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CLIMATE ACTION IN THE ARAB REGION

White Paper on the Nationally Determined Contributions of Middle East and North Africa Countries

December 2022

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ABOUT

This report presents our analysis of the most recent National Determined Contribution (NDC) submissions of the following 16 Middle East and North Africa (MENA) countries, listed alphabetically:

- Arab Republic of Egypt (Egypt)
- Hashemite Kingdom of Jordan (Jordan)
- Kingdom of Bahrain (Bahrain)
- Kingdom of Morocco (Morocco)
- Kingdom of Saudi Arabia (Saudi Arabia)
- People's Democratic Republic of Algeria (Algeria)
- Republic of Lebanon (Lebanon)
- Republic of Iraq (Iraq)
- Republic of the Sudan (Sudan)
- Republic of Tunisia (Tunisia)
- State of Kuwait (Kuwait)
- State of Palestine (Palestine)
- State of Qatar (Qatar)
- Sultanate of Oman (Oman)
- Syrian Arab Republic (Syria)
- United Arab Emirates (UAE)

For the NDCs submitted in French by Algeria, Morocco and Tunisia, we reviewed the English versions available on the NDC Registry for Algeria and Tunisia, and an unofficial internal translation of the Morocco submission. As for the NDCs submitted in Arabic, we reviewed the Arabic version. Furthermore, this report does not reflect all the information in each NDC, only the relevant parts required to fulfill the scope of this paper.

Citation: Seta Tutundjian, Dima Maroun, 2022. *Climate Action in the Arab Region: White Paper on The Nationally Determined Contributions of Middle East and North Africa Countries*. Thriving Solutions L.L.C.

The report can be downloaded for free at: https://thrivingsolutions.earth/climate-action-in-the-arab-region/

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TABLE OF CONTENTS

Thriving Solutions

FOREWORD

Seta Tutundjian
CEO & Founder
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There are few places on Earth where the inter-connectivity between water-energy-food-climate is more evident than the Middle East and North Africa (MENA) region. Home to the most water-scarce countries in the world, the region has a long history of coping with high temperatures, drought, aridity, and poor soil conditions.

A coping strategy for the region has been a heavy reliance on building dams to capture water coupled with infrastructure to desalinate, treat and pump large quantities of water to meet the needs of its inhabitants and industries. This has required a high dependency on energy, predominantly fossil fuels. Coincidentally, many of the region's countries have been endowed with large reserves of oil and gas enabling them to fuel the growth of their economies and rely on less expensive energy to make water available to their economic sectors. For the countries that do not have oil and gas reserves, the energy requirements of the water sector impose a heavy burden on national economies. Another coping strategy for the water scarcity challenge, has been the region's heavy reliance on food imports. Though a viable strategy from a water security perspective, the pandemic and the ongoing conflict between Russia and Ukraine has exposed the vulnerability of this strategy.

Climate change has exacerbated the aridity in the region; projections indicate further increases in temperature, decline in precipitation averages, prolonged droughts and intensified dust storms. Moreover, rising sea levels place the coastal cities of the region at the forefront of a myriad of challenges. The Nationally Determined Contributions (NDCs) of the region's countries indicate that all are aware of the climate change risks and the need to increase resilience through adaptation measures. Even countries whose economies depend on oil and gas recognize that such high dependence, is a luxury that will be difficult to sustain if we are to limit global warming to 1.5°C by 2030. This report presents our analysis of the NDCs of the MENA countries identifying their commitments as well as their major mitigation and adaptation strategies.

Seta Tutundjian

CLIMATE CHANGE

'Climate Change' refers to the longer-term changes in the behavior of the atmosphere that persist for an extended period of time (decades or more). These changes can be driven by natural causes or human activities.

Presently, climate change is the biggest challenge humanity is facing.

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GREENHOUSE GASES

Greenhouse gases (GHGs) absorb and trap heat in the atmosphere increasing the average global temperature of the atmosphere. The greenhouse effect of each gas depends on its absorption ratio and the length of time it stays in the atmosphere.

The increase in the global atmospheric temperature affects the other components of the atmosphere such as wind patterns, humidity, clouds and precipitation. It also affects other planetary systems, namely the:

- Hydrosphere *(water cycle)*.
- Cryosphere *(glaciers, sea ice, ice caps, permafrost)*.
- Biosphere *(sum of all the ecosystems on Earth)*.

Due to these wide-scale implications of small increases in average temperatures, we find that "global warming" and "climate change" are used interchangeably.

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CLIMATE CHANGE IMPACTS

Modeled projections of increases higher than 1.5 ℃ of current global temperatures by 2050, result in events that alter the conditions on Earth for thousands if not millions of years.

These events include, but are not limited to:

- Large-scale melting of ice sheets and permafrost.
- Burnout of forests.
- Changes in the oceans' temperature, salinity and acidity.
- Rise in sea-levels.
- Altering of wind currents.
- Altering of ocean currents.
- Drying of rivers and lakes.
- Terrestrial and marine ecosystems' collapse.

Risks of not limiting global warming to 1.5°C

Extreme natural events

Salinization of ground water resources

Massive species extinction

Coral reef collapse

Flooding of coastal cities & lands

Pest outbreaks

Reduction in crop yields and quality & crop failure

Loss of livelihoods

Compromised food & water security

Massive displacement & migration

Loss and damage to infrastructure

Famines and health issues

Economic collapses

Increase in conflicts and wars

This will affect every single person on Earth, but most affected will be the vulnerable groups, especially those living in developing countries.

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MENA CHALLENGES

COP27 focus on food is understandable. The Arab region is home to 6% of the global population (Data World Bank 2021), lies in the most arid and water-scarce area on earth, and 70% (Park et al. 2016) of its lands are dry.

Renewable water supplies of most MENA countries are significantly below the absolute water scarcity level of 500 cubic meters per capita, per year (FAO, 2021). Reliance on energy intensive water desalination and/or distribution over hundreds of kilometers is a corner stone of most water strategies to meet urban and industrial needs. This is a financial strain on national budgets, particularly for countries dependent on imported energy such as Jordan and Lebanon.

The region's biophysical constraints (aridity, water scarcity) result in heavy dependence on food imports given the challenges of sustainable agri-food production. Climate change is aggravating these challenges. Today, food insecurity is on the rise with 32.3% of the region's population not having access to adequate food in 2020 (FAO, 2021).

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CONFERENCE OF PARTIES (COP)

COP27 was the first UN Climate COP that put food at center stage.

It had the first dedicated Food Systems Pavilion, and an Agricultural Day hosted by the COP President.

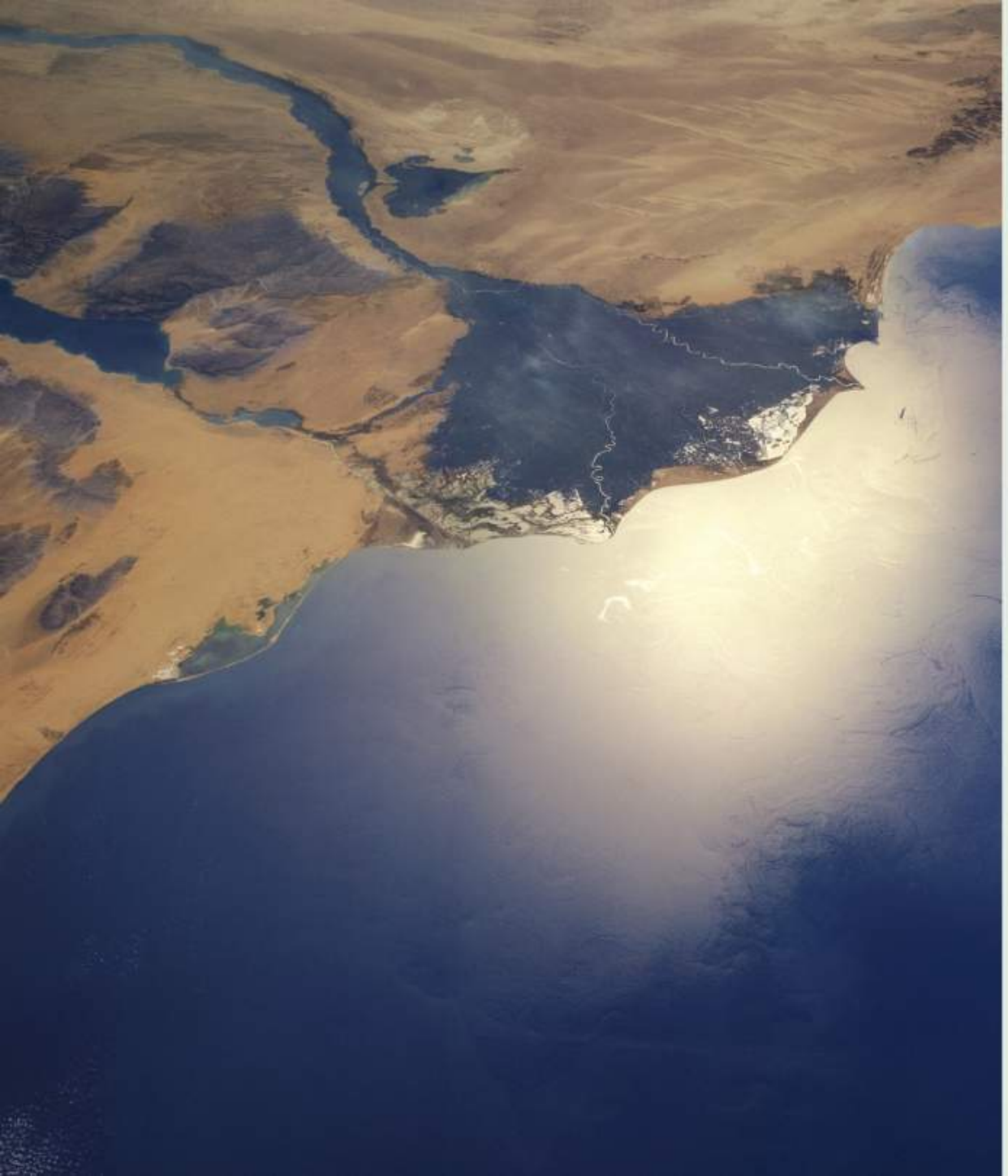
Image: REUTERS/Sayed Sheasha

MENA CLIMATE RISKS

A rise of the global average temperature by 2°C is expected to have drastic consequences on the region. It will reduce average precipitation, increase evapotranspiration, accelerate the rate of aridity spread, and increase the frequency and severity of droughts and dust storms.

Countries in the region have already started reporting a decline in precipitation. Algeria reports annual average rainfall decline exceeding 30% (Algeria NDC, 2015), while Jordan reports a yearly decline of 60% (Jordan NDC, 2021). This has wide-reaching implications on renewable water resources, irrigation management and agricultural productivity further exacerbating aridity, water scarcity and food insecurity.

Further temperature increases will lead to the rise of sea-levels to a degree that puts many coastal settlements across the MENA region at risk. Flooding will damage infrastructure, escalate disease and pest outbreaks, and intensify salinization of coastal groundwater. Higher temperatures will lead to crop failures further worsening food and nutrition insecurity. Consequently, populations will be exposed to additional health risks, loss of livelihood and displacement.



EXAMPLES OF FUTURE CLIMATE RISKS

EGYPT

By 2030, Egypt may lose 8.2% of its cultivated area compromising food security. This will lead to the loss of livelihood and massive labor migration of 25% of the agricultural labor force.

By 2100, 1% of the country's 5.5% inhabited areas would become submerged leading to further displacement and economic losses.

Loss of cultivated area

Affected agricultural force

Loss of inhabited area

Source, Egypt NDC, 2022

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EXAMPLES OF FUTURE CLIMATE RISKS

KUWAIT

A 0.5 to 2 meter rise in sea level will result in Kuwait losing 1.4 to 3 percent of its coastal areas.

The consequences of this loss amounts to 5% of Kuwait's Gross Domestic Product (GDP).

Rise
of sea level

Loss
of coastal areas

Loss
of domestic product

Source, Kuwait NDC, 2021

THE PARIS AGREEMENT

Due to the growing threat of climate change, in 1992, the global community adopted the United Nations Framework Convention for Climate Change (UNFCCC) to champion a global response to stabilize GHG concentrations at tolerable levels.

UNFCCC has 198 Parties and is the parent treaty of the Paris Agreement.

The Paris Agreement, is a legally binding international treaty to limit global average temperature increases to below 2°C (or preferably 1.5°C) pre-industrial levels.

The Paris Agreement has been ratified by 196 Parties. As of November 2022, all members of the Arab League have signed the Paris Agreement and 21 members have ratified it. (UNFCCC, n.d.)

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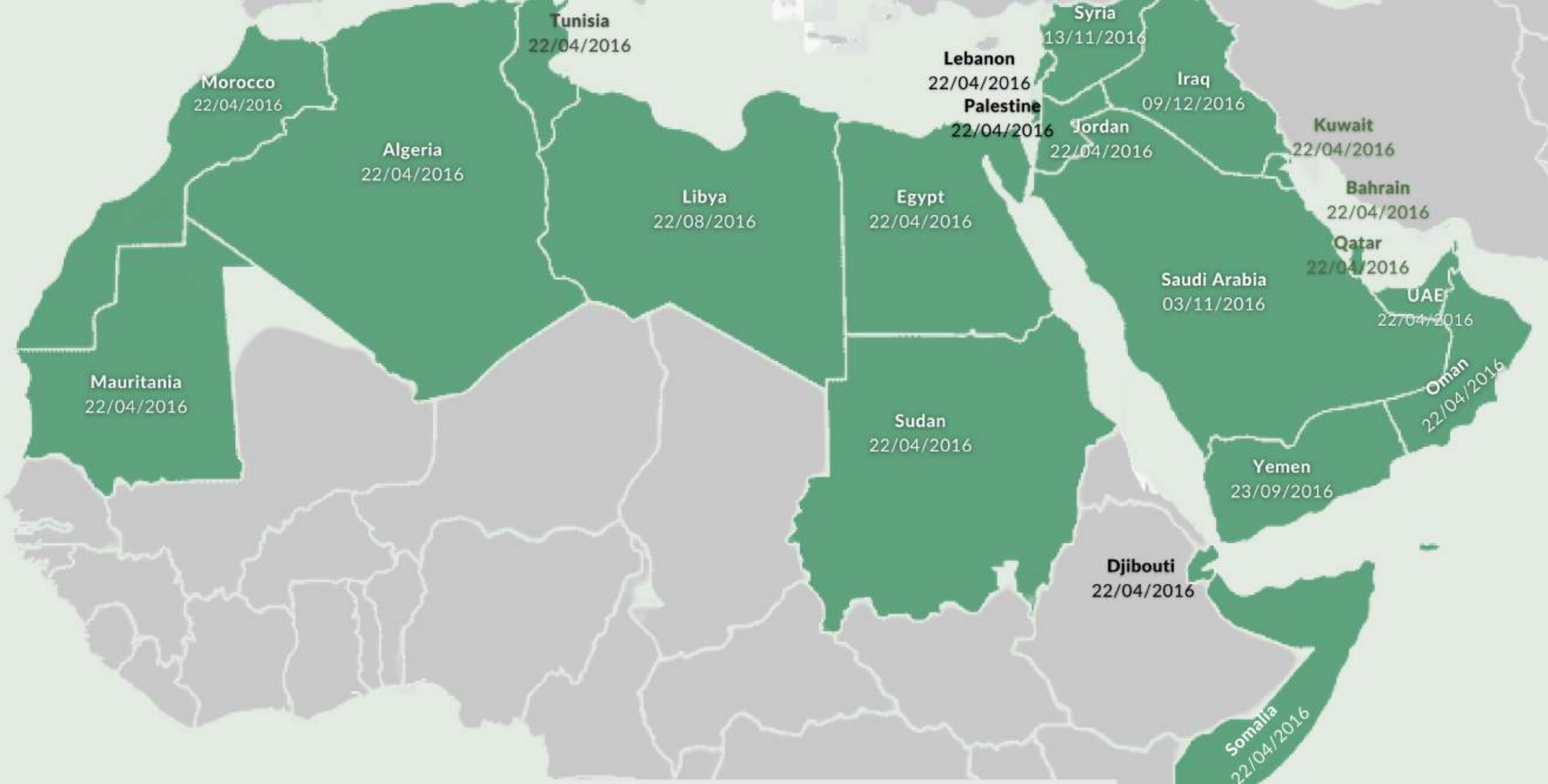

DATE OF RATIFICATION OF THE PARIS AGREEMENT

Yemen is the only Arab League country that signed the Paris Agreement on 23/09/2016 and did not ratify it. (UNFCCC, n.d.) (dates in format dd/mm/yyyy)

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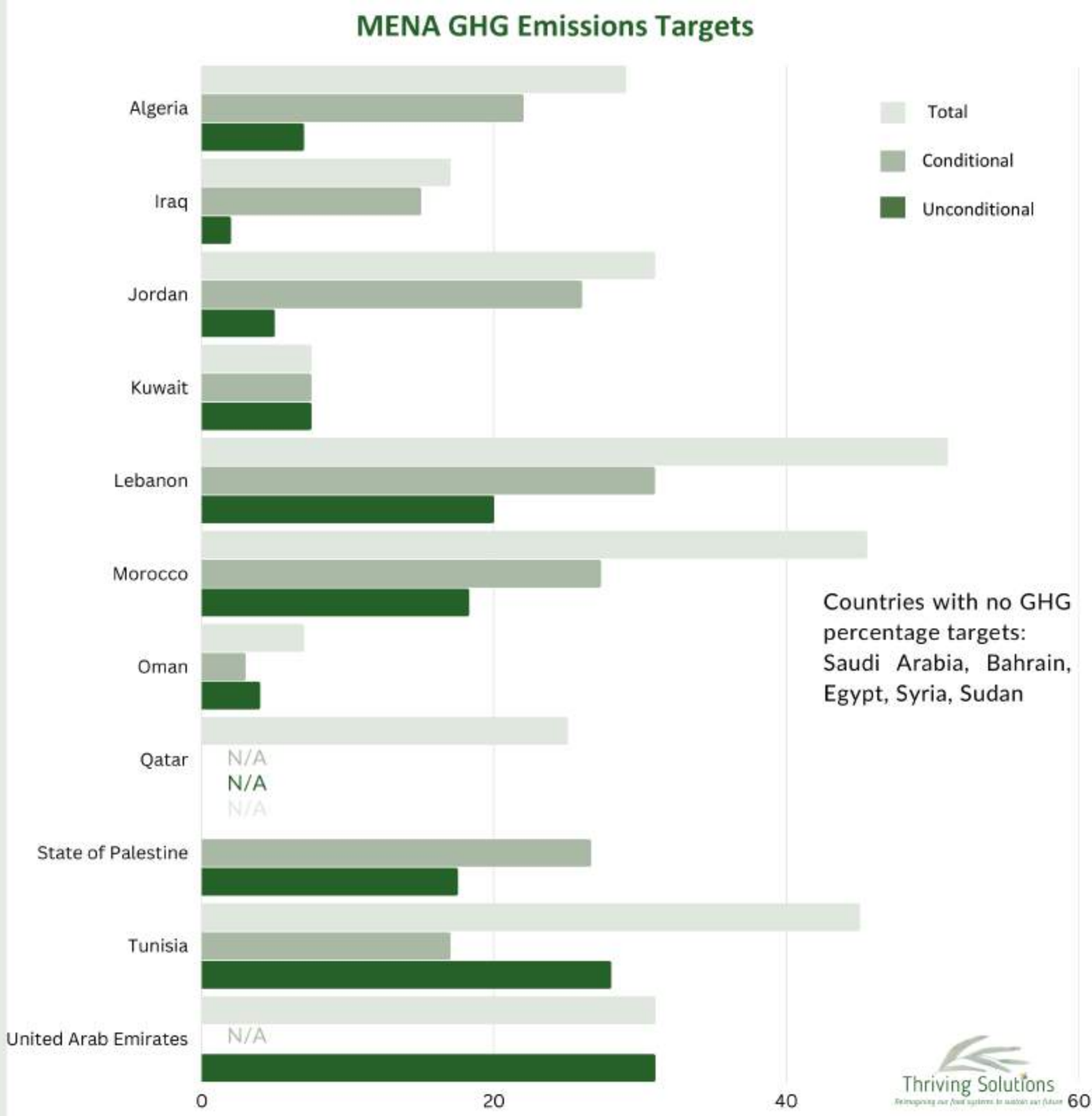
MENA GHG EMISSIONS TARGETS

Following the Paris Agreement, signatories were requested to prepare, submit and maintain NDCs which communicate the country's public commitment to implementing the Agreement and the measures they will take. With the exception of Libya and Yemen, all Arab League countries have an Active NDC submission in the NDC Registry (United Nations Climate Change, 2022).

The bar chart on the side exhibits the percentage (%) of GHG emission reduction targets (total, conditional, and unconditional) compared to Business as Usual (BAU), as reflected in the NDCs. Some NDCs didn't reflect their targets as percentage of GHG emission reduction and hence their targets are not included in the chart.



NDC KEY WORDS AND PHRASES

GHG EMISSION REDUCTION TARGETS COMPARED TO BUSINESS AS USUAL (BAU)- The greenhouse gas emissions reduction targets that countries have pledged to achieve in comparison to resuming BAU (i.e. not making any changes in their operations).

CONDITIONAL- The targets that will be reached on the condition on certain factors, mainly that the country will receive international financial and/or support.

UNCONDITIONAL- The targets that will be reached by the country, using its own resource.

ADAPTATION MEASURES- In the context of NDCs, it refers to measures taken to cope with existing and future climate change impacts.

MITIGATION MEASURES- In the context of the NDCs, it refers to measures taken by the country on how to reach its GHG emission reduction targets.

SUMMARY OF COUNTRY NDC ASSESSMENT

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ALGERIA

GHG Emission Reduction Targets Compared to BAU:

Total 29% GHG emission reductions by 2030

7% Unconditional

22% Conditional

Targets:

9% reduction in energy consumption by 2030

27% of its electricity from renewable sources by 2030

1% reduction in gas flaring

1 million vehicles converted to LPG

20,000 buses converted to LPG

Main Sectors:

Mitigation:
Energy
Transport
Cities
Industry
Waste
Forests

Adaptation:
Water
Agriculture
Cities
Land Restoration

Greenhouse Gases:

Nitrous Oxide

Carbon Dioxide

Methane

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Algeria submitted its first and only NDC in October 2016. The submission is very brief and doesn't provide much detail. The NDC clearly refers to the high dependence of the national economy on petroleum exports which makes the country vulnerable to not only the climate change risks, but also to the global mitigation efforts.

Mitigation - Algeria's energy mitigation depends on renewable energy and energy efficiency. Renewable sources mentioned are photovoltaic, wind, solar, biomass and geothermal. Energy mitigation efforts touch upon transport and urban settlements pursuing high-performance lighting, thermal insulation of buildings; and converting transportation to LPG. It also pursues energy recovery and recycling of methane from landfill sites and wastewater treatment plants; the priority being management of household solid waste.

Adaptation - Algeria NDC doesn't elaborate on its adaptation measures. It states that adaptation strategies for sectors impacted by climate change are required particularly water, agriculture, health and transport as well as the need for regulatory frameworks, institutional capacity, modeling and early warning systems.

BAHRAIN

GHG Emission Reduction Targets Compared to BAU:

Not specified

Targets:

- 6% reduction in energy consumption by 2025
- 5% peak energy capacity from renewable by 2025
- 10% by 2035

Main Sectors:

Mitigation:
Energy
Forests
Mangroves

Adaptation:
Water
Coastal Zones

Greenhouse Gases:

Not stipulated

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Bahrain submitted its first NDC in December 2016 and updated its submission in October 2021. The updated submission is brief and centered on adaptation referring to the country's low annual footprint (0.1% of global GHG footprint).

Mitigation- Climate mitigation is pursued through mitigation co-benefit from adaptation and economic diversification strategies. These include the National Energy Efficiency Action Plan aiming to reduce energy consumption; National Renewable Energy Action Plan pursuing feasible solar, wind and biogas renewable energy options; National Afforestation Plan; and the Mangrove Transplantation Project.

Adaptation- The submission is focused on adaptation based on three pillars: (1) National Adaptation Investment Plan which is under preparation; (2) enhancing coastal resilience to sea-level rise and storm events to protect national infrastructure; and (3) comprehensive integrated water resources management to improve efficiency and diversify water resources.

EGYPT

GHG Emission Reduction Targets Compared to BAU:

33% GHG emission reduction by 2030 from electricity generation transmission and distribution

65% GHG emission reduction by 2030 from oil and gas activities

7% GHG emission reduction by 2030 from transport sector

Main Sectors:

Mitigation:
Energy
Transport
Industry
Cities
Tourism
Waste

Adaptation:
Water
Agriculture
Cities
Land
Restoration

Greenhouse Gases:

Not stipulated

Targets:

10% decrease in thermal energy consumption by the iron, steel, fertilizers, and ceramic tiles industries

95% waste collection efficiency by year 2025

60% of the collected waste utilized

20% of collected waste utilized for waste-to-energy

20% increase in agricultural water-use efficiency

17% of the national marine and wildlife areas covered by protectorates

20,000 km of irrigation canals rehabilitated

Produce 4 million m3 of water desalinated daily

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Egypt submitted its first NDC in June 2017 and updated its submission in July 2022. The submission is extensive providing an overview of actions taken in line with initial submission, as well a description of mitigation and adaptation interventions till 2030. These interventions and targets are conditional on financing of USD 196 billion for mitigation and USD 50 billion for adaptation.

Mitigation- The energy mitigation strategy is built of three pillars. First, improving the efficiency of electricity generation, transmission, and distribution, combined with expanding renewable energy capacity. Second, modernizing the oil and gas sector to improve efficiency and expand alternative green fuels (i.e. algae oil and bioethanol). Third, modernizing transport through improving public transport including metro, rail, low-carbon fueled buses, and incorporating green fuel within civil aviation. Industry is another targeted sector, particularly the cement, iron, steel, fertilizers, ceramic tiles, textiles and food industries, plus the transformation of the charcoal sector.The mitigation strategy for cities is focused on promoting the adoption of low carbon standards and programs for existing and new buildings, and expanding green spaces, while for hotels on promoting energy efficiency and renewable energy sources. Integrated waste management is another pillar of Egypt's mitigation strategy that aims to improve the efficiency of collection, valorization and energy recovery.

Adaptation- Adaptation plans are also well covered in the NDC with a focus on agriculture and irrigation management to conserve water resources, utilize non-conventional water resources; and expand the biodiversity of strategic crops and livestock, among others. Coastal zone management and protection is another key adaptation pillar as is urban development and tourism.

IRAQ

GHG Emission Reduction Targets Compared to BAU:

16% - 17% Total commitment GHG emission reductions

1-2% Unconditional by 2030

15% Conditional by 2035

Targets:

Not specified

Main Sectors:

Mitigation:	**Adaptation:**
Energy	Water
Transport	Agriculture
Industry	Health
Agriculture	Forestry
Waste	Coastal Zones
Housing	Waste
	Energy
	Tourism
	Modelling
	Education

Greenhouse Gases:

Not stipulated

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Iraq submitted its first and only NDC submission in October 2021. The targets are conditional on peace and stability, economic and financial resources in the range of USD 100 billion, technical capacity and technology available.

Mitigation- Energy mitigation focuses on increasing energy efficiency, expanding renewable energy and usage of LPG for vehicles and public transportation. Emphasis is on oil, gas, electricity generation and transmission, and transportation as they cause 75% of the country's emissions. Energy efficiency within the housing sector is also highlighted as is carbon capture and storage and managing and recycling waste. Agriculture and land use mitigation measures range from rehabilitating degraded lands and forests to climate-smart agriculture and livestock production.

Adaptation - Increasing the resilience of the water sector constitutes a large portion of the country's adaptation plans based on the Water Resources and Lands Strategy till 2035. Most of the measures for the waste sector are focused on wastewater as means to increase the resilience of the water sector. Adaptation measures also target increasing the resilience of the agriculture, health, tourism, terrestrial and marine ecological systems, and protecting their biodiversity from the various climate change risks. Iraq's NDC has a section on modeling and one on education, each with specific adaptation measures.

JORDAN

GHG Emission Reduction Targets Compared to BAU:

31% Total commitment for GHG emission reductions by 2030

5% Unconditional by 2030

26% Conditional by 2030

Targets:

Energy Sector – reduce CO2 emissions by 10% by 2030

Water Sector – reduce energy consumption 15% by 2030

Energy Efficiency of all sectors to increase 9% by 2030

Increase renewable energy by 35% by 2030

Main Sectors:

Mitigation:
Energy
Transport
Industry
Agriculture
Waste

Adaptation:
Water
Agriculture (and food security)
Health
Coastal Zones
Biodiversity
Tourism
Cities

Greenhouse Gases:

Nitrous Oxide

Carbon Dioxide

Methane

Hydrofluorocarbons

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Jordan submitted its first NDC in November 2016 and updated its submission in October 2021. The updated submission is extensive and takes into account the new policies and programs that have been adopted by the country in its drive towards a lower carbon and more climate-resilient pathway.

Mitigation - The key sectors where mitigation actions are necessary are energy (e.g. shift to renewables), industry (e.g. cleaner processes), transport (e.g. improved public transport), agriculture (e.g. land restoration and smart agriculture), and waste (e.g. biogas collection and generation). There is a general theme of the use of technology within the mitigation policies. The energy sector is the highest emitter of GHGs, followed by the industrial sector, the waste sector and the agriculture, forestry and other land use sectors.

Adaptation - The country has developed several nationwide plans that will support the sustainable growth of all sectors. The vulnerable sectors identified for adaptation measures are water; agriculture including food security, health, coastal zones, biodiversity, tourism, and cities. Within these sectors, there is a general theme of resilience, disaster risk reduction, gender equality and protection of vulnerable groups such as refugees.

KUWAIT

GHG Emission Reduction Targets Compared to BAU:

7.4% Total commitment for GHG emissions avoidance by 2035

7.4% Unconditional by 2035

Targets:

Energy Sector: CO2Eq 8.34 million tonnes by 2024

Mangroves cultivation: CO2Eq 50,000 tonnes planted by 2018

Carbon Reuse: CO2Eq 327,000 tonnes by 2022

Main Sectors:

Mitigation:
Energy
Mangroves
Industry

Adaptation:
Water
Fisheries
Coastal Zones
Health

Greenhouse Gases:

Nitrous Oxide

Carbon Dioxide

Methane

Hydrofluorocarbons

Thriving Solutions

Kuwait submitted its first NDC in November 2016 and updated its submission in October 2021. The updated submission is brief and considers their latest emission inventory information. The sectors with the most GHG emissions are energy (mainly from electricity generation and water desalination) followed by industry, agriculture, forestry and other land uses, and finally waste.

Mitigation- To mitigate the GHG emissions, the NDC looks to improve energy efficiency, switch to liquified gas in energy production, and increase the use of renewable energy (amongst other actions). Decarbonization using mangroves and the reuse of carbon for industrial applications are also listed as mitigation actions.

Adaptation- Adaptation projects within the fisheries, water, coastal zones and health sectors to ensure that they will not be adversely affected by climate change.

LEBANON

GHG Emission Reduction Targets Compared to BAU:

51% Total commitment for GHG emission reductions by 2030

20% Unconditional

31% Conditional

Main Sectors:

Mitigation:
Energy
Industry
Transport
Waste
Agriculture
Forests

Adaptation:
Water
Fisheries
Coastal Zones
Biodiversity
Agriculture
Cities
Health
Forestry; Disaster Risk Reduction

Targets:

Unconditional: generate 18% of power demand from renewable energy sources

11% of heat demand from renewable energy sources

Reduce power demand by 3% through energy-efficiency measures.

Conditional: generate 30% of its power demand from renewable energy sources

16.5% of heat demand from renewable energy sources;

Reduce power demand by 10% through energy-efficiency measures.

Greenhouse Gases:

N_2O Nitrous Oxide

CO_2 Carbon Dioxide

CH_4 Methane

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Lebanon submitted its first NDC in February 2020 and updated its submission in March 2021. The updated submission is brief and communicates an increased mitigation ambition and provide clarity for adaptation. It focuses on transparency, enhanced synchronization between stakeholders and improved inclusiveness of vulnerable groups.

Mitigation – Mitigation actions focus on the energy, industrial, transport, waste, agriculture and forestry and other land use sectors. Within these sectors it aims to increase energy efficiency measures, increase power supply from renewable energy sources, increase forest protection and reforestation.

Adaptation- Lebanon is prioritizing water and food security within their adaptation principles, they are also looking to increase resilience of infrastructure, protect public health, combat land degradation and desertification while protecting lives related to climate and non-climate related disasters. The priority sectors are water, fisheries, coastal zones, biodiversity, agriculture, cities, health, forestry, disaster risk reduction.

MOROCCO

GHG Emission Reduction Targets Compared to BAU:

45.5% Total Commitment for GHG emissions reductions by 2030

18.3% Unconditional

27.2% Conditional

Greenhouse Gases:

CO_2 Carbon Dioxide

SO_2 Sulfur dioxide

CO Carbon monoxide

CH_4 Methane

HFCs Hydrofluorocarbons

N_2O Nitrous Oxide

NO_x Nitric Oxide (NO) & Nitrogen Dioxide (NO2)

COVNM Non-Methane Volatile Organic Compounds

Targets:

Not specified

Main Sectors:

Mitigation:
- Energy
- Industry
- Transport
- Waste
- Agriculture
- Forests
- Cities

Adaptation:
- Water
- Fisheries
- Coastal Zones
- Agriculture
- Cities
- Health
- Forestry
- Modelling
- Warning Systems
- Socioeconomic

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Morocco submitted its first NDC in September 2016 and updated its submission in June 2021. The updated submission is detailed in the mitigation section and includes two subsectors within the industrial sector.

Mitigation- On a National level Morocco has implemented the National Plan for the Fight Against Global Warming (2010), there was also the establishment of the National Climate Change and Biodiversity Commission. Under the National Plan, the country has set up an online measurement, reporting and verification platform dedicated to monitoring the implementation of the NDC. In the updated report, the key mitigation sectors remain the same but now include 2 subsectors within the industrial sector. These are cement and phosphate production; wherein the updated submission refers to carbon reduction from cement production, and to capturing and storing carbon for use in other processes. The energy and industrial sectors will partially shift to renewable energy and follow 61 mitigation actions. In the waste sector, the aim is to reduce, reuse and recover waste. In the agriculture sector efforts will focus on regenerating and protecting nature as well as promoting the use of renewable energy for irrigation.

Adaptation- Morocco has developed the National Strategy for Adaptation 2020-2030 that aims to conduct more climate impact studies that include socioeconomic risks. The adaptation initiatives within the sectors look to regenerate and protect natural resources, develop sustainable cities, promote adaptation plans within urban sectors to safeguard the populations health (amongst other actions).

OMAN

GHG Emission Reduction Targets Compared to BAU:

7% GHG Emission Reduction by 2030

4% Unconditional

3% Conditional

Targets:

Energy Sector: 20% of electricity from renewables by 2027

Energy Sector: 63% increase in efficiency gas-fired plants by 2027

Main Sectors:

Mitigation:
Energy (oil and gas)

Adaptation:
Water
Fisheries
Coastal Zones
Agriculture
Cities
Health
Tourism

Greenhouse Gases:

Nitrous Oxide

Methane

Carbon Dioxide

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Oman submitted its first NDC in May 2019 and updated its submission in July 2021. The updated NDC highlights the plans for a National Adaptation Plan that will develop project pipelines that help mobilize local and international funds to implement climate resilient and transition pathways. It is a brief submission and centered on one sector in mitigation.

Mitigation- The mitigation plans are limited to the energy sector, more specifically the oil and gas industry. Reduction of carbon emissions in this sector will be achieved through several interventions such as the shift to renewable energy sources and increasing energy efficiency.

Adaptation - Oman has recently developed the Climate Change Strategy and has begun to identify opportunities within the vulnerable sectors water, fisheries, coastal zones, agriculture, cities, health and tourism. However, more work is needed to develop this plan since there is limited data, information, experience and budget.

PALESTINE

GHG Emission Reduction Targets Compared to BAU:

Independence Scenario – 26.6% emissions reduction by 2040

Status-quo Scenario - 17.5% emissions reduction by 2040

Targets:

Improve Energy Efficiency in all sectors by 20% by 2035

20-33% of electricity from renewable sources by 2040

Reduce passenger vehicle emission by 24% by 2040

Overall number of vehicles to reduce by 40% by 2040

Methane emission reduction from landfills by 70% by 2040

Reuse treated wastewater 70% by 2030

Establish 50% climate-smart agriculture by 2040

Annual increase of 2% of forestland and rangeland until 2040

Main Sectors:

Mitigation:
Energy
Industry
Waste
Transport
Agriculture
Forestry and other land use

Adaptation:
Agriculture
Energy
Health
Transport
Waste
Water
Coastal Zones
Food
Industry
Ecosystem
Tourism
Cities
Infrastructure

Greenhouse Gases:

Not stipulated

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The State of Palestine submitted its first NDC in August 2017 and updated its submission in October 2021. Though the first NDC identified gaps in finance to implement the NDC action plans, the updated NDC is detailed and includes investment ready action plans for 6 of the 12 most vulnerable sectors (agriculture, energy, heath, transport, waste and water) while increasing its ambition regarding the conditional mitigation contributions. The NDC provides two GHG emission reduction targets, one in the event that the State gets its independence, and one under the status quo.

Mitigation- Given that the energy sector (including transport) is the largest source of GHG emissions in the State it is identified as the top priority sector for mitigation measures. Energy is followed by waste, agriculture, forestry and other land uses. Industry was not added to the list since there were no direct emissions reported from it. Mitigation actions in the energy sector relied on a shift to renewable energy sources. There was a reliance on smart technologies and proper management and planning when mentioning the mitigation actions for the agriculture, forestry and other land use, transport, waste and wastewater sectors.

Adaptation- The NDC highlights 12 highly vulnerable, adaptation priority sectors, these are agriculture, coastal and marine, energy, food, gender, health, industry, terrestrial ecosystems, tourism, urban and infrastructure, waste and wastewater, and water. Although gender is listed as its own sector, it is highlighted and a theme in all the other sectors listed. The conditional NDC actions, highlight the need for technological interventions such as smart systems, renewable energy infrastructure, improvement in overall infrastructure, greenhouse gas management...etc.

QATAR

GHG Emission Reduction Targets Compared to BAU:

25% Total GHG Emission Reduction by 2030

25% Unconditional by 2030

Targets:

Not specified

Greenhouse Gases:

N_2O Nitrous Oxide

CH_4 Methane

CO_2 Carbon Dioxide

Main Sectors:

Mitigation:	**Adaptation:**
Energy	Water
Industry	Agriculture
Transport	Cities
Cities	Education
Water	Biodiversity
Tourism	Forestry
Education	Coastal Zones

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Qatar submitted its first NDC in June 2017 and updated its submission in August 2021. The updated submission is brief and refers to the country's heavy reliance on oil and gas exports.

Mitigation- Some mitigation actions within the oil and gas sector aim to curb methane emissions along its gas value chain, they also look to increase energy efficiency. The water sector is heavily reliant on the energy sector as energy-intensive technologies are used to desalinate water. Awareness and education within this sector have played a role in reducing energy use and mitigating overall GHG emissions from households and SMEs. Mitigation measures within transport, cities and tourism sectors all look to renewable energy sources and the integration of sustainable principles.

Adaptation- Adaptation actions with mitigation co-benefits have been addressed by efficient water management, biodiversity restoration (to increase carbon sequestration), sustainable urban development, analysis of coastal impacts, education and awareness campaigns and above all food security within agriculture and fisheries.

SAUDI ARABIA

GHG Emission Reduction Targets Compared to BAU:

Unconditional reduction and avoidance GHG emissions by 278 million tons of CO2eq annually by 2030

Targets:

- Increase renewable energy sources by 50% by 2030
- Electricity generation 50% from natural gas by 2030
- Reduce methane emissions by 30% by 2030
- H_2 Production of 650 tonnes/day of green hydrogen by 2025
- NH_3 Production of 1.2 million tonnes/year of green ammonia by 2025

Main Sectors:

Mitigation:
Energy

Adaptation:
Water
Fisheries
Coastal Zones
Health

Greenhouse Gases:

- N_2O Nitrous Oxide
- CO_2 Carbon Dioxide
- CH_4 Methane
- HFCs Hydrofluorocarbons

Thriving Solutions

The Kingdom of Saudi Arabia submitted its first NDC in November 2016 and updated its submission in October 2021. The updated NDC is extensive and ambitious, it raises the reduction and avoidance targets of GHG emissions by more than 2-fold from the previous NDC commitment.

Mitigation- The Kingdom plans to implement economic reforms with sustainability as one of the pillars. It will mitigate emissions though initiatives in the energy sector by improving energy efficiency, increasing renewable energy projects and diversifying the energy mix (including green hydrogen) for electricity production. Projects to capture, utilize and store carbon, utilize of gas, and manage methane will also be implemented as mitigation efforts.

Adaptation- Contributions to adaptation measures have been implemented through the Circular Carbon Economy Framework and several policies, programs and initiatives such as Saudi Green Initiative, National Renewable Energy Program and Saudi Energy Efficiency program. The adaptation measures are all expected to have significant mitigation co-benefits within the water and wastewater, coastal zone protection, forestry, and urban planning sectors. Water is a main concern in the arid country, and KSA aims to increase the use of treated sewage water for irrigation, employing new technologies for irrigation and increase rainwater harvesting techniques.

SUDAN

GHG Emission Reduction Targets Compared to BAU:

Not specified

Targets:

Energy Sector- reduction of 33.2 million tCO2eq by 2030

Forestry sector- removal of 35 million tCO2 by 2030

Waste Sector – reduction of 6.4 million tCO2eq by 2030

Main Sectors:

Mitigation:	**Adaptation:**
Energy	Water
Forests	Agriculture
Health	Coastal Zones
Waste	Health
Water	Food Security
Coastal Zones	
Agriculture	

Greenhouse Gases:

Not stipulated

Thriving Solutions

Sudan submitted its first NDC in Augusts 2017, second NDC in May 2021 and updated its submission in September 2022. The NDC is brief and aims to transform the NDC from a communication document to an action plan.

Mitigation- Mitigation efforts are focused on pursuing low emissions, resilient, sustainable development in the energy, forestry and land use sectors. There is a push to shift to renewable energy sources and to use blended fuel for transport and reducing biomass energy consumption. In the transport sector, it is encouraged that the transport of goods shifts from trucks to rail. The forestry sector is included in both the mitigation and adaptation plans, it includes restoration, carbon removal, blue carbon-mangrove restoration and protection. Mitigation in the waste sector includes integrated waste management systems, composting, recycling and others.

Adaptation- The prevailing theme that is a significant threat to Sudan is food security; and the sectors that have been identified as vulnerable are water, agriculture, coastal zones and health.

Thriving Solutions

SYRIA

GHG Emission Reduction Targets Compared to BAU:

Not specified

Targets:

10% of the energy generated from renewable sources by 2030

Main Sectors:

Mitigation:
Energy
Mangroves
Industry

Adaptation:
Water
Fisheries
Coastal Zones
Health

Greenhouse Gases:

N_2O Nitrous Oxide

CO_2 Carbon Dioxide

CH_4 Methane

HFCs Hydrofluorocarbons

Thriving Solutions

Syria submitted its first and only NDC in November 2018. It is brief and points to the climate change effects the country is experiencing coupled with the local conditions related to the destruction from the conflicts. It also indicates that ability to implement their voluntary efforts is conditional upon support from developed countries.

Mitigation - Mitigation efforts concentrate on rebuilding the energy, transport, waste management and high energy-consuming industries to be more efficient, increasingly relying on more renewable energy sources, and converting waste to energy. Agriculture, land use and forestry are other targeted sectors with objectives to rehabilitate degraded lands, expand conservation agriculture, and use organic waste to generate energy. Better urban and rural planning for rebuilding human settlements is also listed.

Adaptation - Adaptation measures focus on protecting, conserving and using water resources efficiently; protecting biodiversity; combating land degradation and desertification; integrated coastal planning and management; plus developing early warning systems.

TUNISIA

GHG Emission Reduction Targets Compared to BAU:

Total commitment 45% reduction of GHG emissions by 2030

28% Unconditional

17% Conditional

Targets:

Energy Sector: emission reduction of 72% by 2030

Other Land Uses: emission reduction of 13% by 2030

Industrial Processes: emission reduction of 9% by 2030

Main Sectors:

Mitigation:
- Energy
- Industry
- Agriculture
- Forestry
- Water

Adaptation:
- Water
- Agriculture
- Biodiversity
- Health
- Coastal Zones
- Tourism
- Socioeconomic

Greenhouse Gases:

Nitrous Oxide

Carbon Dioxide

Methane

Hydrofluorocarbons

Thriving Solutions

Tunisia submitted its first NDC in February 2017 and updated its submission in October 2021. The NDC update is detailed and aligned with the country's long-term climate vision that was set out in the National Low-carbon Development Strategy. Within the energy sector, the country has implemented energy conversation programs and expanded renewable energy use.

Mitigation- The mitigation measures have included programs and frameworks from the following sectors; energy (mainly shifting to renewable energy sources), industry (mainly cleaner cement production), agriculture, forestry and other land use (mainly to intensify biomass and soil carbon absorption) and waste (mainly reduction of waste and increasing recycling).

Adaptation- In the adaptation objectives, the NDC integrates gender, land use planning and natural disaster risk reduction. Plans and measures to ensure resilience in several sectors such as food (agricultural production), tourism, water, socioeconomic, territorial, health, and ecological (natural ecosystems, coastal systems).

Thriving Solutions

UNITED ARAB EMIRATES

GHG Emission Reduction Targets Compared to BAU:

31% Total commitment to reduce GHG emissions by 2030

31% Unconditional commitment

100% NET ZERO by 2050

Targets:

- 54% reduction of electricity generated emissions by 2030
- 14% reduction of transport emissions by 2030
- 19% reduction of industry emissions from energy demand by 2030
- 26% reduction of waste emissions by 2030
- 35 times increase in carbon capture, utilization and storage activities
- 100 million mangrove seedlings planted by 2030
- 50% reduction in food waste by 2030

Main Sectors:

Mitigation:

Energy
Industry (including carbon capture and storage)
Transport
Waste
Agriculture
Forests
Mangroves
Cities
Water Tourism

Adaptation:

Water
Biodiversity
Agriculture
Health
Waste
Transport
Coastal Zones
Early Warning Systems
Socioeconomic
Fisheries
Forestry
Cities
Energy

Greenhouse Gases:

- N_2O Nitrous Oxide
- CO_2 Carbon Dioxide
- CH_4 Methane
- PFCs Per-fluorocarbons

Thriving Solutions

United Arab Emirates submitted its first NDC in September 2016, followed by a submission in December 2020, and an update in September 2022. The latest NDC is comprehensive and ambitious raising the country's emission reduction target to 31% with the aim to achieve net-zero by 2050. The ambitious targets are supported by several strategies such as the National Energy Strategy, the UAE Green Agenda 2015-2030, and the UAE Net Zero by 2050 Strategy.

Mitigation- The Net Zero Strategy focuses on power, water, industry including oil and gas, transport, buildings, waste, agriculture, forestry and land use. It models the current emissions of each sector and plans to involve various national stakeholders to analyze the pathways and technologies needed to reach net zero emissions. Subsequently, a clear roadmap will be developed and agreed on. Electricity generation, followed by industry and transport are expected to lead the way in decarbonizing the power sector.

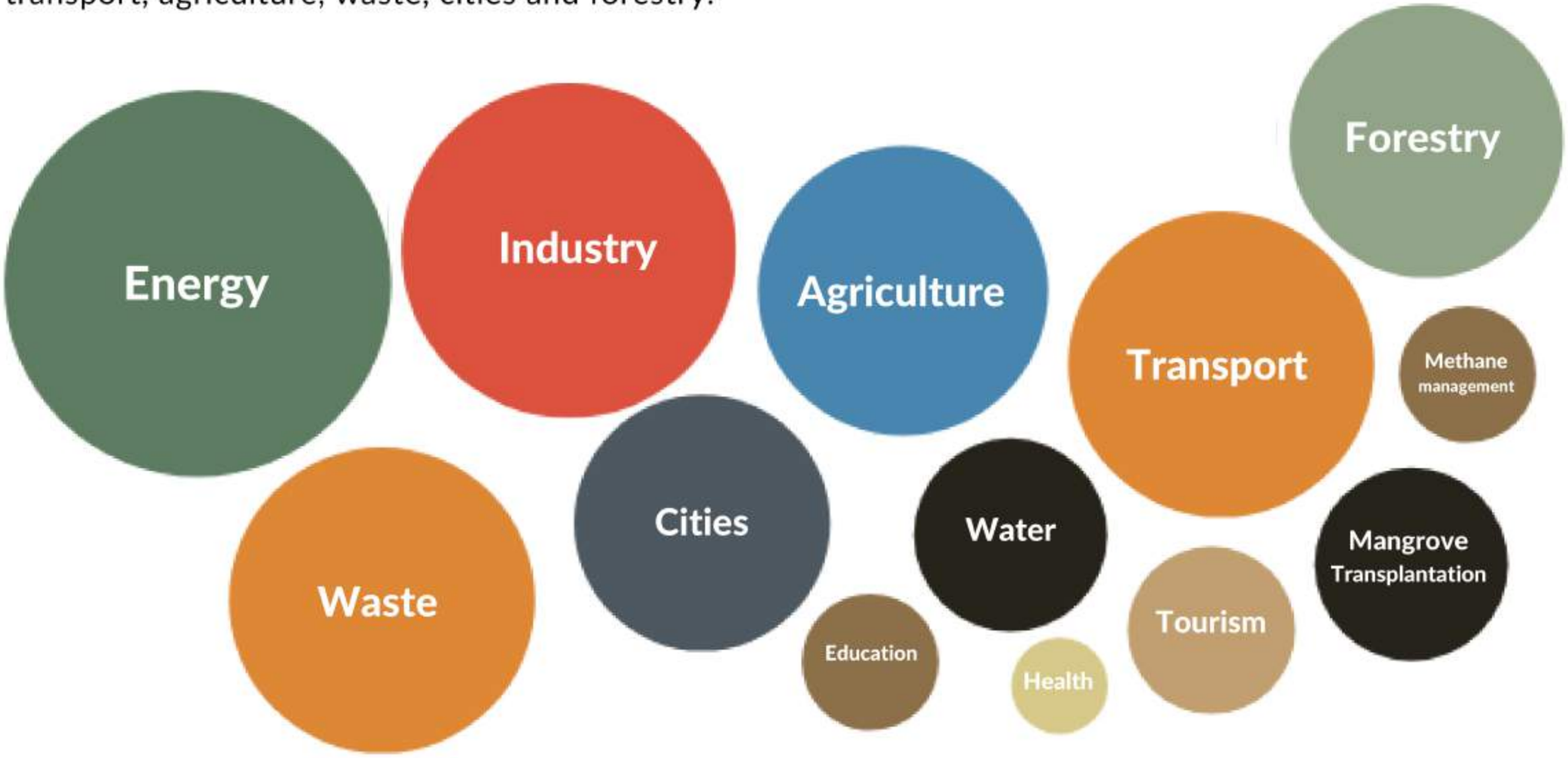
Adaptation- adaptation measures are led by the National Climate Change Adaptation Program with priority sectors being energy, infrastructure, health and the environment. The program aims to increase climate resilience by minimizing risks, especially among vulnerable groups, and these plans have also been reflected in the national Disaster Risk Reduction Framework. Additionally, the NDC identified several adaptation measures with mitigation co-benefits. especially the conservation of the existing Blue Carbon Ecosystem, i.e. coastal areas with mangroves, salt marshes and seagrass beds. Similarly, objectives of the Food Security and Agriculture Sector such as adopting sustainable and controlled environment agricultural systems, reducing food waste, diversifying sources of food imports, promoting climate smart agriculture all contribute to climate mitigation.

CONCLUSIONS

Thriving Solutions

MITIGATION

Main targeted sectors for climate mitigation measures by most MENA countries are energy, industry, transport, agriculture, waste, cities and forestry.



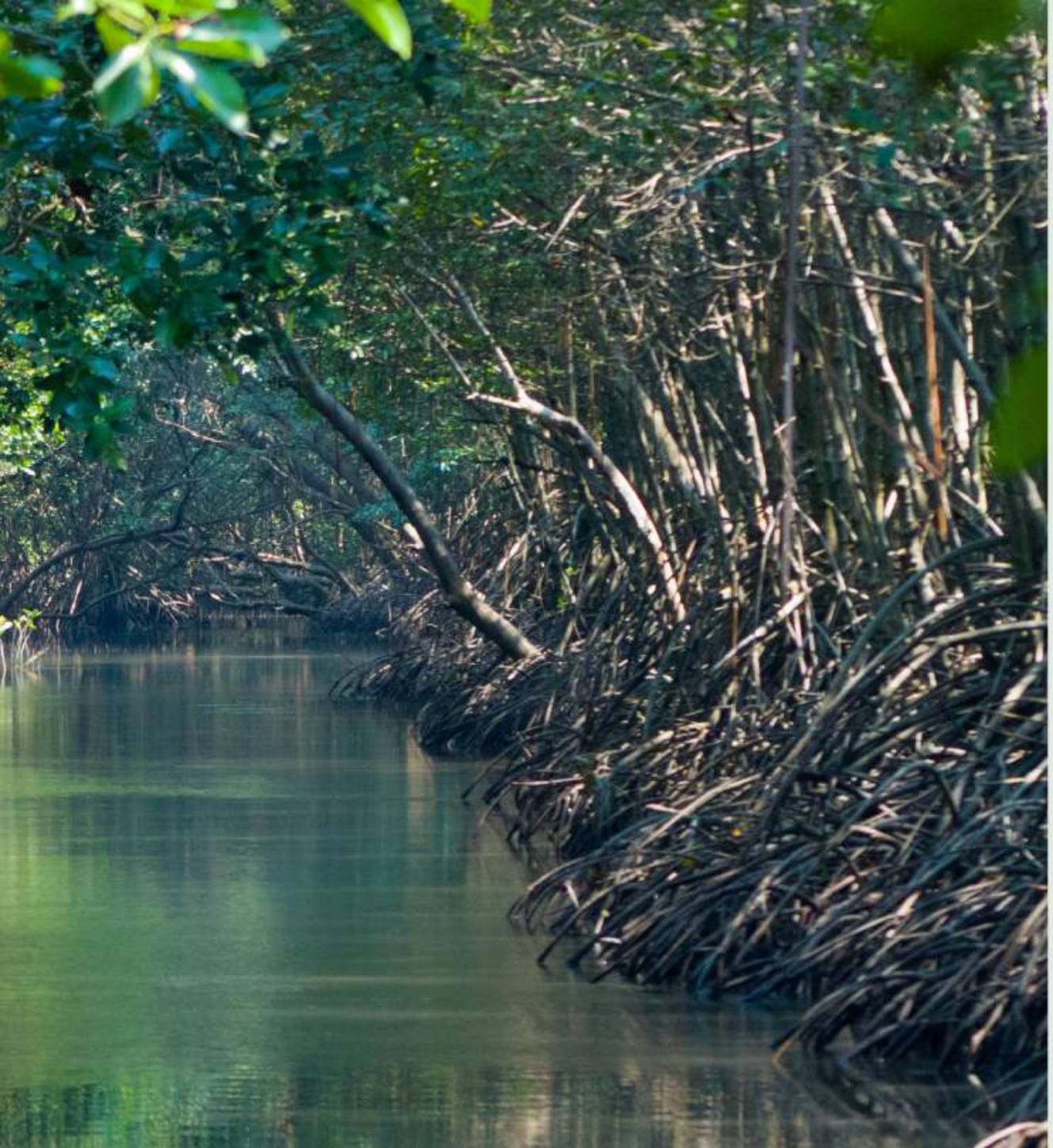
Thriving Solutions

All reviewed NDCs had a strong focus on mitigation measures within the energy sector, as most of the emissions within each of the countries originate from this sector. A shift to renewable energy sources was a consistent theme in all of the NDCs, even for the fossil fuel rich nations. Other common measures to pursue for all countries are the shift to natural gas, making energy production more efficient, as well as reducing energy consumption and increasing energy efficiency in all sectors.

Within waste management, focus is on waste-to-energy initiatives through combustion and landfill gas recovery. This was viewed as a strategy to reduce waste transferred to landfills and simultaneously provide an alternative form of energy.

The strong link between energy and water came through in the NDCs. Given the energy intensive desalination process which is a main source for needed domestic and industrial water in the region, it is no surprise that NDCs included plans to increase energy efficiency in the water sector together with expanding the use of renewable energy and reuse of treated effluent.

Within the transport sector which in several NDCs was incorporated within the energy sector measures, the focus in most countries was to increase the number of electric and hybrid cars. Several NDCs also mentioned a shift towards LPG as a fuel source, improving public transport and reducing the number of individual vehicles.



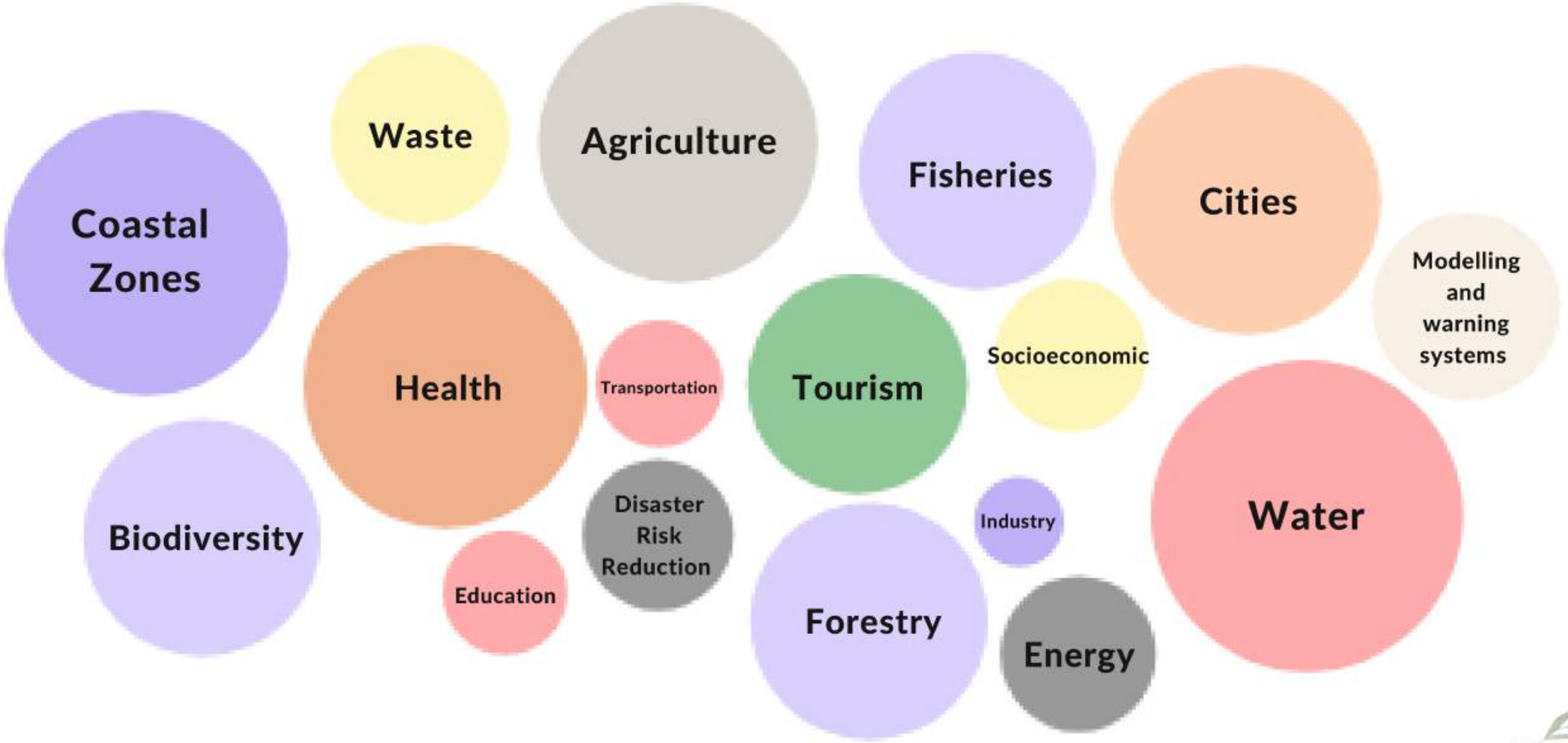
Mitigation measure within the cities sector included improvements on infrastructure construction and management as well as more efficient buildings. There is also a link between cities and transport, specifically public transport, with measures aimed at improving and expanding public transport networks.

The forestry and other land uses sector looked at nature-based solutions for carbon sinks. This is highlighted with plans for improving or introducing sustainable forest management practices, rehabilitating and reforestation to combat ecosystem loss and desertification. Conserving and replanting mangroves were also included in the plans of several countries not only for their role as carbon sinks but also for conserving coastal lines, coastal ecosystems and water health.

The agriculture sector was another mitigation recurring theme with countries indicating their pursuit of more sustainable agricultural practices given the limited arable land and water in the region. The need for more technology inspired practices has also come into the light, given the disruption in logistics during the pandemic and other conflict related reasons.

ADAPTATION SECTORS

Main targeted sectors for climate adaptation measures by most MENA countries are water, agriculture, coastal zones, health, cities, fisheries, forestry and biodiversity.

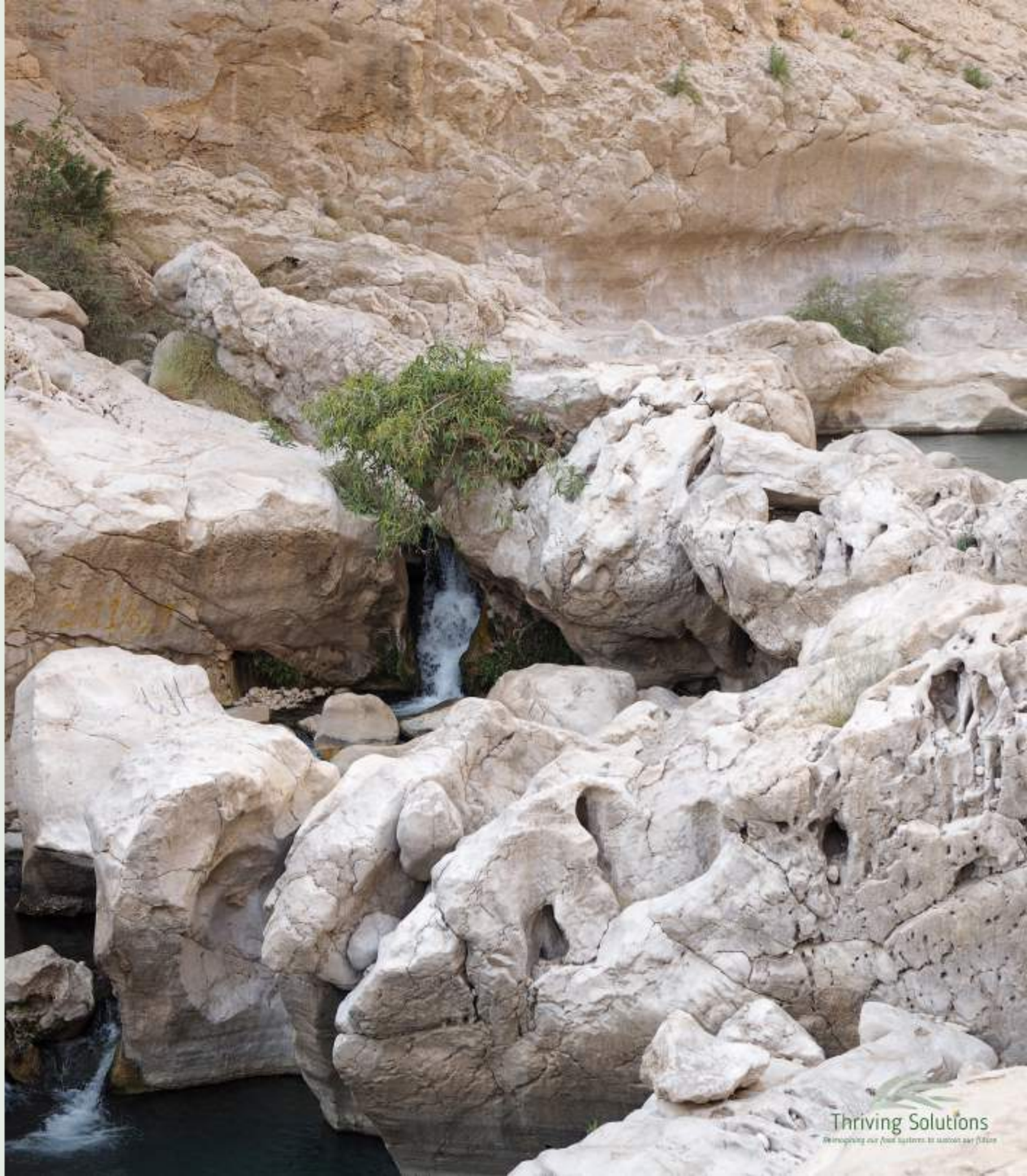


Thriving Solutions

On the adaptation side, it isn't surprising that all the NDCs heavily focused on the water sector. For the MENA region, the water scarcity predicament is and will be further exasperated by climate change, and many countries reported that the effects on their water resources have started manifesting.

For countries that rely on desalination, this reliance will continue but using more efficient technologies and/or renewable energy sources. These countries as well as the others, have developed national plans and roadmaps to address water scarcity by improving infrastructure, employing water efficiency, education and awareness. The use of tertiary treated wastewater as an alternative water source specifically for agriculture and land-use purposes was also highlighted. Furthermore, countries have also addressed the need for proper sustainable management of resources giving underground sources enough time to renew themselves.

Finally, there is a strong link between water and agriculture and food security. Efficient water use in agriculture can ensure that countries become more self-reliant on food production instead of importing the majority of its food. This link was highlighted and mentioned in almost all the NDCs that were reviewed. Countries have taken a step further and have developed early warning systems for floods, droughts, heatwaves and storms.



The urbanization rate in the region is above global average and rising. Correspondingly, many of the reviewed NDCs mentioned the need for measures to enable their cities to adapt to climate change risks to ensure the safety, health and socioeconomic equity of its inhabitants. Adaptation measures pursues include increasing stakeholder engagment, awareness campaigns, development of climate change responsible government entities.

Furthermore, many of the NDCs highlighted the need to rehabilitate and protect coastal areas in ways that ensure protecting its people and enabling them to maintain their livelihood. This is deemed imperative given the great economic and environmental value of coastal areas.

Several NDCs refer to adopting of plans and roadmaps for more sustainable management practices. Generally these plans include gender, education, and awareness components.

Lastly, many NDCs recognized the interdependence of mitigation and adaptation and that pursued measures for one can create co-benefits for the other. Hence, some NDCs presented their targets for one of those, based on the co-benefits derived from the measures of the other. This explains why some actions are common to both categories.

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