimated at 2.8 tonnes in 2020, less than half of the world average of 6.3 tonnes. It was more than three times below the OECD average of 10.5 tonnes in 2021 (Figure 1.5).

Figure 1.5. Per capita emissions in Egypt are low in international comparison

Per capita emissions, excluding LULUCF

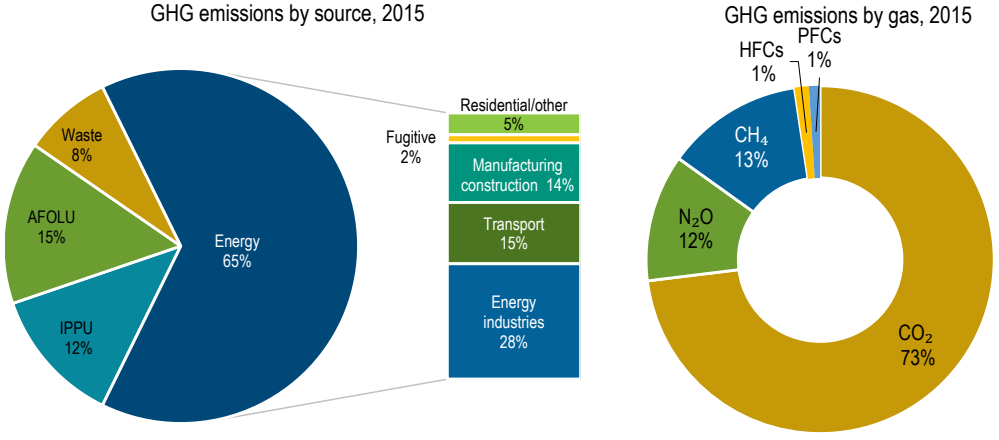


Note: LULUCF: land use, land-use change and forestry; LUCF: land-use change and forestry for Egypt, BRICS and MENA; MENA: Middle East and North Africa; countries include Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates and Yemen. BRICS includes Brazil, the Russian Federation, India, the People's Republic of China and South Africa. OECD includes the 38 member countries.
Source: OECD (2024), Environment at a Glance; World Resources Institute (2024) Climate Watch Historical GHG Emissions, www.climatewatchdata.org/ghg-emissions.

StatLink https://stat.link/nrsbvm

Energy industries remain the sector with the highest GHG emissions (28%) (Figure 1.6). Transport-related emissions have been growing quickly over the past decade, reflecting a larger population and urban sprawl, and triggering a rapidly increasing demand for mobility. The share of agriculture has been shrinking.

Figure 1.6. Egypt's GHG emissions mainly come from the energy sector



Note: AFOLU: agriculture, forestry and other land use. IPPU: industrial process and product use. The left panel shows shares of emissions sources classified according to the IPCC guideline. The right panel shows the share of emissions by gas. The percentage shares are calculated excluding LUCF.
Source: Government of Egypt (2018), Egypt's First Biennial Updated Report to the UNFCCC.

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1.2.2. Main climate policies and targets

Over the past decade, Egypt has considerably increased its national and international climate commitments. Egypt's Vision 2030 sets out the country's overarching Sustainable Development Strategy, including climate goals. An updated version, prepared in 2023, promotes a whole-of government approach with a view to further mainstreaming climate considerations into all policy areas. Several sectoral strategies support implementation of the updated Vision in different policy areas (e.g. Integrated Sustainable Energy Strategy 2035, National Strategy for Green Hydrogen, Water Resources Development and Management Strategy 2050, Seawater Desalination Strategy 2050).

The National Climate Change Strategy 2050, launched in 2022, provides a comprehensive framework for Egypt's climate mitigation and adaptation priorities. It includes measures for advancing Egypt's transition towards a low-carbon development pathway and enhancing the country's climate resilience. Egypt has initiated work on a National Adaptation Plan (Box 1.2).

The Ministry of Environment (MoE) plans to develop a new Environment Law to cover climate, biodiversity and pollution management; the 1994 Law of Environment does not cover any climate issues explicitly. Drawing on lessons learnt with the elaboration of the 2020 Waste Management Law, the MoE intends to conduct an inclusive process. This will engage relevant sectoral ministries at an early stage to gain buy-in. In so doing, it will accelerate preparation of a consensual draft law within the next two to three years. This updated law provides an immense opportunity to set a unifying legal framework for environmental protection and climate action in line with Egypt's national and international commitments.

Box 1.2. Policy framework for Egypt's climate action

2015 Establishment of National Council of Climate Change (NCCC)

2016 Sustainable Development Strategy: Egypt's Vision 2030

2017 Ratification of Paris Agreement

2017 National Strategy for Disaster Risk Reduction 2030

2018 Submission of Biennial Update Report to the United Nations Framework Convention on Climate Change (UNFCCC)

2019 Restructuring of NCCC, now headed by the Prime Minister

2022 National Climate Change Strategy 2050

2022 First updated Nationally Determined Contribution (NDC)

2023 Second updated NDC

2023 Update of Egypt's Vision 2030

2025 National Adaptation Plan within UNFCCC process – *work in progress*

2027 New Environmental Law covering climate, biodiversity and pollution – *work in progress*

Strengthening implementation capacity is paramount to ensure an efficient rollout of climate measures and monitor progress towards strategic goals. Line ministries translate Egypt's national climate goals into action at sectoral level. This requires upskilling in key ministries (e.g. transport, housing, local development). Stronger use of market-based instruments would help set price signals and accelerate a more cost-efficient transition towards a green economy.

On the international scene, Egypt became a party to the United Nations Framework Convention on Climate Change (UNFCCC) back in 1994. It ratified the Kyoto Protocol in 2005[5] and the Paris Agreement in 2017. Egypt submitted three national communications to UNFCCC in 1999, 2010 and 2016, as well as one

biennial report in 2018. At the time of writing, the fourth national communication was being finalised, including updated GHG emissions data. As host of the 27th Conference of the Parties to the UNFCCC (COP27), Egypt's climate commitment gained international attention.

COP27 also raised awareness within Egypt, catalysing its domestic climate agenda. Regular preparatory meetings involving more than a dozen ministries contributed to mainstreaming climate change issues across sectors. Many new initiatives have been launched with the support of international development partners (e.g. Nexus of Water, Food & Energy Platform, global initiative on Action for Water Adaptation and Resilience) (Chapter 2). Egypt should continue to capitalise on this political momentum by updating policies and designing new ones in various areas. It should continue to revise sectoral strategies and upgrade programmes through a climate lens while strengthening subnational capacity. A comparison of existing strategies with new climate ambitions could be a starting point for revising sectoral strategies and upgrading of programmes. This process has started in some but not all areas and needs to be pursued.

The first updated Nationally Determined Contribution (NDC), published ahead of COP27, represented a major step forward. For the first time, the government has set tangible national GHG emissions reduction targets for three sectors: -33% for electricity, -7% for transport and -65% for oil and gas[6] by 2030 compared to business-as-usual, conditional on more international financial support (Government of Egypt, 2022[14]). The electricity target was tightened to -37% in the second updated NDC in 2023 (Figure 1.7). These three sectors cover less than half of Egypt's GHG emissions.

Table 1.1. Emissions reduction targets and estimated funding needs in selected MENA countries

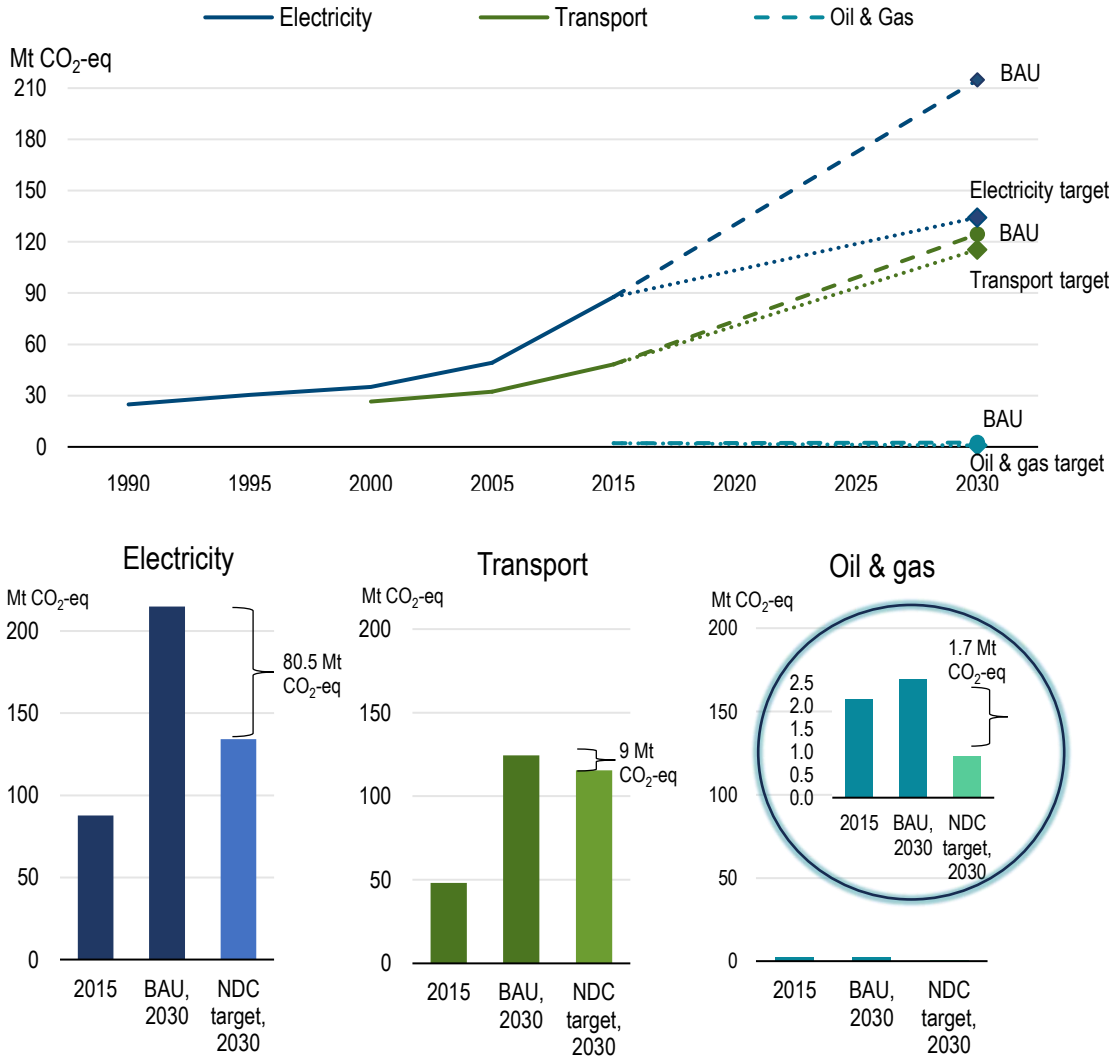
Country	Net-zero target	Updated NDCs	Emissions reduction targets by 2030	Coverage	Funding source	Estimated funding needs by 2030
Algeria	None	None; NDC submitted in 2015	Between -7 and -22% compared to BAU levels	Economy-wide target for GHG emissions	7% emission reductions with domestic funding; 22% emission reductions, conditional on external funding	n/a
Egypt	None	2022 and 2023	-37% in the electricity sector -7% in the transport sector -65% in the oil and gas sector compared to BAU levels	< 50% of GHG emissions	Fully conditional to external funding	USD 196 billion for mitigation measures
Morocco	Within this century	2021	Up to -45.5% relative to 2010 levels	Economy-wide target	18.3% with domestic funding and 45.5% conditional to external funding	USD 17.3 billion (domestic means) USD 38.8 billion (additional resources)
Tunisia	2050	2021	Carbon intensity reduction target: -45% by 2030 relative to 2010 levels	Economy-wide target, covering CO_2, CH_4, N_2O and HFCs	27% with domestic funding and 18% conditional on external funding	USD 14.3 billion for mitigation measures (2021-30)
United Arab Emirates	2050	2023	19% by 2030 relative to 2019 levels, equivalent to 182 Mt CO_2-eq. in 2030	Economy-wide target, covering CO_2, CH_4 and N_2O	Domestic funding – unconditional	AED 134 billion for investment (USD 36.5 billion) (2023-30)

Note: BAU: business-as-usual scenario. CO_2: carbon dioxide. CH_4: methane. GHG: greenhouse gas. HFCs: hydrofluorocarbons. N_2O: nitrous oxide. NDC: Nationally Determined Contribution.
Source: (République Algérienne Démocratique et Populaire, 2015[15]; Government of Egypt, 2023[16]; Republic of Tunisia, 2021[17]; Royaume du Maroc, 2021[18]; United Arab Emirates, 2023[19]).

Egypt's total GHG emissions are projected to grow over the next decades. Therefore, the government will need to amplify efforts to decouple GHG emissions from economic growth. At the same time, it needs opportunities to leapfrog the fossil-intensive energy regime to adopt renewable energy sources. Setting more ambitious targets across various sectors could inform long-term planning and send strong price signals in favour of low-carbon investment. This would also prevent further investment in stranded high-carbon assets (e.g. state-owned fossil fuel companies) and help reduce dependence on fossil fuel.

Figure 1.7. Egypt has set three sector-specific targets to reduce emissions

GHG emission trends, 1990-2015, and sectoral targets for 2030



Note: This figure shows sectoral GHG emissions from 1990 to 2015 and projected trends to 2030 and 2030 targets using official GHG emissions data provided by Egypt. BAU: business-as-usual; GHG emissions: data are shown in solid lines and linear projections are represented by dotted lines. BAU projections of 2030 are indicated with circular marker and 2030 targets are indicated with diamond marker.
Source: Government of Egypt (2023), Egypt's second Updated Nationally Determined Contribution; Government of Egypt (2018), Egypt's first Biennial Update Report to the UNFCCC.

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As in many emerging economies, Egypt's climate targets are not legally binding and remain conditional on additional external funding (Table 1.1). The country has attracted a significant share of Africa's global climate finance (Chapter 2) and has also implemented numerous national climate action projects with public funding. In line with the three categories of funding sources identified in Egypt's National Climate Change Strategy (national budget, international finance and private sector financing), it would make sense to improve accountability. In fact, Egypt already takes many national measures that contribute to reducing GHG emissions. Furthermore, it would be useful to further mainstream climate issues in various economic sectors using a policy mix of tools such as budgetary planning, as well as market and non-market-based instruments.

Climate governance

The government is committed to improving its climate governance. It has developed a detailed institutional framework within its National Climate Change Strategy 2050. It has started operationalising this framework by developing action plans for the strategy's five goals and conducting capacity-building workshops at sectoral and governorate level. For instance, it has strengthened activities of the Centre of Excellence for Research and Applied Studies of Climate Change and Sustainable Development at the National Research Centre. An action plan for improving climate action governance is under development. However, full implementation of the National Climate Change Strategy will require adequate financial resources to expand capacity at all levels. The launch of the domestic measurement, reporting and verification system is still conditional on funding.

The National Council for Climate Change (NCCC), headed by the Prime Minister, is the highest decision-making body on climate issues. It is well positioned to facilitate inter-ministerial co-ordination. However, more key ministries (e.g. energy, transport, industry, housing) need to be represented at the executive level within the Supreme Committee of the Council. It would be useful to clearly communicate on NCCC activities, decisions and outcomes.

A climate-specific co-ordination mechanism for subnational governments could help create engagement and opportunities for mutual learning across governorates. As in other countries, an independent Council of Climate Experts could provide targeted advice for policy makers to inform the country's climate action. This would contribute to strengthening the scientific base of climate action.

Data availability and monitoring capacity

In Egypt's first biennal update report, submitted to the UNFCCC in 2018, the government highlights major bottlenecks related to data availability, access and quality. Most recent official GHG emissions data were submitted to the UNFCCC in 2015. In line with commitments under the Paris Agreement's Enhanced Transparency Framework, Egypt needs more regular GHG emission updates to help analyse the impacts of mitigation and adaptation measures. Achieving this would require strengthening capacity of the Egyptian Environmental Affairs Agency (EEAA) and the Central Agency for Public Mobilization and Statistics (CAPMAS). Efforts to incorporate a Climate Change GHG Unit within CAPMAS go in the right direction. Access to data needs to be improved and made more user-friendly. For example, it should be possible to download data in spreadsheets rather than reading them as non-editable reports.

The National Climate Change Strategy 2050 lays out a series of performance indicators, as well as enabling policies and tools to achieve national climate-related objectives. Sectoral ministries report annual progress in their respective areas of work within the NCCC. Sectoral monitoring tools, which integrate adaptation and climate information, need to be further developed. Digitalisation offers many opportunities to harmonise monitoring practices and make the process less resource-intensive and more efficient.

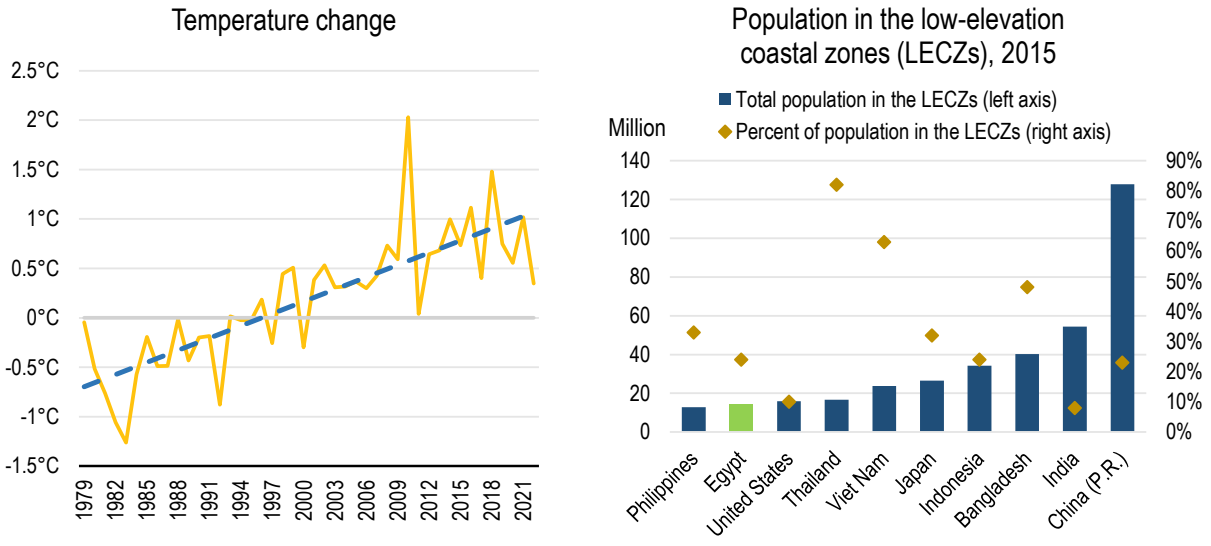
1.2.3. Climate change adaptation

Climate impacts and risks

Egypt is highly vulnerable to the impacts of climate change, which are already affecting human health, ecosystems and the economy. Over the past decades, mean annual temperature has been increasing (Figure 1.8). The country is also heavily affected by water scarcity, drought, desertification, sea level rise and extreme weather events (World Bank, 2022[20]). With less than 80 mm of annual rainfall in most areas,[7] Egypt has an arid climate with hot and dry summers and a mild winter season. Extreme weather events, such as heatwaves, flash floods, and sand and dust storms, exacerbate the impacts of this already difficult climate, particularly in urban agglomerations (Chapter 3).

Low-income households are generally more vulnerable to climate change impacts. They are often more exposed to climate risks, such as heatwaves, and have lower capacity and fewer resources to adapt to a changing climate. This requires targeted support to counterbalance adverse impacts on most vulnerable people.

Figure 1.8. Egypt is significantly affected by climate change and projected sea level rise



Note: Low elevation coastal zones (LECZs) are areas below 10-metres.
Sources: Left panel, IEA/OECD calculations using ERA5 Reanalysis data (Copernicus Climate Data Store) and methodology from Maes et al. (2022), "Monitoring exposure to climate-related hazards: Indicator methodology and key results", OECD Environment Working Papers, No. 201. Right panel, OECD/European Commission (2020), Cities in the World: A New Perspective on Urbanisation, OECD Urban Studies.

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The Intergovernmental Panel on Climate Change identified the Nile Delta as one of the world's extreme vulnerability hot spots (IPCC, 2022[21]). If climate change is not mitigated, sea level rise is projected to provoke the loss of a sizeable proportion of the northern part of the Nile Delta and Sinai, possibly displacing a large percentage of the population. The risk of coastal flooding and erosion heavily affects Egypt's coastal cities (Ali, 2022[22]) (Chapter 3).

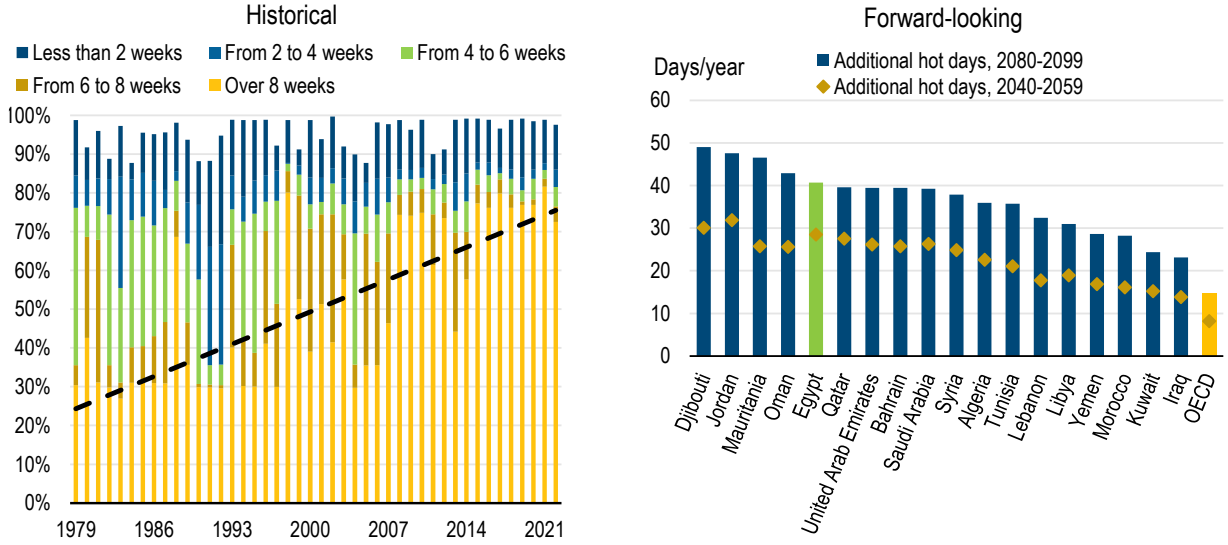
The agricultural sector is particularly at risk as the impacts of climate change raise concerns over food security and the deterioration of rural livelihoods. According to Egypt's second updated NDC, reduced water allocation for agricultural purposes will affect at least one of four farmers (Government of Egypt,

2023[16]). Saline water intrusion reduces the fertility of soils in the Nile Delta. Rising temperatures lead to stronger evaporation, which will place additional pressure on already scarce water resources. For several decades, development partners have supported adaptation of farmers in Upper Egypt. They have built on traditional, local knowledge and privileged easy to adapt, low-cost measures and the expansion of early warning systems and more efficient irrigation methods.

Raising energy demand for cooling during the summer will also affect the resilience of the energy sector. Over the past decades, the population has been increasingly exposed to longer periods of extreme heat, and these extreme temperatures are expected to worsen (Figure 1.9). Rising ambient temperatures could negatively affect power generation efficiency and add stress to power generation from natural gas, solar and wind (IEA, 2023[23]). Plans for energy infrastructure should draw on accurate information on climate risks and impacts to avoid building in high-risk areas (Chapter 3).

Climate change will also affect Egypt's ecosystems (e.g. coral reefs, coastline erosion, desertification) and consequently the basis of its tourism sector. The latter can play a role by promoting sustainable tourism practices and expanding activities that improve resilience of local communities and ecosystems, particularly in vulnerable areas. Local tourist destinations, such as Alexandria or Port Said, are threatened by the risk of sea level rise.

Figure 1.9. Population exposure to extreme temperatures is projected to further increase



Note: The left panel shows the observed historical population exposure to hot days across Egypt, indicating an increasingly longer annual exposure. Trendline shows temporal evolution of population exposure to more than eight weeks. The right panel shows the additional population-weighted hot day exposure across OECD and MENA countries under SSP2-4.5 climate scenario as defined in the IPCC Sixth Assessment Report, 2080-99 and 2040-59 compared to the reference period 1995-2014.

Source: Left panel, IEA/OECD calculations using ERA5 Reanalysis temperature data (Copernicus Climate Data Store) and methodology from Maes et al. (2022), "Monitoring exposure to climate-related hazards: Indicator methodology and key results", OECD Environment Working Papers, No. 201. Right panel, OECD calculations using data from the World Bank Climate Change Knowledge Portal (OECD forthcoming, 2024).

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National adaptation priorities

Adaptation has been a government priority. "Enhancing adaptative capacity and resilience and alleviating the associated negative impacts" (Goal 2) is one of five strategic goals of the National Climate Change Strategy 2050 (Table 1.2), alongside climate mitigation and three enabling goals. The strategy articulates links between the goals related to climate change in Egypt's Sustainable Development Strategy and the main goals of its climate strategy. Key measures are outlined for each specific objective. However, performance indicators do not cover all objectives.

Table 1.2. National adaptation objectives

Goal 2. Enhancing adaptive capacity and resilience to climate change and alleviating the associated negative impacts

Number	Objective
Objective (2.a)	Protect citizens from the negative health impacts of climate change.
Objective (2.b)	Minimise loss and damage to country assets and ecosystems by preserving them from the impacts of climate change.
Objective (2.c)	Preserve the country's resources from the impacts of climate change.
Objective (2.d)	Develop resilient infrastructure and services in the face of climate change impacts.
Objective (2.e)	Implement disaster risk reduction concepts.
Objective (2.f)	Preserve and expand green spaces.
Objective (2.g)	Strengthen women's response considerations to help them adapt to climate change.

Source: (Government of Egypt, 2022[24]).

While Egypt recognises the need to mainstream climate change adaptation into all policy sectors, the integration of adaptation measures into sectoral policies is still in its infancy. This is particularly relevant for development of infrastructure projects and local development plans. These should systematically consider adaptation aspects and support the inclusion of vulnerable populations (Chapter 3).

The development of a NAP is under way. The NAP is building on the momentum from COP27 and the 2011 National Strategy for Adaptation to Climate Change and Disaster Risk Reduction. It provides an opportunity to integrate climate change adaptation into all levels of planning while improving vertical and horizontal co-ordination through dedicated mechanisms. The strategy should move beyond a series of individual adaptation measures and conceive adaptation policies as a progressive and iterative process within an integrated and holistic approach (Fracassitti, 2023[25]). Environmental justice considerations merit to be further strengthened.

To date, adaptation measures mainly focus on improving agricultural productivity and promoting sustainable water management (e.g. weather forecasting services, modern agricultural extension, agricultural insurance system against climate risks, more efficient irrigation systems, water desalination) (Government of Egypt, 2022[24]). The second updated NDC, published in 2023, expands the coverage by also outlining measures for coastal zones, urban development, tourism and plans for early warning systems and awareness-raising activities (Government of Egypt, 2023[16]). Other sectors such as transport or housing will also need to implement preventive adaptation measures and adjust sectoral policies.

Adopting a holistic approach will require building capacity at sectoral level to raise awareness of all sectors and integrating adaptation concerns systematically into the planning of infrastructure projects. Existing climate change units could broaden scope and focus more strongly on adaptation matters in sectoral ministries. This could help build expertise within ministries and thereby promote policy coherence.

Development partners are driving many adaptation projects. While these projects usually include some sort of local capacity building component, local expertise in the area of climate change adaptation remains

fragile and is undermined by turnover of local leaders. Local ownership is paramount to make sure that outcomes are sustained beyond the end of project cycles and benefit local communities.

Adaptation financing

Egypt's National Climate Change Strategy 2050 provides an overview of the costs of adaptation programmes for key sectors using different timeframes ranging from 2023 to 2050. The total cost of adaptation programmes is estimated at USD 113 billion (compared to USD 211 billion for mitigation programmes). This leaves a large funding gap of USD 94.7 billion or 84%. The second updated NDC indicates USD 50 billion as conditional financing requirements for adaptation measures until 2030.

New international funding opportunities may open up with the creation of the Loss and Damage Fund and Egypt's Nexus of Water, Food & Energy Platform (Chapter 2). However, Egypt will likely face substantial funding gaps in the short and medium term. The government will need to attract more private sector resources through domestic and international capital markets. Adaptation projects usually face more difficulties in presenting a strong business case for private investors (Green Climate Fund and Government of Egypt, 2022[26]). Evidence from many countries, including Germany, shows that investments in climate adaptation measures are significantly cheaper than addressing loss and damage from extreme weather events (OECD, 2023[27]). Therefore, the government should continue to build national administrative capacity to better tap into international climate and development finance, including for projects at subnational level.

1.2.4. Clean energy transition

The country has great potential for expanding deployment of renewable energy sources, particularly solar, wind and low-carbon hydrogen. Despite significant investment, the potential of renewables remains largely underexploited. However, green investment in renewable energy sources is set to grow massively in the coming years (Chapter 2).

Egypt is endowed with significant oil and natural gas reserves, particularly in the offshore Nile Delta region.[8] Its proven oil and natural gas reserves were estimated at 3.5 billion barrels and 2.2 trillion cubic metres in 2021, making it the third largest natural gas producer in Africa after Algeria and Nigeria. It became a net exporter of natural gas as of 2018 and exported about 8.9 million tonnes of liquefied natural gas (LNG) in 2022. The country aims to position itself as a regional energy hub between Africa, Asia and Europe. Egypt's oil production remains relatively modest compared to Africa's top producers (e.g. Nigeria, Algeria, Angola, Libya). While natural gas production is projected to remain stable, oil production will fall steadily until 2030 due to declines in output at mature fields (IEA, 2023[28]). Abandoned oil and gas wells could be converted into geothermal resources, particularly in the Gulf of Suez area (Moustafa et al., 2022[29]).

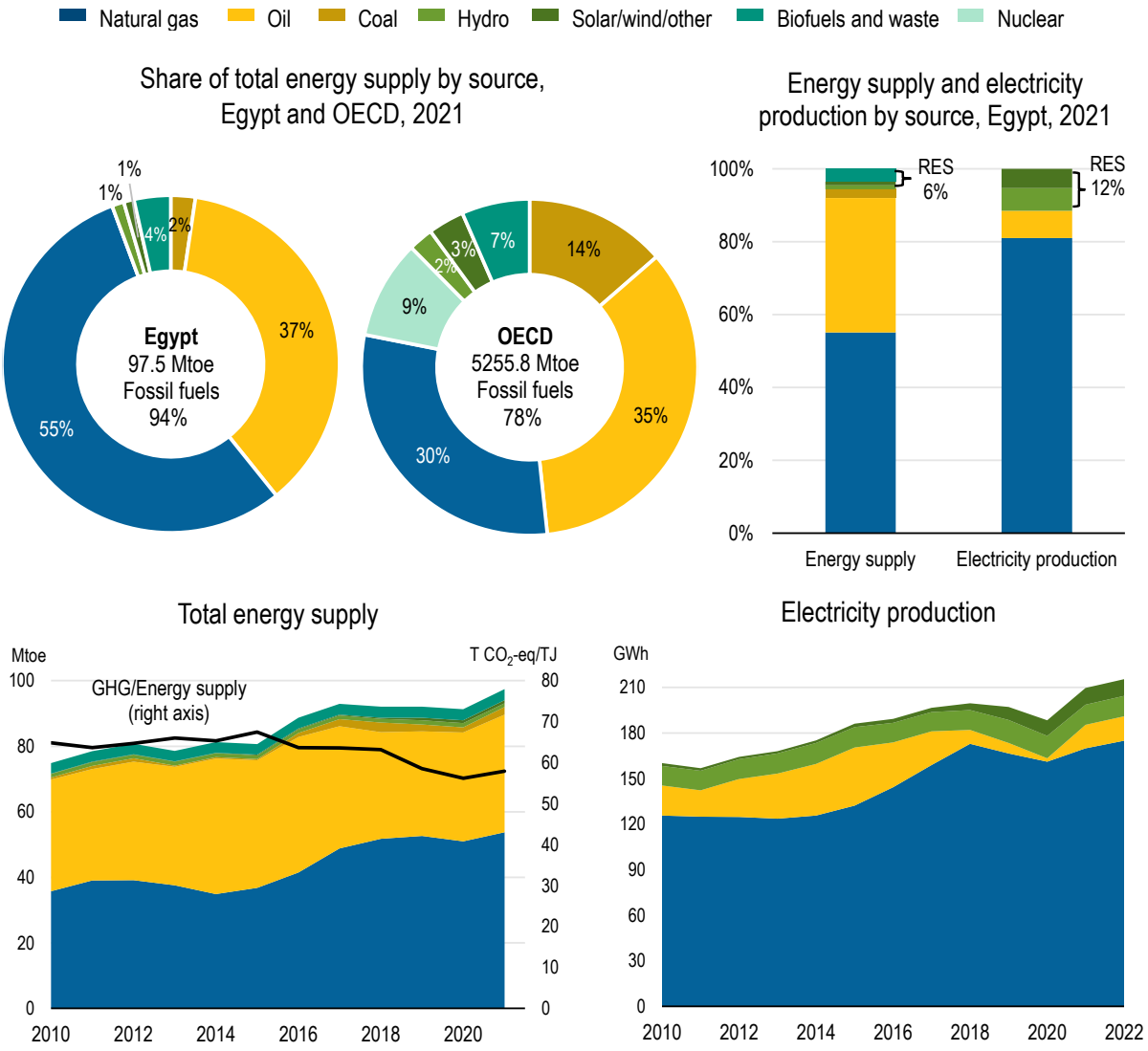
Several initiatives to help the oil and gas sector become cleaner are under way. In 2017, Egypt adhered to the World Bank's Zero Routing Flaring Initiative. In 2022, it also joined the Global Methane Pledge with a view to achieving a 30% reduction in methane by 2030. Within COP27, Egypt's Ministry of Petroleum and Mineral Resources organised the first "Decarbonisation Day". Drawing on six pillars,[9] the Ministry of Petroleum aimed to highlight success stories and progress in the decarbonisation of the oil and gas sector and hard-to-abate industries. In parallel, the first pilot carbon capture and storage project, led by the Italian company Eni, was launched in the Western Desert in 2021. However, the project is still under development.

Energy mix

The energy mix remains heavily dominated by fossil fuels. Oil and gas accounted together for 92% of total primary energy supply, while coal represented less than 2%; renewable energy sources made up about 6% in 2021, mainly driven by increases in wind and solar power (Figure 1.10). The share of renewables in

the national energy mix is below the OECD average. However, Egypt is doing better than many other Middle East countries (Figure 1.11).

Figure 1.10. Egypt's energy mix remains carbon intensive despite some increases in renewables



Note: RES: renewable energy sources. Oil includes oil products, crude, liquefied natural gas and feedstocks. Calculation of total and percentage breakdown exclude heat and electricity trade.
Source: IEA (2023), "World energy balances", IEA World Energy Statistics and Balances (database), https://doi.org/10.1787/data-00512-en.

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Egypt aims to further diversify its energy mix. It plans to complete its first nuclear power plant in 2030 (El Daaba located 250 km west of Alexandria in the Matrouh Governorate), which shall cover about 3% of projected power generation (Figure 1.11). The use of coal is negligible and is excluded as an option for electricity production in the Integrated Sustainable Energy Strategy 2035. This is a welcome development as the country previously intended to increase considerably the use of coal following electricity shortages in 2014.

In line with international trends, Egypt's carbon intensity has decreased significantly since 2015,[10] reflecting technological improvements and the switch from more polluting oil to natural gas. The share of natural gas consumption has grown significantly since 2015; in 2021, natural gas was used for 80% of electricity production (Figure 1.10). The government invests heavily in the expansion of natural gas production and infrastructure across many sectors.

Renewable energy sources

Given its vast areas of desertic land, sunny weather conditions and high wind speeds, particularly in the Gulf of Suez and the Nile Valley, Egypt has enormous potential to develop renewable energy sources. The Wind and Solar Atlases estimate the potential of the East and West Nile areas at around 31.2 gigawatts (GW) of wind power and 52.3 GW of solar (NREA, 2005[30]). According to government estimates, total installed capacity of renewables is estimated at 6.3 GW, including 2.8 GW of hydropower (Aswan High Dam and Reservoir Dams), 1.7 GW of solar power and 1.87 GW of wind power in 2022 Solar PV and wind capacity has grown rapidly, notably thanks to several mega projects (e.g. Benban Solar Park, Zarafana Wind Complex, Gal El-Zeit Wind Farm). However, the capacity of fossil-based plants has increased at a much faster pace.

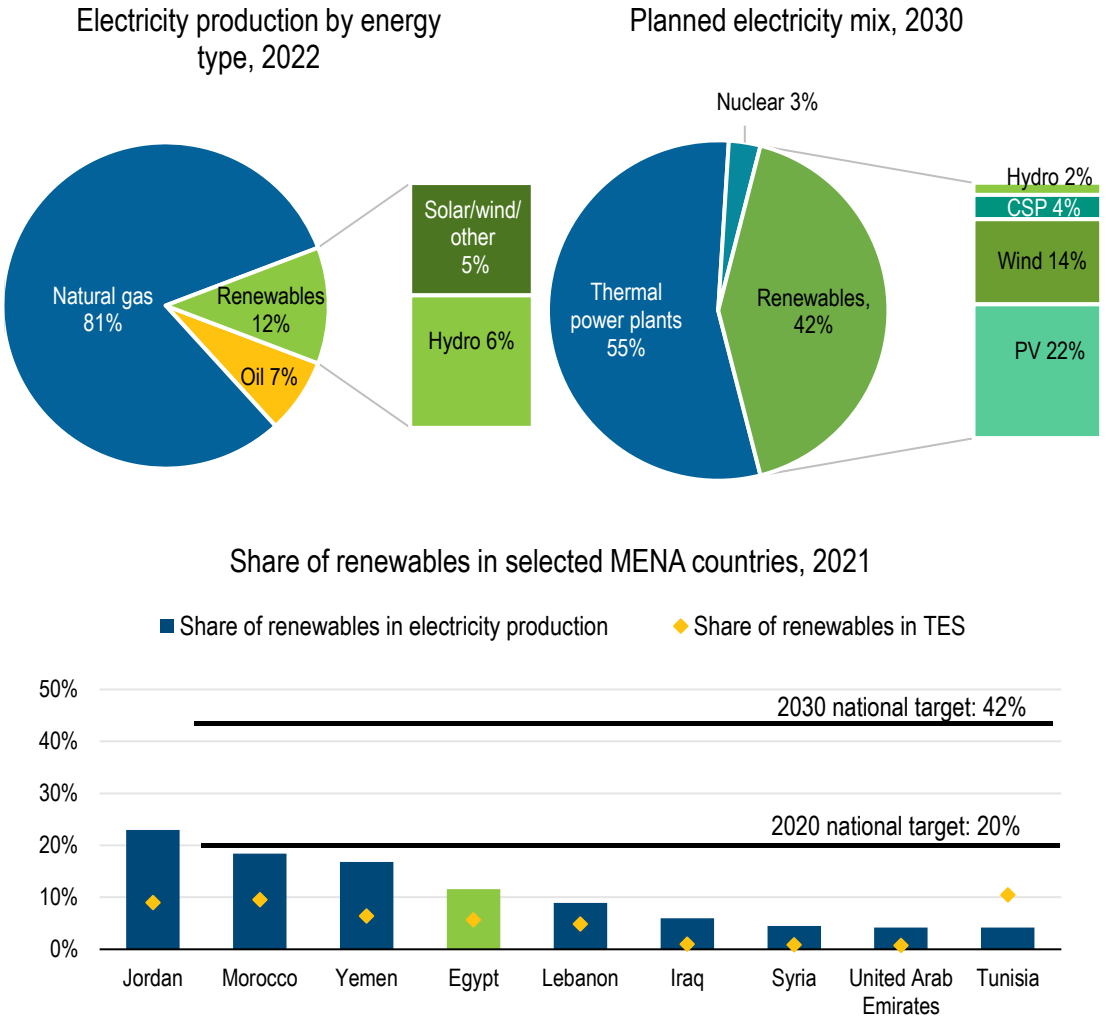
In 2016, the Supreme Energy Council of Egypt approved the Integrated Sustainable Energy Strategy 2035, including a target of generating 20% of its electricity with renewable energy sources by 2022. In 2022, renewables accounted for about 12% in electricity production, which represented 20% of peak load.

Egypt affirmed its transition to clean energy by updating its NDC in 2023, which aims to increase the contribution of renewables to 42% of the electricity production by 2030 instead of 2035. This update was based on the energy pillar of the Nexus of Water, Food & Energy Platform, which aims to close 5 GW of existing inefficient oil and gas power generation capacity (about 9% of Egypt's total installed fossil fuel capacity) and facilitate mainly private investments worth more than USD 10 billion to support the installation of the new capacity of 10 GW of new renewable energy (Government of Egypt, 2023[31]). In parallel, it is continuing both to modernise and upgrade transmission and distribution networks to better absorb renewables, and to invest in digital technology and storage infrastructure.

Most mitigation projects focus on the electricity sector; their cost is estimated at over USD 93 billion conditional on international finance until 2030. In 2021, development partners, such as the European Bank for Reconstruction and Development or the International Islamic Trade Finance Corporation, contributed to finance some projects in the renewable energy and petroleum sectors. Still, plans to transition towards a low-carbon energy system continue to face a significant financial gap.

Policy measures put forward in the NDC include reducing use of fossil fuel power plants, replacing inefficient thermal power plants with renewable alternatives and scaling up on-grid renewable energy. The Integrated Sustainable Energy Strategy 2035 will need to be updated to reflect the goals and measures of the NDC. Mitigation measures and projects should systematically indicate their expected effects on emissions reductions.

Figure 1.11. The share of renewables needs to more than triple to reach Egypt's 2030 target



Note: CSP: concentrated solar power. PV: solar photovoltaic. TES: total energy supply. MENA: Middle East and North Africa. MENA countries with less than 1% of renewables are not shown; these countries are Algeria, Bahrain, Kuwait, Libya, Oman, Qatar and Saudi Arabia.
Source: IRENA (2023), Renewable Capacity Statistics 2023; New and Renewable Energy Authority (2023), 2022 Annual report.

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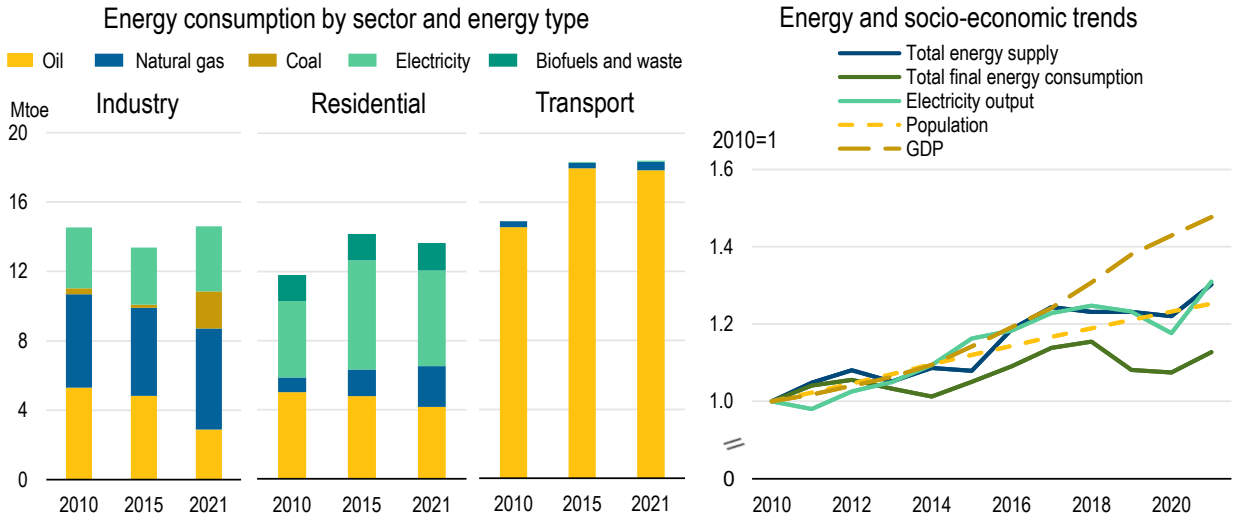
Energy use and intensities

Demand for energy services has increased rapidly in the context of population growth, economic expansion and increased industrial output (Figure 1.12). Primary energy consumption has more than doubled in the past 20 years (Government of Egypt, 2023[32]).

Most energy is consumed by the transport sector (35%), followed by industry (28%) and the residential sector (27%). The remainder is used by services and agriculture. Electricity demand is projected to continue increasing to satisfy the energy needs of a growing population coupled with growing demand for air conditioning due to high temperatures. Energy used in transport has increased rapidly in the past decade (Figure 1.12), reflecting the increasing mobility needs of a growing population and highlighting the need for improving energy efficiency in this sector. Electricity consumption in buildings soared due to the widespread use of air conditioning (Chapter 3).

Figure 1.12. Energy consumption in the transport sector has increased rapidly in the past decade



Note: The left panel shows energy consumption disaggregated by economic sectors and energy source types. The right panel shows the trends of energy and socio-economic indicators relative to 2010. GDP in USD (2017 prices and PPP).
Source: World Bank (2024), World Development Indicators (database), https://databank.worldbank.org/source/world-development-indicators; IEA (2023), "World energy balances", IEA World Energy Statistics and Balances (database), https://doi.org/10.1787/data-00512-en.

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In contrast to many African countries, Egypt achieved nearly universal access to electricity (SDG7). However, despite significant surpluses, electricity supply has been unstable. In 2023, many Egyptians experienced severe power cuts and blackouts during heatwaves, when electricity consumption for cooling soared. These difficulties during electricity peak demand indicate a need to better anticipate user behaviour and communicate load shedding plans in a timely manner.

In response to the global energy crisis, the government announced in 2022 a nationwide energy consumption rationing plan. The plan aimed to rationalise domestic power consumption (15% of natural gas usage) with a view to boosting natural gas exports to Europe. Measures targeted reducing electricity consumption in government buildings, public spaces, malls and sports facilities. This included use of daylight conditions and setting central air conditioners at no cooler than 25 degrees. Street lighting was also reduced, while sports games needed to be completed before sunset. In 2023, the government implemented additional measures. For example, it authorised some groups of employees to telework on Sundays (a regular working day in Egypt) during August. LNG exports were temporarily paused to satisfy the high domestic demand for electricity. In addition, the government increased its diesel fuel imports to balance the power grid (Government of Egypt, 2023[33]).

Considering the much higher export price of natural gas, implementing energy saving measures to reduce domestic demand is a rational choice. It could also offer an opportunity to accelerate the transition to clean energy sources and energy efficiency measures. Enhancing international interconnections could help improve energy supply security and generate higher investment returns. Ensuring a reliable energy supply for all citizens needs to remain a priority.

Energy efficiency

The Integrated Sustainable Energy Strategy 2035 sets a national goal of reducing energy demand by 18% by 2035. To that end, it counts on greater efficiency from both upgraded generation and transmission infrastructure and new technologies. Egypt is developing its third National Energy Efficiency Action Plan.

It notably aims to install 20 million smart meters within ten years (NREA, 2023[34]). The government has started establishing energy efficiency units in ministries and plans to develop a digitalised, sector-wide monitoring system. The strengthening of the institutional framework of energy efficiency is a positive development and needs to be accompanied by adequate resources and staff at all levels. A robust governance framework would help strengthen the enforcement of policies and regulations.

The petroleum sector has developed its first Energy Efficiency Strategy 2022-35 to provide guidance and rationalise the use of petroleum products following a two-stage approach. The first stage lays the groundwork for sound energy management by identifying barriers and energy saving potential of major energy consumers through sector-wide energy audits. It aims to achieve 10% of energy savings by 2027. The second stage aims at upscaling energy efficiency measures in the petroleum sector and harnessing the potential of energy savings in the transport sector. This would help the country achieve its 18% target. A Centre of Excellence of Energy Efficiency and Process Optimisation supports energy efficiency efforts in Egypt (e.g. energy audits, training for engineers), and more broadly on the African continent. In total, the Ministry of Petroleum and Mineral Resources completed 247 projects, which saved about 4 GW per year (Government of Egypt, 2023[32]).

However, energy efficiency measures remain heavily driven by donors, and companies lack economic incentives. Egypt could strengthen energy efficiency in the industrial sector in two ways. First, it could develop a standardised monitoring and reporting system. Second, it could make energy efficiency considerations mandatory in the early design phase for new industrial facilities and major rehabilitation projects. As highlighted in the strategy of the petroleum sector, stronger economic incentives, combined with rewards, could make energy efficiency measures more profitable. Even public companies – which aim to maximise production, not cost effectiveness – would benefit financially. It would also be useful to introduce Minimum Energy Performance Standards for industrial equipment (e.g. motors, pumps, compressors) along with appropriate labelling schemes (Government of Egypt, 2023[32]). The transport sector has untapped potential to improve energy efficiency by setting minimum fuel efficiency standards and energy labelling schemes for vehicles. Tightening energy efficiency standards of housing will help save more energy (Chapter 3).

1.2.5. Sustainable mobility

Mobility patterns

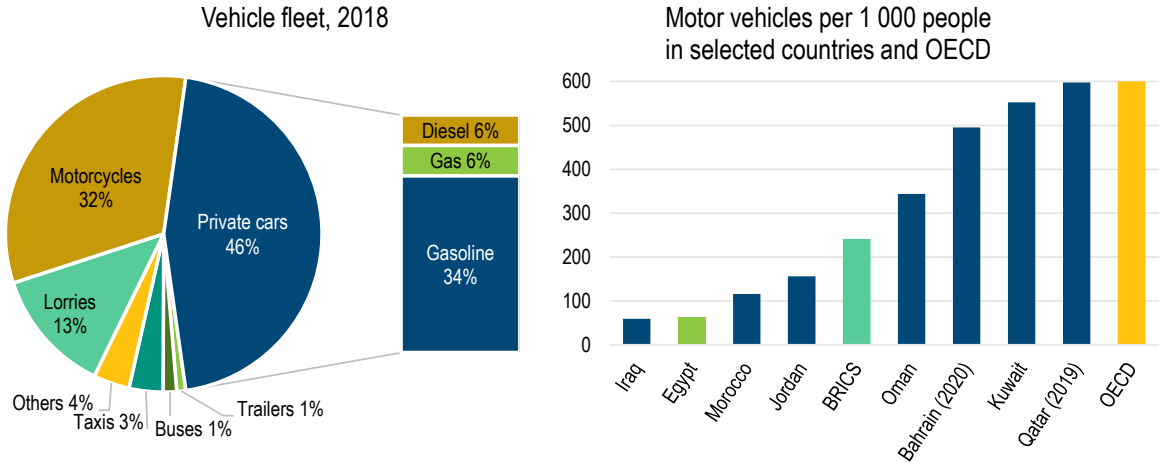
The country has a well-developed road network, one of the oldest railway systems worldwide, and a vibrant passenger and freight transport on the Nile River. Egypt has made major strides in the development of transport infrastructure over the past decade and continues to invest massively in its expansion. The National Roads Project, initiated in 2014, aimed at creating 7 000 km of new roads worth USD 11 billion (Government of Egypt, 2021[8]), while upgrading 10 000 km of existing road infrastructure. Investment in roads and bridges has increased significantly and reached USD 1.8 billion in 2020. Improved connections between cities will contribute to reducing fuel consumption, related GHG emissions and travel time. Freight transport benefits from dedicated road corridors and freight-only rail lines; it is further supported by the modernisation and expansion of maritime port infrastructure. The connection between Cairo and Alexandria has dedicated lanes for heavy-duty vehicles.

With 70 road vehicles per 1 000 inhabitants, Egypt has one of the lowest ratios of motorisation rate in the MENA region (Figure 1.13). It has a relatively large share of motorcycles given the more affordable price. Ownership of private passenger cars is projected to increase rapidly. On average, Egypt recorded 205 000 motor vehicles sales between 2018 and 2022 (CEIC, 2023[35]). These road-dominated mobility trends are a source of rising environmental pressures.

Cairo and Giza recorded together over 5.2 million cars in 2022, representing nearly half all licensed vehicles. This situation leads to traffic congestion with major adverse effects on air quality, public health,

climate and economic activity. Stronger incentives and increased road pricing are needed to better manage and rationalise travel demand (e.g. congestion charges, road tolls, street parking fees) (Chapters 2 and 3). The dense traffic situation in Cairo makes it difficult to promote active transport modes due to road safety concerns; the country has one of Africa's highest caseloads of road accidents.

Figure 1.13. Egypt has a comparatively small vehicle fleet



Note: The left panel shows composition of vehicle fleet in Egypt in 2018. The right panel shows motor vehicle per population for selected countries and OECD average. BRICS covers the non-weighted average of Brazil, Russia, India, People's Republic of China and South Africa.
Source: CAPMAS (2018), Bulletin of licensed vehicles statistics; IRF (2024), World Road Statistics 2024, https://datawarehouse.worldroadstatistics.org.

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Egypt has an immense opportunity to leapfrog towards a low-carbon transport system. All new urban settlements could be developed in a more compact, transport-oriented way that guarantees easy access to transport links. This could include a network of safe walking and cycling routes to prevent car dependency (Chapter 3). However, multiple government bodies plan infrastructure, which are resulting in complex governance. It would be useful to streamline the institutional arrangement and promote collaboration among agencies and authorities. Rather than focusing on individual outcomes, government entities should work together to develop an integrated nationwide sustainable mobility strategy to advance a low-carbon transition in the transport sector. Key elements of such a strategy include tackling accessibility, using transport planning to better control modal share and smart travel demand management. Geolocalised data on modal share (across space and time) are not yet collected regularly. This would provide a starting point to better understand mobility patterns and related transportation needs.

Decarbonising transport

The transport sector is the largest energy consumer and main consumer of petroleum products. It is also a large contributor to national GHG emissions. According to government projections, the sector's CO_2-eq. emissions will more than double between 2015 and 2030 – from 48 million tonnes to 115-124 million tonnes – depending on international financial support (Government of Egypt, 2023[16]). This would be similar to the level of transport-related GHG emissions produced in Germany, a country with a vehicle stock six times larger than that of Egypt. While Egypt's vehicle fleet will continue to increase, the government's GHG projections for the transport sector may be overestimated.[11]

The projected increase of transport-related emissions calls for urgent action to move away from reproducing car-dominated, high-carbon transport models. This would also bring significant economic and public health benefits. The government should therefore consider tightening its target for reducing emissions in the transport sector, while pursuing efforts to scale up affordable, inclusive and secure public transport options (Chapter 2).

Efforts to make the road vehicle fleet cleaner need to be expanded. In the absence of vehicle deregistration, about one-quarter of all circulating vehicles are likely over 30 years old (Harun et al., 2023[36]). Egypt has banned the import of second-hand passenger vehicles older than one year, which greatly limits the influx of additional polluting vehicles. It also implemented several nationwide vehicle scrapping programmes to remove old taxis (50 000 taxis between 2010-21), which were among the most fuel-inefficient and polluting vehicles (World Bank, 2022[37]; Harun et al., 2023[36]). However, Egypt still needs to improve the appropriate infrastructure for recycling end-of-life vehicles in a safe and environmentally sound manner. Many scrapped vehicles were only set aside for storage.

Egypt should consider upgrading its vehicle registration system through three key measures. It could collect climate-relevant information (e.g. fuel efficiency, CO_2/km, air quality certificates) more systematically. It could introduce a climate component in vehicle taxation to promote more efficient and environmentally friendly vehicles (Chapter 2). Finally, it could make deregistration of scrapped or unused vehicles mandatory. Data on the composition and evolution of the vehicle fleet need to be more detailed and accessible.

The government supported fuel switching to cleaner and more efficient fuels such as compressed natural gas (CNG). By end 2023, Egypt recorded 540 000 CNG vehicles and 1 000 CNG fuelling stations (Government of Egypt, 2023[32]). Egypt needs to pursue efforts to develop minimum fuel efficiency standards or energy labelling scheme for vehicles (Government of Egypt, 2023[32]). More particularly, the sulphur content of diesel has been reduced thanks to the upgrade of local refineries and their production capacity of low-sulphur diesel. Due to the age of the car fleet, average fuel consumption remains high, about 8 litres per 100 km (IEA, 2019[38]). The introduction of low-emission zones and diesel bans in densely populated urban areas would reduce air pollution with major health benefits for citizens. However, this would also require an efficient emission control system to enforce regulations. Therefore, it may be more efficient to pursue efforts to upgrade domestic refineries' capacity to produce cleaner diesel that complies with minimum standards. This is particularly relevant for urban areas. In line with the cities-first approach, the government should consider measures to tighten and enforce diesel fuel standards in Greater Cairo and other densely populated cities.

Electric mobility

The deployment of electric vehicles (EV) is in its infancy. Affordability and the absence of adequate charging infrastructure represent major barriers for promoting electric mobility. The EV industry also faces challenges related to the country's foreign currency crunch, as new EVs are offered only in US dollars. Providing EVs at affordable prices and developing the necessary charging infrastructure are preconditions for scaling up electric mobility. As in other emerging economies, promoting the use of electric two-three wheelers and a coherent network of urban buses would be more cost effective (OECD, 2023[39]). Advancing the electrification of road transport would have major benefits for improving air quality, especially in densely populated urban areas.

The government has strong ambitions to push uptake of EVs in the next decade. Its 2019 e-mobility strategy aims to increase the market share of private EVs to 50% by 2040 (World Bank, 2022[20]). The government has also announced plans to ban new sales of internal combustion engine vehicles beginning by 2040. A World Bank-led pilot project supports deployment of 100 electric buses across the Greater Cairo area. The government also introduced electric bus trials in Alexandria.

Economic incentives such as tax breaks, rebates and subsidies could further encourage uptake of EVs. Since 2018, Egypt has authorised the import of used EVs less than three years of age and provides customs exemptions for EVs imported from EU countries and Türkiye. In parallel, the government aims to develop local manufacturing of EVs made in Egypt, including co-operation with the People's Republic of China and India. Government subsidies could support up to one-third of local production costs of EVs. The Supreme Council for Vehicle Manufacturing and a new regulatory authority were created in 2023 to support development of the domestic automotive industry.

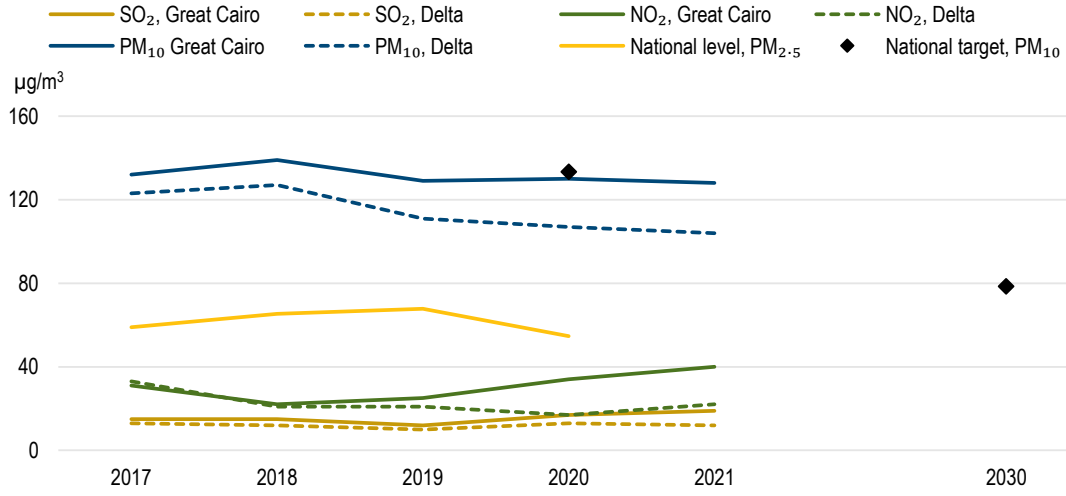
1.2.6. Atmospheric emissions and air quality

Air pollution is a major environmental challenge and health concern. Fine particulate matters ($PM_{2.5}$ and PM_{10}) are among the main sources of outdoor air pollution. Other sources are the open burning of municipal and agricultural waste, notably rice straw. Air pollution is also driven by fossil fuel combustion for energy generation. Traffic and related congestion remain one of the main sources of air pollution in urban areas, with major health impacts for citizens.

In addition to human-made pollution, Egypt is exposed to severe atmospheric air pollution from natural sources given its specific geographic characteristics. The country is almost completely located within the Sahara Desert with an average elevation of 320 metres above sea level. Like other Middle East countries, Egypt is exposed to frequent sand and dust storms, thermal inversion and high temperature exacerbating its ambulant air quality. These conditions are expected to worsen with the impacts of climate change, notably temperature increases. Due to its semi-arid climate with low rainfall, Egypt does not benefit from the effects of rain (and related wind) washing down the pollution, which may have had a small impact on reducing particulate air pollution. Policies to reduce the effects of sand and dust storms, such as monitoring and early warning systems, soil conservation, windbreaks and surface stabilisation, can improve the intensity and effect of both natural and human-made air pollution (UNCCD, 2022[40]).

Figure 1.14. Egypt met its 2020 target of reducing PM_{10} emissions

Concentration of air pollutants, 2017-21, and 2030 target for PM_{10}



Note: NO_x: nitrogen oxides; $PM_{2.5}$ and PM_{10}: particulate matters with a diameter of 2.5 and 10 micrometres or less, respectively; SO_2: sulphur dioxide.
Source: CAPMAS Annual Bulletin of Environment Statistics, Part 2: Environmental Quality and Energy 2021; Government of Egypt (2016), Sustainable Development Strategy: Egypt's Vision 2030.

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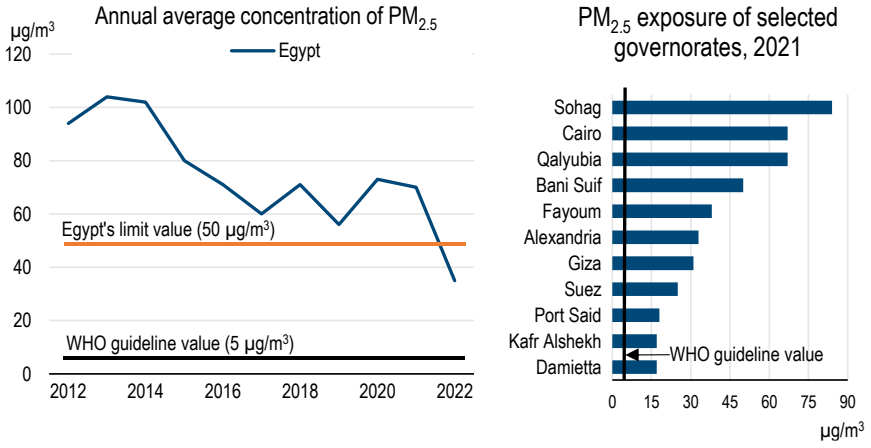
Egypt met its 2020 target of reducing PM_{10} emissions by 15% compared to 2015 levels in the Greater Cairo area and largely exceeded the target in the Delta region (Figure 1.14). However, the country still has a way to go towards achieving its goal of halving PM_{10} emissions by 2030 (CAPMAS, 2023[41]). Annual average concentration of $PM_{2.5}$ has decreased over the past decade and dropped for the first time below Egypt's national limit value of 50 µg/m³ in 2022 (Figure 1.15).

As in many other countries, strong regional disparities persist (Figure 1.15). Air quality is also subject to seasonal variations with the lowest concentrations of $PM_{2.5}$ and PM_{10} occurring in July and August, and the highest in autumn.

Figure 1.15. Air quality is moderate overall, but Egyptians are unevenly exposed to air pollution



Source: Left panel: data provided by the Government of Egypt (2024); right panel: CAPMAS (2023), Annual Bulletin of Environmental Statistics, Part 2: Environmental Quality & Energy 2021.

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Over the past decades, the government has taken several measures to improve air quality. It has focused on regulating industrial emissions, improving solid waste management, reducing road transport-related emissions and scaling up public transport options, and more recently, promoting electric buses. The government also encouraged establishment of a collection system for rice straws. This prevented the burning of agricultural waste leading to toxic emissions (black cloud phenomenon), while creating new economic opportunities for farmers.[12] Egypt has also made major strides in the area of household air pollution by promoting cleaner heating and cooking fuels and through targeted measures to keep out desert dust (Woolley et al., 2021[42]).

The Greater Cairo area remains Egypt's air pollution hotspot. In 2021, with the support of the World Bank, the government launched the Greater Cairo Air Pollution Management and Climate Change Project. The six-year project worth USD 200 million aims to reduce air and climate emissions from critical sectors and increase resilience to air pollution (World Bank, 2022[37]). Key objectives include the modernisation of Egypt's air quality management system, the construction of integrated waste management facilities and the rollout of electric buses, as well as behavioural change and awareness-raising activities to promote citizen engagement (World Bank, 2022[37]).

Air quality monitoring capacity has improved overall. Some stations have real-time monitoring capacity. The government started expanding its network of air quality monitoring stations (Government of Egypt, 2023[43]). Most stations are located in and around Cairo and other major cities; some require technical upgrades to monitor all types of pollutants. Further increasing coverage and capacity of monitoring stations is key to combat air pollution effectively.

As a next step, it would be useful to develop an integrated air pollution reduction strategy. Such a strategy could include timebound targets for all major air pollutants and an integrated vision to reconcile environmental and social dimensions with economic priorities. This would help improve policy integration, moving it beyond a series of individual projects. Moreover, it would ensure alignment between local clean air initiatives and broader national development objectives, particularly industrial development. The maximum limits of outdoor air pollutants, defined in Egypt's Environmental Law no. 4 of 1994, would need to become more stringent to approach international standards (Government of Egypt, 1994[44]). MoE has started publishing air pollution updates through various communications channels. These efforts need to be pursued at local level. This would help vulnerable people cope with high pollution days and to protect themselves by wearing masks and staying inside.

1.3. Transition to a resource-efficient economy

1.3.1. Waste management

Like many emerging economies, Egypt faces major challenges in making waste management more sustainable. Significant portions of waste are not yet properly managed. Most waste goes to landfills and illegal dumping sites or is openly burned despite long-standing laws against the practice (Government of Egypt, 1994[44]). Landfilling remains the primary form of waste treatment in Egypt. The country has a way to go to achieve its 2030 target to reduce the share of landfilled waste to 20%. Moreover, some landfills lack basic sanitary standards. The MoE has developed extensive rehabilitation requirements (e.g. location properties, operation requirements, safety measures, data records and payment system); implementation should be accelerated. Egypt also needs to pursue efforts to deal with historic waste accumulation in open dumps to prevent grave health and environmental deterioration in some governorates.

High landfilling rates, the lack of separation of bio-waste and open waste burning, notably agricultural waste, contribute to making the waste sector a significant emitter of GHG emissions. Waste contributed to about 8% of total GHG emissions in 2015, above the OECD average of 3% (Government of Egypt, 2018[13]). High population growth, industrial activity, urbanisation, changing consumption patterns and limited awareness of citizens are among the multiple factors that amplify Egypt's unsolved waste problems.

According to government estimates, Egypt generated 95 million tonnes of solid waste in 2018. Key waste streams include agricultural waste (34%), waste from cleansing of canals and irrigation networks (28%), municipal solid waste (23%), construction waste (6%), industrial waste (5%) and sludge (2%) (Government of Egypt, 2018[45]) (Figure 1.16). Organic waste represents between 55-60% of waste, followed by plastics (13%). Hazardous waste accounted for less than 1% but is set to grow more rapidly.

Estimates of waste data are inconsistent and it remains unclear how much waste is produced, collected and disposed of per year. Precise data of different types and quantities of waste per sector and per governorate, as well as different waste treatment modes, are only partially available. This gap is also due to unknown amounts of non-collected waste and the informal waste sector. The situation highlights the need for harmonised definitions, calculation techniques and weighting facilities at disposal sites to develop accurate statistics on different waste streams and waste treatment modes (Nassar, Biltagy and Safwat, 2023[46]). It would be useful to produce standardised waste profiles at governorate level. In addition, Egypt could work towards an integrated waste information system that records harmonised data on waste generation and waste treatment across the country. Meanwhile, a digital platform could provide access to key information and promote mutual learning among municipalities.

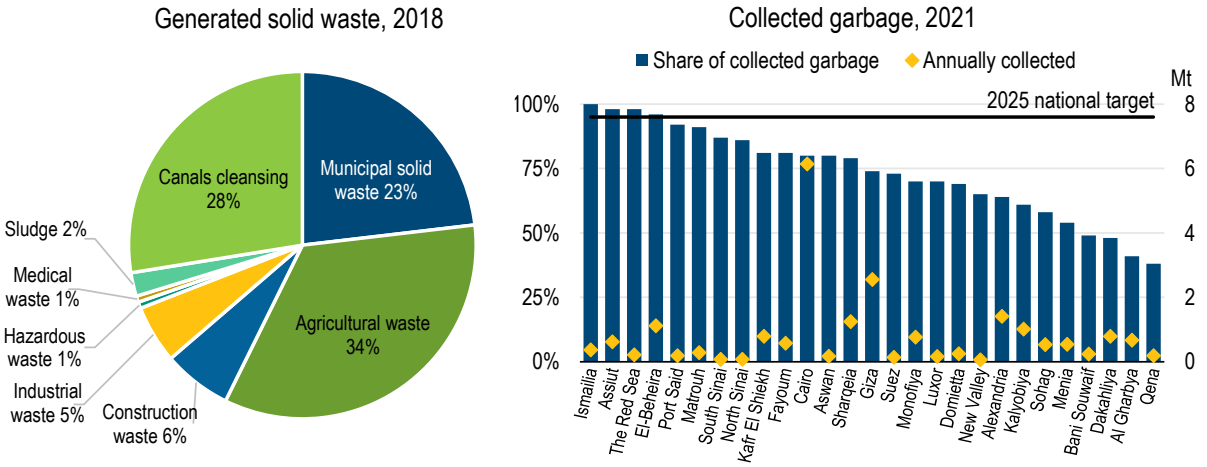
Municipal solid waste

In 2021, Egypt generated an estimated 21.2 million tonnes of municipal waste. Municipal solid waste levels have increased and will continue to grow in the context of rapid population growth, urbanisation and changing consumption patterns. For example, the city of Cairo produced on average 17 850 tonnes of waste per day in 2021. This represented a 2.7% increase from 2020 levels and about one-quarter of total municipal waste (CAPMAS, 2023[47]). According to national estimates, Egypt produced on average about 251 kg of municipal waste per capita in 2021 (Government of Egypt, 2023[48]), which is less than half of the OECD average of 534 kg (OECD, 2023[49]). While richer economies typically produce more municipal waste per capita, some of Egypt's municipal solid waste remains unregistered as collection capacity remains insufficient; therefore, any comparisons should be made with caution.

Moreover, regional disparities are strong. In 2021, four governorates (Cairo, Kalyoubia, Giza and Alexandria) collected nearly half of total waste. Collection rates vary widely from less than 40% to nearly 100% (Figure 1.16). Efforts to increase capacity and establish a nationwide waste collection system are under way.

Recycling capacity remains weak overall. The CAPMAS report estimates the recycling rate of solid municipal waste at 15.9% in 2021 (or 12 140 tonnes per day), while Egypt's 2021 Voluntary National Review of SDGs acknowledges "significant potential for improvement" with an estimated recycling rate of solid waste of 2.5% in 2017 (Government of Egypt, 2021[8]). Increasing waste separation at the source would greatly help reduce the volume of landfilled waste and enable easier recycling and disposal.

Figure 1.16. Collection capacity of municipal waste varies across governorates



Note: Garbage is defined as solid or semi-solid materials left behind from normal daily human activities.
Source: CAPMAS (2021), Annual Bulletin of public utilities services at the level of cities and districts councils; Ministry of Environment (2018), Business opportunities: Economic business models in Egypt's recycling sector for startups and SMEs.

StatLink https://stat.link/byz6j9

Waste management policies and measures

Egypt's updated Vision 2030 aims to raise the efficiency of the waste management system and promote an economy-wide shift to circularity. Sustainable waste management is one of four strategic objectives within the sustainability pillar (CAPMAS, 2023[41]). The second updated NDC sets specific targets for improving waste management. The government aims to reduce waste directed to landfills by upgrading its

solid waste management infrastructure, increase the amount of collected waste from 55% to 95% between 2022 and 2025, and expand recycling and energy recovery rates (Government of Egypt, 2023[16]). It notably intends to create new fixed and mobile transfer stations; gear up mechanical and biological treatment plants to use at least 60% of collected waste; and pursue the closure of uncontrolled dumpsites. In addition, the government aims to increase the waste-to-energy contribution of solid waste management up to 20% of collected waste by 2026. To achieve these ambitious targets, the government will need to increase considerably public financial resources and incentivise private investment. These could be more easily mobilised when waste is seen as a marketable resource (Nassar, Biltagy and Safwat, 2023[46]). Egypt also benefits from the support of several development partners.

Egypt has achieved an important milestone with its adoption of the new Waste Management Law no. 202 of 2020. The law clearly attributes roles and responsibilities of different institutions involved in waste management, while opening up opportunities for private sector investment. As the country's first solid waste management legislation, the new law mainstreams previously scattered regulations. One of its goals is to develop integrated management of municipal, industrial, agricultural, demolition and construction waste to ensure their safe disposal. The 2020 law expressly prohibits open burning of waste; the throwing, sorting or treating of municipal waste except in designated places; and the dumping of agricultural waste into waterways and other unauthorised places. It also introduces measures to reduce single-use plastic bags; a dedicated fund for municipal waste collection in each governorate; a "Green Label" certification to reduce industrial waste; and extended responsibility for producers. The law sets requirements on how to handle hazardous waste. In addition, the MoE launched a "No-to-plastic" awareness campaign.

The new Waste Management Regulatory Authority (WMRA), under the auspices of the MoE, covers a wide range of responsibilities. It notably designs and implements a national strategy for integrated waste management, overseeing regulation of the sector and attracting new investors. Master plans at governorate level will complement a national master plan for municipal waste management. Moreover, several efforts to formalise the sector are underway (Chapter 3).

Despite progress, Egypt is far from leveraging the full potential of waste management tools. Such tools, for example, could separate waste at source, provide economic incentives to make recycling more attractive, and manage pollution taxes, pay-as-you throw mechanisms and extended producer responsibility schemes. Like other countries, Egypt has huge potential to better apply the waste hierarchy and move towards circularity.

1.3.2. Sustainable agriculture

Agriculture is one of the sectors most vulnerable to the impacts of climate change, while remaining a GHG emitter, a major source of pollution and a large user of land, water and energy. It also plays a key role for rural employment, contributing to 11.5% of national GDP boosted by agricultural exports (e.g. citrus, potatoes, olives, onions, garlic). Over 80% of Egyptian farmers are smallholders cultivating less than 3 feddan (1.3 ha) of arable land using conventional irrigation. Achieving food security and improving the livelihoods of rural people are core challenges of the agricultural sector. The government has set ambitious goals for the agricultural sector to lift 2.6 million people out of poverty and to create another 2 million new jobs by 2030 (Government of Egypt, 2020[50]). It also aims to increase the sector's contribution to national GDP to 15% by 2030.

Agricultural productivity has increased significantly over the past decade. However, the sector faces increasing pressure to improve agricultural performance to feed a larger number of people in the context of limited areas of arable land. Fertile agricultural land is confined to the Nile Valley and its Delta ("old land"), as well as a few oases and some arable land in Sinai. Nearly all cultivated areas are under irrigation. Crop intensity is high, reaching about 180%, with up to three harvests per year. However, Egypt also records high food losses along the value chain, estimated at 20% on average and up to 30% for more perishable foodstuffs such as fruit and vegetables (Government of Egypt, 2020[50]).[13]

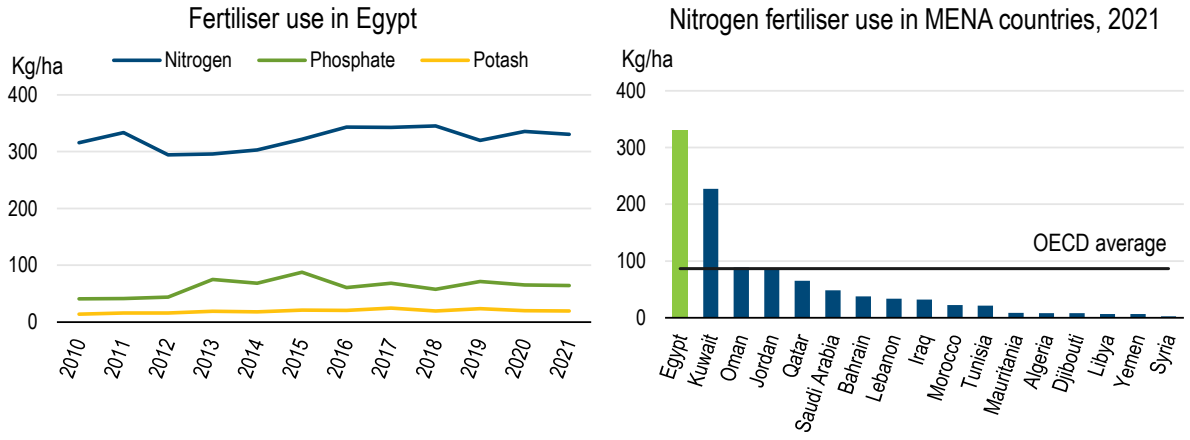
In response to these growing pressures, Egypt increased the surface of cultivated areas from 8.7 million feddan to 9.4 million feddan between 2010 and 2020. This includes 3.3 million feddan of new lands, converting desertic areas to agricultural land. The government aims to gain an additional 1.5 million feddan of new land for agricultural purposes and another 0.5 million feddan in North and Centre Sinai by 2030. These gains would take the share of new lands from about 33% to nearly 50%. Egypt gives high priority to land reclamation and horizontal agricultural expansion. However, it needs to continue improving resource efficiency and total factor productivity to create higher value with less land and water per unit. It also needs to strike a balance between ambitious agricultural export objectives and the need to satisfy increasing demand on the domestic food market, while ensuring sustainability of the natural resource base.

The government has a series of mega projects to increase local production of strategic food commodities (e.g. wheat, vegetables, livestock, fisheries). It aims to increase annual wheat production by 33% from 9.2 million tonnes in 2020 to 12.2 million tonnes in 2030 to reach a self-sufficiency ratio of 67% (Government of Egypt, 2020[50]). Agricultural expansion and crop maximisation have received far more policy attention than improving environmental sustainability. This creates a vicious circle as unsustainable farming practices and the impacts of climate change contribute to deteriorating agricultural land, threatening the long-term sustainability of production.

The level of agricultural pollution remains unknown. Many governorates do not yet monitor key indicators from diffuse pollution from agriculture (e.g. nitrogen and phosphorus concentration) (CAPMAS, 2023[41]). The national project for updating agricultural land maps includes many important measures. These range from geographic information system training for civil servants to awareness-raising campaigns on the importance of conserving agricultural land. Increased use of remote sensing systems will allow monitoring the degradation of soils due to salinisation, sand drift or encroachment of urban areas on agricultural land. The updating of agricultural maps could also provide an opportunity to improve understanding of pollution levels from agricultural activities across the territory. Co-operation between the Ministry of Agriculture and Land Reclamation and the MoE and EEAA needs to be strengthened.

Egypt has one of the world's highest rates of nitrogen fertiliser use per hectare of crop. It used on average 330 kg/ha, far above the MENA average (Figure 1.17). This has major negative impacts on soil and water quality. Better knowledge and an improved agricultural policy mix could help farmers optimise use of fertilisers. This could be achieved through a comprehensive offer of training for farmers, while phasing out fertiliser subsidies.

Figure 1.17. Egypt's nitrogen fertiliser use is among the highest worldwide



Note: Fertiliser use per cropland area. MENA: Middle East and North Africa. The OECD average is the non-weighted average.
Source: FAO (2024), FAOSTAT (database), www.fao.org/faostat/en/#data.

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The government has raised prices of fertilisers significantly over the past decade, mainly due to increased production costs, which contributed to reducing wasteful consumption. Within its efforts to promote sustainable agriculture, the government foresees rationalising use of mineral/chemical fertilisers and expanding use of organic and biological fertilisation. It also plans to create guidelines for most agricultural lands. However, it has not yet set specific targets or measures to incentivise farmers to apply fertilisers more sensitively. Moreover, Egypt has an overproduction of fertilisers, and the government plans to further scale up national fertiliser production for export.The promotion of organic farming has been struggling with low productivity, and lack of appropriate marketing structures and certification schemes. A law on organic farming, adopted in 2020, aims to limit the negative impacts of traditional farming methods dependent on chemicals in planting and animal feeding. However, implementation is falling behind. Organic certified agriculture land accounted for an estimated 160 000 ha in 2018 (GIZ, 2018[51]). While the share of organic farming remains modest, Egypt has one of the largest surfaces dedicated to the practice in Africa. The government set a target of converting 20% of land to sustainable agriculture by 2030, including 350 000 ha dedicated to organic agriculture, which would more than double the current surface. Together with Tunisia and Morocco, Egypt is one of the first African countries to regulate the sector and establish a certification system to guarantee credible quality of organic products for consumers.

Policy measures to develop climate resilience

Egypt's 2030 Updated Sustainable Agriculture Development Strategy, published in 2020, places a stronger emphasis on the environmental dimension and climate adaptation measures to make the agricultural sector more resilient (Government of Egypt, 2020[50]). Sustainable management of natural resources and adapting the agricultural sector to climate change and mitigating its impacts are among the six strategic objectives. The strategy includes an action plan for 2020-25 and 2025-30 with detailed objectives, key performance indicators and a monitoring system. It also provides a strategic framework for climate risks and adaptation to climate change in the agriculture sector. However, national projects mainly focus on agricultural expansion and less on climate-relevant aspects.

The second updated NDC does not include any climate mitigation measures for the agricultural sector (Government of Egypt, 2023[16]). In contrast, nearly all adaptation measures focus on improving water management; costs of adaptation in the agricultural sector until 2030 are estimated at USD 14.5 billion. Key projects within the NDC include enhancing agricultural production in the Valley and Nile Delta regions, rehabilitating agricultural areas in the northern Delta affected by sea level rise, combating desertification, improving water harvesting and developing on-farm irrigation. Early warning systems, improved weather forecasting services and agricultural insurance systems against climate risks are still in their infancy. These are important measures to make the sector more climate resilient. The government could provide further incentives for farmers to adjust their cropping system and on-farm water management practices.

Egypt has scope to further rationalise water use in the agricultural sector. Old lands continue to apply traditional irrigation methods. Current efforts to upgrade and rehabilitate canals in the Delta regions are necessary. In line with the Sustainable Agriculture Development Strategy's absolute priority given to the management of scarce water resources, Egypt is exerting efforts to upscale the use of modern irrigation technologies. This should be combined with price signals to rationalise water usage (OECD, 2015[52]). Egyptian farmers only bear the on-farm irrigation costs and do not pay for water used in their farms (Moh and Saleh, 2018[53]). Agricultural water allocation reform could help incentivise adoption of climate-smart technologies (World Bank, 2022[20]). The action plan sets out a target of establishing modern irrigation schemes for sugarcane and orchard trees for a total surface of 1.1 million feddan by 2030 (Government of Egypt, 2020[50]). In parallel, the government plans to set up improved surface irrigation for 4.3 million feddan to improve on-farm agricultural practices. Within Egypt's Future Project for Agricultural Production, some 2.2 million feddan in Al Dabaa will be designed to maximise irrigation efficiency by up to 90% by 2030. Smart irrigation systems consider the degree of soil moisture, the level of salinity and temperature when calculating water requirements.

While domestic seed production has increased and is regulated, information remains scattered. Egypt should update seed policy periodically and ensure that its seed sector remains fit for purpose and adapts to changing environmental and climate conditions (Thijssen et al., 2023[54]). Awareness of quality seed and new varieties, as well as access to climate-resilient varieties, needs to be further improved and promoted, for instance, through mobile applications.

Despite reforms, the state remains heavily involved in influencing market prices for key crops through price and procurement policies, as well as consumer subsidies (OECD, forthcoming[55]). For instance, agricultural co-ops distribute farm inputs such as seeds, fertilisers and pesticides at village level based on fertiliser maps for each crop. Membership is mandatory for farmers. In 2020, the government introduced an electronic smart card for farmers, which allows them to buy subsidised fertilisers. In turn, Egypt does not have any legal entity to represent the interests of farmers. Like newly created associations that benefit water users, independent associations for small-scale farmers could provide advice, mutualise investment costs and create new economic opportunities along supply chains. Smallholders usually struggle to access financing for investments in climate resilience. Much agricultural support targets large-scale projects; better targeting support to improve the productivity and sustainability of existing farms can accelerate the transition to sustainable agriculture.

1.4. Managing natural capital

1.4.1. Sustainable water management

Water supply and consumption

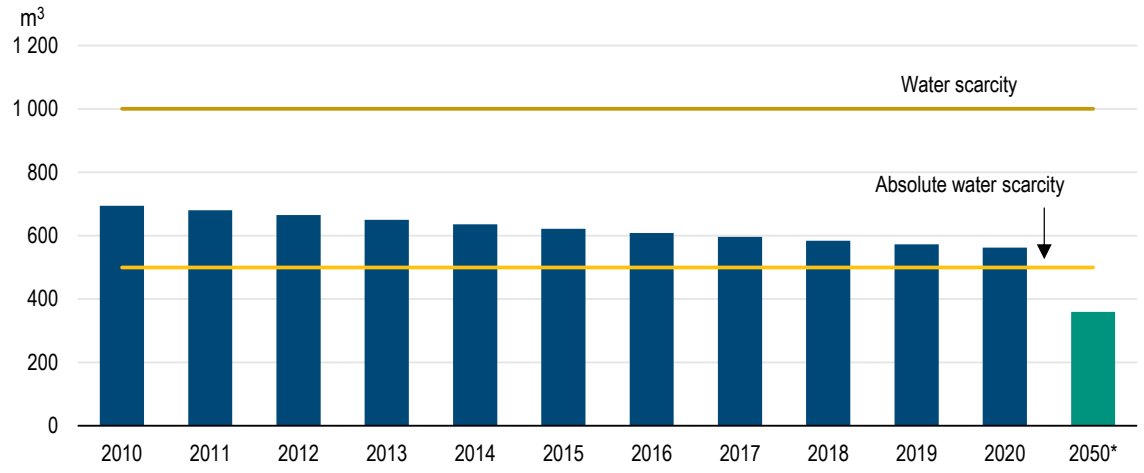
Egypt is among the world's most water-scarce countries. It depends heavily on a single water source, the Nile River, making it vulnerable to upstream developments as witnessed in the controversy over the Grand Ethiopian Renaissance Dam. At 97%, Egypt has one of the highest water-dependency ratios in the Arab region (UNDP, 2013[56]). Consequently, transboundary water considerations are of paramount importance.

Unlike many African countries, Egypt is faced with physical scarcity of water. In the context of rapid population growth and limited availability of freshwater resources, the per capita share of available water has been declining. The country is moving towards absolute water scarcity (less than 500 m^3 per capita of annual water supply) (Figure 1.18). The government estimates that annually available freshwater resources will shrink to only 360 m^3 per capita by 2050, with an estimated population of 170 million people.

Water scarcity is mainly triggered by the country's arid climate conditions posing a major threat to rural livelihoods, which remain heavily dependent on agriculture. The impacts of climate change (e.g. higher evaporation rates, changes in seasonal precipitation) exacerbate this difficult situation, as outlined in the National Climate Change Strategy 2050 (Government of Egypt, 2022[24]).

Figure 1.18. Egypt faces absolute water scarcity with a decreasing per capita share of water

Renewable water resources per capita



Note: *2050: government estimate.
Source: World Bank (2024), World Development Indicators (database), https://databank.worldbank.org/source/world-development-indicators.

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Water demand largely exceeds renewable freshwater supply in Egypt. In 2022, the total annual water supply from conventional water sources was estimated at 59.7 billion cubic metres (BCM), with the bulk of freshwater coming from the Nile River (55.5 BCM or 68%) (CAPMAS, 2023[41]). Demand for water is estimated to reach 90-100 BCM by 2050 (Government of Egypt, 2021[57]). While agriculture accounts for about three-quarters of total water use, the share of households is increasing rapidly (CAPMAS, 2023[41]).

The significant gap between freshwater supply and demand highlights the importance of developing non-conventional water resources. Reuse of agricultural drainage water and treated wastewater can help satisfy an ever-growing demand for water. While the share of water produced from desalination efforts (0.35 BCM) remains negligible, it has been growing rapidly. Beyond the expansion of water supply, the country will also need to improve demand management (e.g. more efficient water distribution networks, water-saving irrigation technologies, water metering). Rapid urbanisation increases pressure on local authorities to develop efficient local water management systems.

Policy framework and measures for sustainable water management

Since the early 1980s, Egypt has developed a comprehensive legal framework to manage its scarce water resources. The Resources and Irrigation Law, ratified in 2021, is a major step forward to unify attempts to improve water use and protect the quality of water bodies. It includes provisions for water user associations and climate change adaptation (e.g. management and protection of coasts; protection from risks of heavy rainfall and flash floods).

The 2050 Water Strategy, supported by the National Water Resources Plan 2017-37, sets out the main strategic goals and framework for water management. It aims to achieve water security for all Egyptians by promoting sustainable management of water resources. To that end, it brings together key stakeholders concerned with water management under a single umbrella. The strategy builds on four pillars: i) developing water resources; ii) enhancing water quality; iii) rationalising water uses; and iv) creating an enabling environment. It includes a series of measurable targets and a monitoring and evaluation system.

As in many other countries, various government entities address water issues. Chiefly, the Ministry of Water Resources and Irrigation manages water. However, three other ministries play key roles: MoE, the Ministry of Health and Population and the Ministry of Housing, Utilities & Urban Communities. In addition, specialised technical agencies have responsibilities, including the EEAA, WMRA, the Egyptian Water Regulatory Agency, the Holding Company for Water and Wastewater (HCWW) and the National Water Research Center. Water-related data and information remain scattered across government bodies, making them difficult for the public to access.

Overall, the government intends to invest USD 50 billion in the water sector, supported by many development partners (CAPMAS, 2023[41]). Implementation involves participation of nine different ministries, including housing, agriculture, health, environment and planning. Effectively managing competition for scarce water resources across uses (agriculture, industry, domestic supply and ecosystem services) and addressing potential trade-offs would be an important step towards integrated water resource management. Water and climate change are inextricably linked. Consequently, nearly all adaptation activities proposed within Egypt's updated NDCs have a water dimension (Government of Egypt, 2023[16]).

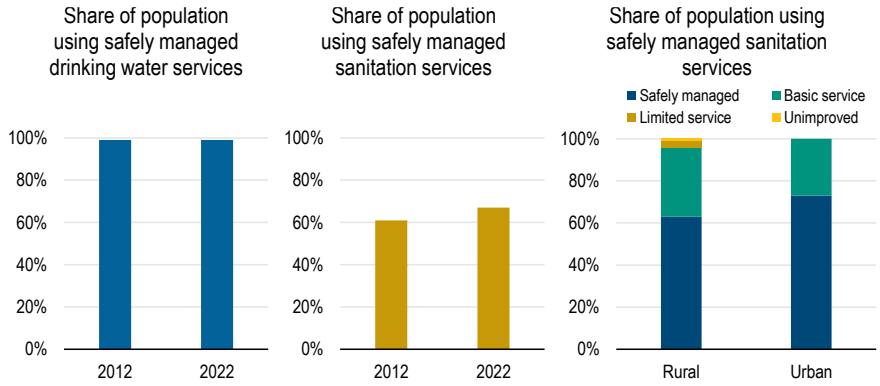
Egypt has developed many ambitious water projects over the past decade. The National Canal Lining Project, launched in 2020, has a budget of EGP 80 billion (USD 2.6 billion). As one of Egypt's biggest water projects, it aims to rehabilitate 20 000 km of irrigation canals by 2024. About a quarter of this total had been completed at the end of 2022. The project will raise water use efficiency and improve water distribution equity, especially for farmers at the end of canals. It will also increase land productivity, restore the shape of canals and reduce water pollution (Government of Egypt, 2021[8]). However, the impacts of modern irrigation systems are complex, and sometimes alter cropping and water application decisions by farmers, inadvertently increasing water scarcity. Moreover, increased irrigation efficiency reduces return flows, which must be carefully considered in allocation arrangements.

In parallel, the government also plans to quadruple its desalination capacity within the next four years to promote water security for its coastal cities (Chapter 3). Given the significant investment in large water infrastructures, the costs and benefits of such projects need careful evaluation and integration into a long-term investment strategy. Beyond investments in water supply projects, a stronger focus on water allocation planning and demand-management policies is needed (OECD, 2015[52]). Egypt could conduct a regular "health check" for water resources allocation in line with OECD best practices (OECD, 2015[52]). Raising citizens' awareness of the value of water and water-wise practices should remain a priority.

Water and sanitation services

Egypt achieved nearly universal access to safe drinking water over a decade ago and is working to ensure the sustainability of drinking water in accordance with national laws and regulations. It is also one of the rare African countries on track to achieve universal basic sanitation by 2030 (UN, 2023[58]). To date, about two-thirds of the population use a safely managed sanitation service (Figure 1.19). About 90% of the population has a handwash facility with soap and water available at home (UN Water, 2023[59]). Disparities between urban and rural areas have been reduced. Much of these achievements are related to the Haya Karima Initiative (Box 1.1).

Figure 1.19. Egypt is on track to achieve SDG 6 on clean water and sanitation



Source: UN (2024), UN Water SDG 6 Data Portal, https://sdg6data.org.

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Egypt needs to improve the efficiency of public water supply and move towards a more sustainable financial management of water and sanitation services (WSS). The state-owned HCWW introduced several reforms to raise water tariffs for WSS and make the sector more financially viable. Most urban households have metered, private connections to a piped water network and are connected to the sewage system. Egypt has developed a progressive water tariff system that guarantees a low tariff rate to cover essential household water needs. High-use consumers pay nearly five times more on their water bills, cross-subsidising the reduced-rate bracket. Water tariffs are also adjusted to different sectors (Table 1.3).

Despite price increases, WSS tariffs do not reflect the full financial cost of services and continue to be subsidised by the government.[14] Experience in OECD countries shows that tariffs are best designed if they manage to secure sustainable financing for service provision; while complementary social measures can target vulnerable groups to address affordability issues (Leflaive and Hjort, 2020[60]). Greater predictability and transparency of tariff increases, along with ensuring reliable, quality of service, could make such increases more socially acceptable (Alternative Policy Solutions, 2019[61]). Government efforts to increase cost recovery should also be informed by long-term strategic financial planning for water infrastructure investment, including climate adaptation.

Table 1.3. Water tariffs are adjusted to consumption levels and reflect different types of usage

Trends in household water tariffs		
Consumption (m^3/month)	Before 2018(EGP)	Since 2018 (EGP)
0-10	0.45	0.65
>10 – 20	1.20	1.60
>20 – 30	1.65	2.25
30-40	2.00	2.75
>40	2.15	3.15
Sewage fee	63%	75%
Sector-specific water tariff trends		
Sector	Before 2018 (EGP)	Since 2018 (EGP)
Service	0.45	3.30
Government	1.20	3.40
Commercial	1.65	3.40
Industrial	2.00	4.55
Tourism	2.15	4.60
Sporting and social clubs	-	10.00
Sewage fee	92%	98%

Source: (Mada Masr, 2018[62]); government submission (2024).

Water quality and wastewater treatment

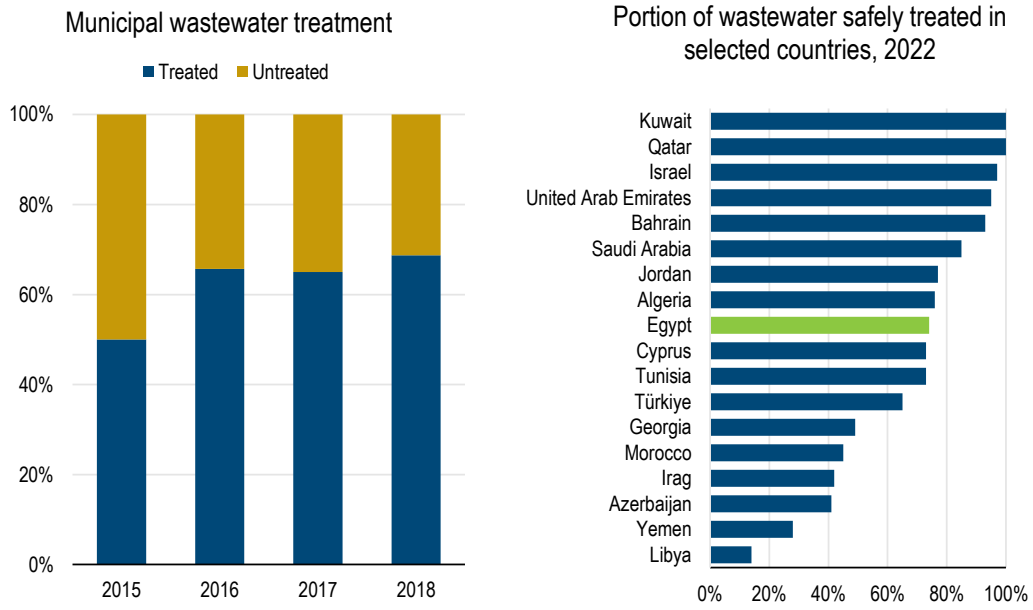
Water quality indicators for the Nile River met most of the national limits in 2021 (CAPMAS, 2023[41]). Water quality standards are defined from executive regulations for different types of water bodies. Over the past decade, Egypt has improved considerably its monitoring capacity, providing an increasingly robust understanding of the state and evolution of water quality. However, many governorates still lack values for nitrogen and phosphorus balances (CAPMAS, 2023[41]). Groundwater and soil quality in the Delta region are also increasingly affected by sea water intrusion, leading to high salinity levels.

Pollution in the Nile River has decreased, thanks notably to increased control of industrial wastewater and growing wastewater management capacity. The new irrigation law also focuses on water quality conservation and pollution control. However, some companies still discharge industrial wastewater with partial treatment. They work towards implementing action plans to achieve full compliance. The government provides technical and financial support to factories to develop industrial wastewater treatment processes and zero liquid discharge systems. There are also dedicated efforts to address pollution in specific drains that need immediate intervention due to critical water quality. The government is reinforcing the polluter pays principle by tightening the penalty for factories whose waste discharge, whether liquid or solid, leads to pollution of waterways (Government of Egypt, 2016[63]; AfDB, 2022[5]). Volunteer initiatives such as “Very Nile” contribute to cleaning the Nile River from solid waste (Government of Egypt, 2021[8]). Since its creation in 2018, local fishers collected over 100 tonnes of plastics to clean the Nile. Another recent initiative aims to ban single-use plastic bags from the Zamalek Island in the heart of Cairo.

The share of treated wastewater grew constantly from 50% in 2015 to 74% in 2022 (Figure 1.20). This is below the OECD average but better than many other countries in the Arab region (UN Water, 2023[59]). Egypt invested in a series of mega projects to enhance its water treatment and reuse capacity across its territory (e.g. Bahr El-Baqar treatment plant, West Delta El Dabaa plant, Elmahsama plant). Several projects target rural areas (e.g. Sustainable Rural Sanitation Services Project, depollution of the Kitchener Drain in the Delta region, wastewater development in Upper Egypt). By 2030, Egypt aims to maintain or enhance the water quality in all surface water sub-systems. It seeks compliance with the Law of

Environment for 85% of surface water sub-systems by 2037 (Government of Egypt, 2021[57]). Despite progress, the country still has a way to go to further improve its water quality.

Figure 1.20. The share of treated wastewater has been growing but requires further improvement



Source: UN Water (2023), SDG 6 Snapshot in Egypt, www.sdg6data.org/en/country-or-area/Egypt.

StatLink https://stat.link/09s3me

1.4.2. Biodiversity

Despite being an arid or semi-arid country, Egypt is biodiverse with around 140 types of globally important species. With a coastline of over 3 000 km, Egypt has a rich diversity of marine life, with over 5 000 species in Egyptian waters. According to government estimates, this includes more than 1 700 different species of fish, about 1 400 species of seaweeds and seagrasses, 220 hard species of coral, 800 species of soft coral and many other marine invertebrate fauna creatures. The Red Sea is one of the world's most important repositories of marine biodiversity. The coastline also offers a variety of habitats, including coastal lakes, mangrove, seagrasses, salt marshes, mudflats, sand dunes and beaches.

Egypt counts five major habitat systems. The desert is the dominant habitat system, covering about 87% of the total area. It is followed by the marine habitat system and wetlands. The fourth and fifth systems – artificial habitat and freshwater habitat – are among the smallest habitat systems in Egypt. Egypt's rich marine ecosystem plays a pivotal role in attracting tourism. At the same time, unregulated tourism can be a major driver of biodiversity loss and degradation (both species and ecosystems). Since tourism-related businesses depend on biodiversity, nature conservation should become a key priority of the industry. Over the past decade, the MoE and Ministry of Tourism have increased co-operation to help the sector become more sustainable.

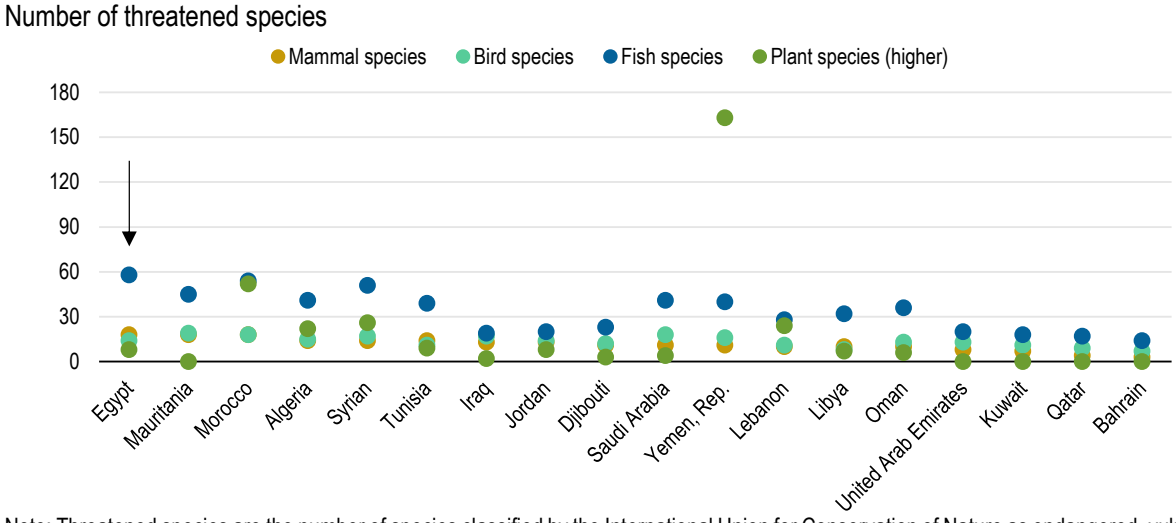
The main direct causes of biodiversity loss are connected to human activities. Land-use change related to urban and agricultural expansion, as well as associated use of pesticides and fertilisers, causes alternations and reduction of ecosystem services of natural habitats. All types of pollution (air, water, soil) negatively affect plant and animal species. In addition, ongoing desertification and climate change exacerbate biodiversity loss. The conversion of natural land area along coastal areas has had a large

impact on coastal and marine species and habitats in some areas. While none of the largest oil spills recorded globally has occurred in Egyptian waters, about a dozen smaller oil spills were recorded in Egyptian Red Sea waters between 2013 and 2017. Houthi attacks on cargo ships represent a new risk for oil spills and other leaks in the southern Red Sea as witnessed in early 2024 (Goodman, 2024[64]).

Threatened species

According to national estimates, over 40 species are under pressure in Egyptian coastal and marine environment, including marine mammals (17 species), marine turtles (4 species), sharks (more than 50 species), sea cucumber, special bivalves, coral reefs, mangrove trees and many birds (Government of Egypt, 2016[63]). Many fish species are in decline (Figure 1.21). This is mainly due to the unsustainable use of water resources (e.g. overfishing, fishing in illegal areas) and coastal pollution. Specific protection, management and restoration efforts will be required to recover certain economically important fish species (Government of Egypt, 2016[63]). Moreover, about one-quarter of sharks are endangered. Shark attacks have recently been on the rise on the Egyptian coasts of the Red Sea. In response to this threat, the government has funded research to better understand the behavioural changes of sharks (Government of Egypt, 2023[65]). Enforcement of regulations for wildlife protection and prevention of overfishing also needs to be stepped up.

Figure 1.21. Many Egyptian fish species are threatened



Note: Threatened species are the number of species classified by the International Union for Conservation of Nature as endangered, vulnerable, rare, indeterminate, out of danger or insufficiently known.
Source: World Bank (2024), World Development Indicators (database), https://databank.worldbank.org/source/world-development-indicators.

StatLink https://stat.link/eyo051

While several national lists on different species exist, Egyptian scientific institutions and the International Union for Conservation of Nature have not jointly adopted an official national Red List of species. However, over the past decade, knowledge about the health of species and ecosystems has improved overall. Several research programmes aim to assess the status of species in terms of density and prevalence rate across Egypt's natural habitats. Among other areas, monitoring focuses on Egyptian gazelles, crocodiles, waterfowls, coral reefs, sharks and desert plants. A solid evidence-based analysis is needed to help set priorities for conservation action plans for protection of species and ecosystems, as well as ecosystem restoration. A monitoring system to regularly update assessment criteria can support the decision-making process.

Measures and policies

Egypt has been committed to protecting biodiversity and implemented many biodiversity conservation measures. It launched its first National Biodiversity Strategy and Action Plan in 1998 (Government of Egypt, 1997[66]), developing an updated strategy and action plan in 2016 covering 2015-30. The government has started another update to reflect the new commitments of the Kunming-Montreal Global Biodiversity Framework. Moreover, the updated Vision 2030 indicates a new target for protected marine areas aimed at increasing the share to 40% by 2030, which would be well above the collective global goal of 30%. Egypt is a party to the Convention on Biological Diversity and signed many international conventions (e.g. Ramsar Convention on Wetlands, Convention on the Conservation of Migratory Species of Wild Animals and the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention), African-Eurasian Migratory Waterbird Agreement and the Gulf of Aden Environment "Jeddah Convention").

Box 1.3. ECO EGYPT, an ecotourism experience

Within the Mainstreaming Biodiversity in Egypt's Tourism Project, ECO EGYPT was implemented by Egyptian Environmental Affairs Agency and the United Nations Development Programme with funding from the Global Environment Facility. It involved co-operation between the Ministry of Environment, the Ministry of Tourism and Antiquities, and the State Ministry of Information.

The campaign was based on four pillars:

- See: explore 13 protected areas across Egypt.
- Do: participate in a variety of eco-activities in different sites.
- Meet: discover the lifestyle of local communities, learn about their culture and tradition.
- Stay: at authentic camps or ecolodges.

ECO EGYPT helped attract tourists to ecological sites and protected areas while strengthening economic development of local communities within an integrated approach. It included the Tribal Talks campaign, offering a series of short videos to shed light on Egypt's diverse local communities.

Among other outcomes, the campaign led to adoption of several decrees, including banning of single-use plastics in South Sinai. Moreover, the first Red Sea Marine Conservation campaign in MENA was launched in 2021 to help protect the Red Sea's marine and coastal environment. As a next step, it would be useful to take stock of the outcomes of the campaign and sustain results. The government intends to pursue the campaign beyond the initial three-year implementation period.

Source: (UNDP, 2020[67]).

Egypt participates in the Ramsar and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. It is also a member of PERSGA, a regional organisation for conservation of the environment in the Red Sea and Gulf of Aden. However, implementation of commitments has been lagging in many areas, notably due to limited financial and human resources. Local expertise needs to be further strengthened to ensure sustainability of actions and better consider local contexts. Moreover, the government should consider updating the legal and institutional frameworks to create an enabling environment for the implementation of the national strategy and related biodiversity conservation and restoration activities. In addition, economic incentives for biodiversity conservation and its sustainable use could better target threatened species, as well as the ecosystems on which they depend.

There is an urgent need to mainstream biodiversity into all sectors. This would help mobilise additional investment in biodiversity conservation and sustainable use measures. EIA of renewable energy projects considers bird migration routes. The government implemented several projects to promote radar-assisted shutdown on demand of wind farms and developed new green job opportunities for female bird watchers. However, other sectors have struggled to integrate biodiversity concerns. For example, the agricultural sector has so far paid little attention to agrobiodiversity. Therefore, Egypt should continue to raise awareness and strengthen capacity of relevant governmental agencies. It should also provide economic incentives for key stakeholders to adopt ecologically sustainable management practices.

Egypt aspires to become a global ecotourism destination. The government nationwide campaign, ECO EGYPT, was launched in 2020 by the MoE within the broader Live Green presidential initiative (Box 1.3.). In addition, it prepared guidance for ecolodges, environmental practices in tourist restaurants and training for hotel workers, as well as media campaigns. However, ecotourism legislation has room for improvement and suffers from weak enforcement. The impact of recreational activities on fragile coastal areas needs to be better assessed and calls for a better implementation of the polluter pays principle. More sustainable tourism practices would help reduce pressures on biodiversity, particularly by reducing waste generation and rationalising water use.

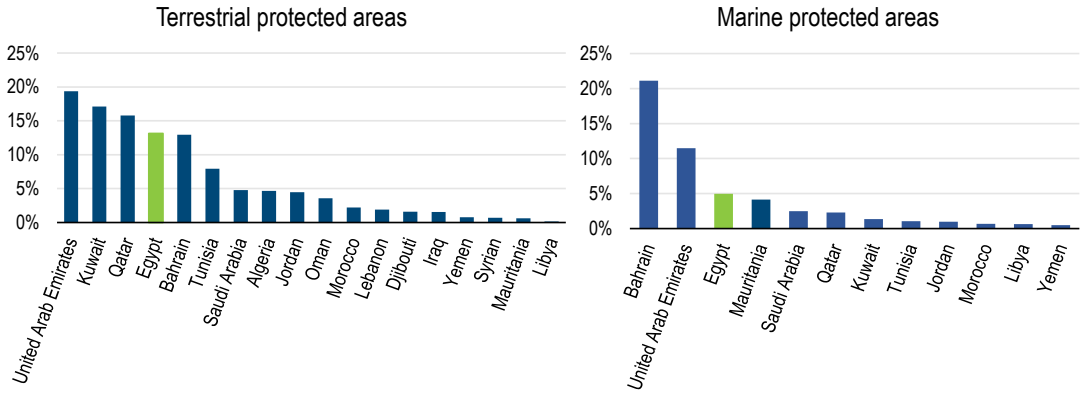
Protected areas

The country counts 30 protected areas, covering about 14% of its total land area. The share of terrestrial protected areas is much higher than in many other MENA countries (Figure 1.22). However, under the Kunming-Montreal Global Biodiversity Framework, Egypt will need to further expand protection to contribute to the new collective global target of 30%. An assessment under way could provide the basis for reform.

For a long time, the performance of protected areas has been hampered by weak operational, administrative and management capacity, as well as by lack of both trained staff and financial resources. In 2015, less than half of protected areas had proper management plans, and many were outdated (Government of Egypt, 2016[63]). However, the government revised the fee system for protected areas, especially in the Red Sea, which attracts up to 10 million tourists per year. This contributed to increasing considerably the income collected from entry fees of protected areas, reaching about EGP 500 million in 2023; income is projected to increase to EGP 1 billion in the coming years. About 25% of collected entry fees is dedicated to the management of protected areas; the remainder is used for other environmental protection programmes. These additional resources allowed increasing the number of scientific staff and experts who support the management of protected areas.

Figure 1.22. Egypt has one of the highest shares of protected areas in MENA countries

Protected areas in MENA countries, 2022



Note: Left panel shows terrestrial protected areas as percentage of total land area and right panel shows marine protected areas as percentage of territorial waters in MENA countries in 2022. MENA countries that have marine protected areas less than 0.5% are not shown; these countries are Oman, Syria, Lebanon, Djibouti, Algeria and Iraq.
Source: World Bank (2024), World Development Indicators (database), https://databank.worldbank.org/source/world-development-indicators.

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The government intends to declare the entire coral reef habitat of the Red Sea stretching over 1 800 km as protected areas (also called The Great Fringing Reef) through a prime ministerial degree in 2024. This will be a milestone given the global importance of coral reefs in the Red Sea area. It will also help significantly increase the share of protected marine areas. In addition, the USAID-backed Red Sea Initiative provided an initial contribution of USD 15 million. This will help protect the Red Sea's coral reefs and surrounding coastal ecosystem against the impacts of climate change and human activity (USAID, 2022[68]). It also aims to leverage private sector funding and develop blended finance mechanisms to support businesses in building climate resilience.

Egypt took another important step at COP28 in 2023, announcing its intention to join the Blue Partnership Agreement. This partnership supports multilateral co-operation to develop a sustainable blue economy in the Mediterranean region. More specifically, it seeks to support sustainable investment in the blue economy. It will also share good practices to improve project design and implementation. Finally, it will develop an enabling environment, alongside participating countries such as Jordan, Morocco and Spain. Mutual learning will help Egypt make progress in different areas of co-operation, including marine tourism, sustainable maritime transport, renewable marine energy and plastic waste.

Egypt will have additional opportunities to strengthen its national commitments as host of the COP24 for the Protection of the Marine Environment in 2025. The government has developed a marine litter management plan and aims to prevent and reduce marine litter pollution in the Mediterranean. Several voluntary initiatives are under way; local stakeholders generally drive action.

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Notes

[1] Revenue from tourism is among the top sources of foreign currency, representing about 12% of GDP. Egypt aims at attracting some 30 million tourists by 2028. It launched its 2030 National Strategy for Sustainable Development in November 2015 (Government of Egypt, 2023[71]).

[2] Traditionally, policy measures focused on strengthening family planning and birth control. For example, in 2019, the government launched a family planning initiative called "Two Is Enough", which encouraged poor rural people to have fewer children. In 2023, the government introduced a financial incentive of EGP 1 000 per year for married women aged over 45 with no more than two children.

[3] It targets 6 million women of childbearing age and 2 million young couples who are about to get married. Beyond educational interventions and the expansion of health services, the nationwide programme focuses on the economic empowerment of women and legislative action, including revising the child marriage law and the child labour law.

[4] According to CAPMAS, the informal private sector is defined as production units that carry out an economic activity without administrative registration or practicing activities without holding permission/license from competent authorities. These economic actors don’t have any legal entity in accordance with the necessary procedures to practice such activities.

[5] As a member of the former non-Annex I group of developing countries, Egypt had less strict requirements under the Kyoto Protocol and benefits from global climate finance from developed countries.

[6] Instead of flaring, the petroleum gases will be directed to gas processing facilities to produce LPG, natural gas and condensates (Government of Egypt, 2023[16]).

[7] Northern coastal areas receive between 80 and 220 millimetres of precipitation annually. In turn, there is virtually no rainfall in the desertic areas of the New Valley governorate. The total amount of rainwater is estimated at 1.3 billion cubic meters (CAPMAS, 2023[41])

[8] With the discovery of Zohr, the Mediterranean’s largest natural gas field and other new offshore gas fields (e.g. Nargis-1), Egypt boosted its role as an important gas hub in the Mediterranean region.

[9] Activities include the expansion of natural gas connections to households, promotion of the switch to compressed natural gas in the transport sector, energy efficiency measures, reduction of carbon intensity of oil and gas resources and promotion of renewables, bio-based products and low-carbon hydrogen.

[10] It was estimated at 51.3 tCO_2/TJ in 2020, below the G20 average (~59 tCO_2/TJ) but remains above EU standards (46.3 tCO_2/TJ).

[11] The transport sector is projected to emit 88 million tonnes of CO_2-eq. in 2030 and 136 million tonnes in 2050 if measures under the policy and regulatory framework are fully implemented (World Bank, 2022[20]).

[12] Some 1.4 million tonnes of rice straw have been collected at 621 locations and transformed into useful products. This government initiative also contributed to creating new employment opportunities for young people in six regions (Reuter and Chang, 2023[72]).

[13] The government's action plan intends to halve food losses by 2030. This will require major improvements in the logistical infrastructure and marketing system. Smallholders would also need easier access to markets.

[14] In 2018, operational costs of the Holding Company for Potable Water and Wastewater accounted for EGP 17 billion and revenues were at EGP 15 billion, resulting in a deficit of EGP 2 billion, which was covered by the government (Amer, 2017[73]).

2 Towards green growth

This chapter discusses Egypt's progress in greening its economy on the path to sustainable development. It examines the policy and institutional framework for sustainable growth, then reviews the use of tax policy to pursue environmental objectives and progress in removing subsidies that can encourage environmentally harmful activities. The chapter also analyses investment in environment-related infrastructure, such as that for renewable energy and sustainable transport. The role of international climate and development finance is also discussed.

2.1. Green growth and sustainable development

Advancing towards a green economy has received significant traction in the past couple of years. High-level government officials developed a strong sustainable development policy narrative emphasising the need to seize investment opportunities and innovation. In 2016, Egypt launched a national strategy for a green economy focusing on four areas: agriculture, energy, waste and water. Many other initiatives (e.g. sovereign green bond, Nexus of Water, Food and Energy programme) are implemented to advance Egypt's green transition. Egypt's green growth and sustainable development agendas are advanced in tandem.

2.1.1. Progress towards the Sustainable Development Goals

While challenges remain for all Sustainable Development Goals (SDGs), Egypt has made progress in many development areas (Figure 2.1). The country moved up six places in the SDG Index for 2023 and now ranks in the middle field of all assessed countries (position 81 of 166 countries). In the 2022 assessment, the country is moderately improving on Goal 13, "Climate Action". However, further progress will require stronger transformative efforts to place the country on sustainable development pathways. The updated Vision 2030 and associated sectoral policies is a welcome step towards promoting an integrated approach towards sustainable development (Government of Egypt, 2023[1]).

Figure 2.1. Egypt made progress towards achieving the SDGs, but challenges remain

Source: Sachs, J.D., Lafortune, G., Fuller, G. (2024). The SDGs and the UN Summit of the Future. Sustainable Development Report 2024. 10.25546/108572; https://dashboards.sdgindex.org/profiles/egypt-arab-rep.

Egypt has demonstrated a high political commitment to implement the SDGs of the 2030 Agenda for Sustainable Development and the goals of the African Development Agenda 2063. In 2016, it launched its first national Sustainable Development Strategy: Egypt's Vision 2030, which aligns national priorities with the SDGs and provides a framework for public action. Several ministries have developed their own sectoral strategies to foster sustainable development in specific areas (e.g. agriculture, energy, tourism).

To monitor progress towards implementing the SDGs, the government has already prepared three voluntary national reviews in 2016, 2018 and 2021, as well as a series of localised assessment reports at governorate level. Led by the Sustainable Development Unit of the Ministry of Planning and Economic Development (MPED), Egypt is preparing its fourth review. This will mark an important milestone in reporting progress and plans for scaling action in line with Egypt's updated Vision 2030 (OECD, forthcoming[2]).

Egypt has started mainstreaming the SDGs into sectoral action plans. The government has established a dedicated national monitoring and evaluation system and set up a centralised co-ordination body under the auspices of the Prime Minister's Office. SDG focal points ensure co-ordination at sectoral level and within the 27 governorates. In 2020, the former National Management Institute was reorganised into the National Institute for Governance and Sustainable Development. It aims at fostering human capabilities and SDG knowledge across public and private sectors, civil society and academia through consulting, training and research activities. In addition, about 3 600 young people were trained within the "Be an Ambassador for Sustainable Development" initiative.

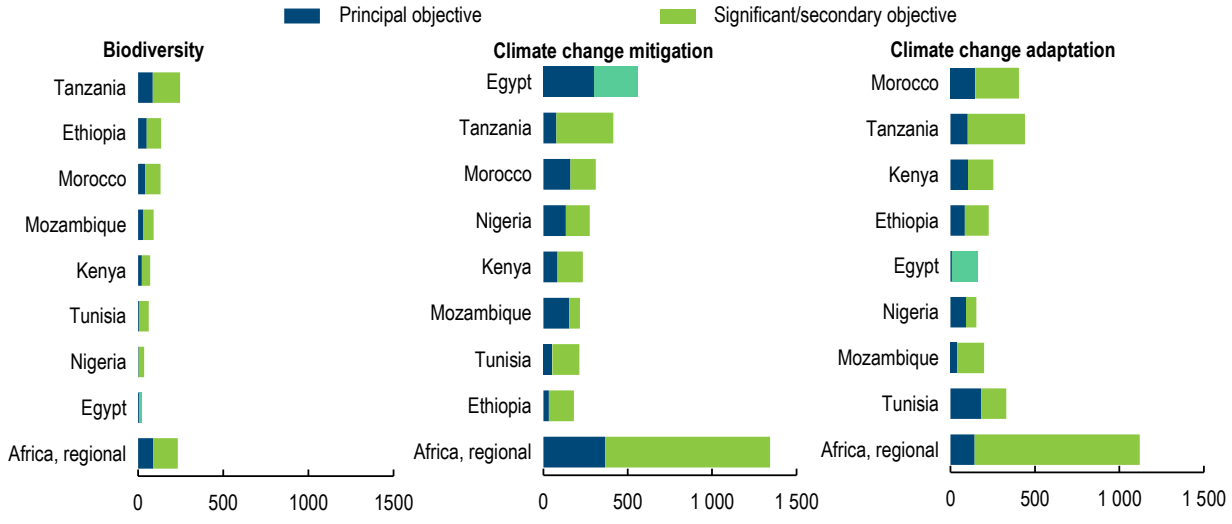
Overall, data availability has greatly improved. Nearly half of all SDG indicators are available, making Egypt one of Africa's top performers. The Central Agency for Public Mobilization and Statistics (CAPMAS), Egypt's national statistics institute, has a dedicated Sustainable Development Unit. The government emphasises its commitment to evidence-based policy making (Government of Egypt, 2021[3]). As part of the annual planning process led by the Strategic Planning Unit of MPED, Egypt has started using budgetary monitoring to link the SDGs to its budget cycle and track expenditures in support of sustainable development. These efforts need to be further consolidated and scaled up.

2.1.2. International climate and development finance

Egypt remains a major recipient country of official development assistance (ODA). Between 2020 and 2023, it received on average USD 7.1 billion in ODA for public sector development. However, only USD 110 million per year was exclusively dedicated to the protection of the environment (Government of Egypt, 2023[4]). Other sectors, such as investment in renewables or public transport, contributed to promoting the green transition with environmental co-benefits.

Figure 2.2. Egypt is among the top ten recipient countries of environment-focused ODA in Africa

Riomarkers for biodiversity, climate change mitigation and adaptation, 2020-22 average



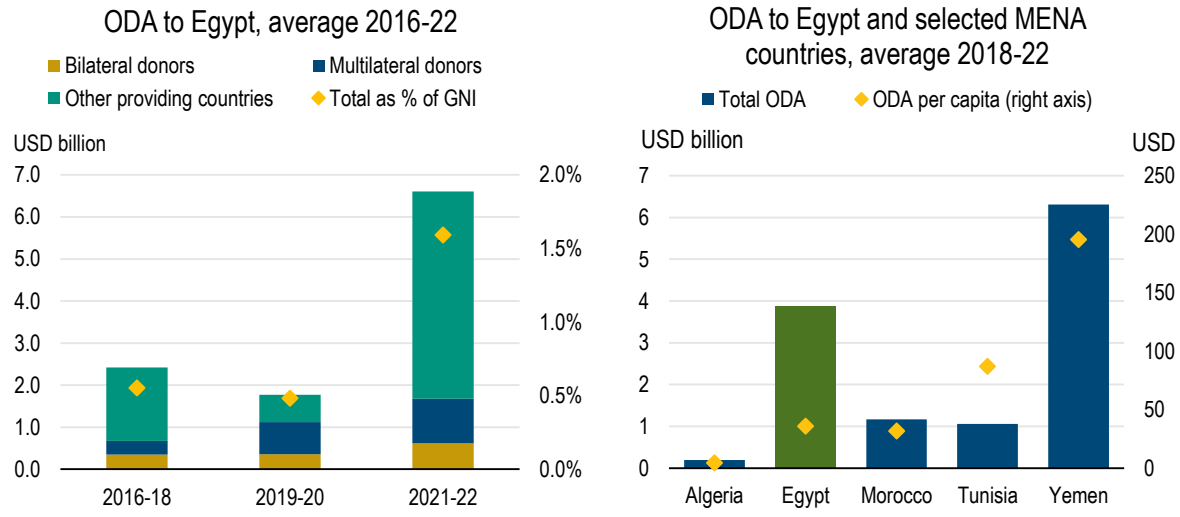
Note: ODA: official development assistance; commitments of bilateral ODA targeting the objectives of the Rio conventions. The same activity can support multiple objectives. Therefore, amounts should not be added as their sum will result in double counting.
Sources: OECD (2024), "Creditor Reporting System: Aid activities targeting Global Environmental Objectives", OECD International Development Statistics (database), https://doi.org/10.1787/9c778247-en.

StatLink https://stat.link/sz4pm5

The share of development finance directed towards private sector development is growing. It represented USD 10.3 billion for 2020-23 compared to USD 28.5 billion in public sector support (Government of Egypt, 2023[4]). According to OECD statistics, Egypt is among the top ten recipient countries of environment-focused ODA in Africa (Figure 2.2); France, EU institutions and Germany are top providers. Egypt received a high share of ODA compared to other countries in the Middle East and North Africa (MENA), representing on average USD 36 per capita per year (2018-22 average) (Figure 2.3). Climate mitigation activities mobilise more funding than adaptation.

Egypt's Ministry of International Co-operation produces annual reports on international partnerships for sustainable development and offers access to geolocalise information of projects by development partners active in Egypt. This information portal should be used to further mainstream development co-operation and avoid duplication. On the sidelines of COP27, Egypt signed over 30 partnership and financial agreements worth close to USD 13.5 billion to support the country's climate action in the coming years (e.g. Nexus of Water, Food and Energy Platform and the Egypt Partnerships Agreements for the Climate Transition).

Figure 2.3. International development finance to Egypt has increased but is volatile



Note: GNI: gross national income; ODA: official development assistance; net ODA disbursements from bilateral and multilateral donors. Values are expressed at 2021 constant prices. MENA: Middle East and North Africa; countries include Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates and Yemen.
Sources: OECD (2024), Geographical Distribution of Financial Flows to Developing Countries 2024, https://doi.org/10.1787/fbd9569c-en-fr.

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The level of additional international climate finance remains below the estimated financing requirements in Egypt's updated Nationally Determined Contributions (NDCs). This leaves the country with substantial funding gaps, especially for adaptation measures (Chapter 1). While international climate and development finance is an important public finance source, it remains highly volatile, making coherent foresight planning more difficult. For instance, multilateral and bilateral ODA dropped substantially in 2023 (Government of Egypt, 2023[4]), representing only nearly half of available resources in 2022. The government has called upon international partners to revisit the global financial system to prevent a debt crisis in developing countries and emerging economies (Government of Egypt, 2023[4]). It seeks a multilateral fund to provide adequate, predictable and sustainable financial resources to help Egypt meet its climate and development commitments.

2.2. Institutions, regulations and compliance

2.2.1. Legislative and institutional framework

Egypt has a longstanding environmental policy and comprehensive legal framework addressing various aspects of environmental protection and natural resource management. The environmental legislative framework comprises the Environmental Law no. 4 of 1994, amended in 2009 and 2015, and Law no. 102 of 1983 on Natural Protected Areas, as well as many executive regulations. The Environmental Law mainly focuses on coastal and marine pollution, air pollution and environmental disaster issues. It also re-defines and strengthens the roles and responsibilities of Egypt's Environmental Affairs Agency (EEAA), initially launched in 1982, prior to the creation of the Ministry of Environment (MoE) in 1997 (Box 2.1).

The right to a "sound healthy environment" is enshrined in Egypt's Constitution of 2014, which recognises environmental protection as a "national duty". The Constitution also sets for each citizen the "right to healthy and sufficient food and clean water" (Article 45). Article 46 stipulates that "the State shall take necessary measures to protect and ensure not to harm the environment, ensure a rational use of natural resources so as to achieve sustainable development; and guarantee the right of future generations thereto". Specific provisions are set for the Suez Canal and the River Nile that guarantee every citizen "The right to enjoy the River Nile" (Article 44). In addition, many sector-specific laws, regulatory tools and strategies consider reduction of negative environmental impacts across sectors.

Ongoing work on a new Environment Law provides an excellent opportunity to set a unifying legal framework for environmental protection and climate action to support achievement of Egypt's national and international commitments, alongside private sector investment. The new law will cover climate action, biodiversity and pollution management. The process, to take place within the next three years, will gain from involving relevant sectoral ministries at an early stage to build consensus and foster a whole-of-government approach to environmental issues. This could also further enhance capacity to enforce provisions of the environmental law and its executive regulations.

National government and horizontal co-ordination

MoE, together with EEAA, its executive arm, promotes and protects the environment through a whole-of government approach. It formulates environmental policies; prepares environmental protection plans, including pilot projects; and promotes environmental relations between Egypt and other states, as well as with regional and international organisations (Ministry of Environment, 2023[5]). The ministry's policy statement comprises key directives, including national and international partnerships, enforcement of environmental legislation, use of market-based instruments in the field of environmental protection, and support for integrated environmental management systems, capacity building and transfer of environmentally friendly technologies. Thematic priorities include recycling waste, air pollution, water pollution, energy savings, protected areas, e-government, climate change and adaptation challenges.

Egypt made progress in adapting a whole-of-government approach to environmental management and sustainable development. To date, environmental considerations are increasingly integrated into many sectoral policies and implemented by different government bodies (e.g. Ministry of International Co-operation, Ministry of Local Development, Ministry of Trade and Industry, Ministry of Tourism, Ministry of Agriculture and Land Reclamation, Ministry of Water Resources and Irrigation, Ministry of Health and Population). MoE has played a pivotal role in supporting co-ordination and mainstreaming environmental considerations at local level, thanks to increased co-operation with the Ministry of Local Development. Policy coherence needs to be further improved by better aligning environmental and sectoral policies.

Box 2.1. Egypt's Ministry of Environment: "Turning environmental problems into opportunities"

A changing narrative for a complex sector

Preserving natural resources and biodiversity was the starting point of Egypt's efforts to protect the environment in the early 1980s. The government approved its first law on natural protected areas in 1983. It created a small technical office to monitor implementation of environmental protection programmes. Egypt's Environmental Law no. 4 of 1994 outlines regulations pertaining to land, air and water pollution and endows Egypt's Environmental Affairs Agency (EEAA) with the powers to enforce these requirements.

In 1997, Egypt created the Ministry of State for Environmental Affairs to cover waste management alongside sustainable management of natural resources. Climate issues were not yet addressed. Moreover, the ministry continued to rely heavily on EEAA for implementation and monitoring of environmental activities. The genesis of different environmental institutions explains why, to date, EEAA still plays a key role in the approval of many environmental decisions. In the early years of the ministry, many development partners provided capacity-building support.

In the early 2000s, many civil servants left the EEAA. This contributed to spreading environmental knowledge across other institutions but also increased the need for renewal of expertise within the ministry. Overall, environmental issues were still considered as a burden for investment. In 2014, Egypt started turning more strongly to solutions within the African continent. It notably hosted the African Ministerial Conference on the Environment.

The year 2015 marked a milestone for environmental affairs at the global level, with the adoption of the Paris Agreement and the entry into force of Agenda 2030 for Sustainable Development. Egypt's environmental narrative evolved progressively and broadened its focus. The ministry began promoting the environment as a tool for development rather than a barrier. Line ministries started becoming more aware about climate and environmental issues.

In 2018, the government decided to change the narrative around the environment sector to link it explicitly to economic growth. The MoE wanted to promote economic opportunities related to addressing environmental challenges. The government introduced incentives to encourage less polluting behaviour rather than focusing on fines only. For instance, instead of burning rice straws on the fields (leading to the seasonal black cloud phenomenon), farmers now have additional opportunities to sell them. These activities contributed to creating a more positive image of the environment sector and reconciling economic development with environmental protection.

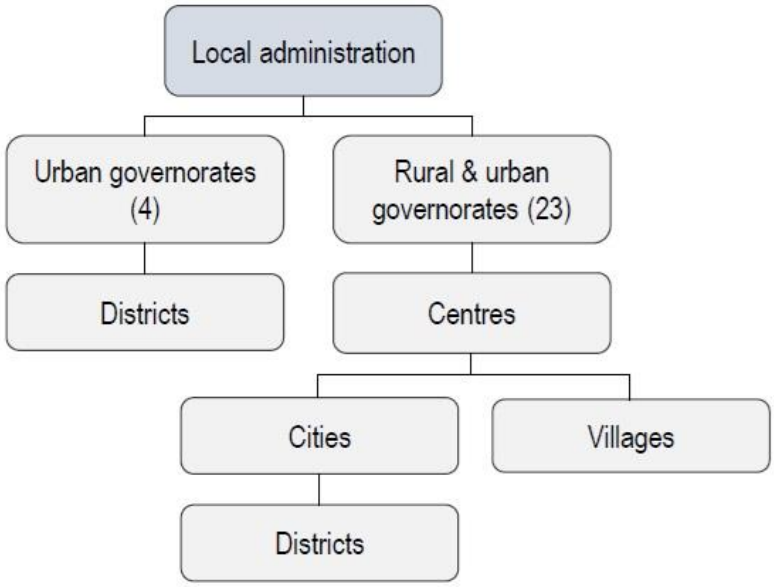
In 2019, work on climate was leveraged at the level of the Prime Minister within the National Council for Climate Change. This provided an opportunity to further develop environmental awareness across sectors during the lead-up to COP27. The government developed its first National Climate Change Strategy, two updated NDCs and is working on a National Adaptation Plan and a new Environmental Law. The MoE has come a long way and its capacity has been strengthened significantly over the past decades.

Source: Policy Mission, Government of Egypt (2024).

Local government and vertical co-ordination

Egypt's highly centralised governance system extends to environmental policy. A hierarchical, pyramidal structure dominates the local administration system, which is composed of three levels of subnational governments: i) governorates (al-Muhafaza), including urban and urban/rural governorates; ii) centres (Markaz) and districts (Hayy); iii) cities (Madina) and villages (Qariya) (Figure 2.4). In total, the country counts 27 governorates, including four urban governorates (Cairo, Alexandria, Suez and Port Said). Egypt is divided into economic regions, which do not have any administrative or political function.

Figure 2.4. Egypt's local administration system



Source: Hemaily et al. (2022), Local Revenue Development in Egypt. The Public Policy Hub, The American University in Cairo, https://fount.aucegypt.edu/cgi/viewcontent.cgi?article=1102&context=studenttxt.

The governorate is legally represented by a governor, who is appointed by the President of the Republic and takes part in the Council of Governors, headed by the Prime Minister. The governor has the highest executive authority in the governorate and is responsible for implementing policies. Each line ministry also has a representative at governorate level who acts as focal point for the central government. They are responsible to the minister for the execution of sectoral policy.

Each local unit operates with two councils, namely the Elected People's Council and the appointed Local Executive Council. However, municipal elections have been repeatedly postponed for the past decade. Nearly all taxes and fees are collected at national level, leaving local authorities with close to no financial autonomy. One of the MoE's objectives is to develop the capacity of Environmental Management Units at governorate level. However, they are usually not involved in strategic planning and mainly participate in implementation processes.

Heavy reliance on centralised decision making increases the risk of disconnect between policies and actual responsiveness to local needs (Tobbala, 2019[6]). In a more decentralised system, citizens can more easily hold local government officials accountable for decisions that affect their daily lives. In many OECD countries, they participate in finding solutions to local problems and contribute to accelerating the green transition.

2.2.2. Setting of regulatory requirements

Environmental impact assessment

Environmental impact assessment (EIA) was introduced 30 years ago, but its effectiveness is still constrained by weak technical and financial capacity; limited consideration of cumulative effects or alternatives; and insufficient enforcement. Public participation also needs to be enhanced. The Environmental Law no. 4 of 1994 makes a full EIA mandatory for high-risk projects. Drawing on sector-specific EIA guidelines, the Central Environmental Impact Assessment Department within EEAA supervises the screening process, reviews and validates EIA reports, and issues an opinion on proposals for mitigation measures. Relevant sectoral ministries act as competent administrative authorities and have executive powers in the EIA process.

The screening allows classifying projects in three categories according to severity of environmental impacts: Category A: projects with minor environmental impacts; Category B: projects that may result in substantial environmental impacts; and Category C: projects with highly adverse impacts and for which a complete EIA is mandatory. A new category, "B-scoped class", has been introduced to cover a growing gap between projects that fall between B and C categories. Oil and gas exploration projects are mostly classified in the B or C categories (Government of Egypt, 2023[7]). Category A projects must provide information on environmental effects and mitigation measures. However, the information provided is rather basic (MER, 2019[8]). Category B and C projects require an EIA report, which is far more detailed for Category C projects.

The administrative process for EIA approval has been improved. More streamlined procedures considerably shorten review periods. A committee facilitates collection of missing data for EIAs and meets weekly to review EIA reports to quickly express an opinion (Government of Egypt, 2023[9]). In addition, EEAA co-ordinates with the Ministry of Tourism to approve requirements of environmental standards for resorts. However, EIAs do not yet sufficiently consider cumulative impacts of tourism on biodiversity and natural resources. This requires strategic environmental assessment (SEA) to better address and connect them to high-level decision making (Ibrahim and Hegazy, 2015[10]).

Egypt does not have any legal provisions for SEA and has rather limited experience in this area (MER, 2019[8]). In 2019, the government used SEA as a tool to improve tourism planning and development in relation to biodiversity conservation in the Red Sea area. For example, in 2021, the "Mainstreaming Biodiversity into Tourism Development" project, supported by the Ministry of Housing, Utilities and Urban Communities (MHUUC), led to the development of a sustainable and environmentally friendly master plan for the expansion of the city of Saint Katherine, in the South Sinai Governorate (Environics, 2021[11]). However, EIAs of Category A and Category B projects are often undertaken at a late stage of the planning process, which makes it difficult to consider alternative options. It is equally important to monitor estimated environmental impacts and compare them with real-world outcomes over time.

Public participation in the EIA review process needs to be further enhanced. Public hearing is only mandatory for Category C projects (MER, 2019[8]), and should be expanded to other categories. In 2024, EEAA started publishing online executive summaries of EIA reports for highly polluting projects, offering opportunities for citizens to provide comments (EEAA, 2024[12]). These efforts to increase transparency go in the right direction and should be pursued.

Egypt continues to suffer from a lack of human, financial and technical resources to produce solid, evidence-based EIA reports. Environmental expertise needs to be further built through training and capacity building at all levels (e.g. structures and roles, research, staff and facilities, skills, tools). Many development partners also conduct their own social and environmental impact assessments for major development projects, typically using participatory approaches to foster stakeholder engagement at an early stage. Early involvement is crucial and increased local capacity could also help better inform EIAs.

Permitting

In a bid to support development of local industries, the Investment Law no. 15 of 2017 introduced a Golden Licence to all projects aiming at promoting local manufacturing. The Golden Licence was initially limited to companies that worked on strategic or national projects. It was then expanded to other companies, including those established prior to the entry into force of the Investment Law (Decree No. 2300 of 2022).

In 2022, the government added new measures to accelerate issuance of licences for industrial facilities. It transferred the responsibility for issuing new licences from relevant administrative units at governorate level to the Industrial Development Authority (IDA). EEAA remains responsible for issuing an environmental opinion and related environmental permits, which are mandatory within the licensing procedure. The review process was shortened to 20 business days for licences that require prior approvals (15% of the total industrial activities). It dropped to seven business days for licences obtained through the notification system (85%), which applies to industries with limited hazards to the environment. In addition, a dedicated unit within the Cabinet follows up on licences of investors listed in the Ministry of Trade and Industry's database. The Cabinet was also mandated to explore opportunities to transfer the affiliation of regulating entities operating in the utility sectors to guarantee independence. The new measures contributed greatly to accelerating the start-up phase of new businesses. Between October 2022 and February 2023, IDA issued 126 licences for high-risk industrial facilities (Government of Egypt, 2023[13]).

As elsewhere, shorter timeframes risk undermining the quality of the environmental permitting process, especially for high-risk industrial facilities. Administrative capacity and technical expertise of the permitting authorities need to be enhanced. This requires, among others, training and upskilling of staff to improve understanding of environmental and sustainability issues (e.g. best available techniques guidance). The government intends to better integrate digital information-sharing between the two government entities. It will be paramount to enhance linkages with environmental enforcement agencies.

The government also introduced measures to legalise unlicensed factories and facilities, also called informal economic projects (IEPs). Law no. 19 of 2023 mandates IDA to grant one-year provisional operation permits to unlicensed factories. The Trade and Industry Minister can renew permits for two additional periods based on a proposal by IDA. In turn, industrial facilities are required to submit relevant documentation and commit to environmental requirements and protection measures. The move intends to legalise unlicensed factories while controlling their environmental impacts.

The example of IEPs shows the need to enhance regulatory enforcement through regular inspections before infringements occur. On the one hand, the regulatory framework must apply to all industrial facilities. Therefore, the legalisation process makes sense and contributes to formalising IEPs. On the other, if illegal industrial activities are possible without sanctions, it may encourage others to start businesses without permits while waiting for the next regularisation round (like the recurrent problem of encroachment on agriculture). Therefore, these regularisation measures need to remain exceptional and combined with tighter controls to enforce accountability. The Environmental Law no. 4 of 1994 foresees punishments of up to EGY 1 million on businesses that do not follow the rule of submitting the EIA report before starting a project. In practice, they were, however, not enforced.[1]

Reducing obstacles for startups and simplifying permitting and licensing rules for new businesses with minor environmental risks is key to reducing the root causes of unlicensed companies. In this regard, the 2020 Law on Micro, Small and Medium-sized Enterprises (MSME) represents a major step towards a more business-friendly environment for small economic players. The law clearly defines MSME enterprises and the informal sector of economy,[2] while offering tax incentives and other benefits. It establishes a MSME Authority, a one-stop shop that oversees all procedures for MSME, entrepreneurships and IEPs, including the licensing process and the facilities for securing land and operations. The law also includes provisions to reduce bureaucracy.[3]

2.2.3. Compliance assurance

Compliance promotion

While Egypt does not have a dedicated compliance assistance and promotion programme, the government implemented several workshops and campaigns to promote compliance. However, the budget for such activities is limited. A stronger focus on compliance promotion, particularly for MSMEs, could help businesses achieve compliance more efficiently while saving compliance assurance costs for regulating authorities. Given the large number of small economic players, it makes sense to improve understanding of the regulatory framework and facilitate compliance through dedicated compliance assistance units. This approach has proven to be useful in several OECD countries.

Over several decades, the Environmental Pollution Abatement Programme, supported by multiple development partners and banks, aimed to help Egyptian industry comply with environmental regulations. Among other services, the programme provided economic incentives to encourage industrial establishments to improve their respective environmental performance. It offered companies an attractive financing package on concessional terms (80% as a commercial loan and 20% as a grant). Companies could gain the 20% grant for good environmental performance following an EEAA assessment. These benefits have contributed to reducing pollution levels of participating companies while enhancing EEAA's enforcement capacity (UNDP, 2021[14]). As these activities are donor-driven, the government should consider increasing the public budget to maintain such programmes.

Compliance monitoring and enforcement

The EEAA plays a key role in environmental monitoring and enforcement using a combination of "carrot-and-stick" approaches. The agency has a central department for environmental inspections and compliance and 17 regional branches for inspections across the territory. Environmental audits can be voluntary or mandatory to follow up on violations. Category B and C projects usually have environmental management plans that require self-monitoring. Detailed guidelines for inspections were prepared in the early 2000s. The inspection procedures are also clearly outlined on the EEAA website, explaining the rights and obligations of investors/companies. However, inspection results are not disclosed. Regular performance assessment (e.g. annual report of inspection outcomes, including the number of inspections; compliance rates; pollution incidents; measures of recidivism and duration) could help assess the effectiveness of compliance assurance activities and thereby ultimately improve environmental outcomes.

In line with general trends in OECD countries, Egypt privileges risk-based targeting to identify high-risk industrial installations for in-depth compliance audits depending on size, location and environmental risks. It also conducts complaint-based inspections. If infractions are detected, the company has up to 60 days to take corrective actions. In case of violations, the environmental law forces the polluters to remedy violations and submit a time-bound environmental compliance action plan. In addition, the polluter remains legally liable for its action.

Non-compliance (e.g. open burning of waste, illegal wastewater discharges in the Delta) calls for proactive inspections and stronger enforcement mechanisms. Following a decision of the President (No. 314 of 2017), the government set up an integrated digital platform that allows citizens to submit complaints electronically. More than 2 700 complaints had been submitted by the end of 2023, including close to 800 environmental complaints (Government of Egypt, 2023[15]). The large majority of cases have been solved. Further digitalisation will play a key role in enhancing the current compliance monitoring and enforcement system and could also contribute to improving transparency.

Green public procurement

The government has implemented several pilot projects to advance the integration of environmental aspects into its public procurement policies. It developed a series of new tools and methodologies, including sustainable public procurement guidelines for practitioners, with the support of the EU-funded SwitchMed Programme. It also trained more than 100 government officials and practitioners. A public procurement law, approved in 2018, represents a major step towards international best practice (AfDB, 2022[16]). However, green public procurement is not yet mandatory. According to survey results on existing legislation, the MoE can implement a preference for green products by decree (UNEP, 2023[17]). In this regard, the introduction of LED lamps in public buildings is one of Egypt's success stories. Some 9.5 million LED lamps were distributed for household lighting (UNEP, 2020[18]).

Box 2.2. Policies in practice: The Netherlands' CO_2 Performance Ladder

Since 2015, green public procurement has been mandatory for Dutch public authorities. However, contracting authorities need to be able to easily identify and procure greener works, products and services that meet key environmental and climate-friendly procurement criteria. Therefore, the Netherlands developed a set of practical instruments, including a certification system that lightens the burden on procurement authorities to verify the companies' commitments.

Initiated in 2009, the CO_2 Performance Ladder is a green public procurement instrument that certifies companies' climate action. Bidding companies commit to reducing emissions and receive in turn an award advantage. As it increases its commitments to reducing CO_2, the company moves up the Ladder and receives more rewards. The Ladder serves as both a CO_2 management system by guiding a company's climate action, and a public policy instrument through which the government can incentivise climate mitigation.

The Ladder's certification system comprises five CO_2 ambition levels (or steps on the Ladder). The first three levels focus on CO_2 management and emissions reductions within the company's business operations. Most organisations start at level 3. As of step 4 and 5, contractors begin exerting influence beyond their own business sphere. They commit to reducing the carbon footprint of the supply chain, participate in investments for innovation and share their knowledge with other business partners. Essentially, as a company increasingly commits to reducing CO_2, it moves higher up the Ladder.

Each CO_2 ambition level is linked to a percentage reduction of the submission price. Bidding companies can thus reduce their price by up to 10% (2% per step). In the contract, the ambition level is included as a performance requirement and must be implemented as part of project execution. Therefore, the Ladder helps companies reduce their carbon footprints and costs.

Source: OECD (2022), IPAC Policies in Practice: The Netherlands' CO_2 Performance Ladder, www.oecd.org/climate-action/ipac/practices/the-netherlands-co2-performance-ladder-890de76d.

Experiences in OECD countries have shown that green public procurement can be a major driver for innovation, providing industry with incentives to develop environmentally friendly works, products and services. For example, the Netherlands introduced a CO_2 Performance Ladder for companies, which has become the Netherlands' most important green public procurement instrument (Box 2.2). Egypt has a strong, untapped potential to enhance green practices in its building sector (Chapter 3).

2.2.4. Environmental democracy

Public participation in environmental decision making

Civil society played a key advocacy role in the foundation of Egyptian environmental policy and legal framework in the early 1980s – a time when environmental concepts were largely unknown by most people in Egypt. Each year, Egypt celebrates National Environment Day on 27 January to commemorate the anniversary of Egypt's Environmental Law no. 4 of 1994. The commemoration highlights the importance of partnerships with private and public sectors and non-governmental organisations (NGOs). Civil society organisations (CSOs) play an active role in the implementation of many local projects. The Small Grants Programme of the Global Environment Facility provides financial and technical support to local civil society and community-based organisations. The MoE played a role in defending the level of this contribution to support local action.

Public participation in environmental decision making needs to be enhanced. Although Egypt's Constitution guarantees civic associations the "right to practise their activities freely" (Article 75), CSOs face many obstacles, notably a chronic lack of funding and administrative hurdles. Any activity, including selecting their Board of Directors or receiving funds, requires prior approval of the Ministry of Social Solidarity (Law no. 84 of 2002).[4]

Some progress has been achieved in this area. The NGO Law of 2019 governs the registration of domestic and foreign NGOs. It shortened the review period for external funding to 60 days and abolished sanctions of incarceration. Furthermore, a central unit was established within the Ministry of Solidarity to monitor NGO matters. However, NGO capacity needs to be further strengthened so they can play their role as watchdogs to alert the public about environmental threats (Human Rights Watch, 2022[19]).

Environmental awareness and education

Some progress has been made in increasing environmental awareness of citizens. The government launched the "Live Green" campaign, targeting young people, to encourage environmentally friendly behaviour. The campaign covered a wide range of environmental issues, including food waste, deforestation, recycling, energy consumption and air pollution (UNEP, 2023[17]). Other campaigns include ECO Egypt to promote sustainable tourism, e-Tadweer to encourage the recycling of electronic waste or the "Return Nature to its Natural State" initiative to raise public awareness of climate change and its consequences ahead of COP27. On World Environment Day (5 June), all lights are symbolically switched off during an "Earth Hour" in school to raise children's awareness about climate change.

Drawing on a partnership between the MoE and the Ministry of Education and Technical Education, the government has also updated its school curriculum to integrate environmental issues across all educational levels. This includes comprehensive educational packages for teachers (e.g. climate change, biodiversity, sustainable development). As a next step, it will be key to roll out these programmes across Egypt's educational institutions and monitor impacts over time.

Furthermore, the government has plans to create a Master's programme in the field of environmental compliance and natural resource management at Cairo University. This will be linked to scientific, economic and social specialisations to help open up new areas for business and investment in various environmental fields (Government of Egypt, 2023[15]). Training for government officials to help them use geographic information systems is also under preparation. These efforts will help fill the gap of environmental expertise and create a new generation of Egyptian environmental and climate experts.

Access to environmental information

Access to environmental information and data has improved overall. Monitoring capacity for air, water and soil has expanded but still requires efforts to align with international standards. About half of all SDG indicators are now available, making Egypt one of Africa's top performers. The MoE has published annual reviews of the state of the environment since 2004.

The Annual Bulletin on Environmental Statistics, produced by Egypt's CAPMAS, includes useful environmental data and information. However, more work is needed to expand the scope of data and indicators to better support policy analysis and evaluation. More specifically, it could provide more information on trends over time. Beyond non-editable reports, data should be made available on line to enable users to customise and download them in different formats. In addition, the CAPMAS bulletin could analyse the evolution of the information base, recent developments and remaining gaps.

Environmental data and information remain scattered across various ministries. Key documents such as sectoral strategies, action plans and policies should be systematically published on line. Improving access to information would also require improving ministries' abilities to proactively share information with citizens. The capacity of ministries in this area varies greatly across the government. Moreover, it is critical to improve data sharing between national entities, as well as between Egypt and development partners. This will require substantial upscaling of human, financial and technical resources for data management. The OECD Statistics Directorate works in collaboration with CAPMAS to provide advice on Egypt's national statistical system. This could allow reviewing the presentation and accessibility of environmental information and advance work on an integrated data portal.

2.3. Environmentally related taxes

2.3.1. Greening the tax system

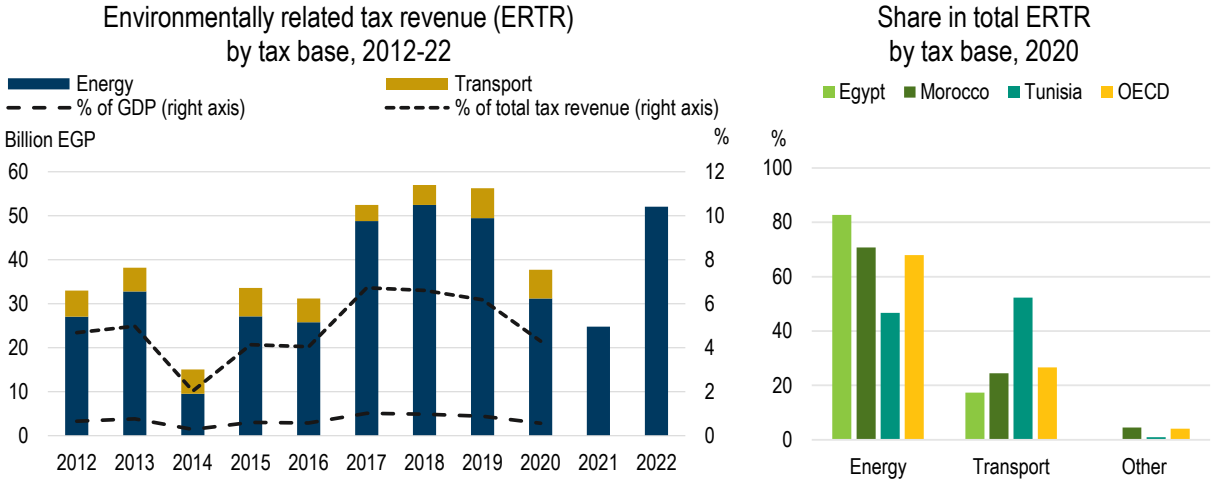
Egypt's tax revenues relative to its gross domestic product (GDP) remain modest in international comparison. Despite an increase in tax revenue in recent years, the tax-to-GDP ratio dropped to 13.3% in 2020 (Figure 2.5).[5] This ratio remains below the African average of 16% assessed in recent OECD analysis.[6] It also falls substantially behind the tax-to-GDP ratio of Tunisia (32.5%) and Morocco (28.3%), which are closer to the OECD average of 32.5% (OECD/AUC/ATAF, 2022[20]). The 2021 Medium-Term Revenue Strategy targets a 2% increase in the national tax-to-GDP ratio until 2024 (IMF, 2023[21]; World Bank, 2023[22]).

The role of environmentally related taxes in public revenues is limited. As a ratio to GDP, revenues from environmentally related taxes account for less than 0.6%, below the OECD average of 1.4% (OECD/AUC/ATAF, 2022[20]) (Figure 2.5). This points to further scope for strengthening the role of environmentally related taxes in the economy.

A green fiscal reform can help Egypt better align its tax system with environmental objectives and mobilise domestic revenues. Within the context of several International Monetary Fund agreements, Egypt is undergoing a comprehensive fiscal reform to restore macroeconomic stability and reduce the country's budget deficit. Phasing out untargeted fossil fuel support and enhancing the tax system's role in mobilising domestic public revenues are at the core of this reform. Expansion of environmental taxes could be considered an additional opportunity to broaden the tax base, while strengthening the link with environmental objectives. By pricing environmentally harmful activities, Egypt can advance its green transition while creating additional fiscal space. Additional revenues can, in turn, enable green investment to enhance its provision of basic services and expand its social protection programmes, among other policy priorities. The trade-off between revenue raising and environmental effectiveness may arise over time and should be considered to ensure that both objectives are pursued.

As in many OECD countries, the bulk of Egypt's environmentally related tax revenue (ERTR) comes from taxes and charges on energy products (83% in 2020) (Figure 2.5). The introduction of a fuel excise tax on petroleum products in 2016 led to an 80% increase of the ERTR the following year. Revenues from fuel excise taxes more than doubled in 2022 from the previous year due to a rebounding fuel consumption after the COVID-19 pandemic. The remainder of ERTR stems from taxes and charges on transport. Egypt has implemented multiple transport-related taxes and fees, including licence fees, annual ownership fees and road tolls. However, Egypt has significant scope for expanding vehicle-related taxation for environmental purposes. In 2020, revenue generated from vehicle-related taxes and fees, excluding value-added tax (VAT), import tariffs and schedule tax, represented approximately 0.75% of Egypt's total tax revenues, less than levels observed in Morocco or Tunisia (Figure 2.5).

Figure 2.5. Environmentally related tax revenue has increased, but its share in GDP remains low



Note: Billion EGP (2021, real prices). For 2021 and 2022, information on transport-related tax revenue was not yet available as of January 2024; data points for energy-related tax revenue stem from Egypt's Ministry of Finance.
Source: OECD (2022), Environmentally related tax revenue, OECD Environmental Statistics (database), Egyptian Ministry of Finance, https://doi.org/10.1787/df563d69-en.

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Egypt does not tax pollution or use of natural resources. Like most countries, Egypt levies drinking water and sewage fees as part of the bill for water consumption. The level of fees per cubic litre of water increases progressively with consumption (Chapter 1). However, there are no taxes that could incentivise firms or households to adopt a more efficient use of water resources and to prevent polluting activities. Such instruments exist in several countries, including a surcharge on industrial wastewater in Canada and a tax on pesticide use in Mexico, Sweden and Norway. Furthermore, Egypt also has an opportunity to levy taxes or charges on resource use such as harvesting of biological resources (e.g. fish), landscape changes, freshwater abstraction or extraction of raw materials. The introduction of taxes on pollution and resources could broaden Egypt's tax base and generate additional revenue streams. At the same time, such taxes set incentives to use resources more efficiently and avoid wasteful consumption, strengthening the application of the polluter pays principle.

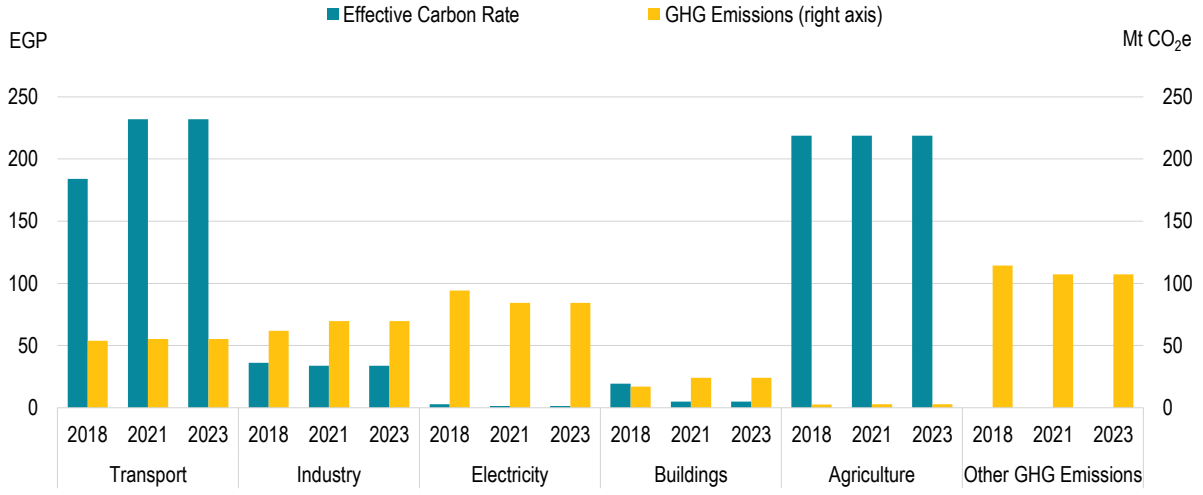
2.3.2. Energy taxes and carbon pricing

Energy use taxation

Fuel excise taxes on petroleum products, mainly used in road transport are Egypt's most relevant taxes on energy use and, indirectly, on CO_2 emissions. Since 2016, Egypt levies fuel excise taxes on petroleum products, while natural gas use remains exempted from these and is only subject to a small stamp duty that can be classified as a specific excise tax. As Egypt neither levies an explicit tax on greenhouse gas (GHG) emissions nor operates an emissions trading system, fuel excise taxes are the only instrument to (implicitly) price CO_2 emissions. Half of combustion-related GHG emissions are covered by a positive Effective Carbon Rate (ECR), which is defined as the sum of a country's explicit carbon prices and fuel excise taxes (Figure 2.6).[7] It amounts on average to 46 EGP/tCO_2-eq. since 2021, up from EGP 38 /tCO_2-eq. in 2018. Since 2021, 16% of these emissions faced an ECR of more than EGP 200, while 30% were priced at a positive rate below EGP 25.

ECRs in Egypt differ across sectors, but overall the transport sector represents the largest component. Combustion-related emissions in the transport sector are nearly fully covered by a positive ECR. Since 2021, an ECR of above EGP 200 covers more than 90% of transport-related emissions. Road transport makes up the lion's share as a fuel excise tax covers all emissions from petrol and diesel combustion. The industry sector's emissions are covered to 53% by a positive ECR but only 15% are covered by an ECR above EGP 25. Agriculture and fisheries are fully covered by a positive ECR. However, the sector only accounts for less than 1% of the country's combustion-related CO_2 emissions. Despite making up a quarter of Egypt's combustion-related emissions, electricity generation did not face an ECR above EGP 25 in 2023. Likewise, residential and commercial buildings continue to benefit from energy subsidies (OECD, forthcoming[23]).

Figure 2.6. Most CO_2 emissions from energy use are covered by a positive ECR, but the levels remain low



Note: Agriculture also includes fisheries; "Buildings" consists of residential and commercial dwellings; the Effective Carbon Rate (ECR) does not include fossil fuel subsidies; "Other" consists of other sectors, including land-use change and forestry.
Source: OECD (forthcoming), Pricing Greenhouse Gas Emissions 2024.

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Fuel excise taxes, as the main instrument for pricing CO_2 emissions from energy use, could be better aligned to reflect external costs. Already progress has been made to strengthen carbon prices on

petroleum products. Amid the VAT reform in 2016, Egypt introduced a new tax, the so-called schedule tax for petroleum products, which can be classified as a fuel excise tax. It applies to petroleum products used in transport, industrial applications and buildings (Riad and Salah, 2016[24]; PWC, 2023[25]). In 2023, rates stood at EGP 0.36 per litre for automotive diesel and EGP 0.65 litre for domestic Gasoline 92 (RON 92). In contrast to international trends to reduce fuel excise taxes during the energy crisis (OECD, 2023[26]), Egypt introduced an additional levy in 2020 on diesel and petrol consumption to increase tax revenue during the COVID-19 pandemic (Reuters, 2020[27]). This development fee is set to EGP 0.25 per litre for diesel and to EGP 0.30 per litre for all types of petrol (OECD, 2018[28]) (Table 2.1).[8] Consequently, the average, effective tax rate for petrol is higher than for diesel. On environmental grounds, it makes sense to apply a higher tax rate on diesel as it has a higher carbon content per litre and the combustion of diesel tends to produce higher emissions of local pollutants and thus contribute to air pollution. However, diesel-fuelled vehicles represent only 6% of Egypt's vehicle stock (Chapter 1). In contrast to petroleum products, the use of natural gas and electricity is subject to a low specific (excise) tax, levied under the Stamp Duty Law (Table 2.1).

Among other measures, the government could consider introducing a climate component in its current taxes on energy use. To that end, it could link the tax rate directly to the fuel's carbon content to set the highest price on the most emitting petroleum use. Such a reform could serve as the basis for a fuel-based carbon tax, whereby the tax rate would still be expressed as a price per commercial unit of a fuel. This is common practice among OECD countries, as well as for emerging economies. Uruguay introduced a carbon tax on petrol in 2022, for example, while Albania's carbon tax varies by fuel.

Table 2.1. Level of taxes by energy source

	Fuel excise tax	Development fee	Specific (excise) tax	Total
Diesel	EGP 0.36 /litre	EGP 0.25 /litre	-/-	EGP 0.61 /litre
Gasoline 92, domestic	EGP 0.65 /litre	EGP 0.30 /litre	-/-	EGP 0.95 /litre
Petrol/gasoline (Other)	EGP 0.18 – 0.48 /litre	EGP 0.30 /litre	-/-	EGP 0.48 – 0.78 /litre
Kerosene	EGP 0.36 / litre	-/-	-/-	EGP 0.36 / litre
Natural gas (Industry)	-/-	-/-	EGP 0.002 /m^3	EGP 0.002 /m^3
Natural gas (Other)	-/-	-/-	EGP 0.036 /m^3	EGP 0.036 /m^3
Electricity (Lighting, Buildings)	-/-	-/-	EGP 0.03 /kWh	EGP 0.03 /kWh
Electricity (Industry)	-/-	-/-	EGP 0.00006 /kWh	EGP 0.00006 /kWh

Note: Petrol/gasoline (Other) includes domestic and imported Gasoline 80 and Gasoline 95.
Source: Country submission from the Egyptian Ministry of Finance (2024), Stamp Duty Law no. 111 of 1980 and its amendments, including Law no. 104 (2012), Schedule Tax Law no. 67 (2016).

Driven by strong population growth and high energy subsidies, Egypt's electricity consumption has increased by 26% since 2010, while more than 80% of the country's electricity generation continues to rely on natural gas (IEA, 2023[29]). Electricity demand spiked in summer 2023 due to high cooling needs. At the same time, outputs from Egypt's major gas fields declined, putting electricity supply under additional strain (Cousin, 2023[30]). In addition, Egypt's power grid suffered from high transmission and distribution losses of about 22% in 2022 (Egypt Today, 2023[31]). Consequently, Egypt urgently needs to invest in the modernisation of its power grid infrastructure and rationalise the use of electricity and thereby natural gas. Increasing effective energy rates[9] can contribute to the provision of reliable and sustainable electricity. In Egypt, energy use based on fossil fuels is taxed less than other energy sources in large part due to its fossil fuel subsidies, including on fuels used for electricity generation (OECD, 2022[32]).

Egypt does not price electricity at a sufficiently high level to allow for full cost recovery of power generation, transmission and distribution costs (El-Tablawy and Wahba, 2024[33]) (Section 2.4.1). The IMF estimates that Egypt spent about EGP 114 billion in explicit consumer subsidies in 2022 (IMF, 2023[34]). Electricity

consumption is subject to a low specific (electricity excise) tax, sometimes referred to as a stamp tax. In April 2023, industrial electricity consumption was taxed at a rate of EGP 0.00006 per kWh, while electricity used in residential and commercial spaces or for lighting purposes was subject to a rate of EGP 0.03 per kWh. Egypt needs to further leverage energy taxes and align prices with cost recovery to induce energy savings. This will allow it to reduce wasteful energy consumption, promote the uptake of more energy-efficient electric appliances and spur investments in industrial energy efficiency.

Towards a voluntary carbon market

In December 2022, the government issued a decree to establish a voluntary carbon market platform within the Egyptian Stock Exchange for the trading of carbon emissions reduction certificates. The market aims to become the first of its kind in Africa, enabling companies to trade certified carbon credits and contribute to carbon emission reduction efforts in line with international standards and Egypt's 2030 Vision. The government has established a regulatory committee and approved certification and verification bodies to oversee the market (Business Today, 2022[35]; Enterprise, 2023[36]; Meshref and Gadelhak, 2023[37]).

2.3.3. Transport-related taxes and charges

Vehicle taxes

Vehicle taxation in Egypt is complex, encompassing various taxes and fees on different types of vehicles throughout their life cycle (from import to annual use) (Table 2.2). Vehicle taxes primarily aim to raise government revenue, but, if well designed, they can also encourage adoption of less polluting vehicles. Beyond high import taxes, vehicles face schedule taxes, which are specific rates based on vehicle type, age and engine capacity. These are all partial proxies for environmental performance of a vehicle (Table 2.2).

Table 2.2. Taxes and fees levied on vehicles

Taxes or fees	Frequency	Rates
Private vehicle licence	First year of registration	0.25%-2.5% of vehicle value depending on cm^3
Private vehicle licence	Each year	EGP 225 – 3 000/2.5% of vehicle value depending on cm^3
Vehicle type development fee	Year of import or of purchase (if new locally manufactured)	0%-8.5% of vehicle value depending on cm^3
Tax on rapid transit vehicles	Each year	EGP 15-120 (petrol, petrol and CNG), EGP 60-480 (diesel) depending on cm^3
Annual fee for the use of license plates	Each year	EGP 400
Fee for the smart transport system developed within the Intelligent Transportation Programme	Each year	EGP 60-350 depending on cm^3 for cars EGP 250-300 depending on tonnes of load for trucks
Table tax (excise tax)	Year of purchase	0%-30% of vehicle value depending on cm^3, local production and powertrain (EV not covered)
Incoming tax (import duty)	Year of import	0%-135% of vehicle value depending on cm^3, country of origin and powertrain (exemption for EV, 35% reduction for CNG-fuelled vehicles)

Note: Additionally, a 14% VAT is levied at the time of purchase, as well as a 0.5% industrial and commercial profit tax and a 3% resources development fee at the time of import.
Sources: Law no. 147 of 1984 imposing a fee for the development of the state's financial resources (as last amended on 9 March 2023); Traffic Law n° 66 of 1973; Presidential Decree n° 419/2018; Egyptian customs website.

Vehicle taxes are almost exclusively administered at the national level (Hemaily et al., 2022[38]). Reducing the number of taxes and fees would simplify the taxpayer experience. New imported vehicles are taxed at high rates, up to 176% for a petrol- or diesel-powered vehicle of important size, compared to locally produced vehicles[10] (Figure 2.8). Vehicles from European Union and Türkiye, nevertheless, have benefited from full exemption since 2019 as part of the Egyptian-European Partnership Agreement that gives these vehicles a considerable trade advantage.

Moreover, Egypt has restricted the import of used passenger vehicles. Vehicles can only be imported up to one year after their manufacture date. This discourages the import of heavily polluting vehicles, while boosting development of the domestic automotive industry. In contrast, second-hand car sales have been booming in many African countries, with considerable negative environmental impacts. Nevertheless, Egypt's vehicle stock remains old considering the high purchasing costs of new vehicles (Chapter 1).

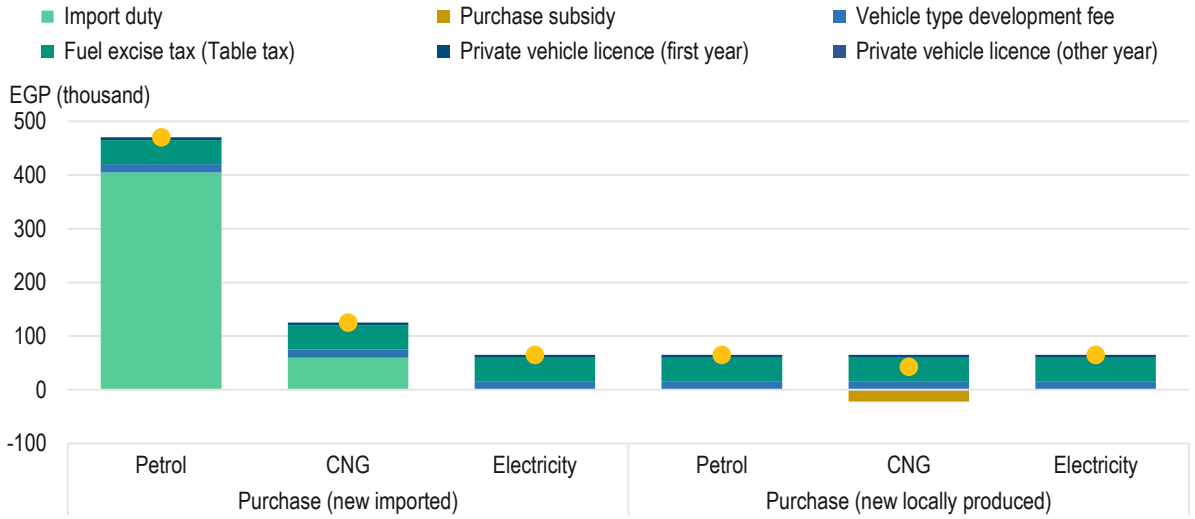
Egypt's transport-related taxes would benefit from a thorough review and adjustment to better consider externalities linked to road use and pollution. Directly setting tax rates on environmental parameters can more effectively address external costs related to the road transport sector. The collected transport-related taxes cover only a small fraction of public investment in road infrastructure and social costs related to environmental damage caused by road usage (e.g. GHG emissions, air pollution, congestion, road damage). Therefore, it would be key to better apply the polluter pays principle in the sector, ensuring that road users pay more for environmental and economic externalities of transport use.

Incentives to encourage the switch to less polluting vehicles

Egypt promotes the renewal of its vehicle fleet by incentivising the shift to vehicles powered by compressed natural gas (CNG). Since 2021, adoption of dual-powered vehicles (petrol and natural gas) has been promoted through scrappage schemes for old, highly polluting vehicles, as well as purchase incentives to convert the existing vehicle fleet (Figure 2.7). The Green Incentive of the Presidential Aging Vehicle Replacement Initiative, launched in 2021, has already replaced 24 000 cars by the end of 2022 (Government of Egypt, 2023[13]). This initiative facilitates the purchase of a new, dual vehicle (petrol and CNG) by extending credit and offering a subsidy equal to 10% of the vehicle price for private cars and 25% for taxis (Government of Egypt, 2023[13]). Reduced insurance price is also granted. Natural gas vehicles further benefit from an exemption from import restrictions on used vehicles, as well as reduced import tariffs. Over 900 natural gas refuelling stations are available, but further investment to develop storage and distribution infrastructure will be necessary.

Figure 2.7. Electric and compressed natural gas vehicles have the lowest vehicle tax burden

Net taxation for an average vehicle depending on powertrain



Note: Results for a 1 700 cm^3 vehicle, with EGP 300 000 value if new. Imported vehicles from European Union countries and Türkiye have benefited from full exemption of incoming tax since 2019 as part of the Egyptian-European Partnership Agreement. CNG: compressed natural gas.
Source: Law no. 147 of 1984 imposing a fee for the development of the state's financial resources (as last amended on 9 March 2023); Traffic Law n° 66 of 1973; Presidential Decree n° 419/2018; Egyptian customs website.

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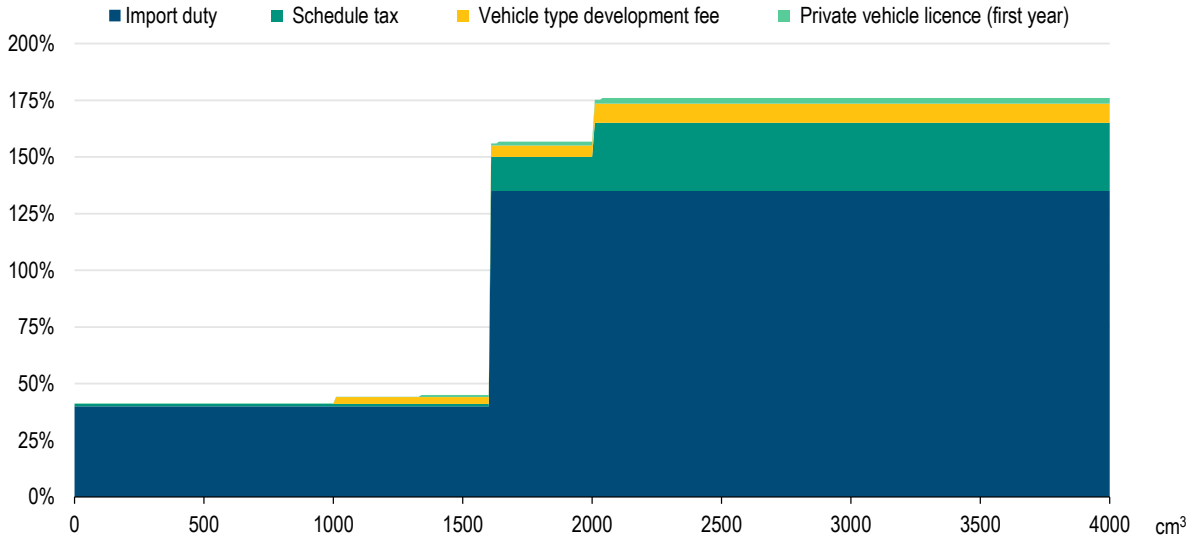
Vehicles powered by natural gas are not necessarily a more environmentally friendly option due to differences in fuel economy (Transport & Environment, 2018[39]) and emissions of other toxic pollutants, in particular by older models (Transport & Environment, 2020[40]). Therefore, the government should pursue efforts to discard old, polluting vehicles and promote a shift to more fuel-efficient, low-carbon vehicles. Scrappage schemes could be costly and less effective, particularly if they subsidise the scrappage of old vehicles that would have been discarded regardless (Li, Linn and Spiller, 2013[41]; Linn, 2020[42]). Better targeting of the scrappage scheme based on a vehicle's future emissions can reduce programme costs substantially (Linn, 2020[43]). The emission-based design of the scheme reinforces the need to track vehicles' emission performance. At the same tim e, there is an opportunity cost to selling untaxed natural gas domestically at prices that do not cover costs, as well as the cost of the incentive schemes for CNG vehicles. While the transition towards low-emission vehicles may warrant a greater role for CNG-powered vehicles, the costs versus benefits of this strategy should be considered to ensure long-run fiscal and environmental sustainability.

Egypt could encourage the renewal and decarbonisation of the fleet by introducing a tax system based on fuel efficiency or CO_2 emissions**.** Currently, taxation of passenger cars is based mainly on vehicle size and value. The difference in taxation according to vehicle size is especially acute for new cars. Tax rates range from 1% of vehicle value for less than 1 000 cm^3 to 41% and 176% for more than 3 000 cm^3 for locally produced and imported vehicles, respectively (Figure 2.8). To a certain extent, this may incentivise less polluting vehicles as the tax structure provides incentives to buy smaller cars, which tend to emit fewer GHG emissions. To influence the purchase of low-emission vehicles, Egypt should consider adding a climate component in vehicle taxation. Through a feebate (or bonus-malus) system, vehicles with high CO_2 emissions or poor fuel efficiency (low fuel economy) pay a fee. Meanwhile, those with low CO_2 emissions or better fuel efficiency (high fuel economy) receive a rebate.

Figure 2.8. Vehicle size mainly determines the level of taxes for imported vehicles

Taxes on new imported internal combustion engine vehicles by percentage of the vehicle's value depending on size



Note: Vehicles imported from the European Union or Türkiye are exempted from incoming tax. A 14% VAT also applies uniformly to all vehicles when purchased.
Source: Law no. 147 of 1984 imposing a fee for the development of the state's financial resources, (as last amended on 9 March 2023); Traffic Law no. 66 of 1973; Egyptian customs website.

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Feebate systems need to be revenue-neutral and avoid adding a burden to public finances. France, Singapore and New Zealand have had feebate programmes of varying designs and adjustments over time (Wappelhorst, 18 June 2022[44]). France, for example, has had a longstanding feebate scheme. It has continuously adjusted the design of its bonus-malus programme to increase its effectiveness and stabilise its budget. Mostly recently, in 2023, France further strengthened the malus component (Government of France, 2023[45]). Sweden discontinued its bonus part of the scheme in 2022 (TransportSyrelsen, 2023[46]).

Introducing a fuel efficiency standard for new vehicles could complement the fiscal incentives for cleaner vehicles and higher fuel taxes. Fuel standards can influence fleet composition by transferring responsibility to carmakers for clean technology in a context of uncertain fuel prices (Anderson et al., 2011[47]). Indeed, households usually tend to underestimate the future cost of fuel when buying a vehicle. This is all the more relevant in Egypt, where the low fuel taxation level is less likely to send a price signal that influences a buyer's decision. A simple mechanism, such as setting a fuel efficiency standard per vehicle as in the People's Republic of China (hereafter "China"), could be implemented. However, caution is warranted. Fuel efficiency standards that improve the fuel economy of new vehicles may result in a "rebound effect", increasing the distance driven and thus partly offsetting the gains (Anderson et al., 2011[47]; Frondel and Vance, 2017[48]; Bjertnæs, 2019[49]).. Similarly, air emission standards would help reduce air pollution, which would be valuable in cities with high traffic (ACEEE, 2022[50]). For example, new vehicles have to comply with Euro 6b standard in China starting from 2023, and in Morocco starting from 2024. In addition, the introduction of an electronic "smart card system" for gasoline could help better understand consumption patterns and rationalise the use of subsidised fuels.

Support for low-carbon vehicles

Electric vehicles (EVs) benefit from some tax exemptions, but their broad uptake will require further measures and substantial support to build a spatially balanced network of charging infrastructure. Egypt

implemented several incentives in favour of EVs. It has exempted import tariffs since 2013 and the need for a permit to import used EVs up to three years old since 2018 (Egypt, 2018[51]). However, vehicles imported from the European Union and Türkiye also benefit from exemptions, which do not provide EVs a relative advantage (Table 2.3). Additionally, this exemption benefits only cars and trucks, and could be extended to motorcycles and buses. Motorcycles, buses and, to a lower extent, taxis are indeed the most cost-effective segments to electrify first in developing countries. This is due to the small additional cost for motorcycles and buses, and the high mileage throughout the lifespan of taxis (Briceno-Garmendia, Qiao and Foster, 2023[52]). There are no direct subsidies, which should be implemented with caution due to their fiscal cost. Moreover, given that Egypt's electricity mix relies heavily on fossil fuels (Chapter 1), climate mitigation impacts will be limited. However, advancing the electrification of road transport would have major benefits for improving air quality, especially in densely populated urban areas. As Egypt is advancing development of its domestic EV industry, producing more affordable low- or zero-emitting vehicles will enhance their presence on the domestic market. Therefore, the government should maintain incentives granted under the Special Initiative to support investment throughout the entire EV value chain (e.g. battery cell manufacturing and deployment of rechargeable batteries).

Road pricing

Road tolls are relatively well developed and applied on major national routes.[11] They are mostly collected by the National Road Company. Receipts are dedicated to a private fund for maintenance and construction work. In addition, some urban tolls have been introduced, mainly in new urban communities. As part of the Intelligent Transportation Programme, the government is building new roads with toll fees that will be collected electronically, without need to stop. This programme has been financed since 2020 by a dedicated annual fee for all registered vehicles (Table 2.2). Road tolls in place use a fixed price per trip or monthly pass. Tolls vary only according to the type of vehicle (e.g. private car, bus, truck, etc.) and not according to the distance or vehicle characteristics (Morsy, 2020[53]). Egypt could further increase the use of road pricing to make drivers pay more directly according to use and environmental damage. For instance, it could put in place distance and emission parameters. Additionally, the introduction of congestion charges would be particularly relevant for Egypt's densely populated mega cities, helping reduce air pollution and other negative environmental impacts. As a start, Egypt could consider modulating road tolls according to time to reduce congestion and encourage road users to avoid peak hours. However, these measures would need to be socially balanced, including through the provision of alternative, less polluting transportation options.

2.3.4. Greening corporate income tax incentives

Corporate income tax (CIT) incentives are often used to reduce investment costs for businesses and influence investment decisions in certain sectors, activities or locations – including green investment. If well designed, CIT incentives can encourage investment to promote climate and environmental objectives. This could include, for example, investment in clean power generation and the take-up of cleaner production technologies. While investment decisions are driven by both tax- and non-tax factors, CIT incentives can act as an additional policy to help mobilise the significant volume of investment needed for the transition to carbon neutrality.

Using CIT incentives comes with a cost. Tax revenues forgone can be significant and they may be difficult to remove support once incentives have been introduced. Tax incentives may also benefit investments that would have taken place in the absence of the support scheme (limited additionality). If the incentives are not properly designed, they could create windfall gains for some investors. In addition, CIT incentives heighten complexity in the tax system, create distortions and increase administrative costs. The trade-offs linked to using CIT incentives are not always well understood and pose a significant challenge for tax and investment policy makers.

Egypt does not offer CIT incentives that exclusively target green investments, but certain green investment projects can benefit from the Special Incentive (Table 2.3).[12] The Special Incentive is available to investment in certain strategic sub-sectors for approved projects by the Supreme Council for Investment. Companies can deduct an additional 30% or 50% of investment costs for tax purposes. This comes in addition to a 100% deduction of capital investment costs for tax purposes. Given other CIT system features, the total deduction for eligible investment can effectively total 150% of investment costs.[13] Investments in regions most in need of development in Egypt (Locations A), receive the more generous 50% tax allowance, while other regions (Locations B) receive a 30% allowance.[14]

Introduced in 2018, the Special Incentive targets expenditures as opposed to income. This is likely to be more effective in promoting additional investment than tax holidays that are widely used in Egypt for other purposes.[15] Empirical evidence on the benefits of tax incentives is limited. However, it generally supports the view that expenditure-based incentives, such as tax allowances, are more efficient in promoting additional investment (Klemm and Van Parys, 2012[54]; IMF-OECD-UN-World Bank, 2015[55])**.** Expenditure-based incentives reduce the cost of investing and can make more projects economically viable at the margin, encouraging projects that would not be made in the absence of the incentive. On the other hand, income-based tax incentives, such as tax holidays, provide tax relief based on secured earnings. In so doing, they only benefit projects that are already profitable. This, in turn, risks creating windfall gains for those investors without necessarily making additional projects profitable. Egypt, as other countries in MENA, employs a range of income-based incentives (OECD, 2022[56]). The recently agreed Global Minimum Tax for large MNEs may curtail the effect of certain tax incentives by reducing or nullifying the monetary benefit of the incentive (Box 2.3).

Box 2.3. Tax incentives and the global minimum tax for multinational enterprises

A global minimum effective taxation level for large MNEs

Pillar Two of the new international tax agreement establishes a global minimum effective corporate tax rate of 15% for large multinational enterprises (MNEs) with a EUR 750 million revenue threshold. Where an MNE's effective tax rate in a jurisdiction falls below 15%, the MNE would potentially be subject to top-up taxes under the Global Anti-Base Erosion (GloBE) Rules, a core component of Pillar Two. The GloBE Rules establish the minimum corporate tax and are complemented by the subject-to-tax rule. This will allow developing economies to tax certain base-eroding payments (such as interest and royalties) when they are not taxed up to the minimum rate of 9%. The GloBE Rules apply top-up taxes to profits in excess of a substance-based income exclusion (SBIE), which allows some profits based on economic substance (tangible assets and payroll) to be deducted from the GloBE base.

Impact on the use of tax incentives

The GloBE Rules will not affect all jurisdictions, MNEs and tax incentives in the same manner. The impact of the GloBE Rules on tax incentives will depend on their design, on the jurisdiction's tax system (its baseline tax system and its use of base narrowing provisions), and on the characteristics of MNEs and their activities in the jurisdiction. For example, MNEs may continue to use tax incentives below the EUR 750 million revenue threshold without them being affected by the GloBE Rules.

The impact of the GloBE Rules will strongly depend on the design of tax incentives. Certain types of tax incentives will be strongly affected. This is especially true for certain income-based tax incentives such as full exemptions or significantly reduced CIT rates, which are widely used across the world. Others may not be affected at all, such as accelerated depreciation for tangible assets. Understanding how the rules may affect tax incentives requires careful consideration of the detailed design of tax incentives.

Targeted tax incentives, incentives with economic substance requirements and expenditure-based tax incentives targeted at tangible assets may be less affected. Tax incentives may affect some categories of income or expenditure or limitations to tax benefits more than others. Due to the SBIE, for example, GloBE Rules may be less likely to affect expenditure-based tax incentives targeted to payroll tangible assets or tax incentives with substantive economic substance requirements. However, the value of providing strongly reduced CIT rates or CIT exemptions to in-scope firms might merit reassessment of the use of these tax incentives.

The GloBE Rules should prompt jurisdictions to review the use of tax incentives and consider tax incentive reform. This is particularly the case for tax incentives that may become inefficient due to the operation of the GloBE Rules.

Source: (OECD, 2022[57]).

Renewable energy and green manufacturing industries can benefit from the Special Incentive, including producers of machinery and equipment used in these industries. Investment projects need to relate to certain sub-sectors to be eligible for the Special Incentive. Sub-sectors differ in A and B Locations but overlap to some extent (Table 2.3). The incentive appears to put an additional focus on infrastructure and renewable energies for A Locations, and the wider industrial sub-sectors for B Location.[16] In March 2022, the eligible sub-sectors were broadened to include renewable energy projects. They also include the production of goods that can help reduce environmental impacts in Egypt, such as EVs and alternatives to

plastic. Support to green industries extends beyond the targeted industry to producers of inputs. This provides support to the entire value chain, such as investments, EV components and EV charging stations.

The Special Incentive is also available to non-green investments. As a result, it may not lower the relative costs of green investments in certain segments, which reduces the steering effect towards the green transition. The Special Incentive may target green and non-green segments of a market (e.g. petrochemical products can benefit from the B Location incentives as can green petrochemical products) (Table 2.3). In such cases, the steering effect of the incentive towards the green investment may be reduced or even nullified as it does not make the green investment relatively more attractive.

Table 2.3. Green and non-green investment projects can both benefit from the Special Incentive

Overview of industries eligible to benefit from the Special Incentive, by sector group and location

Eligible industries	Location A and location B	Only location A	Only location B
Renewable energy generation and inputs	Wind power station components Solar cells and their components Green hydrogen and ammonia Seawater desalination supplies	Green hydrogen electrolyser Wind power station components Green fuel derivatives; Seawater desalination using environmentally friendly technologies	Batteries
Reducing environmental impacts	Electric and natural gas vehicles, their components and EV charging stations Manufacturing environmentally friendly alternatives to plastic products Refrigerated transportation Carbon and methane reduction	Sewage and industrial waste treatment plants Investment in sustainable and green tourism	Green petrochemical products
Other sectors	Mining and related services Food industries Pharmaceutical industries Land transportation (rail, road, river) Dry ports Hotels Education, sports and health services	Agriculture and husbandry Mining ores and minerals Petroleum exploration-related services and oil storage Non-green hydrogen Printing and furniture industry Wet ports	Fishing and meat production Petrochemical products Other manufacturing industries (textile and apparel; wood; chemical and plastics; basic and fabricated metals industries; auto parts; electronic and ICT equipment; machinery and equipment) Medical tourism

Note: ICT: information and communication technology.
Source: OECD based on the Investment Tax Incentives database (Celani, Dressler and Wermelinger, 2022[58]) and Prime Ministerial Decree Nos. 104, 981 and 1775 of 2022.

Moreover, green technologies of different levels of maturity can benefit from the incentive. Both well-established and emerging green technologies are eligible for the incentive. This could include solar panels and wind turbines, as well as hydrogen and carbon capture. Emerging green technologies may face relatively higher up-front costs than competing technologies based on fossil fuels. Targeting support towards green projects that are not yet competitive may help bring technologies to the market. However, costs related to such targeting need to be evaluated carefully and scaled back once the market has become more mature. In particular, care must be taken to avoid technological "lock-in" and providing windfall profits to investors for activities they would have undertaken anyway. Governments need to carefully balance their targeted interventions to avoid excessive spending.

Only a limited number of economies in MENA and Africa provide CIT incentives for green investments, which are more widely used in OECD economies (Table 2.4). Egypt is the only country in its region that provides a tax allowance (as opposed to an income-based incentive) to support green investments. When other economies in the region use incentives to promote green investment, they use tax holidays (Algeria,

Tunisia and Palestine Authority). When those developing economies use expenditure-based incentives in the green transition, they target them narrowly to renewable energies (e.g. Mauritius and South Africa). Previous OECD work has shown that 10 out of 36 OECD and selected partner economies provide fiscal depreciation schedules that are more generous for carbon-neutral power generation technologies than the comparable carbon-intensive technology (Dressler, Hanappi and Van Dender, 2018[59]).

Table 2.4. CIT incentives targeting green investment in selected African and MENA economies

Country	Targeted investment	Description of policy
Algeria	Priority sectors, including renewable energy	Investors benefit from a three- to five-year CIT exemption. Eligible sectors include renewable energy; agriculture, aquaculture and fisheries; mining and quarrying; industry (including petrochemical), services and tourism; knowledge economy; and information and communication technologies.
Mauritius	Renewable energy	An accelerated depreciation allowance for solar energy units (100% in the first year) and green technology equipment (50% per year).
	Renewable energy (financing)	CIT exemption from interest derived by individuals and companies from debentures, bonds or sukuks issued by a company to finance renewable energy projects.
Morocco	Renewable energy (wind, solar, hydropower or biomass)	A once-off deduction of 125% of renewable energy assets (including their supporting structures, as well as the direct cost of installation or assembly) used to generate electricity from renewable energy sources, including: wind power, solar energy (photovoltaic or concentrated), hydropower or biomass. The incentives apply to renewable energy projects brought into use on or after 1 March 2023 but before 1 March 2025.
South Africa	Renewable energy (bio-fuels)	An accelerated depreciation allowance (50% in the first year of use, 30% in the second and 20% in the third year) for machinery and articles used in farming and production of bio-diesel or bio-ethanol.
Tunisia	Waste management & recycling	A partial 66% exemption from CIT on qualifying income and a reduced 10% CIT rate, which apply from the start of their operation. Eligible sectors include collection, processing, recovery, recycling or treatment of waste and refuse; as well as various social services (e.g. child and elder care institutions, education, scientific research, cultural industry and others).

Note: This table considers the tax incentives available as of 1 January 2023.
Source: OECD based on the Investment Tax Incentives database (Celani, Dressler and Wermelinger, 2022[58]) and national legislation.

Egypt could more clearly define the criteria used to approve projects for the Special Incentive. Applications for the Special Incentive are sent to the General Authority for Investments (GAFI) and approved by the Supreme Council for Investment, which consists of members of both GAFI and the Egyptian Tax Authority. While regulations define eligible sector and investment areas, the granting committee issues approvals on a case-by-case basis, which can increase the risk for discretion when approving projects. The criteria used by the granting committee should be clarified, a process considered as a best practice in granting CIT incentives (IMF-OECD-UN-World Bank, 2015[55]).. One option could be to create a points-based system to evaluate applications. For example, applications to Uruguay's *COMAP* incentive are evaluated based on quantifiable measures of how the project satisfies different policy objective, such as job creation, exports generated and clean technology investment. However, this approach involves administrative costs.

Egypt's Vision 2030 is ambitious, requiring the support of co-ordinated and cohesive tax and non-tax investment policies to reach its goals of sustainable development. Focusing CIT incentives on green and energy-efficient technologies could better align investment decisions with Egypt's climate goals and limit revenue forgone. This would also increase the competitiveness of energy efficiency initiatives.

In addition to the Special Incentive, Egypt grants other CIT incentives that are not targeted to specific sectors and activities, such as the Free Zone regime and accelerated depreciation for machinery. Prior to August 2023, Egypt prohibited oil and gas processing companies from operating under its Free Zone regime, which grants a permanent CIT exemption to investors within these zones.[17] An amendment to the Investment Law authorised oil and gas companies from operating in the Free Zone with the approval of the Supreme Council of Energy.[18] Several countries in MENA prohibit oil and gas investment from benefiting from CIT incentives where these industries are well established, including Algeria, Jordan and

Tunisia. The Supreme Council of Energy should carefully evaluate the need to grant Free Zone regime to fossil fuel projects and consider re-introducing the prohibition in the medium term. The August 2023 law amendment also introduced a new 35-55% refund of the corporate tax paid by taxpayers in the previous year for up to ten years.[19] The target of the new policy is under discussion, but Egypt could consider excluding fossil fuel industries from the new policy.

While tax incentives do not result in up-front policy costs, they can result in significant tax revenues that are not collected. As a result, tax incentives reduce available public finances, crucial for delivering public goods and services. Identifying opportunities to focus support where it is needed, such as for green investment and energy efficiency initiatives, could help limit pressure on public resources.

2.4. Reforming environmentally harmful support

2.4.1. Energy consumption subsidies

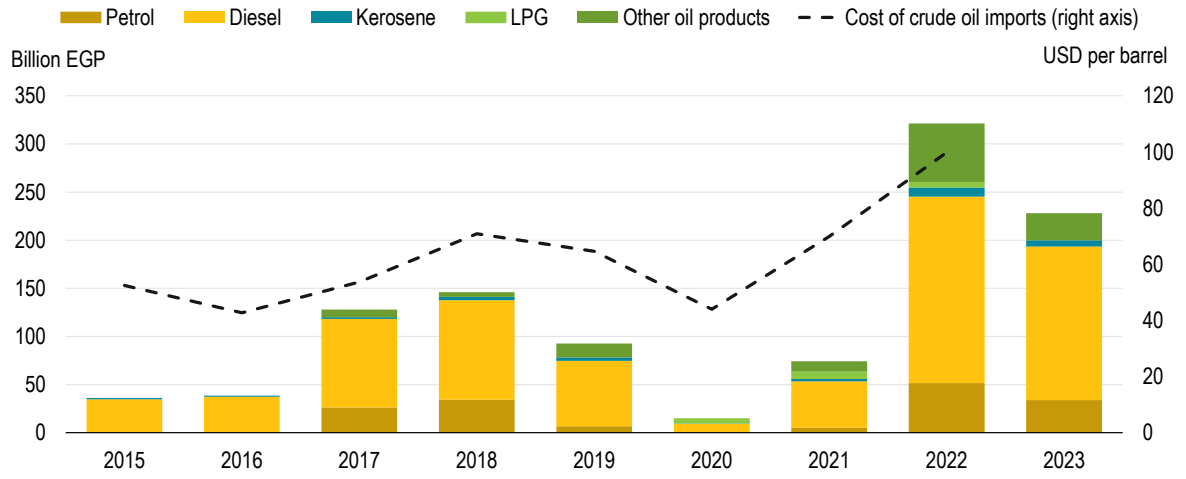
Energy subsidies have been a longstanding feature to support households and industries in MENA countries. In 2022, the region alone accounted for a quarter of global explicit subsidies on energy use (IMF, 2023[34]). By supplying energy products to businesses and households at prices well below the market value of the fuel itself, these economies have traditionally used energy subsidies as a crucial pillar for their industrialisation strategies. They are also a key mechanism to protect domestic consumers from fluctuating energy prices, attenuate social inequalities, or address energy poverty and reliability of access.

However, energy subsidies that incentivise fossil fuel use have negative environmental impacts and, if untargeted, may not attenuate social inequalities. In addition to the fiscal burden, subsidising fossil fuel use has negative effects on the environment and climate. Instead of internalising environmental damage, fossil fuel support undermines the clean energy transition by setting artificially low prices for fossil fuels. These artificial prices lead to excessive demand and risk wasteful energy use. Further, these subsidies divert scarce public resources from productive uses including health, education, social protection programmes and investments in low-carbon technologies. Thus, fossil fuel support can prolong the economy's reliance on energy-intensive industries and stall energy efficiency improvements, e.g. through electrification (Rohac, 2013[60]; Eibl, 2017[61]).

Furthermore, untargeted low energy prices do not necessarily reduce poverty levels efficiently. Fossil fuel support, in particular for automotive fuels, can be highly regressive (IMF, 2017[62]). If subsidies are not targeted at low-income households, they disproportionately favour wealthier people, who generally consume more fossil fuels (e.g. having larger homes or owning a vehicle) (Abouleinein, El-Laithy and Kheir-El-Din, 2009[63]; WRI, 2021[64]). Before the subsidy reform, according to analysis of Egypt's household surveys in 2010, the population's top 40% in income distribution received around 60% of energy subsidies; the bottom 40% received about 25%. These differences are more pronounced in urban areas where the top 40% received about 75% of energy subsidy benefits, and more than 90% of petrol subsidies (ESMAP, 2010[65]).

Energy subsidies have come at a tremendous cost and higher uncertainty for public finances. Fluctuating with international petroleum prices and the currency exchange rate, Egypt's petroleum subsidy expenditure is volatile. This adds to the challenging macroeconomic situation. Until 2014, Egypt strongly subsidised petroleum products such as petrol, diesel, kerosene and liquefied petroleum gas (LPG), natural gas and electricity by setting fuel prices well below world market average. As Egypt has been an oil importer since 2005, the petroleum subsidies made its economy vulnerable to fluctuations of global commodity prices (Rohac, 2013[60]; IEA, 2023[29]) (Figure 2.9). After spikes in petroleum subsidies driven by international prices, the Egyptian government implemented a far-reaching subsidy reform between 2014 and 2019, strongly increasing domestic consumer prices for a range of petroleum products (WRI, 2021[64]).

Figure 2.9. Egypt's petroleum subsidy expenditure fluctuates with global oil prices



Note: Billion EGP (2021, constant prices); LPG: liquefied petroleum gas; cost of crude oil imports is calculated as the unweighted average of average annual cost of total crude imports across 26 exporting countries.
Source: IMF (2023), IMF Fossil Fuel Subsidies Data: 2023 Update; IEA (2024), "Crude oil import costs and index", IEA Energy Prices and Taxes Statistics (database), https://doi.org/10.1787/eneprice-data-en.

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The fuel price adjustment mechanism has been a core component of Egypt's wide-ranging energy subsidy reform. In 2019, the Egyptian government established the Fuel Automatic Pricing Committee (FAPC), comprising representatives from the Ministry of Petroleum and Mineral Resources, the Ministry of Finance and the Egyptian General Petroleum Corporation. The FAPC regulates prices of petroleum products on a quarterly basis through a fuel price indexation mechanism. The mechanism considers changes in global commodity prices, Egypt's exchange rate and the share of imported fuel in domestic consumption. However, it does so only within the limit of a +/-10% change (IMF, 2018[66]; Egypt, 2023[67]). As a result, end-user fuel prices increased, which contributed to a drop in spending on fuel subsidies by approximately 65% from July 2019 to March 2020 (OECD, 2018[28]). Since early 2022, driven by surging petroleum prices in international markets and currency depreciation, the price per litre has been raised in steps. Between the end of 2022 and the end of 2023, prices of petrol and diesel increased between 22% (automotive diesel) and 43% (industrial diesel) (OECD, 2024[68]).

In contrast, prices for natural gas are not frequently revised. Egypt's Prime Minister tasked a ministerial committee in 2019 to periodically review natural gas prices for industrial activities, considering changes in global prices, and economic and social circumstances. Consequently, reviews of natural gas prices are conducted less frequently than for petroleum products. Moreover, recommendations for adjustments are not based on an adjustment mechanism, which bears the risk of under-pricing. Building on its positive experience with the FAPC, Egypt could develop and implement a similar price adjustment mechanism for natural gas as an intermediate step towards further energy market liberalisation.

Like many countries around the world, Egypt implemented measures to support its industry during the COVID-19 pandemic in 2020. The government cut the price of natural gas for industry to USD 4.5 per million British thermal units (BTU) (UNDP, 2021[14]). The most recent changes in prices were made in 2021 and 2022, which are set according to sub-sector. For instance, natural gas for electricity generation has been priced at USD 3 per million BTU since 2022, while the iron and steel sector has paid USD 5.75 million BTU since 2021. In addition, natural gas use in households is priced progressively with the consumption level at EGP 2.5 to 3.75 per m^3 (Gas Regulatory Authority, 2024[69]). Explicit natural gas subsidies were largely used to support residential consumption of LPG bottles. The government supported the switch

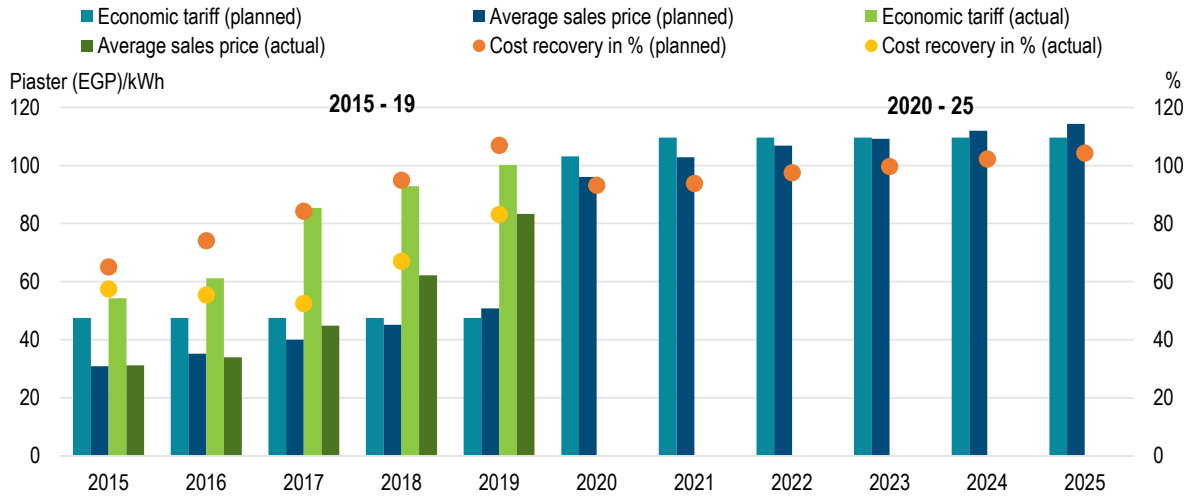
from LPG bottles to residential gas connections through economic incentives (including covering installation costs and collecting small instalments over long payment periods). As most households are now connected to the national gas grid, LPG consumption has strongly decreased since 2019.

Egypt's electricity market reform brought greater transparency in tariff setting, but full cost recovery has not yet been achieved. While the first five-year Electricity Tariff Restructuring Plans 2015-19 envisaged increasing cost recovery from 57% in 2015 to 100% in 2019, it is estimated that Egypt achieved 83%. The second Plan 2020-25 reiterated the goal of achieving full cost recovery by 2023 (EgyptERA, 2023[70]) (Figure 2.10). While Egypt took important steps to raise electricity tariffs multiple times in 2023, full cost recovery has still to be achieved. Despite a recent 16-26% increase in January 2024 (depending on the consumer category), the price of electricity for the highest consumption bracket still remains below the supply costs of EGP 1.77 per kWh (El-Tablawy and Wahba, 2024[33]). The IMF estimates that Egypt spent about EGP 114 billion in explicit consumer subsidies on electricity in 2022 (IMF, 2023[34]).

In Egypt, as in many countries, electricity tariffs are differentiated by type of customers (e.g. industry, shops and households) and consumption levels. Residential tariffs are divided into seven categories. Vulnerable customers whose consumption is below 650 kWh per month are supposed to be charged at a lower rate than the cost of supply. However, in principle, all residential consumers receive a subsidised tariff. This reflects the need to pursue reforms to provide more targeted support for vulnerable households while improving energy efficiency.

Figure 2.10. Electricity tariffs remain below cost recovery

Electricity tariffs compared against average sales prices and resulting cost recovery in the two five-year Electricity Tariff Restructuring Plans 2015-19 (actual and planned) and 2020-25 (planned)



Note: 100 piasters = 1 Egyptian Pound (EGP). Information about the actual implementation of the Electricity Tariff Restructuring Plan 2020-25 is not yet available.
EgyptERA (2023), Electricity Tariff Subsidy Reduction: The Case of Egypt.

StatLink https://stat.link/jlxi2k

As part of the reform, adoption of the New Electricity Law no. 87 of 2015 enhanced the role of the country's independent power sector regulator, the Egyptian Electric Utility and Consumer Protection Regulatory Agency (EgyptERA). Following the reform, EgyptERA began developing economic rules and principles to calculate tariffs and charges; approving access charges to the transmission and distribution networks; and recommending changes in electricity tariffs to the Cabinet of Ministers. EgyptERA develops such

recommendations for tariff adjustments based on its "Cost of Service" methodology. It uses a formula that considers costs of electricity generation, transmission and distribution; the weighted average cost of capital of a regulated asset; and allocation costs to different voltage levels and customer groups (Africa Energy Portal, 2022[71]; EgyptERA, 2023[70]). While EgyptERA's new methodology made tariff setting more transparent, the Cabinet of Ministers makes final decisions. It can opt for a lower electricity tariff if the Ministry of Finance pays the difference as a subsidy (Rana and Khanna, 2020[72]). As a next step, electricity prices need to be adjusted following EgyptERA recommendations more closely and more frequently to better reflect fluctuations of exogeneous factors affecting electricity supply costs.

Box 2.4. The Takaful and Karama Programme enables targeted poverty reduction

In 2014, Egypt adopted a far-reaching economic reform programme that transitioned government spending away from general untargeted and costly subsidies for fuels and food. This reform provided fiscal space to develop and expand more targeted social protection measures aimed at mitigating increases in poverty and inequality among the most vulnerable groups in the country.

As a result of this reform, Egypt adopted an expanded social protection programme, Takaful and Karama, in 2015. Initially co-financed by the World Bank, the programme is now fully funded by the general state budget and implemented by the Ministry of Social Solidarity. Karama is an unconditional cash transfer to elderly poor (over 65 years old) and people with severe disabilities, ranging between EGP 230-450 per month. Takaful provides cash transfers to low-income families with children. Each household receives EGP 325 per month, plus between EGP 60-140 per child depending on their age for up to two children. A soft conditionality was introduced in 2018, tying the benefits to children's regular school attendance and on periodic health follow-up visits for the children and expectant mothers at primary health care units. Beginning in March 2022, Egypt implemented multiple major fiscal packages, which expanded the programme's scope in terms of beneficiaries and financial benefits. Most recently, Egypt increased the programme's benefits by 15% through the fiscal package in February 2024.

In 2022, Takaful and Karama covered 3.67 million beneficiaries, about 13% of the country's households. This was up from 0.51 million in 2016 after beneficiaries of the social security pensions – another unconditional cash transfer programme – were transferred to Takaful and Karama. Most beneficiaries live in Minya, Giza and Assiut governorates. Women make up 75% of beneficiaries representing their household. The total amount of cash transferred through the programme tripled between 2017 and 2022, amounting to EGP 19.4 billion.

Sources: (ESMAP, 2017[73]; UNDP, 2021[14]; Egypt, 2023[67]; OECD, 2024[68]).

In recent years, Egypt has started rechannelling fiscal savings from the energy subsidy reform towards social spending, especially health and education. In 2015, the government established the Takaful and Karama Programme, which directs cash transfers to vulnerable households, notably women (Box 2.4). To further counterbalance undesired social impacts of electricity price increases, Egypt could consider expanding cash transfers through these existing channels (UNDP, 2021[14]; IEA, 2023[29]).

2.4.2. Production subsidies for petroleum and natural gas

The oil and gas sector is an important pillar of Egypt's economy, representing around 24% in 2020 of the country's GDP (US ITA, 2022[74]). It contributes nearly EGP 320 billion to GDP (2021), strongly expanding its role since 2011 (Egypt Oil & Gas, 2022[75]). Egypt's oil and gas exploration and production industry is governed by concession agreements. These agreements are formalised between i) the Arab Republic of

Egypt, as the owner of the resource; ii) the Ministry of Petroleum represented through one of the public sector companies – Egyptian General Petroleum Corporation, Egyptian Natural Gas Holding Company or South Valley Egyptian Petroleum Holding Company; and iii) a multinational energy company (EY, 2018[76]). Like many countries with extractive industries, Egypt levies a higher corporate tax rate on profits of oil and gas exploration and production companies to capture economic rents. Profits of oil and gas exploration and production companies are taxed at a rate of 40.55% compared to a standard corporate tax rate of 22.5%.

At the same time, the oil and gas sector benefits from certain VAT incentives and CIT incentives. For instance, machinery and equipment used in producing goods benefit from a reduced VAT rate of 5% and exported goods and services are subject to a zero VAT rate (EY, 2018[76]). Egypt grants CIT tax incentives to its fossil fuel producers. However, as these incentives are not direct budgetary transfers, their cost to the government is not measured systematically. Most incentives for fossil fuel producers are provided on the level of individual concession agreements, which makes it difficult to ascertain the type and level of incentives granted. Tax expenditures (and other provisions resulting in government revenue forgone) are reviewed less frequently than direct transfers, which are authorised through the budget process. While this ensures some tax policy stability for economic agents, the lack of frequent reviews impedes opportunities for tax reforms. This can result in tax expenditures costing more than the gains they were designed to generate, or their policy objective no longer being relevant. Therefore, keeping track of forgone revenue is a first step towards verifying that these measures are achieving their objectives in the most cost-effective way. Regularly published tax expenditure reports, including those related to the oil and gas sector, are an important fiscal management tool (Elgouacem, 2020[77]). They also help monitor the alignment of public expenditure with climate goals. Egypt could consider using tax expenditure reports, including tax incentives for the oil and gas sector, to enhance its transparency and tracking of progress towards its climate goals.

2.5. Investment in environmental and low-carbon infrastructure

The government is committed to creating an investment-friendly climate to support Egypt's green transition. Egypt's Climate Investment Plan outlines priorities for low emissions and climate-resilient development (Green Climate Fund and Government of Egypt, 2022[78]). It has embarked on many initiatives to transform environmental challenges into investment opportunities (Box 2.1). For instance, the MoE established a specialised unit for environmental and climate investment and organised its first Environment-Climate Investment Forum in 2023. The annual forum will present green investment opportunities to the private sector. A new online investment platform showcases environmental and climate investment opportunities by sector and by governorate, including information on green finance facilities, feasibility studies, incentives and other services (Government of Egypt, 2023[79]).

Egypt became the first MENA country to issue a sovereign green bond in 2020 with a value of USD 750 million in 2021 (Government of Egypt, 2021[80]). About 46% was disbursed for clean transportation and 54% for sustainable water and waste management (Government of Egypt, 2021[80]). Flagship projects include the Cairo Monorail (Box 2.6), the El Dabaa Desalination Plant and the Eastern Alexandria Sludge Treatment Facility. Following Egypt's example, many other MENA countries, notably the United Arab Emirates, issued social, sustainable and sustainability-linked bonds (DGB, 2024[81]).

Under its green financing framework, the government defined sustainability criteria to prioritise green investment. It aims to allocate 50% of public investments to green projects in the fiscal year 2024/25 and to achieve 100% by 2030 (Government of Egypt, 2023[82]). Efforts could be further supported by setting climate-specific objectives for state-owned enterprises. These should ensure that public assets and investments comply with climate change requirements, including disaster and risk assessments. In addition, Egypt should enhance corporate social responsibility reporting (Box 2.5).

Box 2.5. Enhancing corporate social responsibility of state-owned enterprises

Investment Law no. 72 of 2017 emphasises corporate social responsibility (CSR) in the investment landscape. However, CSR reporting remains limited among state-owned enterprises. The few exceptions are primarily in sectors such as banking, and oil and gas, where competitive pressures drive the disclosure of such information.

Providing more comprehensive information is a precondition to enhance the effectiveness of CSR reporting. Introducing transparency and reporting mechanisms not only fosters accountability but also stimulates efficiency improvements. CSR reports should become publicly available, which would raise public awareness, inform decision making and encourage more responsible business practices.

State-owned enterprises (SOEs) can play a vital role in catalysing the private sector's engagement in CSR. As large and influential entities, SOEs can set a normative benchmark for CSR practices, thus signalling to the private sector the importance and values of CSR. By demonstrating their commitment to CSR, SOEs can inspire and motivate private companies to follow.

The Central Bank of Egypt and the Egyptian Financial Regulatory Authority impose sustainability reporting requirements in the banking sector and among listed companies, fostering transparency and accountability. Extending these mandates to SOEs would establish a unified approach to sustainability reporting and CSR disclosure. This, in turn, would promote a more ethical and responsible business environment across all sectors.

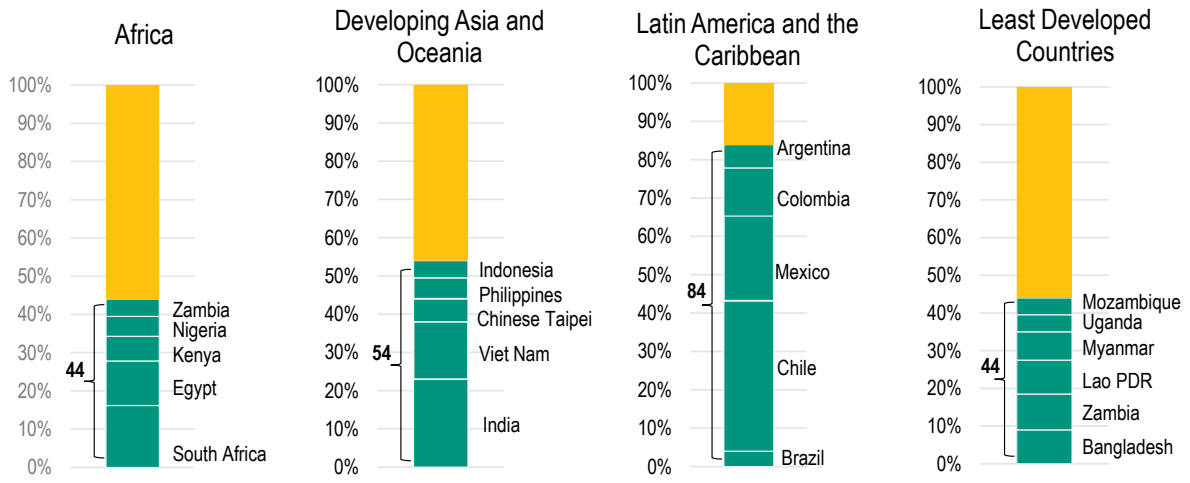
Source: OECD Secretariat.

2.5.1. Renewable energy

The government established the Renewable Energy Financing Framework to unlock Egypt's renewable energy potential (GCF, 2017[83]). Between 2015 and 2022, Egypt attracted over USD 45 billion in international finance for renewable energy, ranking among the top ten development economies worldwide. This makes it the second most popular host country for renewable energy projects on the African continent, after South Africa (Figure 2.11). However, the current investment level represents only a fraction of the resources needed to exploit the country's full renewable energy potential.

The government has implemented several mega projects funded by consortia. For instance, the Benban Solar Park, inaugurated in 2019, extends over 37 km^2 in the western desert (Aswan Governorate). It is one of the world's largest solar plant complexes with a production capacity of 1.5 GW, providing electricity to more than 1 million households. It mitigates about 2 Mt of CO_2-eq. per year and created some 6 000 permanent green jobs (AfDB, 2023[84]). Egypt has also built several large-scale wind farms such as Zafarana in Suez (120 km^2, 545 MW) and Gabal Al-Zait (100 km^2, 830 MW), located near Rhas Gharbib. These flagship projects may pave the way for future investments.

Figure 2.11. Egypt is attracting a large share of foreign investment in renewables within Africa



Source: UNCTAD (2023), World Investment Report 2023.

StatLink https://stat.link/bf1w0p

Over the past decade, major policy reforms supported deployment of renewables. Article 32 of the 2014 Constitution stipulates that the "The State shall make the best use of renewable energy sources, motivate investment therein, and encourage relevant scientific research." With the Renewable Energy Law no. 203 of 2014, the government started creating incentives to encourage private sector investment, while developing an enabling environment for deployment of renewables. The New and Renewable Energy Authority (NREA) acts as national focal point for expansion of renewables.

The Electricity Law no. 87 of 2015 laid the grounds for liberalisation of the electricity market to make it more competitive. Moreover, the government introduced two rounds of feed-in tariffs to attract investors. More recently, it targeted efforts towards developing competitive tenders to attract investors and enhance confidence in the regulatory and operational framework. It also promoted purchasing power agreement prices between private parties.

Several presidential decrees attributed new land areas to NREA for the development of renewable energy plants. The most recent one was announced for the Sidi Barrani district in Matrouh Governorate in 2023 (Presidential Decree No. 55). Unlike many European countries, Egypt does not lack space for the development of renewables.

However, uncertainty over state-owned utility projects and delays in the competitive auction scheme slowed progress in the deployment of renewables. For example, only 26 MW of 1 GW of planned state-owned projects have been commissioned since they were announced in 2017 (IEA, 2023[85]). While about two-thirds of installed renewable energy capacity have been channelled through public financing, the private sector leads the large majority of ongoing and planned renewable energy projects. The government has taken several measures to improve a supportive enabling environment to expedite private investment in renewable energy projects, while promoting energy efficiency measures (e.g. electricity sector reform). Overcoming barriers to scale up renewable energy investment needs to remain a priority. Efforts to bring down the cost of capital, improve transparency and streamline administrative procedures need to be pursued.

Low-carbon hydrogen

Egypt aims to become one of the largest exporters of low-carbon hydrogen. Its National Strategy for Low-Carbon Hydrogen, approved by the Supreme Energy Council in February 2024, aims to reach a tradable share of 5-8% in the global hydrogen market. The government intends to contribute thereby to both domestic and global decarbonisation efforts. According to government estimates, the development of low-carbon hydrogen could lead to an estimated GDP increase of USD 10-18 billion by 2040. At the same time, it seeks to create more than 100 000 jobs along the supply chain (Ahmed, 2023[86]).

In the context of the EU carbon border adjustment mechanism, increasing exports of low-carbon hydrogen could help Egypt decarbonise its manufacturing industries. This, in turn, would help it maintain the competitiveness of Egyptian exports (e.g. fertilisers, chemicals) on the European market. It would also contribute to Egypt's climate mitigation goals (Government of Egypt, 2022[87]). Egypt will need to strike the right balance between low-carbon hydrogen exports and domestic demand to advance local decarbonisation priorities.

Egypt has attractive regulations for investing in renewable energy production. The National Council for Green Hydrogen and its Derivatives aims at fostering a competitive, investment-friendly business climate (Government of Egypt, 2023[13]). In January 2024, the government issued Law no. 2 regarding incentives for low-carbon hydrogen production projects and derivatives, offering generous tax credits of up to 55%; VAT exemptions on equipment and exports; discounts for the use of seaports, maritime transport and ship servicing; and other non-tax incentives for project developers. In turn, 70% of investment costs need to be sourced from foreign sources; operations must start within five years; and foreign workers are limited to 30% of the total workforce within ten years (Martin, 2024[88]).

So far, Egypt has signed 12 framework agreements and 27 memoranda of understanding for low-carbon hydrogen production projects. The Green Hydrogen Plant Project in the Suez Canal Economic Zone, worth USD 8 billion, launched its first phase in 2022 (UNCTAD, 2023[89]). As elsewhere, most planned projects have not yet reached a final investment decision. The delays are due to uncertainties about demand and transport infrastructure (IEA, 2022[90]).

The OECD Clean Energy Finance and Investment Mobilisation Programme is helping Egypt operationalise its national hydrogen strategy. Drawing on the OECD framework for industry's net-zero transition, the programme is assessing the low-carbon hydrogen production capacity gap. This will further identify enabling conditions and financial solutions to enhance bankability of the current low-carbon hydrogen project pipeline in Egypt. Further, it will accelerate decarbonisation in domestic, hard-to-abate sectors.

Egypt has a competitive advantage in producing and transporting low-carbon hydrogen based on two factors: a large renewable energy endowment and a well-established gas infrastructure that can be retrofitted. It also benefits from its geographical location, with easy access to potential offtakers in Europe through the Suez Canal offering great opportunities for exporting green hydrogen to Europe (Dagnachew et al., 2023[91]). However, Egypt faces several challenges in scaling up related to affordable financing, technological expertise, infrastructure development and stable policy. Egypt will need to define a transparent certification process for low-carbon hydrogen and its derivatives. Securing demand is among the most critical factors to support the early stage of low-carbon development projects. A clear signal from major import markets such as the European Union would help unlock private sector investment.

Moreover, EIAs need to carefully consider environmental and safety concerns. Hydrogen export projects should not place additional strain on already scarce resources such as water, energy and habitable land (Dagnachew et al., 2023[91]). In this regard, seawater electrolysis could be an interesting option. However, this technology is not yet mature and may require more energy-intensive processes (Dargin, 2023[92]). Low-carbon hydrogen production will require large quantities of renewables. This should also not compromise the government's domestic renewable energy target. It will also be important to further develop local expertise and invest in research to create ownership of projects and local jobs.

2.5.2. Sustainable transport

The transportation sector is one of the main drivers of economic and social development in Egypt and thus a key national priority. The government allocated USD 15.6 billion of investments to the transport sector in fiscal year 2021/22, representing a 110% increase compared to the previous fiscal year (Government of Egypt, 2021[80]). The transport sector also attracts the largest share of development finance, representing USD 7.3 billion between 2020 and 2023.

As the government is advancing its shift from old Cairo to the New Administrative Capital, it is essential to create the necessary public infrastructure to help people commute between their residence and workplace. The Cairo Monorail, one of Egypt's flagship projects, has been under construction since 2018 (Box 2.6). Considering the high population density of Greater Cairo, Egypt has many opportunities to further develop clean transport options. Better inter-city connections will help decrease use of private vehicles and related environmental pollution in densely population areas. The country's electric public transport system has been expanded significantly, including investments in tramway, and improved electric rail links and bus rapid transit lines.

Box 2.6. The Cairo Monorail

A mass transit system to improve inter-city connections in the Greater Cairo area

Spanning over the governorates of Giza and Cairo, the Cairo Monorail covers 56.5 km from East Cairo to the New Administrative Capital (22 stations), and 42 km connecting 6th of October City to Giza (12 stations). It will be one of the longest driverless monorail systems worldwide and Egypt's first public transport inter-city connection. At full capacity, the Cairo Monorail can transport approximately 45 000 passengers an hour in each direction, representing more than 1 million passengers per day. The trains will operate at speeds of up to 80 km/h on both lines.

Under a USD 4.5 billion contract with Egypt's National Authority for Tunnels in 2019, the project is managed by a consortium of Bombardier Transportation, Orascom Construction and Arab Contractors in charge of constructing and operating the two lines. About 11% has been funded with the government's Green Bond proceeds. Construction works started in 2018 but have been delayed. They are now expected to be completed by end 2024.

According to government estimates, if 30% of car and bus traffic switches to rail, the Cairo Monorail is expected to help reduce 8 000 t CO_2-eq. per year for the line to the new capital (weighted to the share of green bond finance), and 13 300 t CO_2-eq. for the 6th of October City-Giza line. This will also greatly contribute to reducing air pollution. An adequate pricing strategy needs to ensure sustainable access to all social groups to facilitate large-scale uptake and promote inclusive public transport options.

Source: (Railway Technology, 2019[93]; Government of Egypt, 2021[80]).

The government also advanced plans to develop its national railway network, including the construction of a 2 000 km high-speed rail system linking 60 cities across the country. This will become the sixth largest high-speed rail system worldwide and is expected to create up to 40 000 local jobs. The high-speed network will comprise three lines: i) "The Suez Canal on rails", connecting the port cities on the Red Sea to Marsa Matrouh and Alexandria on the Mediterranean (660 km); ii) connection between Cairo and Abu Simbel near the Sudan border, linking the mega city to rising economic centres in the south (1 100 km); and iii) a line between Luxor in Upper Egypt and Hurghada by the Red Sea (225 km). This rail link will also improve freight transport for goods and materials between the Safaga harbour and inland locations. According to project developers, the expected modal shift from road to rail with a fully electrified network

will cut carbon emissions by 70% compared to current car or bus transport (Siemens, 2022[94]). However, more precise estimates and impact assessments over time will be useful. Moreover, decarbonising transport through electrification will also require cleaning Egypt's electricity mix more rapidly to harness the full potential of reduced emissions.

2.5.3. Nexus approach to advance investment in water, food and energy

With a view to bridging its climate finance gap, Egypt started developing innovative financial solutions to attract global climate finance and catalyse private sector investment, notably for adaptation and resilience. Launched in July 2022, Egypt's Nexus of Water, Food and Energy Programme (NWFE, Arabic translation of the phrase "Fulfilling Pledges") aims to accelerate implementation of the national climate agenda (NWFE, 2022[95]). Nine of 26 flagship projects of the National Climate Change Strategy 2050 will be implemented within the NWFE platform involving eight ministries and 25 development partners. The nexus approach recognises the interlinkages between different sectors considering shared dependence on natural resources and related human activities. It also brings together climate action and development efforts. A leading development partner has been appointed for each pillar: EBRD for energy, the African Development Bank Group for water; and the International Fund for Agricultural Development for food. In addition, led by the European Investment Bank, the NWFE+ programme also covers sustainable transportation.

The NWFE platform contributes to fostering country ownership and makes it easier for development partners to co-ordinate joint efforts. It also allows Egypt to showcase investment opportunities and provides a co-ordination mechanism for international public and private finance. The first NFWE progress report illustrates a broad-based commitment with financial pledges from development partners worth more than USD 3 billion (Government of Egypt, 2023[96]).

However, the implementation phase of most projects has not yet started, making it too early to assess NWFE's impact. Enhancing effective governance systems is crucial to maximise positive real-world impacts. As the NFWE platform foresees to comply with international reporting standards, technical support and international expertise may help strengthen national monitoring and evaluation systems (Government of Egypt, 2023[96]). This should, however, not undermine speedy implementation.

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Notes

[1] Article 84 BIS stipulates that "Whoever violates provisions of Articles 19, 23 of this law shall be fined a sum of not less than L.E. fifty thousand and not more than L.E. one million."

[2] The Informal Sector of Economy is defined as follows: "Each medium, small or micro project that carries out its activities without obtaining a building or operating license, or any other license or approval that is necessary for the practice of the activity and determined by a decision of the Prime Minister."

[3] Public employees who delay or suspend the project's licence or harm the investor's interest without legal justification, are subject to a fine of EGP 20 000-100 000 (Youssry Saleh & Partners, 2020[107]).

[4] The Ministry of Social Solidarity is responsible for reviewing the project outline, amount of funds and donors within three working days. For funds from foreign sources, the procedure is laborious and time-consuming, taking up to

60 working days. If the donor has already an existing protocol of co-operation, the approval process may be much shorter.

[5] Egypt's Fiscal Year (FY) ends on 30 June. OECD data are reported as follows: the year 2020 represents 1 July 2019 to 30 June 2020.

[6] The analysis covers 31 African countries (OECD/AUC/ATAF, 2023[109]).

[7] Explicit carbon pricing instruments are carbon taxes and emissions trading system permit prices. Fuel excise taxes are considered to be an implicit carbon pricing instrument as most often their objective is not to price carbon emissions but to raise revenue. Yet fuel excise taxes levy a tax on a base that is proportional to CO_2 emissions.

[8] Gasoline 92 accounts for about one-third of Egypt's total petrol/gasoline consumption (OECD, 2022[32]). Fuel oil used in bakeries and for electricity generation is exempted from the tax. The use of kerosene remains untaxed; residential LPG use has been subsidised, but consumption has decreased in the past years to a negligible level.

[9] Net Effective Energy Rates include several instruments: fuel excise taxes, electricity excise taxes, carbon taxes, ETS permit prices, fossil fuel subsidies and electricity subsidies.

[10] Excluding VAT, industrial and commercial profit tax and resources development fee.

[11] It includes Cairo to Alexandria, Cairo to Ismailia to Port Said, Cairo to Ain Sukhna, Cairo to El Fayoum, Kaistep to Belbis, Ahmed Hamdy Martyr Tunnel crossing Suez Canal, the route to Mubarak Peace Bridge crossing Suez Canal, Cairo to Suez Desert Road (which is the main road for entering the new Cairo cities, al-Shorouk, Badr and Madinaty).

[12] In addition to the Special Incentive, Egypt provides a range of other CIT incentives that do not directly target green investments.

[13] Investment costs are defined as all assets used in the investment project, such as: tangible fixed and movable assets; intangible assets, such as intellectual property rights; and long-term liabilities in setting up the investment, such as stocks and shares of company incorporation, non-governmental bonds, and privileges or contracts granted under the laws on public utility (Article 11 of the Investment Law of Egypt).

[14] Geographic locations most in need of development include the area South of the Giza governorate, governorates affiliated to the Suez Canal region (i.e. parts of Port Said, Ismailia and Suez governates on the east of the canal, and the border governorates (e.g. Red Sea and the Upper Egypt governorates, New Valley, Matrouh). The Prime Minister may choose additional areas. Non-industrial investment projects in Locations B must meet one additional condition related to the project's size, national importance or export orientation to benefit from the Special Incentive.

[15] Article 11 of the Investment Law of 2017. Prior to January 2022, the Special Incentive was only partially operational and effectively only available to investors within the Suez Canal Economic Zone, as the implementing regulation to define eligible sub-sector had not yet been issued.

[16] For example, investments in sewage and industrial waste treatment plants, seawater desalination, the construction of hotels and tourism infrastructure are only eligible in A Locations. Textile, apparel and leather sub-sectors are only eligible in B Locations.

[17] Fertiliser, iron and steel, arms and ammunitions, liquor and alcohol production and energy-intensive industries, defined by the Supreme Council of Energy, are also prohibited from operating within Free Zones according to Article 34 of the Investment Law no. 72 of 2017.

[18] Under Law no. 160 of 2023, which amended the Investment Law no. 72 of 2017, GAFI, with the approval of the Supreme Council of Energy, can provide Free Zone licences to projects in the fields of petroleum processing and refining, liquefaction and transportation of natural gas, fertiliser industries, iron and steel manufacturing, and other energy-intensive industries.

[19] The partial CIT refund or *cash incentive* was passed into law in 2023 through Law no. 160 of 2023.

3 Building climate-smart, resilient and inclusive cities

As engines of growth, cities can play a pivotal role in supporting Egypt's green transition. At the same time, cities are major sources of pollution. They need to contribute more strongly to national climate mitigation efforts and build resilience to multiple climate-related risks, especially heatwaves, flash floods, dust storms and rising sea levels. The role of subnational governments is essential in advancing place-based climate action. This chapter examines opportunities and challenges to make cities more inclusive and a driving force for Egypt's green transition. It includes brief case studies on climate action in the Governorate of Alexandria and the city of Al-Kharga, an oasis in the New Valley Governorate.

3.1. Introduction

Cities can play a pivotal role in supporting Egypt's green transition. With about 80% of employment, Egyptian cities are engines of the country's growth and among the largest contributors to its gross domestic product (GDP), estimated at 75% (UN-Habitat, 2024[1]). Cities can support Egypt's green transition through urban economic activity, green innovation, jobs and more inclusive development (UN-Habitat, 2024[1]).

At the same time, cities are major polluters and greenhouse gas (GHG) emitters and thus need to contribute more strongly to national climate mitigation efforts. According to World Bank calculations, Egyptian cities contribute to more than 80% of direct carbon dioxide (CO_2) emissions at national level (Goyal and Sharma, 2023[2]). Cities also represent a large share of growing demand for energy and public water supply. They face increasing waste management and pollution challenges, especially air pollution and wastewater discharge. Addressing Egypt's chronic shortage of affordable housing remains a key challenge, along with creating an adequate offer of public transport options for all.

Coherent and targeted policy action is urgently needed from different levels of government to steer urban development towards more sustainable pathways (OECD, 2018[3]). A systemic shift towards more circular cities and regions is therefore vital (OECD, 2020[4]), especially because the design of urban infrastructure will have long-term impacts on the country's low-carbon trajectory, resource use, and exposure and vulnerability to climate risks.

The effects of climate change in urban areas are increasingly visible. Egyptian cities are exposed to multiple climate-related hazards, especially heatwaves, flash floods, dust storms and rising sea levels (Goyal and Sharma, 2023[2]). It is essential to strengthen climate resilience at city level to reduce the economic costs of the impacts of climate change and to protect the most vulnerable populations. Low-income residents are more likely to be exposed to hazards, and typically lack financial safety nets to recover from climate impacts.

The government has set up an ambition to build climate-smart, resilient and inclusive cities in line with Egypt's Vision 2030. These three dimensions are overlapping and mutually reinforcing. For example, green spaces help build climate resilience and reduce emissions, while making cities more liveable for citizens. Meanwhile, better land and infrastructure planning and design can contribute to both climate mitigation and adaptation objectives.

The government is raising its climate commitments, as the National Climate Change Strategy 2050 and the second updated Nationally Determined Contribution (NDC) expanded scope to include policy action for urban areas. In parallel, climate issues need to be further mainstreamed into urban planning and design, embedded in both broader regional development strategies and sectoral policies. Egypt faces an implementation gap between national objectives and local realities. Despite more prominence in national strategies (Chapter 1), the role of subnational governments in advancing low-carbon development strategies and climate resilience remains limited in practice.

3.1.1. Population growth, spatial constraints and settlement dynamics

Egypt's population is projected to reach 160 million people in 2050, doubling its population compared to 2010 levels (UN, 2022[5]). Every year, the population is projected to increase by at least 1.6 million people (CAPMAS, 2020[6]), placing additional strain on already scarce natural resources, housing and public services.

Most of the Egyptian population is concentrated in urban areas on about 12% of the territory, mainly along the Nile Valley and its Delta, and to a lesser degree around the Suez Canal (Figure 3.1). Given the limited availability of habitable land and competition with scarce arable land for agriculture, some agglomerations are among the world's densest with more than 20 000 inhabitants/km². With about 23 million inhabitants, Greater Cairo hosts nearly one-quarter of Egypt's population, making it one of the world's largest

metropolitan areas (OECD/European Commission, 2020[7]). The pace of urban population growth, driven by both population growth within cities and rural-urban migration, varies across the country. The Greater Cairo and Alexandria have been growing quickly, dominating Egypt's urban system.

Egypt has a total surface area of close to 1 million km^2, which is mainly desert land and sparsely vegetated areas. About 3% of its total land surface is arable; forest areas represent 0.1% (or about 70 000 ha) and have decreased over the past decade. The government has been reclaiming desert land for agriculture and to support a planned urban development. Since the 1970s, the government has built new urban communities (NUCs) to relieve pressure from saturated urban areas in the Nile Valley and Delta. Within three generations, 23 NUCs have been built; another 23 new cities – known as the "fourth generation" – are under way (Figure 3.4). These NUCs aim to accommodate about 30 million residents by 2030[1] (Government of Egypt, 2021[8]).

However, urban policies have been unable to keep pace with population pressures, which has led to uncontrolled urban expansion, environmental degradation and precarious living conditions. Informal and unplanned expansion absorbed most of the demand for affordable housing close to city centres. Meanwhile, many NUCs, built on desert land adjacent to cities, struggle to attract new residents (Zaazaa, 2022[9]). Given the country's spatial constraints, population size and settlement patterns (i.e. the geographical distribution of people) need to become the starting points for analysis to inform urban planning and design.

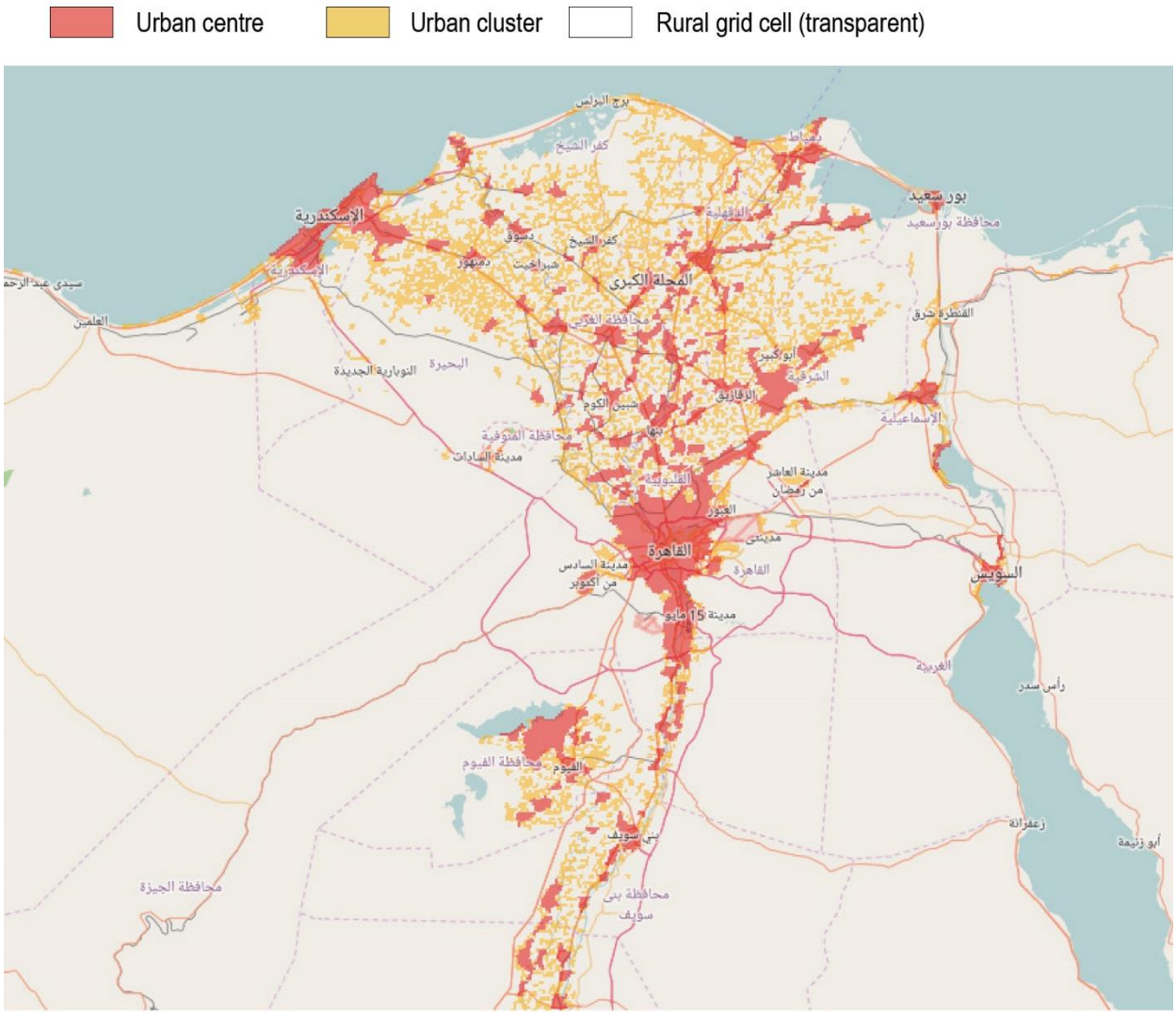
3.1.2. Rural-urban continuum

According to national statistics, 42.8% of Egyptians lived in urban areas in 2020 (CAPMAS, 2020[6]). This has been the same reported share for several decades, although the population has more than doubled since 1990. Egypt uses a purely administrative definition of "urban", which does not relate to the actual size of the agglomeration's population. According to the 2014 Constitution, the State is divided into administrative units, including governorates, cities and villages. Urban areas include: i) the four urban governorates (*muḥāfẓat*), namely Alexandria, Cairo, Port Said and Suez; ii) cities (*madînat*) and sub-divisions (*agsâm*) with *markaz* status (a rural subdivision); and iii) the cities (*madînat*) that are seats of *markaz* administrations (Africapolis, 2023[10]) (Chapter 2). The qualification of urban is thus connected to the function as capital city of governorates and sub-divisions while the rest of the administrative units are considered as rural. In total, the most recent population census of 2016 counted about 250 administrative units as urban (CAPMAS and CEDEJ, 2023[11]) compared to over 1 000 agglomerations.

The binary categories of urban and rural areas no longer reflect Egypt's urban realities with its dense settlement patterns. As a result, highly urbanised areas are categorised as "rural" while facing many challenges related to increased pressure on infrastructure, environmental degradation and social inequalities. The definition of "urban" has a pivotal influence on spatial planning and urban development plans.

Figure 3.1. The binary categories of urban and rural areas no longer reflect Egypt's urban realities

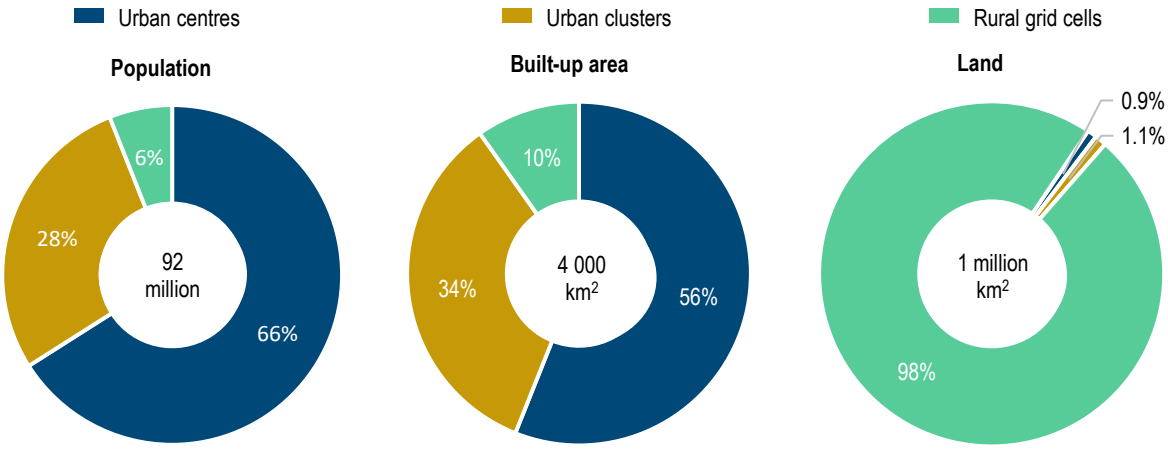
Degree of urbanisation in 2015



Note: This map focuses on densely populated areas and does not reflect Egypt's full territory. The degree of urbanisation classifies municipalities based on their population share in three types of grid cells: "cities" have the majority of their population in an urban centre; "towns and suburbs" have the majority of their population in an urban cluster but are not cities; "rural areas" have the majority of their population in rural grid cells. An urban centre consists of 1 km^2 with a density of at least 1 500 inhabitants per km^2 and a minimum total population of 50 000. An urban cluster consists of 1 km^2 with a density of at least 300 inhabitants per km^2 and a minimum total population of 5 000.
Source: European Commission, Copernicus (2024). Testing the degree of urbanisation at the global level, Egypt Country Summary, https://human-settlement.emergency.copernicus.eu/documents/cfs01/V3/CFS_Egypt.pdf.

Data from the internationally harmonised definition of cities show that, in 2015, 66% of Egyptians lived in urban centres and 27% in semi-dense urban areas, also called urban clusters, accounting for 93% of the population (Figure 3.2). The discrepancy with national statistics is substantial and merits consideration towards an approach that more accurately reflects settlement patterns and the resulting implications for effective urban and socio-economic planning (UN-Habitat, 2012[12]).

Figure 3.2. About two-thirds of Egyptians lived in urban centres in 2015



Note: The degree of urbanisation classifies municipalities based on their population share in three types of grid cells: "cities" have the majority of their population in an urban centre; "towns and suburbs" have the majority of their population in an urban cluster but are not cities; "rural areas" have the majority of their population in rural grid cells. An urban centre consists of 1 km^2 with a density of at least 1 500 inhabitants per km^2 and a minimum total population of 50 000. An urban cluster consists of 1 km^2 with a density of at least 300 inhabitants per km^2 and a minimum total population of 5 000.
Source: European Commission, Copernicus (2024). Testing the degree of urbanisation at the global level, Egypt Country Summary, https://human-settlement.emergency.copernicus.eu/documents/cfs01/V3/CFS_Egypt.pdf.

StatLink https://stat.link/jv5o9x

Some governorates such as Giza share highly urbanised areas alongside large unpopulated desert areas. Egypt also has many satellite cities near a large city or metropolitan area (Figure 3.1). They are less dense but connected with the economy of the main city; dwellers usually adopt urban lifestyles and commute to their workplace in the main city. This has major impacts on economic activity of previously rural areas. Considering the rural-urban continuum is paramount for regional development planning to ensure policy coherence and integrated action across the territory (e.g. transport, services, administration).

Drawing on OECD methodology, Egypt could consider defining functional urban areas (FUAs) using population density and travel-to-work flows as key information to better understand its urban systems (Box 3.1). FUAs comprise a densely inhabited city and its commuting zone whose labour market is highly integrated into the city. This would help create a harmonised definition of cities and their areas of influence. This, in turn, could better represent the reality of settlement patterns and support policy analysis on topics related to urban development, including climate action, and inform urban development policies and spatial planning. Some efforts to define urban clusters are under way (Box 3.2).

The next national population census, scheduled for 2026, is an opportunity to reconsider administrative divisions and review the definition of urban areas. This could better reflect the actual size of cities and related infrastructure needs. Drawing on harmonised definitions, an analysis of different urban typologies (e.g. formal versus informal; urban, peri-urban, rural) would also be useful. This would capture the diverse characteristics of urban and peri-urban areas and help better understand the trends and challenges of national urban systems, including urban-rural connectivity. This would also contribute to ensuring that policies and funding address the specific needs of its populations, as well as challenges associated with urban sprawl.

Box 3.1. Functional urban areas

A common definition of metropolitan areas to inform national policy making and facilitate international comparison

The OECD, in collaboration with the European Commission, developed a harmonised definition of urban areas as functional economic units. This aims to overcome previous limitations linked to administrative definitions.

Functional urban areas (FUAs) consist of a densely inhabited city and of a surrounding area (commuting zone) whose labour market is highly integrated with the city. This definition chooses as building blocks for FUAs the smallest administrative units for which national commuting data are available (e.g. national commuting data in non-European countries). It captures cities and their respective areas of influence based on people's daily movements.

FUAs are defined by population size in four categories:

- small urban areas, with a population below 200 000
- medium-sized urban areas, with a population between 200 000 and 500 000
- metropolitan areas, with a population between 500 000 and 1.5 million
- large metropolitan areas, with a population of 1.5 million or more.

FUAs can inform national and regional urban planning and policy. A common definition increases international comparability of the economic, social and environmental performances of metropolitan areas. The OECD produces country profiles and maps to localise FUAs for its 38 member countries and some non-members.

Source: (Dijkstra, Poelman and Veneri, 2019[13]; OECD, 2023[14]).

3.2. Enhancing urban governance

3.2.1. Institutional and policy framework for urban planning

Egypt's institutional framework for urban planning and development is complex, involving a large number of government bodies and specialised agencies. These entities formulate, implement, finance and regulate urban development policies, and promote sustainable development at different levels and for different types of cities (NUCs vs. existing cities). Most competencies for urban planning and development are centralised at the national level.

The Prime Minister chairs the Supreme Council for Urban Planning and Development (SCUPD), which is the highest authority of urban planning. SCUPD has evolved over time and currently includes nine ministers, two urban agencies and ten experts, enhancing its capacity to address urban planning and development challenges. Among its ministerial members[2] is the Minister of Defence, who also serves as a board member of the National Centre for Planning and Sustainable Land Use. This underscores the interconnectedness of urban development with broader national security and strategic considerations. However, the MoE is not a permanent member of SCUPD. Its regular presence would be important to support the mainstreaming of environmental sustainability into all decisions and better align urban policy with climate and environmental challenges.

The General Organization for Physical Planning (GOPP) under the Ministry of Housing, Utilities and Urban Communities (MoHUUC) is responsible for regional planning and acts as technical secretariat of SCUPD. Concomitantly, the New Urban Communities Authority (NUCA) plans and implements any development of new cities in desert regions. The Urban Development Fund (UDF), an economic agency, is in charge of upgrading existing cities (Box 3.2).

Several sectoral ministries are involved in urban development, which has top-down processes:

- Desert land falls under the responsibility of the Ministry of Defense. It engages the private sector through land allocation and infrastructure development, such as roads, bridges, water systems and power plants.
- The Ministry of Agriculture and Land Reclamation (MoALR) oversees agricultural land in the Nile Valley and Delta, as well as reclaimed desert land for agricultural purposes. Extensive agricultural projects in these areas have led to the emergence of informal housing settlements (Section 3.5.2).
- The Ministry of Housing, Utilities and Urban Communities (MoHUUC) supervises the administrative structure governing urban areas, operating under Law no. 119 of 2008, in conjunction with SCUPD. MoHUUC also holds authority over local infrastructures and utilities, including water and sewage systems for housing under the supervision of institutions affiliated with MoHUUC.
- The Ministry of Planning and Economic Development (MoPED) supervises and plans any economic development.
- At the local level, the Ministry of Local Development (MoLD) is a key player in urban governance and implementation as cities and districts are under its jurisdiction. Infrastructure development, such as supply of regional wastewater or water treatment stations, solid waste management and roads, is usually implemented through a collaboration between several ministries (e.g. MoPED, MoLD, MoALR) in line with their respective mandates.

The institutional framework for urban planning and development faces several challenges. National plans, local infrastructure planning and associated service delivery are not in sync with local development needs. In addition, horizontal co-ordination between different government entities is weak across all levels. There are bureaucratic hurdles, alongside limited local capacity and insufficient financial resources (Alhowaily, 2021[15]).

The government needs to ensure consistency and policy coherence in its approach to sustainable urban development based on common principles of environmental sustainability, climate resilience, social inclusivity and economic viability. Key stakeholders such as GOPP, NUCA and UDF could review legislative and regulatory tools to identify sustainability gaps and propose amendments for legal frameworks. These three bodies are key players but do not have a common space to facilitate dialogue and share experience. Together, they could build a strong foundation for environmentally responsible urban development practices.

In late 2023, the government adopted a National Urban Policy (NUP), which aims to promote positive transformative change in cities. The new policy could play an important role to better manage urban growth and make cities more competitive and liveable (Box 3.3). It is important to rapidly develop actions plans, accompanied with adequate finance and institutional mechanisms, to ensure effective implementation of the new policy.

Increased resources are needed for compliance monitoring and enforcement of laws and regulations. Monitoring and evaluation of urban projects and their respective environmental impacts could be improved by better linking institutions in charge of planning such as GOPP with local authorities in charge of implementation at governorate level. This gap has led to low implementation. There is room to close the loop between urban planning, implementation, monitoring and evaluation to inform future planning.

Box 3.2. Egypt's key agencies in charge of urban planning and development

The General Organization for Physical Planning (GOPP)

GOPP is a governmental body established by Presidential Decree no. 1093 of 1973, mandated to be the sole official authority for planning human settlements in Egypt (Government of Egypt, 2014[16]). It operates under the supervision of the Minister of Housing Utilities and Urban Communities (MoHUUC). Law no. 119 of 2008 empowered GOPP to formulate public policy planning and sustainable urban development; prepare plans and programmes at the national, regional and governorate levels; and review and approve urban plans at the local level. It also monitors and evaluates implementation of these plans through seven regional offices with a view to co-ordinating regional planning and ensure implementation on the ground.

New Urban Communities Authority (NUCA)

Operating under MoHUUC, NUCA is a state-owned enterprise established by Law no. 59 of 1979. It has a comprehensive mandate to reshape Egypt's urban landscape by building new urban communities in desert areas, making it Egypt's largest real estate developer and constructor of residential units. The government aims to redistribute Egypt's population away from the saturated Nile Valley to remote regions and mitigate urban sprawl onto agricultural land. NUCA plans new cities, including housing and associated infrastructure. After NUCs are complete, NUCA has remained responsible for service delivery and infrastructure management. More recently, it became engaged in renovating existing areas (e.g. Maspero Triangle, rehabilitation of Downtown Cairo), creating overlap with the Urban Development Fund. NUCA has become Egypt's third largest state-operated enterprise after Egyptian General Petroleum Cooperation and the Suez Canal Authority. Its activities have accelerated in the past five years with a budget of EGP 145.5 billion (USD 4.7 billion) in the fiscal year 2023/24.

Urban Development Fund (UDF)

UDF, established in 2021 by prime ministerial decree, is placed under the Prime Minister. It succeeds the Informal Settlements Development Fund, which had upgraded unsafe and unplanned areas and informal markets since 2008. The portfolio of the Fund was enlarged; it can now generate its own resources by managing investments and assets, and establish branches and offices at governorate level. UDF collaborates with GOPP and local authorities across governorates to enhance long-established urban areas, in partnership with private sector organisations and real estate developers. The Fund operates in four main areas: i) urban extensions (pockets of agricultural land within cities, urban extension in the desert periphery within a city's boundaries); ii) brownfields (transformation of land previously used for industrial purposes); iii) areas of valuable or special nature are historical or waterfront land types; and iv) deteriorated areas (e.g. unsafe, planned deteriorated, unplanned and informal activities areas). While NUCA focuses on new cities, UDF's mission is to revitalise and improve quality of life in existing cities.

Source: (UN-Habitat, 2015[17]; UDF, 2023[18]).

The government developed a two-pronged approach to urban development. Urban governance differs depending on whether a city is classified as "new" (since the government started building NUCs in the 1970s). The persistence of this dichotomy is no longer fit for purpose. Once NUCs are well established, they should be integrated under respective governorates as initially planned. This would facilitate coherent regional strategies and enhance the role of local councils. A common governance framework would enable better co-ordination, streamline decision-making processes and provide clear guidance for urban planning

and development projects. This common framework should also include urban clusters to ensure coherent spatial planning beyond the narrow focus of the current administrative definition of “urban areas”.

Box 3.3. Egypt’s National Urban Policy

In late 2023, drawing on nearly a decade-long elaboration process supported by UN-Habitat, the government approved a new National Urban Policy (NUP), which builds on five pillars:

- managing urban growth
- connectivity within and between cities
- integrated system of cities
- urban governance and land management
- local economic development.

The new policy could play an important role to better manage urban growth and make cities more competitive and liveable. It could help counterbalance the strong attraction of Cairo and Alexandria, thereby enabling development of secondary cities. NUP proposes a new urban system of cities based on six clusters of cities, acknowledging different paces of urbanisation (UN-Habitat, 2024[1]). It will be key to integrate environmental sustainability into all NUP measures and establish sustainability criteria to monitor progress. NUP could provide a common framework for better aligning national with local policies, while supporting local climate initiatives (Matsumoto et al., 2019[19]). Moreover, urban dynamics move quickly; problems change faster than their solutions. Therefore, it will be essential to develop analytical tools that adequately capture rapidly changing urban reality.

Source: Country submission; (Tiemeier, 2019[20]).

3.2.2. Mainstreaming of environmental considerations into urban development plans

Egypt’s policy framework acknowledges the importance of making cities more sustainable but still lacks an integrated vision and action plan on how to achieve this. Egypt’s Vision 2030, the National Climate Change Strategy 2050 and the NDCs provide guidance for developing greener, low-carbon cities. For example, the second updated NDC highlights energy efficiency measures in new and existing buildings, expansion of green spaces and promotion of active mobility (Government of Egypt, 2023[21]). There is a substantial gap between strategic plans and green measures in local development plans. Sectoral policies need to be better integrated into local planning. Information and data on the links between urban development, environmental degradation and climate change impacts remain scattered across various policies and strategies.

In line with Egypt’s Vision 2030, environmental considerations need to be systematically mainstreamed into all urban development plans and related urban and land-use planning tools. Several sectoral strategies are under preparation (Box 3.4). Over the past decade, the MoE and MoPED have undertaken capacity building initiatives. In 2017, the Egyptian Environmental Affairs Agency (EEAA) prepared "Guidance for Building Sustainable Cities". It recommends various aspects of urban planning and development, including land use, infrastructure, energy efficiency, waste management and transportation. However, these guidelines remain optional. Another example is the Environmental Sustainability Standards Guide prepared within the Strategic Framework for Green Recovery in 2021.

Strategic environmental assessment (SEA) would help improve policy coherence by ensuring sectoral policies and major urban development projects adequately consider the environment (e.g. prior to the

creation of new cities). This includes, for example, the mandatory use of localised climate risk assessment in urban planning to prevent construction of new buildings in high-risk flood zones (Section 3.4.1). Stronger co-operation between environmental and urban authorities would help raise environmental awareness and develop expertise in sectoral ministries and at subnational level.

Box 3.4. Green strategies at sectoral level

The government is preparing several sectoral strategies to achieve its sustainability goals:

- **National Strategy for Green Urban Buildings** (green construction materials, increasing the share of green buildings, enhancing quality of life through green areas)
- **National Strategy for Smart Cities and Integrated Land Management in New Cities** (roadmap for the gradual transformation of smart cities through technological applications to solve urban problems)
- **National Strategy for Green Urban Transportation**
- **National Active Transportation Strategy**
- **National Strategy for Active Mobility** (promoting walking and cycling paths).

As elsewhere, strategies are only as good as their implementation. Therefore, national strategies should be systematically shared with key stakeholders, accompanied with an action plan, intermediate targets to monitor progress and associated financial resources. In addition, the government could set up incentive mechanisms for implementation (e.g. results-based financing) and further strengthen decentralisation to overcome working in silos.

Source: Country submission (2024).

3.2.3. Tailored place-based policies to support sustainable urban development

Decentralisation of urban planning

Heavy reliance on centralised decision making increases the risk of disconnect between policies and responsiveness to local needs (Tobbala, 2019[22]). In a more decentralised system, citizens can more easily hold local government officials accountable for decisions that affect their daily lives. In many OECD countries, citizens participate in finding solutions to local problems and contribute to accelerating the green transition.

While national frameworks can drive local action, subnational governments are well positioned to develop tailored place-based policies to tackle the risks and seize the opportunities presented by the green transition (OECD, 2024[23]). Experience in many OECD countries illustrates the importance of a territorial approach to climate action and resilience (OECD, 2023[24]). As the impacts of climate change vary significantly within countries, local actions can complement national efforts. Moreover, climate risks are highly context-specific, depending on a combination of hazard, exposure and vulnerability. A heatwave, for example, will have a different impact on people living in an oasis like Al-Kharga compared to a densely populated area within Cairo. Moving to more decentralised, participatory approaches would help Egypt better align urban policies with local development needs. This will require strengthening competences, capacities and financial autonomy of subnational governments.

Increasing financial autonomy

In line with provisions of Egypt's Constitution (Articles 176 and 177), each local administration unit should have an independent budget. As such, it should be entitled to collect its own revenue through subnational taxes and fees, which would also strengthen accountability. Nearly all taxes are collected at the national level, leaving local authorities with close to no financial autonomy (Hemaily et al., 2022[25]). Consequently, local authorities depend excessively on cash transfers from the central government, which may undermine local initiatives to advance climate action. Moreover, fragmented investment planning by sectors impedes an integrated development vision at subnational level.[3]

NUP may offer opportunities to develop a more flexible financial system that entitles local councils to increase their own financial revenues, which could be used to finance climate action at the local level. This would be a welcome development and could help reduce fiscal imbalances. A green fiscal strategy and action plan at subnational level can help integrate green priorities into budgeting (OECD, 2019[26]). Furthermore, local administrations have opportunities to raise non-tax revenues. For example, they could raise user fees or charges for publicly provided services or facilities, such as parking. However, increasing the financial burden for citizens may be difficult in the current economic context. Higher fees could be more socially acceptable if citizens notice better services (e.g. waste collection) and if climate action benefits their quality of life (e.g. green spaces).

Meanwhile, it is essential to develop ways to better channel funding from development partners and national governments to support subnational governments, including cities, in addressing climate priorities (Matsumoto et al., 2019[19]). The development of subnational climate action strategies, including local targets, may help local authorities tap into international climate and development finance. Development partners can be more easily convinced to support climate action at subnational level if action contributes to achieving official climate targets in line with the principles of the Paris Declaration on Aid Effectiveness. Local authorities should also aim to leverage additional external funding, particularly from the private sector, as a complement to public resources directed at climate change (OECD, 2019[26]).

Local engagement in national decision making and citizen participation

Actively engaging local authorities in urban development planning processes is essential. For instance, long-term strategic planning at the local level can better consider policy complementarities in different sectors (Matsumoto et al., 2019[19]). More participatory approaches can ensure that plans reflect the specific needs and challenges of each locality by leveraging local knowledge. However, this requires continued capacity building at local level. Many local authorities do not have the required technical expertise to develop such plans, resulting in heavy reliance on development partners. Egypt could strengthen the role of subnational governments by formally acknowledging their contribution to climate mitigation and adaptation efforts in the next update of its NDC.

The MoLD could play a more significant role once empowered local councils participate actively in decision-making processes. It could monitor progress across different governorates and municipalities and thereby make sure subnational plans apply the objectives of national strategies and disseminate funding accordingly. The forthcoming Local Administration Law could further strengthen the role of local councils.

Stronger city-to-city co-operation could further alleviate the overreliance on central government support in all matters. This could be encouraged through the building of city networks and international initiatives such as the OECD Champion Mayors for Inclusive Growth Initiative (OECD, 2024[27]).

While many citizens already play an active role in the implementation of local climate initiatives, public participation and active community engagement in environmental decision making need to be enhanced (Chapter 2). This would help create a sense of ownership, enhance social acceptability of policy measures and facilitate effective implementation. Raising environmental awareness, especially among young people, is critical. Egyptian citizens can become a driving force of the transition to sustainability. As in other

countries, the central government and local authorities both need to pursue efforts to create the conditions for empowering citizens and building effective forms of public participation.

3.2.4. Land-use planning and management

In the context of rapid population growth, urbanisation and agriculture are the main drivers of land-use change. Given the scarcity of agricultural land, agricultural-to-residential land conversion is illegal. Any conversion is subject to approval by the General Authority for Reconstruction Projects and Agricultural Reclamation under the MoALR. Nevertheless, Egypt lost since 2011 an estimated 90 000 feddan (about 37 800 ha) of fertile agricultural land to unplanned settlement growth (Egypt Daily News, 2020[28]).

Urban planning tools have been unable to keep pace with the demand for affordable housing, which is mainly satisfied by the informal sector. This situation has led to continued encroachments on agricultural land and unplanned urban expansion beyond city boundaries. According to government estimates, more than 2 million informal buildings were constructed between 2011 and 2020 (Samir, 2020[29]), driven by a lack of affordable housing, high land prices and weak institutional capacity to enforce land regulations. Several presidential decrees and the 2019 Reconciliation Law for Informal Buildings retroactively legalised previous encroachments on agricultural land. However, urban encroachment on agricultural land may continue if the root causes of uncontrolled expansion are not addressed (Abdelkader et al., 2022[30]).

In 2020, the government launched the National Centre for Spatial Data Infrastructure, which aims to establish an integrated national planning system to prevent future land encroachments. This provides an important opportunity to integrate climate considerations systematically into land-use planning. In this way, Egypt could strengthen climate-smart spatial development (e.g. green zoning, land-use change for climate risk mitigation).

Egypt's land management is complex, involving multiple government entities in land allocation. It distinguishes mainly between two categories of lands: i) urban lands within city or village cordons, including agricultural lands; and ii) desert lands. The latter generates significant economic gains and is increasingly used as a capital investment in urban development companies. NUCA plays a pivotal role in land allocation inside the administrative borders of NUCs.

Outdated land surveys, bureaucratic registration methods, the large number of different permits needed and limited accountability of key stakeholders contributed to the expansion of unplanned informal settlements. Egypt needs to simplify land planning and registration and make it more transparent and faster, as well as enforce existing laws. Plans to streamline land allocation, notably through a "one-stop-shop" go in the right direction and would help improve transparency in the land allocation process and the overall investment climate for private sector actors (IMF, 2023[31]).

3.3. Promoting climate-smart cities

Most of Egypt's economic activity is connected to urban areas. However, there are no official data on the share of cities in national GDP. It would be helpful to collect relevant data to calculate the precise contribution of cities.

As in other countries, the digital economy offers significant opportunities for economic growth, job creation and efficiency gains thanks to smart technology. By 2050, the government plans to have transformed or built 38 smart cities, mainly fourth generation cities. In 2022, the National Initiative for Smart Green Projects was launched to encourage the mapping of smart green projects at governorate level with a view to connecting these projects to financing agencies, as well as attracting additional investment from both domestic and international sources. A Code for Smart Cities is pending approval.

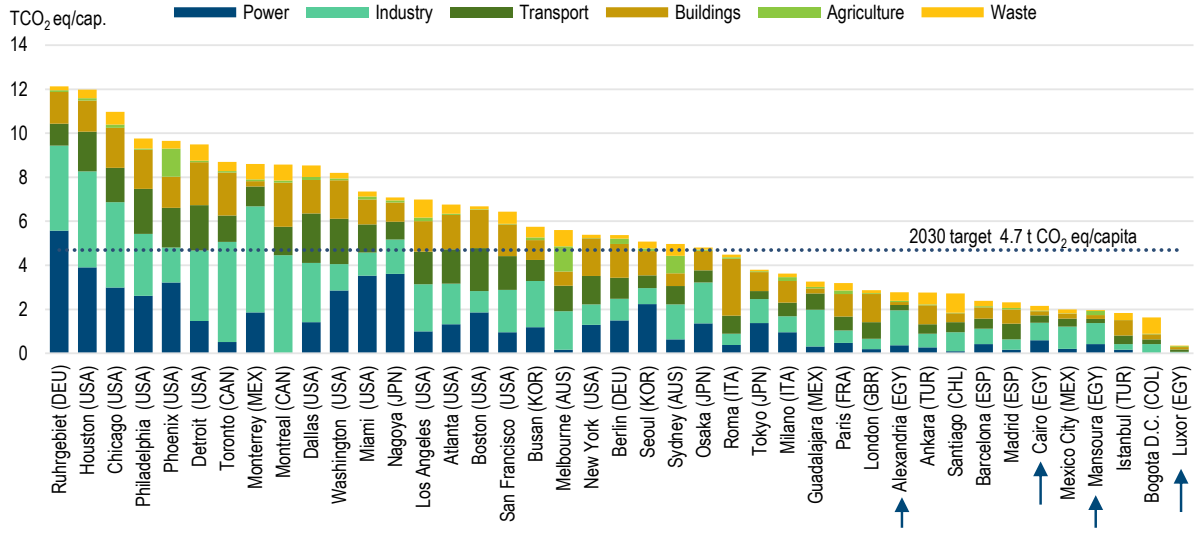
Smart cities must be sustainable. New digital models can help optimise urban design to minimise energy consumption and carbon emissions (Matsumoto et al., 2019[19]). Therefore, Egypt needs to incorporate climate goals and environmental standards explicitly into the definition of smart cities and reflect environmental considerations in land-use planning and building codes. The labelling of smart cities should include mandatory sustainability requirements and promote social inclusiveness (Waisová, 2022[32]). Smart cities offer new opportunities to establish city-level climate mitigation and adaptation plans and measure progress towards these targets.

3.3.1. Measuring subnational GHG emissions

While cities are major sources of pollution, including GHG emissions, they also have significant potential to contribute to emissions reductions efforts. Since the early 1990s, cities across the world have started raising their climate actions. These range from installing solar panels, renovating buildings and implementing congestion charges to maintaining and expanding green spaces, constructing porous infrastructure and reclaiming wastewater (Matsumoto et al., 2019[19]). Some cities and regions have set even more ambitious GHG emissions reduction targets than their respective central governments at the national level (Figure 3.3).

Figure 3.3. There are significant disparities in progress towards net zero across cities and regions

Emissions per capita by sector in OECD metropolitan areas and four Egyptian cities, 2018



Note: The 2030 emissions per capita target (4.7 tCO_2-eq.) is defined based on computations derived from the IEA Net Zero Emissions Scenario for advanced economies.
Source: OECD calculations based on the Emissions Database for Global Atmospheric Research (EDGAR) v8.0, https://edgar.jrc.ec.europa.eu/dataset_ghg80.

StatLink https://stat.link/kog7dy

In Egypt, GHG emissions at subnational level are not yet monitored and the GHG footprint of Egyptian cities remains unknown (Government of Egypt, 2022[33]). Therefore, Egyptian governorates and cities will face challenges in defining their own climate mitigation objectives. As MoE and the EEAA gear up national monitoring capacity to conduct more regular GHG inventories, it will be essential to also develop municipal-level measuring, reporting and verification systems. This would help guide emission reduction efforts, resource allocations and development of comprehensive climate action plans at subnational level (Wu, Raich and Xiao, 18 January 2023[34]). Like other emerging economies, most Egyptian cities lack staff with

appropriate technical skills. However, standardised methods have made it easier to account for GHG emissions by sector and scope (OECD, 2023[24]). These include such methods as the internationally comparable GHG reporting methodologies for companies, organisations and local governments. An increasing number of cities are publicly reporting emissions data by sector and type of emissions.

According to World Bank calculations, per capita emission intensities in Egyptian cities have increased rapidly over the past decades and reached about 2.4 tonnes annually in 2015 (Goyal and Sharma, 2023[2]). These increases were driven by economic activities, rising incomes and changing consumption patterns. Buildings, urban mobility, solid waste and wastewater management, and urban land use are key drivers of GHG emissions in urban areas. The spatial concentration of industrial and residential activities largely defines CO_2 concentrations in cities, also depending on income levels (e.g. Shubra al Khaymah) and population densities (e.g. Alexandria and Port Said) (Goyal and Sharma, 2023[2]). It is therefore necessary to promote policies that encourage low-carbon development to counterbalance the impacts of changing consumption patterns and urban population growth.

At the global level, it is estimated that local governments have direct power over less than a third of GHG emissions reductions; the remainder depend on national or state governments or co-ordination across levels of government (CUT, 2019[35]). As most policies are designed at national level, Egyptian cities have far less power to influence policy design in key domains such as energy supply or transport infrastructure. As elsewhere, lack of power impedes local efforts to advance climate mitigation measures. Limited financial autonomy represents a key barrier (Section 3.2.3).

3.3.2. New urban communities

The creation of NUCs offers many opportunities to design environmentally sustainable, climate-resilient and inclusive cities. The design of cities greatly affects their environmental footprints. Reducing GHG emissions in cities therefore starts with improving urban planning to build more compact, transit-oriented cities that better connect residential areas to economic and social activities.

NUCs have become greener over time. The Central Unit for Sustainable Cities and Renewable Energy was established in 2014 within NUCA. It helps design urban communities to improve energy efficiency, water management and recycling, waste management and sustainable transportation. More recently, it expanded its scope to facilitate co-ordination and support green architecture, including solar panels on rooftops of administrative buildings. Some 21 solar power plants were established that contributed to reducing 1 500 tonnes of CO_2-eq. Furthermore, it facilitated the construction of 25 sewage treatment plants to irrigate green spaces and create new forest areas while supporting integrated waste management and the creation of walking and cycling paths.

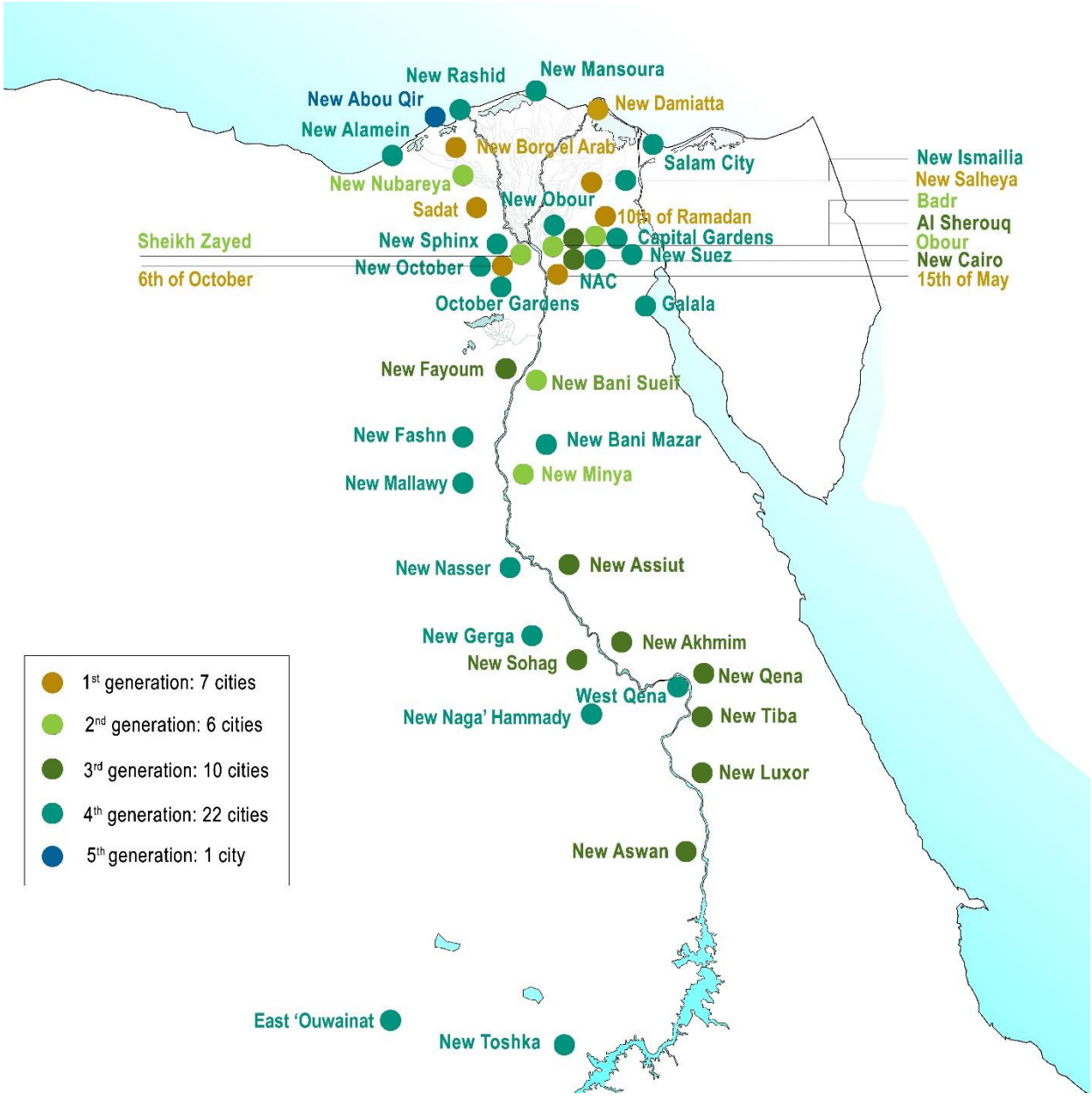
The fourth generation of NUCs (Figure 3.4) strives to incorporate green and inclusive principles in urban planning, but implementation varies. Egypt has no official definition of fourth generation cities or smart cities (Waisová, 2022[32]). Nonetheless, fourth generation cities are generally branded as sustainable, environmentally friendly, “eco cities”. For instance, NUCs dedicate larger areas to green spaces and gardens. New Alamein City will be mainly operated with renewable energy sources. These cities are among Egypt’s flagship projects to promote sustainable urban planning. Several pilot projects have been implemented to help cities promote sustainable tourism (e.g. Green Sharm el Sheikh, Green Hurghada).

At the same time, new cities struggle to attract dwellers and remain largely below target population, partly due to commuting distance and a lack of affordable housing options. In 2017, less than 2 million people lived in new cities, far below the targeted 3.6 million inhabitants for 2006 (Shawkat, 2013[36]).

The high vacancy rate is a concern and should lead the government to draw lessons from the first three generations of NUCs. They may not match demand for affordable housing and may unnecessarily increase environmental costs related to the construction of unoccupied buildings. An assessment of the viability of NUCs, their attractiveness and respective environmental footprint is overdue to guide future policy making

(UN-Habitat, 2012[12]). SEA can help assess environmental impacts related to the choice of location and NUC's broader economic integration (e.g. distance to job opportunities). Moreover, it would be useful to introduce a minimum share of social housing to address affordability issues and improve the social mix of different income groups within NUCs.

Figure 3.4. Egypt counts 23 New Urban Communities and plans to build another 23 by 2030



Note: This map focuses on New Urban Communities and does not reflect Egypt's full territory.
Source: Country submission (2024).

3.3.3. Greening the building sector

The building sector is a major GHG emitter given the high carbon footprint of construction material and energy consumption of buildings. Egypt's building code provides detailed provisions for many sectors. However, the code is not enforced in many cases, even in the formal building sector. Moreover, the existing building stock has limited focus on green building (Goyal and Sharma, 2023[2]). A revision of the building code is urgently needed to reflect up to date standards that support climate and environmental goals.

The government has many opportunities to integrate tighter building standards and green building practices into its building code and thereby mitigate GHG emissions while improving climate resilience. This could include the definition of national standards for low-carbon construction material, minimum energy efficiency standards for all new buildings, provisions for use of renewable energy sources and minimum requirements for green public spaces in residential areas. The expansion of on-site renewables has great potential in Egyptian cities. Some OECD countries with far less optimal sun conditions have made use of solar panels on roofs mandatory for all new commercial buildings (OECD, 2023[37]); many others provide generous incentives for residential buildings.

The Housing and Building National Research Center, established under MoHUCC, develops and issues technical codes. Among other priorities, it disseminates knowledge and training of engineers and technicians in the fields of housing and building (HBRC, 2024[38]). Increased co-operation with universities and relevant professional staff (e.g. engineers, architects) could help raise awareness and facilitate development of a new curriculum on sustainable building. More research into green construction materials could help reduce the material costs of green buildings.

Many codes and guidelines have been issued such as the smart city code and energy codes (commercial and residential buildings). In addition, guidelines for bicycle infrastructure and green building are under development. An update of the energy code is also under way to make it more applicable to the real estate market. HBRC participated in the development of one of the first energy performance certificate for buildings in the MENA region aimed at reducing GHG emissions in the built environment (Build_me, 2024[39]). However, implementation of guidelines generates high up-front costs. This represents a burden for investors and buyers, while efficiency gains to be harnessed over time are less visible. Economic incentives to encourage the application of green building design are therefore essential.

Building materials and construction methods

Greening the building sector requires a stronger focus on mitigating environmental hazards resulting from the construction materials industry. Cement, one of the most important industrial sectors in Egypt, has a production capacity of about 92 million tonnes annually. This makes Egypt the largest cement producer in Africa and places it among the top ten worldwide (Government of Egypt, 2024[40]). The country is also the largest steel producer on the African continent. The manufacturing of these materials is highly energy intensive and has a large carbon footprint. At the global level, transition to green construction could help reduce global carbon emissions in construction value chains by about 23% by 2035 (IFC, 2023[41]). Several emissions reduction strategies for construction can be followed, ranging from alternative additives in materials and design optimisation to waste recycling, alternative water sourcing, and enhanced water and building system efficiencies.

It would be important to develop and implement robust standards for environmentally friendly construction materials. Measures could prioritise the use of renewable energy sources in the extraction processes in mines and quarries. They could also offer access to dedicated funding mechanisms and subsidies for sustainable construction projects. Targeted efforts could further promote circularity of building materials by designing recyclable materials and closing the material loops for construction and demolition.

Nearly all buildings in NUCs are villas or low-rise buildings that rarely exceed five stories. Skeleton structure is the dominating construction system, which heavily relies on concrete or steel. Historically,

Egypt used natural stones and bearing walls systems. These would offer a more suitable construction system for buildings up to five stories.[4] Stone is a natural and readily available resource in most NUC locations, which would also minimise transportation costs and related CO_2 emissions. Stone buildings have excellent thermal mass, meaning they absorb heat during the day and release it slowly at night. This process naturally regulates indoor temperatures in the hot desert climate. Egypt can also build on existing know-how as stones are still used to construct buildings in numerous villages.

Green building certification

Green building certificates and energy efficiency labels could further incentivise green practices in the building sector. Several green building certificates exist but have struggled to lead successful change at scale (Box 3.5). National certifications still lack international recognition to encourage international or multinational companies to apply for them. The national certification system needs to better consider the specific requirements and nature of the construction ecosystem to upscale green building components in the construction and real estate sectors. Economic incentives could encourage the real estate sector to apply for green certification more systematically. The large-scale rollout of green building certificates would also require lowering certification costs, strengthening enforceability, and raising awareness among architects, engineers and investors. More cost-reflective electricity pricing (Chapter 2) would provide more incentives for developers and house owners to invest in energy-efficient buildings.

The government also has much scope to green its own public buildings and social housing programmes through mandatory application of building certificates and energy efficiency standards and enhanced green public procurement. In 2022, Egypt's National Social Housing Programme adopted green building practices in social housing units for the first time (World Bank, 2022[42]). Some 7 000 units using the Green Pyramid Rating System (GPRS) were completed during the pilot phase; another 25 000 units are forthcoming. It would be important to pursue efforts and apply national GPRS certification scheme on all public housing projects while scaling up training for architects and engineers.

By 2030, Egyptian cities will require an estimated 4.5 million residential units and at least 23 million m^2 of commercial buildings (Goyal and Sharma, 2023[2]). Basic environmental standards must be applied to all housing types, including those designed for low-income populations. Guidelines for retrofitting building stock could be tailored to different urban typologies (formal vs. informal). For instance, buildings in the informal sector that apply these guidelines could benefit from a reduced reconciliation fee. This would make it attractive for the informal housing sector to invest in green measures and promote formalising their property in the land system.

Box 3.5. Green building certification

Green Pyramid Rating System (GPRS)

The GPRS is a national certification scheme developed by the MoHUUC in 2011 to promote green building practices in Egypt. GPRS scoring is based on a point-weighting system that assesses various aspects of building practices. The GPRS v2.0 of 2017, assesses seven categories: sustainable sites, energy efficiency, water efficiency, materials and resources, indoor environmental quality, management protocols and innovation (counted as a bonus). Buildings are rated on a scale of one to five pyramids, with the top score indicating a highly sustainable building. In 2022, the government launched a testing phase of applying GPRS certification on social housing projects.

TARSHEED

TARSHEED, meaning "rationalisation" in English, is affiliated with Egypt's Green Building Council. To obtain TARSHEED certification, a project must save at least 20% of energy, water and material resources. The evaluation involves two stages: i) a preliminary assessment during the design phase; and ii) a final assessment during construction and handover.

Leadership in Energy and Environmental Design (LEED)

LEED is an internationally recognised green building certification system, developed by the United States Green Building Council. LEED evaluates buildings across numerous criteria, including energy efficiency, water conservation, materials selection, indoor environmental quality and innovation. LEED has mainly been used by buildings occupied by international companies or organisations, which have strong mandates for green workspaces. Over 20 buildings have received LEED certification. However, high fees and complex technical requirements pose barriers to wider adoption on the Egyptian market.

Excellence in Design for Greater Efficiencies (EDGE)

Developed by the International Finance Corporation of the World Bank Group, EDGE stands out for its user-friendly approach. While not as comprehensive as LEED, EDGE's streamlined approach makes it easier to encourage widespread adoption of green building practices. It has been applied in over 100 countries. EDGE is supported by free software that encourages solutions to reduce energy, water and the energy used to make building materials by at least 20%, which is the standard for EDGE certification. Combining successful elements of GPRS and EDGE may open new avenues for a locally adjusted, internationally recognised green building certification system.

Source: (Arafat et al., 2023[43]; Egypt GBC, 2024[44]; EDGE Buildings, 2024[45]).

Sustainable cooling

As in other countries, Egypt's demand for space cooling will continue to grow in the coming years. It will generate peak electricity demand during summer, putting enormous strain on electricity systems, particularly in densely populated cities (IEA, 2023[46]). Cairo already consumes about half of its electricity demand for air conditioning compared to 20% at the global level (UNEP, 2022[47]). In many areas, diesel-powered generators fill energy supply gaps with detrimental effects on human health and the environment.

Therefore, in the short term, implementing policies to improve equipment efficiency is paramount to curb the ever-growing energy demand for cooling. This requires little new technology as existing and new installations have lower efficiency than the best available technology in the market, leaving Egypt with

significant untapped potential for energy savings (Hassan, Dallal and Grözinger, 2022[48]). Labelling of products should be expanded to inform consumers, along with financial incentives to encourage demand for higher efficiency products (UNEP, 2023[49]). Tighter energy efficiency standards in Egypt's building codes are urgently needed to make improvements in the energy performance of buildings mandatory.

These policies are especially important for new buildings given the large amount of housing that will be constructed in the next decade. Egypt has a unique opportunity to develop a holistic approach to cooling policy for NUCs through a combination of regulations, information and incentives. Passive design strategies, including proper insulation and nature-based solutions (e.g. green roofs and façades), could provide climate-friendly alternatives to air conditioning (e.g. district cooling systems). At the same time, they could reduce energy consumption and GHG emissions, and strengthen climate resilience. For example, a feasibility study for a seawater air-conditioning system has been developed for New Alamein City (UNEP, 2022[47]). Such alternatives need to be more systematically considered for widespread use.

Improving energy efficiency in existing buildings will require considerable support for retrofitting. Low-income households cannot afford major investments and are thus more vulnerable to heatwaves. About three-quarters of existing households are not equipped with air conditioning (Hassan, Dallal and Grözinger, 2022[48]). Cheap but inefficient equipment results in high electricity bills for end users, additional strain on electricity distribution infrastructure and higher GHG emissions (UNEP, 2023[49]). Egypt would benefit from developing National Cooling Action Plans at subnational levels, including support to help vulnerable groups (e.g. young children and the elderly) cope with extreme weather conditions and to attenuate health impacts.

3.3.4. Shift towards low-carbon transport systems

The transport sector accounted for 15% of national GHG emissions in 2015, which are set to double by 2030 (Chapter 1). Emissions from urban mobility systems represent a primary driver of this projected increase in the sector's GHG footprint. The expansion of public transport can significantly reduce transport-related emissions. For instance, the Cairo Metro expansion of lines 2 and 3 will save about 1 million tonnes of carbon dioxide equivalent (Mt CO_2-eq.) emissions per year (Attari et al., 2023[50]). Despite investment in public transport (Chapter 2), Egypt's mass transit system remains insufficient as demand for urban mobility is growing rapidly and has outpaced the capacity of public transport.

Strategic plans covering urban transport include the National Urban Development Framework 2052, launched in 2014 and Cairo 2052 (Government of Egypt, 2014[16]). For instance, the strategic plan for Greater Cairo identified environmental degradation as a key challenge and included better environmental sustainability in its eight strategic pillars for the development of Cairo (Government of Egypt, 2014[16]). Specifically, it aimed to develop a highly efficient public transportation network and strengthen interlinkages with NUCs. Safety concerns hamper public transport use and active mobility.

Advancing integrated planning of public transport

Urban transport planning is conceived and managed by various government entities depending on different transport modes. Informal operators, managing 7- or 14-seater microbuses, dominate public transport services in cities and are lightly regulated. Tighter regulations, combined with economic incentives, to help these operations shift towards more fuel-efficient and cleaner vehicles would provide major GHG emissions savings and reduce air pollution in cities. A project to deploy 100 electric buses is under way within the Greater Cairo Air Pollution Management and Climate Change Project (World Bank, 2022[51]). In parallel, dedicated bus rapid transit lanes need to be expanded in major corridors. In the context of COP27, government entities worked together to set up a fully electrified bus transit network composed of 140 electric buses in Sharm El Sheikh within half a year (Hegazy, 12 March 2023[52]). This example

illustrates that speedy implementation is possible, underlining the importance of strong political commitment, co-ordination and early stakeholder participation.

The Greater Cairo region and Alexandria are the only cities with public transport operators. Cairo Transport Authority oversees concession-based agreements with over 20 private operators and runs historic tramlines and two Nile ferry lines. The Ministry of Transport is responsible for the metro operation through the Egyptian Company for Metro Management and Operation and construction through the National Authority for Tunnels; suburban rail lines are operated and maintained by Egypt National Railways. The Greater Cairo Transport Regulatory Authority (GCTRA) was established in 2012 as lead institution for transport planning and regulation in the Greater Cairo region. However, it struggled to fulfil its mission and was replaced by Law no. 93 of 2019 with the Land Transport Regulatory Authority (Attari et al., 2023[50]). The Transport Regulation Unit was created to fill the gap of public transport service provisions within NUCs, creating yet another system.

The multitude of public authorities involved in transportation planning highlights the need to streamline the institutional framework. An integrated, multi-modal strategy is needed at cluster level (including NUCs) that expands and improves the quality of public services while reducing traffic congestion. Geolocalised data on modal share (across space and time) need to be collected regularly. This would provide a starting point to better understand mobility patterns and related transportation needs to inform urban transport planning. Key elements of such a strategy include tackling accessibility, using transport planning to better control modal share and introducing smart travel demand management.

Improving accessibility

The Greater Cairo region faces a growing spatial mismatch between people's living places and employment. Most people live in the inner and central zones of the city. Central Giza and Cairo have the highest job density, while only an estimated 10% of jobs exist in the NUCs (Attari et al., 2023[50]). This situation will greatly change with the ongoing move of government bodies to the New Administrative Capital; the move will heavily affect commuting patterns, and the monorail will play a key role in connecting people with their workplace (Chapter 2). However, more needs to be done to solve the first and last-mile problem to help passengers get from a transit stop to their destination and bridge the lack of transportation between transit connections.

NUCs are characterised by wide lanes and expressways. Building more compact, transit-oriented cities is essential to reduce distance between residential areas and workplaces. Access to public transport system is highly unequal, especially in NUCs. This underscores that the early stage of urban planning and design of NUCs does not sufficiently consider sustainable transport. The fourth generation of NUCs provides an opportunity to make necessary adjustments to reduce growing car dependency and create more equitable and smart transportation services.

Tackling congestion

The Greater Cairo region is one of most congested urban agglomerations in the world. Despite numerous initiatives, the situation has not improved over the past decades. Congestion has major economic, environmental and social costs. Without congestion, people living within Central Cairo can reach over 80% of jobs within 30 minutes of travel. Accessibility for most of these zones drops below the 60% threshold with congestion. Most people living within the Greater Cairo region can reach over 80% of jobs within 60 minutes (Transport for Cairo, 2022[53]).

Widening roads has proven to be inefficient as the newly created space has been quickly filled with an ever-growing number of vehicles. Experience in other mega cities such as Seoul has shown that congestion intensified over time despite larger roads (Korea Green Growth Partnership, World Bank, 2015[54]). Therefore, promoting modal shift from private cars to sustainable integrated public transport

needs to become a priority (Chapter 2). Stronger incentives and increased road pricing are needed to better manage and rationalise travel demand (e.g. congestion charges, road tolls, street parking fees). Charges related to road traffic have proven to be effective in many OECD countries and contributed to reducing congestion and related economic and environmental costs (Box 3.6).

Box 3.6. Policies in practice: London's congestion charges and low emission zones

London's congestion charge zone is one of the largest in the world. It was set up nearly two decades ago to discourage road traffic in central London, improve air quality and raise additional resources for public transport. A low emission zone for heavy goods vehicles was created in 2008. In addition, the city of London introduced the world's first 24-hour ultra-low emission zone (ULEZ) in 2019, covering 4 million people or about a third of the city's population. While traffic congestion in central London remains a challenge, carbon emissions and other air pollutants from transport have been reduced. According to the 2022 six-month assessment report of the expanded ULEZ, a larger share of vehicles in London is cleaner, contributing to London's commitment to becoming a zero-carbon city by 2030. Nearly 94% of vehicles driving in the ULEZ meet the emission standards on an average day. London also recorded a sharp decline in the use of diesel cars driving in the ULEZ, resulting in cleaner air and important health benefits. On average, there were 44 000 fewer diesel cars each day, representing a 20% reduction.

Source: (OECD, 2022[55]), IPAC Policies in Practice: London's Congestion Charge and its Low Emission Zones.

3.4. Strengthening climate resilience

Egyptian cities are at high risk from climate-related natural hazards, including heatwaves, flash floods, dust storms and rising sea levels for coastal cities, as well as growing water scarcity. According to the World Bank's climate risk vulnerability assessment of 14 cities, more than 80% of the population is exposed to at least one major climate risk (Goyal and Sharma, 2023[2]). Climate-hazards have cascading and compounding consequences across sectors, which are felt differently across people and places (OECD, 2023[24]). Informal settlements are usually more vulnerable due to their physical conditions and residents' limited capacity to cope with climate impacts. As elsewhere, young children, the elderly and those working outside are among the more vulnerable groups. Adopting a place-based response is essential to better consider local interactions between different domains and deliver solutions that generate synergies and co-benefits (Section 3.2.3). In the context of uncertainty, it is vital for Egyptian cities to develop resilience to enhance their ability to anticipate, absorb, recover from and adapt to climate shocks.

3.4.1. Understanding localised climate risks and measuring progress on adaptation

Many governorates and cities do not have a solid understanding of the adverse impacts of climate change in their respective areas. They are thus unable to protect their citizens from climate-related hazards. In line with recommendations in the National Climate Change Strategy 2050, governorates should develop their own subnational climate change strategies to identify localised climate risks and adequately address them in local and regional planning processes (Government of Egypt, 2022[33]). Giza, with the support of MoE and development partners, has been the first governorate to formulate a framework for such a strategy in 2018; however, implementation has been lagging. The National Adaptation Plan, under development,

should explicitly include the role of subnational governments in building climate resilience and develop adaptation solutions to address vulnerabilities of urban communities.

The MoE is finalising an interactive map of climate change risks by 2100. This represents an immense opportunity to develop strategic foresight in support of future policy making. It would be helpful to share findings and make these mapping tools available at governorate and city level to inform climate-sensitive local planning and implementation.

The central government will need to pursue efforts to downscale climate risk assessments at subnational level and develop appropriate city-level early warning systems (e.g. floods, heatwaves). This requires substantial support for capacity building. For instance, GOPP, supported by the German Development Agency (GIZ), has started working on a methodology to produce standardised profiles of climate risks and vulnerabilities at governorate level. Once approved by SCUPD, this would become part of standard procedures of GOPP's urban planning process and would thus greatly contribute to mainstreaming climate risk considerations within strategic planning at governorate level. These efforts need to be pursued and implemented across all governorates.

Localised risk assessments would also allow local communities to gain a better understanding of localised climate risks, exposure and vulnerability, and take appropriate self-protective measures. Moreover, the World Bank, in collaboration with the MoLD, GOPP and other government bodies, elaborated a City Atlas of Egypt (World Bank, forthcoming[56]). This includes updated information on environmental challenges and climate change risks and natural hazards. As such, it will provide another excellent information source for both local and national stakeholders.

Egypt needs to consider climate risk assessments systematically when developing new cities to ensure integrated and risk-informed planning. For instance, New Alamein City and New Mansoura City are both built directly on the shores of the Mediterranean Sea. According to different scenarios for rising sea levels, New Mansoura is built in a high-risk area. Similarly, the Al-Alamein Towers, a series of 170-m skyscrapers, will be constructed just 300 m from the shoreline. GOPP co-operation with the United Nations Development Programme (UNDP) on developing sustainable spatial planning, resulting in guidelines for SEAs in urban plans, is a step in the right direction.

Meanwhile, NUCs have started gearing up to address environmental problems and become more climate resilient. For instance, 6th October City has become Egypt's first city to complete its Green City Action Plan under the Green Cities programme of the European Bank for Reconstruction and Development (EBRD, 2024[57]).[5] In response to growing pressure on drainage infrastructure and recurrent flash flooding, New Cairo implemented a green infrastructure pilot project to improve stormwater management in a sustainable, cost-effective manner (Azouz and Salem, 2023[58]). UDF conducts pilot initiatives to develop local urban resilience plans in some neighbourhoods of existing cities.

Assessing progress on adaptation is a common challenge faced by many countries that attempt to monitor actions and document their contribution to resilience building. Local authorities are well positioned to participate in assessment of adaptation progress given their connection with local dynamics. They can play a role in implementing adaption measures and collecting data and information for national assessment reports (OECD, 2023[59]). Measuring the impact of adaptation measures can help justify the investment cost in sustainable infrastructure and thus attract more financing. While Egyptian cities scale up adaptation, they should consider developing indicators that allow them to measure progress towards building climate resilience.

3.4.2. Coastal protection

Many efforts to protect coastal cities against flooding focus on building grey coastal defence infrastructure to halt coastline erosion and protect coastal cities from storms. For instance, about 2.5 km of Alexandria's shoreline has been transformed into a concrete landscape (Bonnefoi, 2022[60]). Submerged breakwaters

were installed offshore in the east of Alexandria to limit the height of waves before they reach the shore. These measures have so far been relatively effective in protecting the densely populated coastal areas from marine submersion, while raising awareness about the impacts of climate change. In the long term, however, hard infrastructure may not be enough to protect built-up areas against the consequences of rising sea levels. The ongoing construction boom in coastal areas further increases built-up area and the value of assets exposed to climate risks, while reducing natural protection offered by vegetation.

Green buffers such as dunes could provide natural barriers against erosion and rising sea levels (Bonnefoi, 2022[60]). Within a multi-year project funded by the Green Climate Fund, Egypt upscaled nature-based coastal protection solutions in the Nile Delta using a dyke system in the five most vulnerable hotspots (GCF, 2022[61]). These efforts need to be sustained. In addition, the project supports development of an Integrated Coastal Zone Management plan for the whole North Coast. A stronger use of nature-based solutions can enhance Egypt's systemic resilience to extreme weather events and address water scarcity, while yielding well-being and environmental co-benefits (OECD, 2020[62]).

3.4.3. Green spaces

Green spaces in cities play a vital role by providing shade, absorbing water and cooling the local environment, thereby reducing the urban heat island effect. They also contribute to improving air quality and urban biodiversity, making cities more liveable. Little green space is available in Egypt. Greater Cairo lost 900 000 m^2 of greenery between 2017 and 2020 (UDF, 2023[18]). This is in line with Africa-wide trends, where green spaces tend to disappear when urban agglomerations become larger and more compact; they are often the easiest to be sacrificed to build larger roads (Dimitrijevic, 2022[63]). While the World Health Organization (WHO) recommends that all people reside within 300 m of green space, this is the case for only 8% of citizens in Alexandria (Anderson et al., 2022[64]). Restoration of green space should be prioritised and would also help better protect citizens from extreme heat.

Egypt's Vision 2030 sets a target of creating 3 m^2 of greenery per person compared to 0.74 m^2 per person in Cairo in 2020 (Dimitrijevic, 2022[63]). This would be a significant improvement but still three times less than recommended by WHO. Egypt's second updated NDC foresees to "increase green spaces and sustainable parks in new cities that are irrigated with treated wastewater to act as carbon sinks to improve quality of life for citizens and reduce negative health impacts" (Government of Egypt, 2023[21]). It intends to increase the per capita share of public green areas in existing cities. All Egyptian cities would benefit from setting their own green cover targets and measuring progress, while preserving existing green spaces in city centres. Drought-tolerant landscaping, combined with modern irrigation practices, would help rationalise the use of scarce water resources.

As in other countries, green space is less available in lower-income neighbourhoods. Moreover, some newly created parks and walkways have entry fees, limiting access to citizens who can afford to pay. Providing more equitable access, including minimum proximity standards for accessibility to social housing, would be important for inclusion. Developing comprehensive data on green spaces could be a starting point towards more integrated planning and management of green spaces (Dimitrijevic, 2022[63]).

3.4.4. Desalination and water efficiency

The government plans to quadruple its desalination capacity within the next four years to reduce water dependency on the Nile River and ensure water security for its coastal areas. The government developed a dedicated water desalination strategy. It aims to create a desalination capacity of 8.8 million m^3/day (3.2 billion m^3) by 2050 at a cost of USD 8 billion. All new cities and communities along the coast shall depend on sea water desalination to meet municipal requirements. Over 80 desalination plants are already in operation. The Sovereign Fund of Egypt has designated 14 consortia and three companies to bid for the

construction of new seawater desalination plants. According to government plans, all new desalination plants shall be powered by renewable energy, thereby reducing their carbon footprint.

While an expansion and diversification of water sources is urgently needed, most forms of desalination are energy-intensive and costly. They may also have major negative environmental impacts (e.g. brine waste), which requires close monitoring and the use of best available technologies to minimise negative impacts on marine life and ecosystems. Cost-effectiveness analysis should systematically explore viable alternatives that may achieve the desired results with fewer environmental impacts (e.g. rehabilitation of water distribution networks to reduce water leakage). Beyond investments in water supply projects, a stronger focus on demand-management policies would be useful to further rationalise water consumption (Chapter 1). New water monitoring technologies can help develop climate-resilient and more efficient water distribution networks. Raising citizens' awareness of the value of water needs to remain a priority.

3.5. Prioritising policies for inclusive cities

3.5.1. Making existing cities more liveable and sustainable

More attention is clearly needed to help housing in existing cities become more climate resilient and energy efficient. Despite the size of the informal building stock and significant surface area, few efforts have been directed towards establishing mitigation and adaptation plans for existing neighbourhoods. The National Climate Change Strategy 2050 foresees a budget of only USD 31 million for housing and utilities, compared to USD 57.5 billion for transport and USD 7.6 billion for waste management (Government of Egypt, 2022[33]). The budget required for retrofitting buildings is largely underestimated.

Development partners implemented some adaptation projects but rarely moved beyond the pilot phase. For instance, GIZ conducted a participatory climate change adaptation project in informal settlements of the Greater Cairo region (Schuck, 2015[65]). The initiative focused on introducing green roofs, painting façades in bright colours and installing shading devices in the streets. On a larger scale, one of the requirements to apply for legalisation under the reconciliation law was painting the façades of the building in white. This requirement aimed to improve the visual identity of the informal settlements but also had environmental co-benefits: white façades can help mitigate the heat resulting from the sunlight on the buildings.

While UDF has successfully upgraded many buildings, its finances are limited. The fund has a budget of USD 10.3 billion to upgrade unsafe and unplanned areas between 2021-30 (Watan News, 2020[66]). In comparison, public and private investment in NUCs accounted for USD 22.8 billion in the fiscal year 2023/24 alone. NUCA more than doubled its annual budget from USD 2 billion in 2021/22 to USD 4.7 billion in 2023/24, mainly directing it towards high-income housing. However, most Egyptians live in existing areas, which benefit from less generous public support. Achieving spatial justice will require a more equitable distribution of public resources between different income groups. Some precarious areas still lack basic services and require urgent infrastructure upgrades. UDF could start building a pipeline of feasible urban upgrading projects, including adaptation measures, with a view to attracting climate and development finance.

3.5.2. Tackling informality

The past decades have witnessed a significant transformation in the shape and character of Egyptian cities, driven primarily by the growth of informal settlements. According to different estimates, between 40-60% of Egypt's housing stock is informal. This means that more than 3 million housing units were constructed without permits (UN-Habitat, 2016[67]). The government aims to eliminate informal housing areas by 2030 (Government of Egypt, 2021[8]). While government initiatives historically focused on direct

supply of subsidised housing for lower-income groups, they were insufficient to accommodate the expanding urban population. Long-term efforts to improve housing and access to basic services are needed (Box 3.7).

Box 3.7. Improving housing and access to basic services in Indonesia

The challenge of affordable housing has been especially acute in Indonesia where the population is rapidly urbanising, putting pressure on land and housing markets. In addition to a housing shortage, close to one-third of the population live in housing with at least one substandard feature (e.g. poor quality materials, a lack of access to basic services).

The government has prioritised housing through numerous laws and programmes over many years with mixed results. Some programmes have been successful with positive impacts on living conditions. However, others have failed to achieve expected results due to land availability; complicated processes for land acquisition and permitting; constraints on developer finance; and housing built in areas far from urban centres.

The National Slum Upgrading Program (NSUP) stands out for its positive impact in low-income communities. As one of the few countries that has gone to scale with upgrading at the national level, Indonesia presents many lessons for other countries. The NSUP, which invests in basic infrastructure and services in low-income communities, operates with communities and local governments at the centre. Through participatory approaches, communities identify and plan for priority needs, while local governments integrate community investments with city-wide planning. Investments include a focus on improving urban resilience and disaster/climate risks (with specific investments in housing resilience), and on encouraging a more energy-efficient, compact urban environment.

Through the programme, the country has achieved significant progress in improved access to clean water and sanitation, local roads and drainage, solid waste management, more secure housing, and health and education services for residents. Investments in major capacity building efforts at the local level have reached a cadre of planners, engineers and community facilitators, an important factor contributing to success.

A key challenge for programme implementation has been in fostering co-ordination across levels of government. This has been addressed through developing a collaborative institutional arrangement that created task forces at the central, provincial, local and municipal ward levels. Local Slum Improvement Action Plans served as the basis for co-ordinating any intervention in the slum area.

Key lessons from Indonesia point to the importance of investments in strengthening local governments and the central role of community participation, preserving in-situ upgrading when possible, and strong efforts to align planning with investments both at the community and city-wide level through collaboration.

Sources: (World Bank, 2021[68]; NAHP, World Bank, PUPR, 2023[69]).

In the informal sector, the government distinguishes between unplanned settlements and unsafe areas. Over the past decade, Egypt has made major strides in addressing unsafe areas. According to government estimates, the share of people living in unsafe areas was halved from 10.6% in 2015 to 5.2% in 2019 (Government of Egypt, 2021[8]). The government declared the country to be free of “unsafe areas” in 2022. By the end of 2023, it completed nearly 1 million social housing units within its large-scale programme to provide “Housing Units for all Egyptians” (Government of Egypt, 2023[70]).

However, actions to address unsafe areas were accompanied by colossal demolitions of urban housing and displacement of residents for investment or infrastructure projects. Where possible, upgrading slums would reduce significant environmental impacts related to construction and demolition waste. At the same time, it would prevent isolation of displaced populations in informal areas (Alternative Policy Solutions, 2023[71]). Given the long commutes, many households chose cash compensation and settled in other informal areas rather than accept a unit in public housing projects.

Efforts have also been made to prevent new unplanned settlements and encroachment on agricultural land, including a six-month suspension of construction for companies violating regulations within the governorates of Cairo, Giza and Alexandria. The Reconciliation Law for Construction Violations of 2019 was an important step to legalise the informal housing stock under certain conditions. Given the magnitude of informal housing, such a law is a pragmatic step to acknowledge Egypt's urban realities. However, high reconciliation fees and technical requirements undermined implementation. In late 2023, the government adopted a new law to make it easier for citizens to settle construction violations with state authorities. For instance, a 25% discount is granted to those who pay complete reconciliation fees or pay in instalments within the next five years (El-Din, 2023[72]). Despite progress, Egypt has a way to go to increase access to adequate housing at affordable prices.

3.5.3. More gender-equitable and inclusive transport

The use of public transport is undermined by a lack of security, particularly for women. Surveys have reported that some Egyptian women feel unsafe on public transportation (UN Habitat, 2021[73]; World Bank, 2021[74]). Other cities, such as Quito in Ecuador, face the same challenge (Box 3.8). The government started implementing specific measures to promote gender-equitable transport. For instance, the National Council of Women, with the support of the French Development Agency (AFD), supported development of gender-focused action plans in major urban transport projects, such as the renovation of the Alexandria Tram and Cairo Metro Line 1. Every new transportation project, plan or policy should be screened to check if it incorporates a gender-inclusive perspective. Systematic collection of relevant gender-disaggregated or gender-sensitive data could help analyse the impact of measures. Similarly, geolocalised data on modal share (across space and time) would be a starting point to better understand mobility patterns and related transportation needs.

Beyond gender issues, promoting inclusiveness also requires efforts to make transport fees accessible to all income groups. Operators such as Muasalat Misr offers smart, sustainable mobility solutions with barrier-free access (e.g. wheelchair ramps) and the first cashless transit smart card for Cairo with flexible fares. However, travel fares are not affordable for certain socio-economic levels. This may lead to the exclusion of lower-income groups.

Box 3.8. Addressing gender safety in public transport in Quito, Ecuador

At the core of a well-functioning, equitable city is safe and secure access to public transport, which is essential for reaching jobs, markets, health care and education. Yet in many cities, women face verbal and physical harassment with little opportunity for recourse. The city of Quito has faced this same challenge. In 2012, an estimated 91% of women reported harassment in public spaces. To address this challenge, the city embarked on a long-term effort with multiple initiatives.

Among key reforms over the past two decades are policies and programmes to eliminate gender-based violence through training of public servants, bus drivers and police, targeted public awareness campaigns and allocation of municipal resources to upgrade bus stops to make them safer for women. In 2017, a campaign focused on using SMS to provide information in real time. This alerted the bus driver of the harassment incident and sounded an alarm inside the bus to alert passengers. Security personnel of the Transport Authority are alerted to intercept the victim and/or aggressor at the next bus station. The Transport Authority also promoted female employment to address the gender gap.

Through these initiatives, Quito has seen an improvement in safety for women in public spaces and on public transport. An evaluation (2012-17) on sexual harassment and violence found a 6% decrease in in public spaces and an 8.4% decrease in public transport. Overall perceptions of the initiatives have been reported as positive for safety improvements by those women interviewed.

More recently, efforts to employ women in the sector have also paid off. The share of women employed by the Quito Metro has increased, with approximately 40% in positions as employees and 50% in managerial positions. Having women in both technical and managerial roles can help design transportation services that promote safety for women.

Key lessons for other cities on how to best achieve results include the importance of engaging with citizens and operators to diagnose the problems and develop solutions from the outset; designing incremental reforms to enable changes as needed; identifying specific groups for tailored information campaigns (e.g. men). Using technology for addressing real-time offences and creating social awareness/peer pressure can also be effective.

Sources: (Allen, 2018[75]; IDTP, 22 May 2023[76]; Gonzalez, 2024[77]).

3.5.4. Formalising the waste sector

Waste management continues to rely heavily on the informal sector, depending on more than 100 000 poor, mostly young workers, as the backbone of the industry (UNDP, 2021[78]). New efforts to formalise the sector are under way. Through training, for example, rubbish collectors and recycling workers are able to integrate into formal waste management companies (Box 3.9). This move recognises their profession on Egyptian identity cards, providing them with social protection coverage. The government also plans to connect household waste collection fees to the well-established electricity billing system. These efforts to integrate informal workers and enhance public waste management services have much potential for improving waste management services overall and reducing GHG emissions, which represented 8% of national emissions in 2015 (Chapter 1).

Box 3.9. Formalising waste pickers in Pune, India

Waste pickers in cities typically belong to vulnerable groups such as recent migrants, women, children, the elderly and disabled, who have few other employment options. Conditions are risky with exposure to hazardous and environmental risks. Yet waste pickers provide critical services at a low cost in cities and are an integral part of the waste management ecosystem.

The municipality of Pune provides a good example of how informal waste pickers worked together with waste buyers and the municipality. Together, they created an efficient approach for waste collection, sorting and recycling in the city. At the same time, they formalised jobs and access to social protection for vulnerable workers.

The initiative started 30 years ago with the formation of a membership-based trade union, Kagad Kach Patra Kashtakari Panchayat (KKPKP). The union worked to improve conditions for members through advocacy, and convinced the municipality to provide identity cards. The KKPKP commissioned several studies to quantify the economic savings that informal workers provided to the city through their service. This information proved to be powerful in convincing Pune to pilot a new approach. The municipality created Solid Waste Collection and Handling (SWaCH), a worker's co-operative that worked with the city government to provide formalised waste and recycling services to residents.

Through the cooperative, an estimated 3 700 members collect waste door-to-door. The service covers some 4 million citizens or about 80% of the city. As SWaCH has grown, it has continued to diversify its collection services. It now includes sanitary waste, electrical and electronic equipment, clothing and compost.

Household fees for services generate most of the revenue. Workers have seen a substantial rise in income and resulting improvements in living conditions. The city-wide impacts have also been impressive, with substantial savings in labour, processing and transport costs in their solid waste management. Some 78 T of waste is recycled annually. This resulted in annual GHG emissions savings of approximately 50 000 tonnes of CO_2 in 2021.

SWaCH illustrates an effective model for bridging the gap between the informal sector and municipal waste management service needs. The organisation has had considerable success in helping waste pickers in the city transition from scavenging to service provision, improving their working conditions, income generation and legitimising their work. Given the success of the programme, the national government passed legislation in 2016 requiring all cities to register waste pickers, provide them with identification cards and integrate them into formal waste management.

Sources: (Center for Public Impact, 2021[79]; World Bank, 2021[80]; Swach Coop, 2023[81]).

3.6. Climate action in the Governorate of Alexandria

3.6.1. People, places and economy

Alexandria is Egypt's second largest urban agglomeration after the Greater Cairo region. Located on the Mediterranean Sea, about 220 km north of Cairo, Alexandria is one of four urban governorates with an estimated population of 5.5 million people in 2017 (CAPMAS and CEDEJ, 2023[11]). However, during the summer period, its population reaches up to 9 million people due to seasonal tourism, including from Cairo based Egyptians. This massive influx of tourists has significant consequences on the city's infrastructure and service delivery, notably for waste and wastewater management. The governorate has introduced

emergency plans to address problems related to stormwater and rain flooding. It also expanded capacity and raised the efficiency of its wastewater treatment plants. Growing electricity demand puts the city's electricity grid under strain. Congestion in the city of Alexandria is endemic. According to government projections, Alexandria's population is expected to reach 6.8 million by 2030, putting additional pressure on already saturated places (AFD, 2018[82]).

The governorate has a coastline of 44.5 km spanning from Al-Ajami in the west to Abu Qari in the east. Its landscape is diverse and counts 65 sandy beaches. The heart of Alexandria city is built on a T-shaped peninsula caught between the sea, lagoons and former lakes. The Corniche, a large waterfront, runs along the Eastern Harbour, one of the world's oldest ports, with a major traffic corridor. As large parts of the city are below sea level, it is vital to further improve flood protection and the city's drainage system. About 2.5 km of the shore has been transformed into concrete landscape to protect the city against stormwater and coastal erosion (Bonnefoi, 2022[60]). Moreover, the city, has a rich cultural heritage with numerous monuments from Greek-Roman times, which require adequate protection.

Most people live in the city of Alexandria and its surroundings. New Borg El Arab City, located about 55 km southwest of Alexandria, was established in 1979 as part of the first generation of NUCs. It aimed to reduce commuting between Alexandria's core city and industrial areas, and relocate people away from the already saturated city. These efforts also aimed at preventing urban sprawl on agricultural land and absorbing population increases. However, like other NUCs, New Borg El Arab struggled to attract the targeted population, mainly because of a lack of urban infrastructure and public services. The distance from the sea also made it less appealing, considering the many (informal) job opportunities in the ocean economy. The city is under NUCA administration, giving it different governance. Containing urban sprawl and tackling informal and unsafe areas continue to be among the key challenges of the Alexandria governorate.

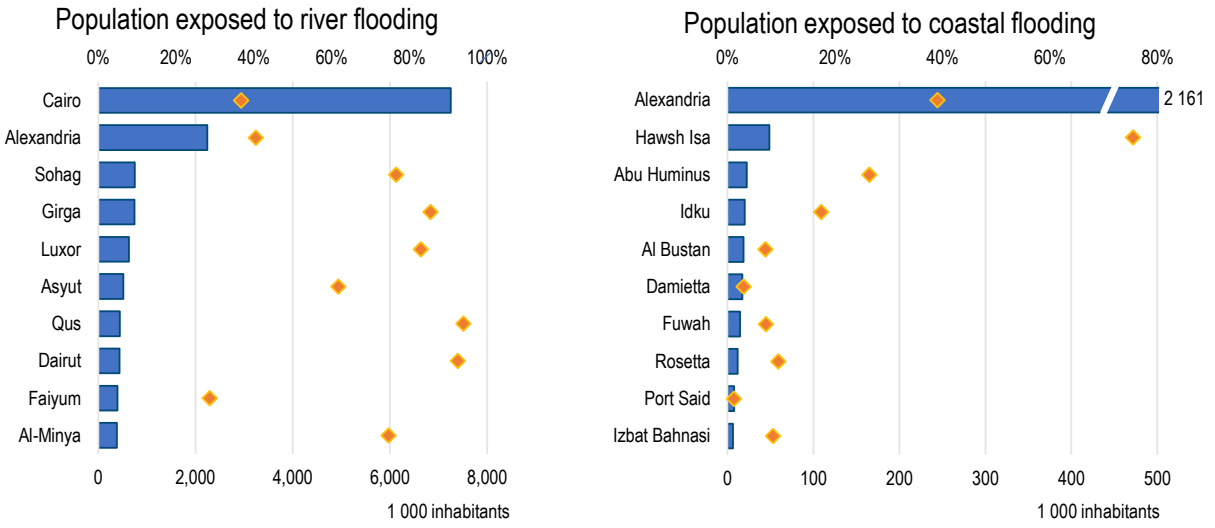
Alexandria is an important economic centre. Its significant industrial base represents nearly 40% of national industries because of its natural gas and oil pipelines from Suez and the presence of refineries, mainly managed by state-owned companies. The governorate attracts significant investment in other major industries (e.g. chemicals, metallurgy, leather, electricals, engineering, textiles, cement). Its well-established and diverse manufacturing sector is growing quickly. Alexandria's shoreline sources around 13% of Egypt's fish production (Iskander, 2021[83]). As Egypt's largest seaport on the Mediterranean, Alexandria is also a major trading hub. The Alexandria Public Free Zone, located near the city, provides a wide range of services, including shipping, unloading, navigation and transport. Moreover, the Cairo-Alexandria Logistical Corridor operation, which will link Alexandria's seaport to Cairo's dry port and Upper Egypt, is expected to provide further efficiency in the transport and logistics chains (IFC, 2023[84]). This will help better connect the two metropolitan areas.

3.6.2. Climate-related risks

As a coastal city, Alexandria is exposed to several climate-related and natural hazards, mainly rising sea levels, storms, flooding, saltwater intrusion, earthquakes, rising temperatures and related heat stress. High population density further exacerbates environmental pressures, notably water scarcity.

Four of ten people in the Alexandria area are exposed to coastal flooding risks (Figure 3.5). This is among the largest shares in Egypt. Furthermore, 42% of the population is also exposed to river flooding. About 45% of the population live in areas below mean sea levels (Goyal and Sharma, 2023[2]) and land is sinking by 1.6 mm annually (Al-Mailam, Arkeh and Hamzawy, 2023[85]). Depending on different projections, rising sea levels may flood a significant part of Alexandria. If climate change is not mitigated, this situation may require a massive relocation of people and assets. Considering the environmental risks, any future urban development in low-lying areas must be avoided.

Figure 3.5. Alexandria's population faces significant coastal and river flooding risks



Note: Data features urban centres, which are defined by specific cut-off values on resident population and built-up surface share in a 1x1 km uniform global grid (European Commission, Copernicus, 2024[86]).
Source: OECD calculations based on Muis et al. (2016), A global reanalysis of storm surge and extreme sea levels (coastal flooding) and Baug. et al. (2024), Global river flood hazard maps (river flooding).

StatLink https://stat.link/u01gyb

Alexandria's built-up area exposed to pluvial flood hazard increased from 9 km^2 to 24 km^2 between 1985 and 2015 (Goyal and Sharma, 2023[2]). This is less than in the Greater Cairo region but still represents a significant increase (Figure 3.5). The 2015 floods inundated at least one-third of the city, killing seven people and causing a direct damage of nearly USD 40 million. A storm in 2016 caused more moderate damage to beaches and tourist facilities of Corniche. The catastrophic 2023 flooding in neighbouring Libya, which killed over 4 000 people and destroyed a quarter of the port city of Derna, was a wakeup call for all coastal cities in the Mediterranean to gear up their respective natural disaster risk strategies.

Given that Alexandria is close to the sea, people cope more easily with heatwaves than Cairo-based citizens. Nevertheless, prolonged days with extreme temperatures slow down economic activity and bear major health risks for vulnerable populations. As in other cities, more use of air conditioning leads to unsustainable energy consumption during summer periods (Section 3.3.3).

Local institutional capacity to manage these risks and build resilience of communities to cope with climate change impact and prepare for potential future disasters is limited (AFD, 2018[82]). The emergency response system remains highly centralised with limited horizontal and vertical co-ordination between agencies down to the level of local communities.

3.6.3. Policies and climate measures

The Alexandria Strategic Urban Plan 2032 (UNDP, 2020[87]), managed by GOPP under MoHCC, outlines the city's development vision. The diagnosis phase from 2011-14 was supported by a Germany-based consulting firm. Consultations with local stakeholders led to the development of a new geographic information system for the Alexandria governorate. Building on a decade-long partnership between GOPP and UNDP (2009-19), the government approved Vision for Alexandria 2032 and the Strategic Urban Plan for Alexandria City till 2032. Implementation has advanced slowly, undermined by lack of financing and technical expertise. Local ownership has been limited due to frequent changes in governors and their

executive councils, as well as staff turnover (Government of Egypt; UNDP, 2019[88]).[6] Ten years on, a mid-term assessment would be timely to take stock of achievements and remaining challenges, while updating local development plans to make them more climate sensitive. This involves analysing the specific climate risks and vulnerabilities of Alexandria, assessing local capacity and resources, and aligning city-level priorities with national adaptation goals.

Meanwhile, MoPED, together with the United Nations Population Fund, elaborated subnational indicators to localise the Sustainable Development Goals (SDGs). In this way, it would facilitate implementation of Agenda 2030 for Sustainable Development at governorate level. However, the SDG localisation report of Alexandria does not cover SDG 13 on climate action (Government of Egypt, 2021[89]). It indicates that the governorate is ahead of the national average in many areas (e.g. eliminating unsafe areas, clean water and sanitation services) and ranked position 6 of 22 governorates for SDG 11 on sustainable cities and communities (Government of Egypt, 2021[89]). The experience of localising SDGs could be useful for developing subnational indicators for climate action at governorate level to contribute to translating Egypt's national climate commitments into practice. Downscaling national adaptation priorities outlined in the second updated NDC to the city level would require development of a localised adaptation plan for Alexandria.

Given its high-risk exposure, adaptation is a key priority for the city of Alexandria. Under the leadership of Governor El Sherif, a Committee on Climate Change was established in 2023 to bring together researchers, private sector representatives and local stakeholders to analyse the impacts of climate change on the city. Work will include localised risk assessments and the development of early warning systems. Several initiatives to promote green growth and climate action in Alexandria are under way (Box 3.10).

Enhancing capacity to leverage green finance, including private financing for green investment, needs to remain a key priority to overcome financial gaps. Access to international development and climate financing could be further facilitated through a governorate-level Climate Action Strategy for Alexandria, including measurable, timebound targets. This would not only allow monitoring and assessing Alexandria's progress towards low-carbon development and climate resilience, but also increase accountability of public action.

Many development partners intervene to support climate action in Alexandria. For instance, the World Bank and the International Finance Corporation prepared a comprehensive Climate Action Plan for Alexandria. It included risk assessments and projections, accompanied with recommendations for investment and reform priorities to enhance the city's climate resilience and pivot towards green and low-carbon solutions (Goyal and Sharma, 2023[2]). The EBRD is developing a Green City Action Plan focusing on key environmental challenges such as water, air quality and waste (EBRD, 2023[90]). GIZ supports the governorate in developing climate risk assessment tools to build the foundations for effective climate risk management through participative approaches (GIZ, 2023[91]). AFD contributes to development of sustainable urban transport and mobility (AFD, 2023[92]). Given the multitude of development partners, it is key to avoid duplication and strengthen local ownership to facilitate implementation and sustain results. Despite many capacity building efforts, local authorities still need to enhance technical and financial capacity to conceive and implement climate action in a coherent and efficient manner.

Box 3.10. Examples of green measures taken by the Governorate of Alexandria

The Governorate of Alexandria with the support of the central government, is gearing up to advance low-carbon development and build climate resilience, through the following:

Climate mitigation projects:

- Transformation of Alexandria's port into a smart green port.
- Development of an integrated cleaning and garbage collection system through a contract with the Egyptian company Nahdet Misr Environmental Services.
- Development of public squares around Misr station, contributing to GHG emissions reduction efforts and improving the quality of life for citizens.
- Implementation of a plasticiser programme in co-operation with EBRD.
- Upgrading of unsafe areas to improve living conditions and air quality.
- Expansion of the use of solar energy in many projects, including:
    - a first solar-powered market in the Amriya area
    - use of solar-powered lighting poles in the city's main corridors.

Adaptation measures:

- Nine coastal protection projects using submersible barriers and beach restoration (e.g. placement of sand to restore the beachline); three forthcoming projects, including one on enhancing protection of the Castle of Qaitbay; projects are implemented by the Coastal Protection Authority with funding from the Ministry of Water Resources and Irrigation.
- Several rainwater management projects are under way focusing on the separation of rainwater from sewage; projects were designed by the Faculty of Engineering of the University of Alexandria and implemented by the Armed Forces Engineering Authority under the supervision of the Council of Ministers.

Source: Country submission, Governorate of Alexandria (2024).

3.6.4. Examples of policy action in specific sectors

Improving wastewater management

Alexandria's rapidly growing population and influx of seasonal visitors increase demand for water, generating an ever-growing amount of wastewater. Several lakes in the Delta region suffer from increased concentrations of nitrogen, phosphorus and organic matter. This is mainly due to large amounts of agricultural drainage, as well as domestic and industrial wastewater discharged directly into the lakes over the past decades. In 2021, Lake Mariout close to Alexandria deteriorated to bad water quality status according to the World Quality Index (CAPMAS, 2022[93]). The situation is set to improve thanks to a rehabilitation programme and expansion of the city's wastewater management capacity. For example, upgrading of the East Alexandria Wastewater Treatment increased capacity to 800 000 m^3/day, making it one of the largest sewage treatment plants in Alexandria. It includes a sludge treatment facility using energy recovery, which contributes to reducing about 1 000 tonnes of CO_2-eq. per month (Arab Contractors, 2023[94]). This is one of the city's flagship projects, contributing to environmentally friendly practices and reduction of GHG emissions. In some areas, the governorate has introduced treated wastewater in agriculture and landscape management.

Addressing sustainable mobility

Congestion and related air pollution is a major challenge for the city of Alexandria. Considering geographic space constraints, the city's road network is linear with a few east-west streets; they are mainly parallel to the sea, while others are perpendicular to them. The public transport system is insufficient and has degraded over the past decades (Mohamed, 2023[95]).

The governorate has been promoting use of low-carbon transportation through introduction of 55 electric buses. In addition, the Transport and Passenger Authority replaces about 50 buses powered by fossil fuel each year with those run by compressed natural gas. Alexandria is also gearing up its public transport offer through rehabilitation of a 13.8-km long Raml tramline and construction of its first metro line spanning 21.7 km with 20 stations from Abu Qir Railway Station to Misr Station (EIB, 2023[96]). Construction, which started in early 2024, is scheduled for completion in 2026. It will have a capacity of 60 000 passengers per hour and will halve travel time to 25 minutes. These mega projects are funded with the support of international partners and will help Alexandria make a leap in its transition towards more sustainable mobility. In addition, a green belt could help address traffic and pollution issues on Alexandria's internal roads and encourage broader use of active transport modes, especially on El-Gaish Road, the main transport corridor of the Corniche (Mohamed, 2023[95]).

Increasing green spaces

The city of Alexandria has much scope to increase green spaces. In comparison with other African cities, Alexandrian citizens live further away from green spaces (Anderson et al., 2022[64]). The governorate contributes to implementing national strategies in this area, notably to the Presidential Initiative aimed at planting 100 million trees. Some 280 000 trees have been planted in Alexandria with the support of MoE and citizen volunteers. Increasing green spaces in and around the city will not only improve citizens' well-being but can also make Alexandria more attractive to new businesses and generate investment opportunities.

3.7. Al-Kharga, Egypt's first environmentally friendly city

3.7.1. People, places and economy

An oasis in the Western Desert about 340 km west from Luxor and 600 km from Cairo, Al-Kharga is the capital of the New Valley governorate, and as such has the administrative status of "urban".[7] It is an archipelago of irrigated spots within a vast depression stretching over 200 km (Garcier, 2023[97]). In total, Egypt counts six inhabited oases west of the Nile. Despite its remote location, Al-Kharga's population has been growing over the past two decades by over 30% and reached about 90 000 people in 2017 (Garcier, 2023[97]). According to government estimates for 2024, its population currently counts about 108 000 people. This makes it Egypt's largest oasis closely followed by Dakhla (Garcier, 2023[97]). Its name in English means "the outer" (outsider or outside city). It was known in the past as the "Great Oasis" and is considered one of the ecotourism destinations thanks to several important archaeological sites (e.g. Temple of Hibis; Temple of Nadura, Ghweita Temple, Qasr al-Zayan Temple, Dosh Temple, Bagawat cemetery) (Government of Egypt, 2023[98]). Some of these monuments date back to the Persian period (660-330 BC).

Urban infrastructure is relatively well developed. All households have access to electricity; water and sanitation services are connected to the sewage network by 90% coverage (World Bank, forthcoming[56]). The oasis depends entirely on groundwater, which is extracted from the Nubian Sandstone Aquifer System. Water is mainly used for domestic and agricultural purposes.

The average rate of annual municipal solid waste in the city is estimated at 182 kg per capita, below the national average of 251 kg per capita (Chapter 1). About half of total waste is sorted and recycled; the remainder of collected municipal solid waste is disposed on open dumps outside the city (World Bank, forthcoming[56]).

Al-Kharga counts 39 solar energy stations to extract water from wells, 19 of them in the local governorate buildings, 6 in schools and 14 in mosques, with a total generating capacity of 600 kW. Thermal springs in villages at Bulaq and Nasser Elthawra to the south of the city of Kharga are famous for water temperature of up to 50°C. The springs have attracted some tourists, but tourism activity has been generally limited because of their remote location. At the same time, increased tourism would put more pressure on municipal waste management and scarce water resources.

Al-Kharga needs a marketing action plan to identify niche opportunities and further structure the emerging tourism sector, while enforcing strict environmental regulations to balance recreation and nature conservation. Improving access would be key to developing tourist activities. Egypt may wish to co-operate with other countries and regions to share experiences and lessons learnt. For instance, the Amazonas and Pantanal regions of Brazil face similar challenges related to access and sustainable tourism practices. It will also be important to develop activities in an inclusive manner so that benefits and economic opportunities are shared broadly.

A bus service connects the oasis to the other oases in the Western Desert (e.g. Dakhla, Farafra, Bahariya) and to the rest of Egypt. A road trip to Luxor in the Nile Delta takes between 4-5 hours. A commercial flight from Cairo is planned to operate once per week. The oasis remains isolated. Within the revival of the New Valley project, also known as Toshka project,[8] Al-Kharga may have opportunities to better connect with other desert areas by improving the transportation network and deepening economic linkages. It could further develop economic co-operation with cities in the Nile Valley.

3.7.2. Climate-related risks

Located in the middle of the desert approximately 600 m above sea level, Al-Kharga has a subtropical desert climate with temperatures about 1.9% higher than the Egyptian average. The average surface temperature during summer (2017-21) reached 51.1°C (World Bank, forthcoming[56]). Heat stress is a major challenge. Citizens need to protect themselves and limit their daily exposure to sun during the hottest moments of the day. Al-Kharga has one of the world's lowest precipitation rates with less than one rainy day per year (0.08 mm annually). Sandstorms represent a major threat to monuments. Sands from the nearby dune belt have already started to accumulate around the Temple of Hibis.

3.7.3. Policies and green measures

Al-Kharga's development vision is outlined in its strategic urban plan, approved in 2015. Drawing on a six-month assessment in 2022, the government designated Al-Kharga as Egypt's first environmentally friendly city. The assessment analysed air, water and light quality, and helped promote responsible use of natural resources and sustainable agricultural practices. The city has increased use of renewable energy sources in co-operation with private sector companies. It does not have any major polluting industry and is committed to becoming plastic free. Al-Kharga has one of the highest shares of green areas in the country (500 m^2 per capita) (Egypt Today, 2022[99]). Some 7 000 trees have been planted along the Al-Kharga airport road, covering 11 km. By designating Al-Kharga as an eco-city, the government aims to provide a sustainable model for the development of desert lowlands that is compatible with urban heritage and the local environment. It aspires to balance economic growth, environmental protection and social well-being, ensuring a sustainable future for the oasis and its communities (Box 3.11).

Box 3.11. Green growth opportunities in Al-Kharga

Al-Kharga has several opportunities to promote sustainable development and incentivise green investment.

Ecotourism: sustainable tourism initiatives that showcase the natural and cultural heritage of the oasis while minimising environmental impacts through the following actions:

- Raise the efficiency of sulphur wells in the province.
- Promote craft and environmental industries.
- Participate in international exhibitions.

Agriculture: supporting local agricultural practices that promote sustainable farming techniques, water conservation and preservation of traditional knowledge through the following actions:

- Promote water conservation, preservation of traditional knowledge, planting low water consumption trees, using modern irrigation methods and operating wells with solar energy.
- Improve different crop breeds.
- Protect date crops from the palm weevil.
- Use scientific research to improve the quality of new varieties with an economic return.
- Carry out various agricultural initiatives that preserve the environment, such as (palm initiative - mulberry tree planting initiative).

Small-scale agro-industry: encouraging development of value-added activities such as food processing, handicrafts and local products that can generate income and employment opportunities.

Renewable energy: developing solar parks, to provide clean energy to the oasis and surrounding areas:

- Promote solar-powered government buildings (e.g. Governorate general office, local units), schools and mosques.
- Pursue efforts to operate public wells with solar energy (e.g. 145 solar-powered wells are already operational).

Source: Country submission (2023).

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Notes

[1] The inhabited area represented about 12% of total land area in 2023 (Chapter 1, Figure 1.1).

[2] Other members include the Minister of Culture; the Minister of Investment; the Minister of Housing, Utilities and Urban Development; the Minister of State for Economic Development; the Minister of State for Local Development; the Chairman of the General Authority for Urban Planning; and the Director of the National Centre for the use and planning of State-owned land, in addition to a group of specialists in urban development matters.

[3] Governorates submit sectoral investment plans to relevant sectoral ministries, impeding development of synergies across sectors.

[4] While this construction method may have some limitations in openings, the environmental benefits outweigh constraints, which could be solved through modern techniques.

[5] Two more action plans are under development for Alexandria and Cairo.

[6] Despite major outputs (e.g. capital investment plan for the city; urban management strategy and guidelines), project results were not largely communicated to the public and to date, key documents are not accessible on line (Government of Egypt; UNDP, 2019[88]).

[7] Al-Kharga became a madina in 1993 in application of the decrees of the Administration of Land Taxes no. 4 of 1993 and Egyptian Surveying Office (ESA) no. 7 of 1993.

[8] The Toshka project was initiated in 1997, aimed at reclaiming desert land for agricultural and industrial development and creating new settlements by connecting these areas through a system of canals to pumped water from Lake Nasser. The initiative faced several technical and organisational challenges: in 2017, about 12 000 hectares of new agricultural land were in the process of being reclaimed (Garcier, 2023[97]).

OECD Environmental Performance Reviews

OECD Green Growth Policy Review of Egypt 2024

Egypt is a rapidly growing emerging economy and a demographic heavyweight on the African continent. High population growth, land-use change, pollution and climate change are increasingly putting pressure on the natural environment, including on its rich biodiversity. Egypt has achieved relative decoupling of greenhouse gas emissions from economic growth, though it needs to further mainstream climate action across sectors and progressively raise ambition. As one of the world's most water-stressed countries, greater use of economic instruments would help address scarcity and improve water quality. As part of Egypt's Vision 2030, the government is committed to turning environmental challenges into opportunities. It has taken steps to move towards more sustainable waste management and address air pollution, which remains a health concern. Egypt has significant potential to accelerate its clean energy transition. While environmental information and data have improved overall, public participation in environmental decision making needs to be further enhanced.

This is the first Green Growth Policy Review of Egypt. It examines progress towards sustainable development and green growth over the past decade. The 40 recommendations aim to help Egypt improve its environmental performance, giving a special focus to building climate-smart, resilient and inclusive cities.

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