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Editorial Team

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Foreword

The National Institute for Governance and Sustainable Development (NIGSD) is a public economic organization specialized in the fields of research, training, and consultation in a variety of topics with a special focus on Governance, Competitiveness and Sustainable Development. Governmental, private, and non-profit organizations benefit from its services. The Institute has several objectives in accordance with the standards of good governance, which include promoting scientific research and statistical activities and surveys to enhance national knowledge in governance, competitiveness and Sustainable development and improving its quality.

The NIGSD is keen to develop awareness and capabilities of human cadres in the areas of governance, sustainable development, and institutional excellence in cooperation with internal and external partners and research organizations, aspiring to become a leading local, regional, and international center, and a meeting place for specialized scientific cadres, decision makers, entrepreneurs, civil society leaders and citizens and offering support to the Egyptian authorities in line with their development vision by providing innovative and effective governance-related solutions regarding transparency and integrity, efficiency and effectiveness, the rule of law, accountability and the fight against corruption.

Hence, the NIGSD issued the Governance and Sustainable Development Review (GSDR) which is a semi-annual scientific journal specialized in governance and sustainable development issues. With the aim of being a hub for scholars, specialists, and practitioners, GSDR offers a platform for discussing and engaging in recent debates on governance and sustainable development related topics. Thus, it supports Egypt's decision-makers, private sector, and NGOs by providing evidence-based recommendations, which could contribute to the actualization of Egypt's Vision 2030 in line with The Global Goals and the 2030 Agenda for Sustainable Development and improving Egypt's ranking in governance and sustainable development indices, regionally and internationally.

The GSDR's editorial board decided to devote this second issue to discuss the topics related to climate change under the theme: "Environmental Governance and Climate Change: Post-COP27: Key Takeaways and Next Steps". This comes in light of Egypt's hosting the UN Climate Change Conference (COP27) in Sharm El-Sheikh in November 2022, under the auspices of H.E President Abdel Fattah El-Sisi, on behalf of Africa, which featured innovative solutions that will help to face the problems of climate change. In addition, the choice of this theme is attributed to believing that climate change is a "global commons problem" as it threatens the effective enjoyment of human rights including those to water, sanitation and food, for which a global response is required, and to cope with current efforts in mobilizing climate action and to promote the concept of "Environmental Governance" for better allocation, management and use of natural resources having no one left behind. Thus, it was important to highlight and tackle the different important topics related to climate change. This is done through two main sections. The first section includes a collection of research or articles written by national and international specialists on the following topics: Adaptation and Mitigation, Climate Finance, Managing Natural Resources and Climate Change, Climate Justice and Decarbonization of Energy and Industrial Sectors. The second section presents an overview of the most recent conferences, events, and reports tackling climate change and sustainability, with the aim of following up, evaluating, and raising awareness for all stakeholders about the developments in these areas.

Dr. Sherifa Sherif
Executive Director of the NIGSD and Editor-in-Chief

An Interview with

H.E. Dr. Yasmine Fouad

Minister of Environment of the Arab Republic of Egypt

1. What were the expectations during and after the Sharm el-Sheikh Climate Change Conference of the Parties (COP 27)? And to what extent could Egypt and the international community manage to mobilize actions aiming at fulfilling commitments under international conventions on climate change?

Despite our recognition of the international difficulties that cast a shadow on COP27's success opportunities, the political leadership's determination backed by the government and all civil servants has been credited for the success of the Conference. Hence, ‹‹Together for Implementation›› was the motto raised by Egypt as the goal of COP27; which aims at achieving the Conference's bigger dream of protecting Planet Earth from climate change adverse implications.

The Conference has a long list of achievements, atop of which is Egypt's ability to organize an international event of such magnitude; which attests to the collaboration and organization among all state ministries and stakeholders. It also reflects how far Egypt is capable of addressing climate change at both international and national levels, as well as Egypt's seriousness in fulfilling its national and international commitments.

In terms of negotiations, the Egyptian Presidency of the Conference, comprising the ministries of Foreign Affairs and Environment, managed to unprecedently include «loss and damage» item on the COP agenda; a request that has been rejected for many years by developed countries. Besides, negotiations on article (6) concerning carbon market have been concluded, a consensus has been concluded to regarding the mitigation action program and an agreement has been reached regarding adaptation and finance file for the purpose of setting them for further progress in the United Arab Emirates.

Egypt's leading role and its national and international efforts addressing environmental challenges and climate change are attested to by Egypt's success in mobilizing global efforts to address a challenge that threatens the entire planet, its success in voicing the demands of African developing countries afflicted by climate change implications, and its success in advancing and accelerating climate action agenda.

Undoubtedly, one of the most important achievements of Egypt and COP27 is placing African interests and priorities on the climate action agenda, thereby supporting Egyptian-African strategic relations that constitute a fundamental pillar of Egyptian foreign policy.

2. What was the course of Egypt's efforts on climate change issues over the past period?

At an early stage in the 1990s, Egypt realized climate change risks. Albeit the political leadership's recognition of the growing climate change threats resulted in placing this issue among the priorities of the Government's agenda and led to addressing this issue with a clear vision and effective efforts. This aims at transforming climate change challenges into sustainable development opportunities within the framework of the 2030 Strategy; which is to be achieved through a national plan inclusive of all development sectors within the country.

In this context, Egypt has been keen to link its national efforts with its international commitments since its ratification of «The United Nations Framework Convention on Climate Change (UNFCCC)›› in 1994, Kyoto Protocol in 1997 and Paris Agreement in 2017. These collectively aim at responding to climate change threats globally in conjunction with sustainable development through holding the global average temperature increase to well below 2°C above pre-industrial levels, strengthening resilience to climate change in a manner that does not threaten food security, and facilitating finance flows for developing countries.

3. How did COP27 address the stances of both developing and developed countries concerning the inclusiveness of climate-related solutions and policies?

A just and inclusive solution shall be anchored in the principle of 'common responsibility but differentiated burdens' among developed and developing countries. It shall also be based on establishing the developing countries' right to achieve sustainable development and fight poverty. Besides, developed countries shall bear their historical responsibility for emissions and support developing countries to address climate change. However, these propositions remain theoretical unless financial and technological resilience is achieved and the ability to address losses and damage afflicted on developing countries is well established. Hence, the importance of the COP Egyptian presidency's success in establishing the Loss and Damage Fund manifests, since the Fund represents a first step towards inclusive and just climate policies.

4. What were the outcomes of COP27 concerning greenhouse gas (GHG) emissions, and what are the sectors of international cooperation included? And what was the status of Egypt's national efforts in this regard?

The Egyptian Presidency of the Conference was geared towards raising the level of mitigation efforts ambition in COP27 decisions as a means to response to the threats posed by climate change. It was also keen on ensuring increased for adaptation efforts and stressing the need to accelerate the development of a global adaptation goal. This is in addition to ensuring a just energy transition and raising the global financing target to assist developing and least developed countries to finance emission reduction activities and implement their NDCs, and launching a package of participatory activities, especially in power, transport, hydrogen and agriculture sectors.

The credibility of COP 27 Egyptian Presidency's stances has been anchored in Egypt's leading national efforts, atop of which are the comprehensive program launched by the state to reform energy policy and the implementation of comprehensive reforms in electricity and oil and gas sectors. These are reflected in Egypt's Integrated Sustainable Energy Strategy 2035 and include promotion of investment in renewable energy, the establishment of wind power plants, e.g., wind farms in Zafarana and Gabal Al-Zeit in Suez, the establishment of the Benban Solar Park in Aswan as the biggest solar park in the Middle East and Africa. This is in addition to energy efficiency measures and the expansion of new and renewable energy use in productive sectors and daily activities of Egyptian citizens.

It was also necessary for Egypt to emphasize the credibility of its international obligation through a set of specific actions, most importantly the launch of the Updated Nationally Determined Contributions (NDCs) Report in 2022, the issuance of the first sovereign green bonds in the Middle East and North Africa (MENA) region in September 2020. These bonds worth $750 million and are listed on the London Stock Exchange to attract foreign investors in the areas of renewable energy, clean transport, sustainable water and wastewater management, and pollution reduction. This is in addition to launching the National Climate Change Strategy (NCCS) 2050, which provides a road map within the framework of Egypt's vision 2030.

5. What is the background for the preparation of this National Strategy? what are its objectives, and what is its role as a key driver that steers climate action efforts and national goals in all areas of development?

It is the first comprehensive National Climate Change Strategy until 2050. NCCS is deemed a roadmap to achieve Egypt's Vision 2030, with Egyptian citizen's welfare at its center, and to keep pace with global endeavors addressing climate change. This is in addition to achieving sustainable development, conserving natural resources and ecosystems, and leveraging the vital role of NGOs in advancing the achievement of NCCS objectives through raising awareness and fostering volunteerism values in climate action.

6. How does climate finance represent a key challenge to the fulfillment of sustainable development and climate action ambitions? What is the role of the private sector and investment in this regard?

Climate finance is a crucial underpinning to translate pledges into the actual implementation thereof. This challenge manifested in developed countries' nonfulfillment of their commitment to provide $100 billion annually for developing countries as of 2020. Maximizing adaptation finance is yet another challenge that needs to be addressed over the coming period. Other challenges revolve around the completion of funding the Losses and Damage Fund, as well as developed countries' compliance with their obligations under Climate COPs decisions.

Access to climate finance and fulfillment of eligibility requirements set by financing institutions is yet another challenge. Hence there is a need for strengthening developing countries' accessibility to finance through creating enabling environments that attract climate finance, preparing fundable project proposals, and greening developing countries' financial systems to attract private sector investment. This is to be done while considering that World Bank's data released in October 2019 revealed that the world would need around $90 trillion work investments in infrastructure by 2030.

It is noteworthy that, despite these challenges, COP27 managed to achieve remarkable gains, atop of which:

- Mobilizing $150 million to activate Africa Adaptation Initiative;
- $15 Million grant from the United States of America to support new and renewable energy;
- Mobilizing $10 million for the water-food-energy nexus (NWFE) projects, with the purpose of implementing the climate NDC Plans.

The Government of Egypt realized that climate financing challenges require a proportionate distribution of financing efforts between the government and the private sector in a way that is commensurate with their respective capacities and requirements; as follows:

1) State's Responsibility:

- Attracting international climate financing institutions, building national institutions' capacities, and enhance the efficiency of the Egyptian banking sector and its active participation in financing private sector climate projects;
- Representation of the Central Bank of Egypt in the National Council for Climate Change;
- Drafting proposed amendments to the laws on the Financial Regulatory Authority, the Capital Markets Authority, and the Egyptian Exchange in order to activate the Voluntary Carbon Market as a means to stimulate the private sector's participation in climate action.

2) Private Sector's role:

- The need for financial eligibility in compliance with the creditworthiness requirements of banks and international financial institutions;
- Alignment of intended private projects with the State's strategy targeting low-carbon sustainable development;
- Active participation in shouldering social responsibility and community service to help them adapt to the expected implications of climate change.

7. What is the role played by youth and civil society in addressing the consequences of climate change? And how does Egypt enhance their respective participation and provide channels for communication with them?

The government of Egypt believes in the vital role of youth play as change makers in climate action. Hence, in COP27, Egypt announced its first-ever Climate Youth Envoy, with a view to youth engagement in stakeholder's dialogue and the generation of new ideas and solutions regarding climate action strategies, policies, and programs. This is in addition to organizing the Seventeenth Conference of Youth of UNFCCC (COY17) that provided a great opportunity for youth to come up with recommendations that would advance their engagement in climate action policies and programs undertaken by both the government and the civil society;

COP27 Egyptian Presidency was also keen to emphasize the importance of women's equal participation in collective climate action and ensuring respect for gender, as well as the efficiency and equity of the means of climate action implementation;

Egypt's recognition of the role of civil society was crystal-clear at the conference, where a specific space was allocated for Egyptian and international civil society organizations (CSOs) and women and youth representatives within the Green Zone, which was established under the name of «Voice of Humanity». This aimed at providing a space for them to engage in open debates that included criticizm to the government; which has not been met with any restrictive measures. The surprising aspect was that the Green Zone was spatially connected to the Blue Zone which hosted, for the first time in the history of COPs, a pavilion dedicated to civil society. This intended to allow civil society to voice their views and suggestions so that they would officially be heard and engaged in decision making. This is in addition to allocating a specific space for demonstrations that were not restricted by anyone. These constituted a public message from the Conference to the world that Egypt is serious about respecting human rights, respect for the other, as well as about protecting its national interests.

8. Egypt has organized and hosted COP27 on behalf of Africa, to what extent did the Conference manage to defend Africa's interests?

Organizing the conference on behalf of Africa was both an honor and a responsibility. Hence, the interests of Africa were at the center of Egypt's efforts throughout the preparations for and during the Conference. One the most important outcomes of these efforts was the launch of three African initiatives including Africa Just Energy Transition Initiative (AJAETI), African Women Initiative, and African Adaptation Initiative (AAI). This is in addition to the Global Waste Initiative 50 by 2050 which is the first initiative in this area and is jointly implemented by the ministry of Environment, United Nations Environment Program (UNEP) and ten African countries. Details of the aforementioned initiative are available on the website of the Ministry of Environment;

Egypt's offer to host COP27 on behalf of Africa was a reflection of a new strategic move in Egypt's relationship with the African continent; which started since President Abdel Fattah El-Sisi assumed the chairmanship of the African Union in 2019. It marks a beginning of a new Egyptian concept of the relations with Africa based on common interests and mutual gains.

It is anchored in leveraging Egypt's economic, industrial and human expertise for supporting the sustainable development of the African continent so that it would catch up with rapid global developments in economic and environmental development and green and digital transformation.

It also intends to enable Africa to assume a global position that lives up to the dignity and capabilities of Africans.

9. How did COP27 comprehensively address challenges driven by climate change implications?

COP27 launched the Sharm el-Sheikh Implementation Plan (SSIP) which aims balancing climate change response goals, atop of which adaptation and mitigation. The Ministry of Environment is working to implement SSIP recommendations in cooperation with different entities, organizations and states, particularly African states. SSIP's most important recommendations include:

- The need for continued further efforts to limit the global temperature rise well at 1.5 °C, while implementing ambitious, just, and comprehensive transitions to low-emission climate resilient development pursuant to the principles and objectives of relevant agreement;
- The importance of immediate, profound and sustainable action for the reduction of global greenhouse gas (GHG) emissions in all applicable sectors; which is to be undertaken through increasing low-emission activities, expanding uses of renewable energy, and building partnerships for just energy transition;
- Promoting the use of clean energy mix as part of energy mix and system diversification, in accordance with national circumstances and in support of just transitions;
- Accelerating the development of policies on and technologies for the transition to low-emission energy systems; which includes accelerated phase-out of coal and gradual elimination of ineffective fossil fuel subsidies. This is coupled with providing support to the poorest and most vulnerable categories;
- Protecting, conserving, and restoring ecosystems and biodiversity;
- Addressing gaps in the Global Climate Observing System (GCOS), as well as supporting and implementing Early Warnings for All initiative;
- The need for organizing a meaningful and effective social dialogue involving all stakeholders to reach sustainable and just solutions to the climate crisis; which need to be anchored in national development priorities, especially social protection targeting the mitigation of the impacts associated with the transition;
- Calling upon multilateral development banks (MDBs) and international financial institutions (IFIs) to reform their banking practices and priorities, ensure easy access to climate finance, develop a new vision and a proper operational model to address global climate emergencies.
- Increasing women's full and equal participation in climate action and the importance of youth engagement in the development and implementation of climate policy and action, as well as considering the inclusion of youth representatives in the national delegations of their respective countries.

10. How did the developed countries express their commitment to provide compensations for damage resulting from climate change?

Developed countries were part of the agreement on relevant decisions made by COP27, most important of which:

Developing new funding arrangements to assist developing countries vulnerable to the adverse implications of climate change, addressing losses and damage through providing and assisting the mobilization of new and additional resources. This is in addition to sources, funds, processes, and initiatives under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement;

Establishing a Loss and Damage Response and a transitional committee for the operationalization thereof. The said committee comprises 10 members from developed countries and 14 from developing countries;

The Fund shall propose institutional arrangements, mechanisms, structure, governance, and terms of reference. It shall also identify the elements of new funding arrangements, expand funding sources, and ensure coordination and integration among existing funding sources;

The Transitional Committee shall be informed of the current situation of the institutions that finance actions relevant to losses and damage, as well as potential gaps and most effective ways to address these gaps, potential funding sources, including innovative ones.

A STRATEGIC VIEW OF EGYPT'S CLIMATE RESPONSE POLICIES - IN LIGHT OF COP27 OUTCOMES

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Introduction

International reports, particularly those of the Intergovernmental Panel on Climate Change (IPCC), indicate that human activities are directly responsible for climate change risks threatening the world with the warming of the atmosphere, oceans, Earth, cryosphere and biosphere.

The rise of global recognition concerning the urgency of addressing climate change due to its negative repercussions on the planet and sustainable development efforts led to actions towards environmental protection to build a sustainable world on both national and international levels. This journey has begun with Egypt's active contributions since Rio's Earth Summit held in 1992, all the way to their hosting of the UN Climate Change Conference: UNFCCC COP27 held in Sharm El Sheikh in November 2022.

At the national level, Egypt's public policymakers have early realized the importance of addressing the risks of climate change through climate response policies, covering both axes of mitigation and adaptation at multiple levels. Egypt's "Sustainable Development Strategy (SDS): Vision 2030" highlighted the challenges of climate change as one of the major challenges to Egypt's sustainable development. Additionally, Egypt has recently launched Egypt's National Climate Change Strategy 2050 to provide additional impetus to Egypt's climate response policies.

This paper discusses Egypt's climate response policies and the associated operational mechanisms as well as Egypt's ability to deal with climate change risks at the strategic, medium- and short-term levels. Given Egypt's international and regional commitments, the paper uses the global and national best practices to recommend alternatives and options to enhance the impact of these policies in promoting sustainable development. As such, the paper is divided into sections. The first section is dedicated to analyzing the climate response policies and interventions in Egypt. The second section highlights the national and international experiences on climate change policies. Lastly, the third section provides strategic and practical alternatives to operationalize Egypt's climate response policies.

1. Climate Response Policies and Interventions in Egypt

Egypt's climate response policies and interventions can be found in development documents, such as the Sustainable Development Strategy: Egypt Vision 2030, development plans, thematic documents directly related to climate change and environmental issues in general. This is in addition to various enabling actions and tools within the national context of climate action.

1.1 Key Development Documents

In Egypt, as in the rest of the world, Climate Change Response policies address two main areas (Ministry of Environment, 2022):

- **Mitigation**, which refers to reducing GHG emissions from the activities of different sectors through multiple alternatives, such as the use of clean technology, fuel substitution, and renewable energies (e.g. wind, solar, hydro, bio).
- **Adaptation**, which refers to responding to climate change implications, through interventions that enhance positive co-existence with their effects. These include, the development of salinity and high-temperature tolerant plant varieties, optimization of water resources use through the implementation of consumption rationalization and water allocation/quota policies, etc....

Within this context, key development documents provide an overview of Egypt's national concerns regarding Climate Response Policies. Table 1, highlights documents and their key policy objectives. Additionally, several observations have been summarized below:

- **Common themes in key climate response policies:** Greater attention is focused on potential risks to coastal areas, air pollution issues, and water resource development, with an ambitious, goal of reducing emission and ozone depleting substances (ODSs) by 100% by 2030.
- **Absence of a framework/template for climate response policies and projects:** As shown in the table, climate change-related issues in development documents vary. Moreover, there is a lack of clear priorities and operational programs emanating from the relevant directions of the Sustainable Development Strategy: Egypt's Vision 2030. These priorities and programs include addressing mitigation and adaptation issues in Egypt, the role of funding, and the engagement of the community (especially the private sector and civil society).
- **Non-traditional climate issues in the National Strategy for Science, Technology and Innovation (NSSTI):** The Government's Program of Action, «Egypt takes-off» has a special program linking scientific research with environmental improvement projects, which focuses on renewable energy and desalination to a large extent. Nevertheless, NSSTI offers non-traditional entry points to support national climate response policies. Apart from pollution, emissions, and resource-related issues, NSSTI focuses on strengthening national capacities of prediction, forecasting, preemption and early warning of climate threats. Moreover, it focuses on developing optimum technologies that are suited to address such threats. Their interests and actions are supplemented with qualitative studies on climate risks and the environmental economy, and helping industrial facilities adapt to the environment.

Table 1: Climate Response Policies' Directions and Objectives in Development Documents

Development Documents	Directions – Policies – Objectives
Sustainable Development Strategy: Egypt's Vision 2030	• 5% reduction in emissions in 2020 – 100% in 2030 • Mainstreaming the environmental dimension as a main axis in socio-economic development sectors. • Objectives and programs: Development of policies on pollution reduction, climate change, climate change-resilient infrastructure, especially in coastal areas; sustainable green building, climate database, ecosystem balance, good governance of natural resources, promotion of renewable energy and the development of energy mix, and sustainable agriculture.
Medium-Term Plan for Sustainable Development 2022/21-2019/18, and its first year	• Key Directions: Good governance of natural resources to support economy and competitiveness, ecosystem balance, biodiversity conservation, pollution reduction, international and regional commitments. • 11 programs, including improved air and water quality, waste management, regulatory legislations, industrial pollution, protected areas, improving the environment in poor villages, and climate change.
Government Action Program – Egypt Takes off 2022/21 – 2019/18	• Five Strategic Objectives, focused on national security, which includes 4 dimensions of national security: citizen security, water security, energy security, and food security. • Programs: Highlighted in the First Strategic Goal on national security and Fifth Strategic Goal on living standards: protecting coasts from climate change risks, developing water resources, air and water quality, waste/hazardous waste, industrial pollution, environment in poor villages, supporting programs, and linking scientific research with environmental improvement projects.
Fourth-year Plan 2022/21 under the Medium-Term Plan for Sustainable Development	• Climate issues are not raised throughout this document, even though recent directions include focus on environmental and sustainable development issues (through the application of environmental sustainability standards to all economic activities and sectors). • It includes 3 Pillars: sectoral development (8 sectors), human and social development (8 axes), and spatial development (2 axes); with no special pillar for the environment. • These main pillars do not include environmental or climate-related axes. • Projects related to the electricity and transport sectors, and regional and local development axes, have some environmental considerations.
The National Strategy for Science, Technology and Innovation (NSSTI) 2030	• Existence of a Pillar dedicated to environmental and natural resource protection. This includes confronting the potential implications of climate change, supporting the green economy, providing a sustainable environment, and natural resources. • Addresses important climate issues: Prediction of climate change burdens and its economic, social and spatial repercussions; developing technologies to address the repercussions of climate change, improving early warning capacities regarding all types of climate risks, promoting green economy opportunities, pollution of all kinds, conservation of biodiversity and natural resources, waste and recycling.

Source: Compiled by researchers from the documents referred to (References list)

1.2 Thematic Development Documents: Environment and Climate

As shown in Table (2), Egypt has adopted several strategies and policies directly related to environmental issues in general, and climate change issues in particular. It can be noted that some of these strategies were not translated into actions through operational programs of action and clear monitoring, evaluation, and impact assessment frameworks.

Considering previous experiences regarding the shortcomings in the implementation of some environmental/climate strategies, the issue of governance and management of the Climate Change Strategy 2050 has become a major concern for ensuring the strategic actions are carried out. In this regard, the Ministry of Environment in cooperation with the USAID-Economic Governance Activity (EGA) and with the participation of the Environmental Affairs Agency (EEAA), organized a panel discussion on the Mechanisms for Achieving the Strategy's Third Objective: «Improving Climate Action Governance and Management within the context of Climate Change». This panel discussion drew on relevant previous domestic and corresponding international experiences (Ministry of Environment and USAID, 2022).

The panel noted that climate response policy governance requires better coordination between key institutional entities, and the relevant administrative and organizational divisions within state institutions. It also stressed on the strategy's need to adopt the Enhanced Transparency Framework (ETF), which was launched by the parties to the Paris Agreement in 2015, aiming to strengthen the global response to the threat of climate change. ETF focuses on a broader range of issues concerning mitigation, adaptation, finance, technology and many more related to climate change. Throughout the session, it was also emphasized that attention towards gender issues are important in the climate context.

Table 2: Thematic Strategies and Policies for Climate Response in Egypt

Thematic Documents	Directions – Policies – Objectives
National Strategy for Climate Change Adaptation and Disaster Risk Reduction – 2011	• Integrate adaptation plans into sustainable development programs and plans. • The role of local engagement, and regional and international cooperation. • Implementation framework, projected estimated costs, monitoring, follow-up and evaluation procedures.
Biodiversity Strategy -2015 2030	• Showcasing successful experiences and best practices in biodiversity conservation. • A vision, mission, platform and action program to support biodiversity and genetic resources for sustainable development in Egypt and for the well-being of future generations until 2030.
Egypt's National Climate Change Strategy 2050	• Launched in 2022, it includes five main goals and several objectives. • It includes sectoral and non-sectoral performance indicators to track and evaluate the achievement of goals. • Proposed enabling policies and tools that support the achievement of goals and objectives. • It provides a proposed set-up of the institutional framework to oversee monitoring and evaluation.
Climate Investment Plan to implement the National Climate Change Strategy– 2022	• Announced at COP27, aiming at exploring and evaluating the sources of funding available at domestic and international levels, especially in cooperation with the Green Climate Fund (GCF). • Translating financing contributions locally and abroad into effective investment plans.
Low Emission Development Strategy (LEDS) – 2018	• It is developed to align with the climate action-related directions of the SDS: Egypt's Vision 2030.
National Green Hydrogen Strategy - November 2022	• It was announced at COP27 and prepared in collaboration with the European Bank for Reconstruction and Development (EBRD) and opened room for multiple projects. • It aims at acquiring 8% of the global green hydrogen market.
Integrated Sustainable Energy Strategy 2035	• Approved by the Supreme Council of Energy in 2016 and updated in 2021. • It intends to increase the supply of electricity generated from renewable sources to 20% by 2022 and 42% by 2035.
Egypt's Water Resource Development and Management Strategy 2050	• It intends to achieve sustainable water security for Egypt until 2050. • 4 strategic areas: water resource development, conservation, water quality, and integrated management.
Other strategies and policies	• Started drafting of Low Emission Development Strategy 2050. • Launching the Project on the Interactive Map of Climate Change Risks for Egypt-2022. • Initiating a vision for building a national system for monitoring, reporting and verification of emissions.

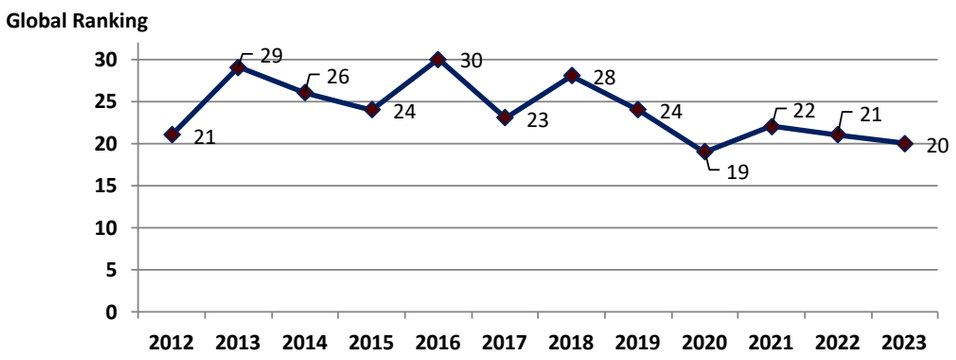
Source: Compiled by researchers from the documents referred to (References list), in addition to: The Ministry of Environment (2022), "Egypt strongly addresses the climate change file". https//www.eeaa.gov.eg/

Egypt's early interest in climate issues has yielded good implications on the Climate Change Performance Index (CCPI), as shown in Figure (1). Egypt's position improved and its rank raised to the 20th (out of 60 countries) in 2023, compared to the 21st in 2022. The Kingdom of Morocco ranked fourth globally and first in the Arab and African countries on the index in the same year. It is known that CCPI covers four indicator categories: Renewable energies, GHG emissions, energy use, and climate policy.

When it comes to the integration of climate response policies, there is an urgent need to practically ensure the incorporation of climate policies and water resources policies in Egypt. This is to be done in light of the Egyptian initiative launched by The Ministry of Water Resources and Irrigation that dedicated a Water Day at COP27 in Sharm El-Sheikh. This is also to be guided by the launch of the AWARe Initiative (Action for Water Adaptation and Resilience) launched at the same conference, which focuses on adapting the water sector to climate change in Egypt and African countries. Additionally, the need for a national drought strategy/policy is essential

This urgency is compounded by the deterioration of water scarcity in Egypt, where the per capita share of water has fallen below 1000 cubic meters per year, which represents the water poverty line, and is approaching the scarcity limit of 500 cubic meters per year, according to United Nations standards. The per capita share of water in Egypt has already declined to about 580 m3/yr., which places Egypt among the world's water scarce and severe water stressed countries (UNICEF, 2022).

Figure 1: Egypt's Global Ranking in the Climate Change Performance Index (CCPI)



Source: Compiled from previous reports of the Climate Performance Index, the most recent of which is the following: Jan Burk et.al., (2023), CCPI climate change performance Index 2023-. Germany: Germanwatch, Climate Institute, and Climate Action Network

1.3 Interventions for Supporting Climate Response Policies in Egypt

While strategic frameworks and policies are important at the macro-level for the success of climate response policies, it is equally important to shed light on the variables and enabling tools within their working environment, which include: The legislative and regulatory frameworks, institutional roles, and other enabling interventions that are identified under table (3).

Despite the multiplicity and breadth of the interventions, there exists some policy gaps. These gaps include legislative ones linked to shortcomings of the Environment Law's inadequate coverage of climate change issues, particularly those related to adaptation, in favor of focusing on pollution mitigation issues. This is in addition to the Law's failure to provide and allocate financial appropriations to support GHG mitigation efforts and adaptation to the adverse effects of climate change. Likewise, the Law does not provide for an institutional framework with svpecific mandate, powers, and responsibilities to coordinate between the competent authorities concerned with climate change and the implementation of national climate policies. There is also a need for new relevant legislation that address energy efficiency, environmental accounting, and sustainable transport (Sahar Mustafa, 2022).

At the institutional level, there is a need to restructure and activate the roles of certain councils concerned with climate response policies, e.g. the Supreme Council of Energy, to enhance their developmental role, and the role of the energy sector, in promoting sustainable development as per the proposals of the thematic committees of the Egyptian Senate (Egypt's Senate, 2022).

Table 3: Examples of Interventions for Enabling Climate Response Policies in Egypt

Type of Intervention	Nature of Intervention
Legislative interventions	• Law No. 4 of 1994 Promulgating the Environment Law, amended by Law No. 9 of 2009 and by Law No. 105 of 2015. • The New Electricity Law No. 87 of 2015 – for restructuring and regulating the electricity market. • Law No. 203 of 2014 on stimulating the Production of Electricity from Renewable Sources of Energy. • Prime Minister's Decree No. 41 of 2019 Determining the feed-in-Tariff of Electricity Supplied from power Plants Using Municipal Solid Waste or Biogas. • Law No. 202 of 2020 regulating Waste Management, and the executive regulations
Institutional interventions	• Establishment of the Environmental Affairs Agency (EEAA) – 1982, with branches in Egyptian governorates. • Establishment of the Environmental Protection Fund (EFP) - Law No. 1994/4 - amended by Law 2009/9. • National Council for Climate Change - Prime Minister's Decree No. 1129 of 2019. • Establishment of the Supreme Council of Energy – by virtue of the Prime Minister's Decree No. 1039 of 1979 and restructured by Prime Minister's Decree No. 364 of 2014. • Establishment of the New and Renewable Energy Authority (NREA) – 1986.

Type of Intervention	Nature of intervention
Planning interventions	• Greening the State Budget, by raising the share of green investments to 30% of the State budget investments and targeting to raise it to 50% in the draft budget of FY 2024. • Promoting Green Finance, offering $750 million worth of green bonds in 2020. • Launching and applying Projects' Environmental Sustainability Standards Guide, in cooperation between the Ministry of Planning and Economic Development (MPED) and the Ministry of Environment in 2021, * The standards are applied to all development plan projects as of 2021, and cover 14 areas and activities to support the transition to a green knowledge economy, transfer and localization of clean technology, eco-friendly manufacturing, and reduction of industrial pollution.
Interventions to support international and regional climate cooperation and meet national commitments	• Egypt ratified the United Nations Framework Convention on Climate Change (UNFCC) in 1994 and the Paris Climate Agreement in 2016. • National Communications (NCs), in accordance with the United Nations Framework Convention on Climate Change (First NC in 1999, second NC in 2010, third NC in March 2016, fourth NC in progress). • Nationally Determined Contribution (NDCs), in accordance with Paris Agreement commitments regarding the State's efforts in climate adaptation and mitigation (2015 NDC report - Updated by a new NDC Report in 2022). • Participation in multiple regional and international initiatives at COP27, including: The Sharm el-Sheikh Guide to Fair Climate Finance, Climate Responses for Sustaining Peace (CRSP Initiative), Africa Just and Affordable Energy Transition Initiative (AJAETI), Sustainable Urban Resilience Initiative

Source: Compiled by researchers from multiple documents (reference list), in addition to: National Institute for Governance and Sustainable Development (2022), Climate Change – General Background and Future Directions, Cairo, National Institute for Governance and Sustainable Development (NISGD).

1.4 Projects Supporting Climate Response Policies in Egypt

Projects are the operational tools to translate climate response strategies and policies into reality, whether within the framework of development plans, the government's Program of Action or through other frameworks for partnership with international parties such as relevant international companies or relevant international organizations. Some of these projects are:

- CDM Project Portfolio, internationally registered at the Executive Board of the Clean Development Mechanism (CDM EB). According to the 2019 update, this portfolio includes 26 projects distributed to 6 sectors, including: renewable energy, waste, transportation, fuel conversion, improving energy efficiency, and industry (Ministry of Environment website: https://www.eeaa.gov.eg/).

- Project package of the National Green Projects Platform – NWFI Initiative: Within the framework of Egypt's Nexus of Water Food and Energy, from Pledges to Implementation. The Platform is one of the projects of the Ministry of International Cooperation (MOIC). It is also one of the main strands of the National Climate Change Strategy (NCCS) 2050 for promoting sustainable development in collaboration with International Finance Institutions (IFCs). The platform adopts a "developmental / financing / spatial equity" approach, through the presence of standards that distribution green platform projects across the regions of Egypt, and the provision of innovative concessional financing to stimulate green investments.
- Green hydrogen projects, is a leap through which Egypt seeks to capitalize on its competitive advantages, such as the availability of cheap renewable energy sources and the advantages granted by the state to private sector renewable energy companies by allowing them to inject all the energy they generate directly into green hydrogen and water desalination projects; which constitutes an effective competitive edge. (Al-Husseini, 2022)

Table 4: New Green Hydrogen Projects in Egypt

Table (4) displays a few examples of green hydrogen projects in Egypt, which are carried out in cooperation with foreign Arab and International partners.

Project	Public Party	Private Party	Nature of the Project
• **Letter of Intent – January 2021** • **Memorandum of Understanding (MOU)– signed August 2021**	Egyptian Electricity Holding Company (EEHC)	Germany's Siemens	Pilot project to produce green hydrogen through EPS+ Finance
Cooperation Agreement • **March 2021**	Egyptian Electricity Holding Company (EEHC), the Egyptian Natural Gas Holding Company (EGAS) and Abu Qir for Port Management Co.	Belgian consortium (DEME, Port Antwerp and Fluxys)	An integrated project for the production, processing, trade and management of green hydrogen
Prime Minister's approval of an MOU initiation • **May 2021**	-	German ThyssenKrupp company	Green ammonia factory for export to Germany

Project	Public Party	Private Party	Nature of the Project
Memorandum of Understanding - • **July 2021**	EEHC & EGAS	The Italian ENI	Production of green and blue hydrogen
Memorandum of Understanding - • **August 2021**	-	TAQA Arabia Group and German Man Energy Solutions	Pilot project for the local production of green hydrogen
Partnership Agreement • **October 2021**	Sovereign Fund of Egypt	Belgian consortium (DEME, Port Antwerp Norway's Scatec and Fertiglobe and Fluxys)	Production of green hydrogen as a feedstock for green ammonia production
7 Memorandums of Understanding signed at the Cabinet Meeting in New Alamein • **August 2022**	Suez Canal Economic Zone (SCZone) - Egyptian Electricity Transmission Company Egypt - Sovereign Fund - New and Renewable Energy Authority (NREA)	KSA's Alfanar - British Global AK-India's ACME, and UAE's K&K,	Facilities to produce green fuels for export and ship bunkering in Ain Sokhna and East Port Said

Source: Ahmed Kandil (2022). Localization of Green Hydrogen Projects in Egypt – Opportunities, Challenges and Recommendations. Information and Decision Support Center - A series of visions on the road to development. Amr El Husseini (2022), Egyptian Pioneering – Green Hydrogen Economics, Cairo: Egyptian Center for Thought and Economic Studies.

2. Experiences from Climate Response Policies at National and International Levels

This section presents the experiences of climate response policies at the global level. Then it presents important national experiences in planning and implementing such policies by developed and developing countries.

2.1 Global Climate Response Policy Experiences

The outcomes of climate response policies at the global level appear to be below the aspired levels, while the results of these policies at the national level vary between developed and developing countries.

2.1.1 Global Mitigation Policies Gaps and Challenges Deepen Climate Change Risks

The latest Global Emissions Gap Report (EGR) indicates that the impact of current actions are poor, which could lead to global warming levels to rise to °2.8C in the 21st century, unless additional effective mitigation measures are taken (UNEP, 2022).

Global challenges to mitigation policies vary, most notably (UNEP,2022; IMF,2022):

- Global mitigation commitments are poorly met, with very little progress in implementing the commitments made at COP26 in Glasgow.
- Global declines in emissions reduction post-COVID19, where the use of fossil fuels has returned to rise in many countries, especially developed countries, after declining during the pandemic, and, therefore, CO2 emissions set records in 2021.
- Gaps in the G20 commitments, where the group lacks a common alignment for the implementation of its mitigation commitments, creating a gap of up to 1.8 Mt CO-2eq until 2030. This constitutes the gap between the emissions projected under ongoing policies, and those expected if the NDC policies are fully implemented across all G20 countries.
- Technological challenges linked to slow pace of the programs on transition to clean and renewable technologies as an alternative to fossil energy, especially in industrial sectors, and those on support for low-carbon industrial processes.
- Multiple Finance challenges with variations between developing and developed countries, where African countries face institutional challenges in accessing climate funds finance, relevant data gaps, debt problem and governance-related problems, and challenges concerning public finance management efficiency.
- Legislative challenges, linked to gaps in developing and updating legislations catalyzing carbon-neutral activities in the sectors of industry, transport, construction, urbanization, and green infrastructure.

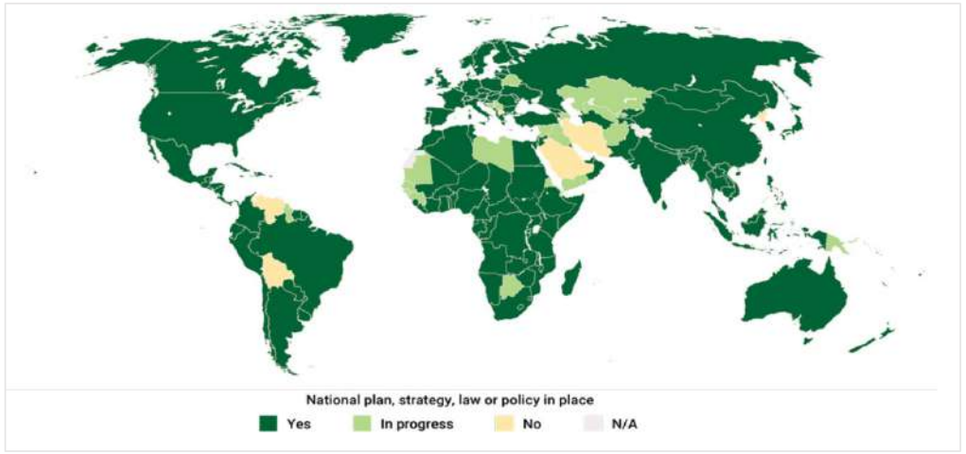
2.1.2 Global Mitigation Policy Gaps and Challenges Deepen Climate Change Risks

The global picture of mitigation efforts and policies is not different from that of adaptation efforts and policies. The findings of the most important relevant international reports recently released (UNEP AGR, 2022) reveal very little and slow progress in the efforts concerning adaptation to climate change risks. Hence, global failures directly indicate the poor impact of policies addressing adaptation issues in different countries.

Even though more countries in the world (84% of the parties to the UNFCCC), including Egypt, have established adaptation plans, strategies, laws, policies, and targets (as is illustrated in figure 2), reality indicates that these policies have not achieved yet the desired outcomes.

This modest performance of policy implementation is generally ascribed to large gaps between existing adaptation levels of adaptation, needed finance to address reduce risks and level of policies necessary to respond to the adverse impacts. Additionally, it is problematic that a large number of these policies focus on a specific sector for the short term rather than the strategic prospects. This is also accompanied with attaching more attention to the policy planning instead of practical implementation (Portner, 2022).

Figure 2: Status of Adaptation Planning Worldwide



Source: United Nations Environment Programme (2022). Adaptation Gap Report 2022: Too Little, Too Slow – Climate adaptation failure puts world at risk. Nairobi. https://www.unep.org/adaptation-gap-report2022-, P. XIII

Several reviews of relevant international reports indicate that the most prominent challenges causing limited impact of adaptation policies are (UNEP, 2022):

- Short-term focus and neglect of future climate risks which require strategic-level policies with proactive, more inclusive and interconnected dimensions for different development sectors.
- A large and widening finance gap, especially in developing countries, resulting in shortcomings in the implementation of climate plans and policies. International adaptation financing flows to developing countries are 5 to 10 times less than the estimated adaptation needs of. The estimated adaptation needs amount to US$ 340-160 billion by 2030, and US$ 565-315 billion by 2050.
- Poor community participation in adaptation policies, due to inadequate inclusive involvement of stakeholders from community groups and regions in addressing climate change, which also undermines climate justice considerations.
- Multiple gaps in systems supporting adaptation policies, such as gaps in: regulatory legislation, climate information systems and databases, relevant scientific research capacities, and appropriate infrastructure.
- The impact of non-climate factors on adaptation policies, which include: a lack of international political will, the repercussions of profound conflicts, (such as the war in Ukrainian and their negative effects on food supply chains), accelerated inflationary pressures, and energy crises around the world.
- Absence of effective frameworks for measuring and evaluating the success of adaptation interventions/ policies among the target beneficiaries to assess the actual societal impact of these interventions and extent to which they meet international commitments.

In a recent attempt to positively address the challenges of climate response policies in mitigation and adaptation; and within the context of achieving the United Nations Sustainable Development Goals (SDGs), the Presidency COP27 in November 2022 in Sharm El-Sheikh has launched some important initiatives addressing these challenges globally and regionally, including:

- The establishment of the Loss and Damage Fund, which aims to provide financial assistance to poor countries, most vulnerable and climate impacted countries. It was described by the President of the Conference, Mr. Alok Sharma, as a historic achievement for COP27.
- Sharm El-Sheikh Guidebook for Just Financing, was developed in cooperation between the Egyptian Ministry of International Cooperation and various international organizations (like the World Bank and African Development Bank). The Guidebook is intended as a tool to help developing countries access finance for the implementation of climate change projects.
- Launch of Sharm El-Sheikh «Adaptation Agenda», in partnership with UN Climate Change High-Level Climate Champions and the Marrakech Partnership. The agenda outlines 30 Adaptation Outcomes to enhance resilience for almost half of the world population (4 billion people) living in the most climate vulnerable communities by 2030 across five impact systems: food and agriculture, water and nature, coastal areas and oceans, human settlements, and infrastructure (including enabling solutions for planning and policy-making capacities and innovative finance for adaptation activities).
- The Africa Adaptation Summit of Leaders, which reaffirmed the importance of supporting the Africa Adaptation Accelerator Program (AAAP), a joint initiative of the African Development Bank and the Global Center on Adaptation (GCA), to mobilize $25 billion to achieve, scale up and accelerate climate adaptation across Africa, one of the world's most vulnerable regions (AfDB 2022).

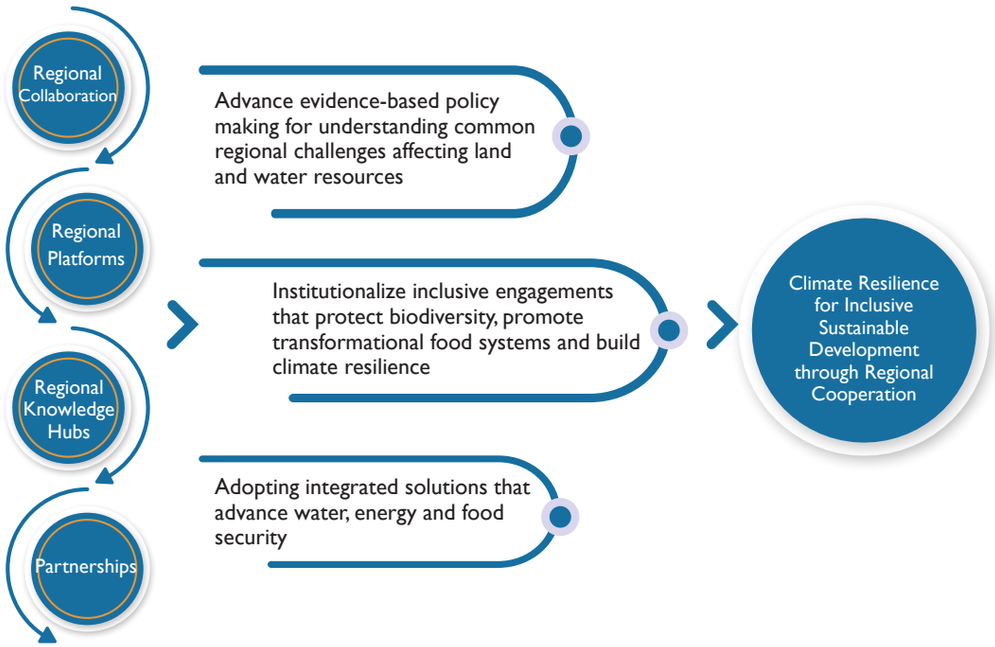
2.2 Climate Response Policy Responses at Regional/Arab Level

There are numerous areas of networking and synergies for joint Arab efforts within the context of climate response policies, which has recently evolved into an Arab Climate Change Strategy (Habitat, 2022) focusing on 4 key areas of Climate change in Arab societies, namely:

- Reducing Arab urban-rural spatial inequality and poverty gaps across Arab urban-rural areas
- Promoting the common prosperity of different cities and regions
- Strengthening climate action and improving urban environment
- Prevention of and effective response to urban crises

Furthermore, there are multiple areas for cooperation among Arab institutions concerned with Arab climate action, particularly the Arab Center for Climate Change Policy (ACCCP) which implements various initiatives linking climate action to sustainable development. These initiatives include «addressing the implications of climate change on sustainable development in the Arab region». It also adopted an initiative to improve the integrated management of natural resources for sustainable development within a cooperative Arab framework targeting policy-making improvement through regional platforms and knowledge hubs, which is further illustrated in figure (3). As such, it would allow the spread of knowledge sharing products to enhance Arab States› resilience to climate effects; which would promote Arab sustainability (Arab Center for Climate Change Policy, *https://www.unescwa.org/acccp).*

Figure 3: General Framework of the Initiative on the Integrated Management of Natural Resources



Source: Arab Center for Climate Change Policy, https://www.unescwa.org/acccp .

2.3 National Experiences of Climate Response Policies

These experiences can be drawn from the review of some national practices in managing climate response policies at both mitigation and adaptation levels. This overview includes lessons learnt and best practices from past experiences of one of the world's developed industrialized countries (United States of America), an emerging country (South Korea), as well as a developing country (South Africa).

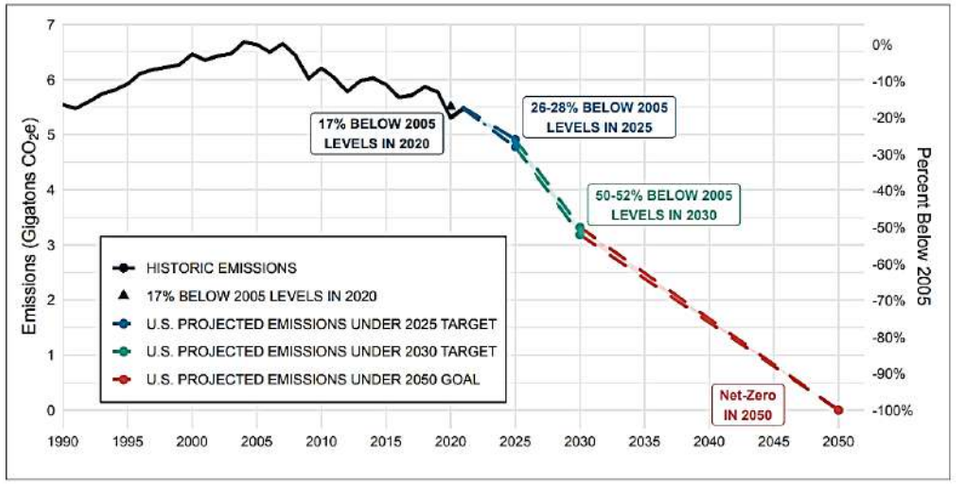
2.3.1 United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050

The Strategy adopts reaching net-zero as a strategic goal by 2050 as a key means to operationalize U.S. mitigation and adaptation efforts, especially considering the United States being one of the world largest emitters of carbon dioxide. Some features of this Strategy, include: (the United States Department of State, 2021)

- Alignment with the global nature of climate risks, where the strategy considers the risks of climate change to be imminent in all regions and areas of the world and need to be addressed by urgent collective and national interventions. The recent Global Risk Report 2023 confirmed this by ranking climate change mitigation failure, waste/loss of biodiversity and environmental degradation as the top risks the world is facing in recent and future years (WEF, 2023).
- Creating opportunities for a new world with carbon neutrality. This changes the quality of life as and creates new, clean and equitable economies with better job opportunities.
- Priority sectors: the report focuses on the need to review the national and global energy sector, transform agricultural systems, and decisively halt deforestation.
- Highlighting the positive outcomes of carbon neutrality, especially on public health conditions and individual productivity, avoiding the high costs of climate change, improving climate security, building a different national economy based on clean new technologies and innovation.
- Establishing a critical role for research and development, with support from the federal government so that clean, carbon-free technologies can be transferred from laboratories to businesses and factories.
- Achieving clean electricity by 2035 with various positive implications. The strategy's objectives also include reaching 100% clean electricity in 2035 through the decarbonization of the electricity sector, which will have a positive impact on the economy, especially in some areas such as electric vehicles, buildings, and various industrial processes.

Achieving the targeted net-zero by 2050 will require a phased and time-scaled approach that includes cutting global greenhouse gas (GHG) emissions by at least 40% below 1990 levels by 2030, as shown in figure (4), and reaching global net zero GHG emissions by 2050 or soon after.

Figure 4: United States Actual Emissions and Projected Emissions under the 2050 Goal for Net-zero



Source: The United States Department of State and the United States Executive Office of the President, (2021), The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050, Washington.p.11.

2.3.2 South Korea: Carbon Neutrality and Green Sustainable Society by 2050

South Korea demonstrates many important experiences and practices in the areas of developing, managing, and evaluating climate response policies at the national level, such as: (https://unfccc.int/sites/default/files/resource/LTS1_RKorea.pdf)

- Adopting a proactive approach to climate risk, through multiple carbon neutrality measures, policies, and scenarios, to promote early warning of climate change and its potential implications.
- Relying on effective mechanisms for community involvement, with a view to diversifying the introduction of appropriate collective/group/community alternatives and options for climate action.
    * The 2050 Low-carbon Vision Forum was established as a community platform that supports the strategy by listening to various expert opinions from private sector, academia, and youth.
    * A government-wide (consultative committee) comprised of representatives from different ministries and governmental agencies was established to survey their views on the directions of the Strategy.
- Linking the competitive advantages of both digital and green technologies, where the state's competitive digital capabilities are employed in advancing green technology and developing innovative climate technologies to achieve the objectives of the Strategy and become a green society.
- Improving energy efficiency, scaling clean energy and green hydrogen, to expand and stimulate business activities and models in these areas, and roll them out across all sectors.

- Stimulating the circular/green economy, as part of the transition towards a low-carbon economic structure and incentivizing sustainable green industrial activities.
- Having an effective governance structure, where the Government builds a stronger governance structure, including the establishment of the Presidential 2050 Carbon Neutrality Committee, for the systematic implementation of carbon neutrality by 2050.
- Supporting international and regional climate efforts, which emanates from South Korea's recognition of the climate risks threatening the planet and their impacts on developing countries in particular.

2.3.3 South Africa: Linking Climate Adaptation and Promoting Sustainable Development

Climate change has had substantial adverse social, economic and environmental impacts on South Africa. This prompted the Government to adopt a National Climate Change Adaptation Strategy (NCCAS), with a view of enhancing the country's capacity to address all aspects of climate change in a more innovative and effective way. It also aims to support sustainable development through planned targets and interventions as shown in table 5. The key features of NCCAS can be summarized as follows (Republic of South Africa, 2022):

- Linking the Strategy with sustainable development plans by providing a common vision for adaptation to climate change that is linked to the National Development Plan, the National Sustainable Development Strategy and international adaptation commitments.
- Breadth of participation, where the Strategy covers all sectors in the country. Moreover, adaptation activities cover provinces, municipalities, non-governmental bodies, the private sector, the research community and civil society.
- Alignment with International requirements, as the Strategy supports South Africa in meeting its international obligations, as outlined in the Paris Agreement. This is carried out by defining the country's vulnerabilities, plans to reduce such vulnerabilities and leverage opportunities, outlining the required resources for such action, and demonstrating climate change adaptation progress.

Table 5: Objectives, Interventions and Outcomes of South Africa's National Climate Change Adaptation Strategy

Objectives	Interventions	Outcome
1- Build climate resilience and adaptive capacity to respond to climate change risk and vulnerability	Intervention 1: Reduce human, economic, environmental, physical, and ecological infrastructure vulnerability and build adaptive capacity. Intervention 2: Develop a coordinated Climate Services system that provides climate products and services for key climate vulnerable sectors and geographic areas.	Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environmental, physical and ecological infrastructure. Outcome 2.1: Climate products and services for key climate vulnerable sectors and geographic areas developed and implemented

Objectives	Interventions	Outcome
2- Promote the integration of climate change adaptation response into development objectives, policy, planning and implementation.	Intervention 3: Develop a vulnerability and resilience methodology framework that integrates biophysical and socioeconomic aspects of vulnerability and resilience. Intervention 4: Facilitate mainstreaming of adaptation responses into sectoral planning and implementation.	Outcome 3.1: A framework for assessing climate risks and exposure across all key sectors. Outcome 4.1: Effective adaptation planning that covers at least 100% of the South African sectors identified in the NCCAS. Outcome 4.2: Achieve a 100% coverage of climate change considerations in sectoral operational plans
3- Improve the understanding of climate change impacts and the capacity to respond to these impacts.	Intervention 5: Promote research application, technology development, transfer and adoption to support planning and implementation. Intervention 6: Build the necessary capacity and awareness for climate change responses.	Outcome 5.1: Increased research output and technology uptake to support planning and implementation. Outcome 6.1: Capacity building and awareness for climate change response enhanced.
4- Ensure resources and systems are in place to enable implementation of climate change responses.	Intervention 7: Establish effective governance and legislative processes to integrate climate change in development planning. Intervention 8: Enable substantial flows of climate change adaptation finance from various sources. Intervention 9: Develop and implement an M&E system that tracks implementation of adaptation actions and their effectiveness	Outcome 7.1: Adaptation governance defined and legislated through the Climate Change Act once approved by parliament. Outcome 7.2: Institutional structures for climate change adaptation strengthened Outcome 7.3: Enhanced public-private-civil society collaboration and stewardship Outcome 8.1: Adequate financial resources for national adaptation priorities from national and international sources. Outcome 9.1: A national Monitoring and Evaluation system developed and implemented

Source: Republic of South Africa (2022), National climate change adaptation strategy, South Africa: Department of Forestry, Fisheries & Environment.P,24 (https://www.dffe.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf)

3. Strategic and Practical Alternatives to Operationalize Egypt's Climate Response Policies

Egypt's climate response policy-making context is composed of variables, influences and developments that have an impact on their efficiency and outcomes.

3.1 Observations and Trends concerning Climate Response Policymaking in Egypt

- Multiple institutional frameworks for climate response policies, including, inter alia, supreme councils, national councils, ministries, and agencies, among others. Nevertheless, there is no clear view as to the coordination or integration frameworks between the bodies concerning planned objectives, joint program and projects, or targeted outputs and outcomes.
- Multiple strategies are related to improving the climate response in the areas of energy, water, environment, biodiversity, etc., without clear mechanisms or spaces for coordination and integration between them, especially with time limit variations (2030, 2035, 2050, 2052).
- The absence of strategies for key productive sectors, where industry and agriculture sectors - in particular - suffer from a lack of stable strategic visions, and strategic frameworks. Thus, halting the process of turning the visions into a reality that supports sustainable development and strengthens climate response efforts in particular.
- Multiple challenges when employing climate response strategies, with gaps existing in: legislative support (energy efficiency legislation, green accounting, etc.), governance of climate strategy, policy management, and integration between these policies and strategies and different thematic development policies. Moreover, there are gaps in the use of scientific research and innovation to support climate response policies. In addition to the gap in climate data and information and in instilling environmental education at different stages of education, etc.
- Several considerations in climate policies need more attention. For instance, Climate justice considerations and the role of localities/governorates in the formulation of climate response policy as part of development policies is essential. This is to be done in accordance with the directions of the State's General Unified Planning Law No. 18 of 2022 concerning the achievement of equitable balanced development among groups of society, closing sectoral and spatial gaps, with a focus on protecting coastal areas most vulnerable to climate risks.
- The importance of revisiting the interim climate goals and policies, in light of developmental evolutions, like the completed Medium-Term Development Plan 2022/21 and The Government's Program of Action 2022/21. There is also a need to work on new sensible and phased time frames for climate response policies.
- Ensuring sustainable community engagement, especially business sectors, professional organizations, academic institutions, think tanks, civil society, and media institutions.
- Confirming and deepening the interlinkage between climate and water policies in Egypt and the region, in recognition of Egypt's initiative launched at COP27 to devote a day to water and the launch of the AWARe Initiative focusing on the adaptation of the water sector to climate change in Egypt and African countries in particular.

- Utilizing lessons learnt from climate response policy in international, regional, and national experiences:
  * Climate change is a global issue and requires cooperative global and regional initiatives. This is because climate change risks threaten all regions of the world and may get compounded in the absence of such cooperation.
  * Climate response policies are at the core of sustainable development policies, whether globally or at the level of developed or developing countries, including Egypt.
  * Developing countries, including Egypt, are the most vulnerable to climate risks, which requires increased attention to developing climate response policies as part of their development.
  * Climate risks are interrelated with other developmental risks, with causal and correlational relationships with: biodiversity risks, food and food security risks, risks of degradation of the efficiency and quality of agricultural land, risks of drought and desertification, energy security risks, social security risks, employment and gender opportunities, marginalization of women's role, waste hazards, public health risks, etc.
  * Financing is a governing element for successful climate response policies, which entails innovative green finance alternatives, and the engagement of business communities, civil society and international organizations.
  * Research and technological development play a pivotal role in providing diverse alternatives of digital and green technologies to support climate policies, new business models, and energy efficiency.
  * Governance plays a central role in climate response policies, including the qualification of professional human resources, establishing effective monitoring, control, reporting, verification, early warning and data systems.
  * An essential role is played by studies supporting climate response policies, in which think tanks, research institutes and academic institutions can play key roles, focusing on aspects of (climate security), climate projections, and the enhancement of proactive climate capabilities.
  * Developing economic opportunities within climate change, green and circular economy, by seeking to stimulate and support green business models, especially in the fields of entrepreneurship and SMEs is vital.
  * Promoting climate diplomacy practices, with a view to strengthening participatory and collaborative climate policy frameworks and initiatives, particularly those launched during COP27. This is to be done in collaboration with relevant international institutions, such as the Green Climate Fund (GCF). Additionally, focusing on green technology transfer from developed to developing countries, and building climate capacity and infrastructure is necessary.
  * Importance of Arab and African dimensions, as attested to by the events of COP27 in Sharm el-Sheikh, by focusing on experience sharing, technical cooperation and coordination regarding water and desertification issues.

3.2 Strategic Developments in the Context of Climate Response Policy-making in Egypt

Enactment of a new planning law in Egypt, namely Law No. 18 of 2022, promulgating the State's General Planning Law. This law sets out new forms and frameworks for the management of development, and sustainable development planning process at the macro level. Additionally, it starts with the National Plan for Sustainable Development and the National Urban Development Masterplan. These are composed of sectoral, regional, local plans (including governorate and district plans) and programs highlighted by the new law. These programs are a set of investment projects and ongoing activities contributing to the achievement of specific objectives, which include climate response programs.

In the context of this new planning framework, there is a need to reconsider Egypt's climate response strategies, policies and program, to work towards their efficient and flexible integration into this new national framework for planning and managing sustainable development at the macro, sectoral and local levels. Hence, this entails a necessary review of the objectives and mechanisms of Egypt's National Climate Change Strategy 2050 and other strategies related to climate action in Egypt.

The role of the Supreme Council for Planning and Sustainable Development: The new Planning Law provides for the establishment of the Supreme Council for Planning and Sustainable Development, and defines its main mandate under articles four through six. The Council is mandated to:

- Set sustainable development goals and policies at the national, regional, local and sectoral levels.
- Discuss the proposals of the National Plan for Sustainable Development and the Strategic Urban Development Masterplan.
- Schedule the preparation and update of (planning documents) at the national, regional, local, and sectoral levels.
- Define the preparation mechanism and time frame for the development of various planning documents.

These developments in the national planning environment for sustainable development, regardless of whether or not we agree with, offer opportunities to enhance the national policy-making environment directly and indirectly concerned with effective climate response. This is to be carried out through the establishment of linkages and complementarities among such policies while coordinating and integrating the institutional roles involved.

3.3 Proposed Framework for Coordinating and Optimizing the Effectiveness of Egypt's Climate Response Policies

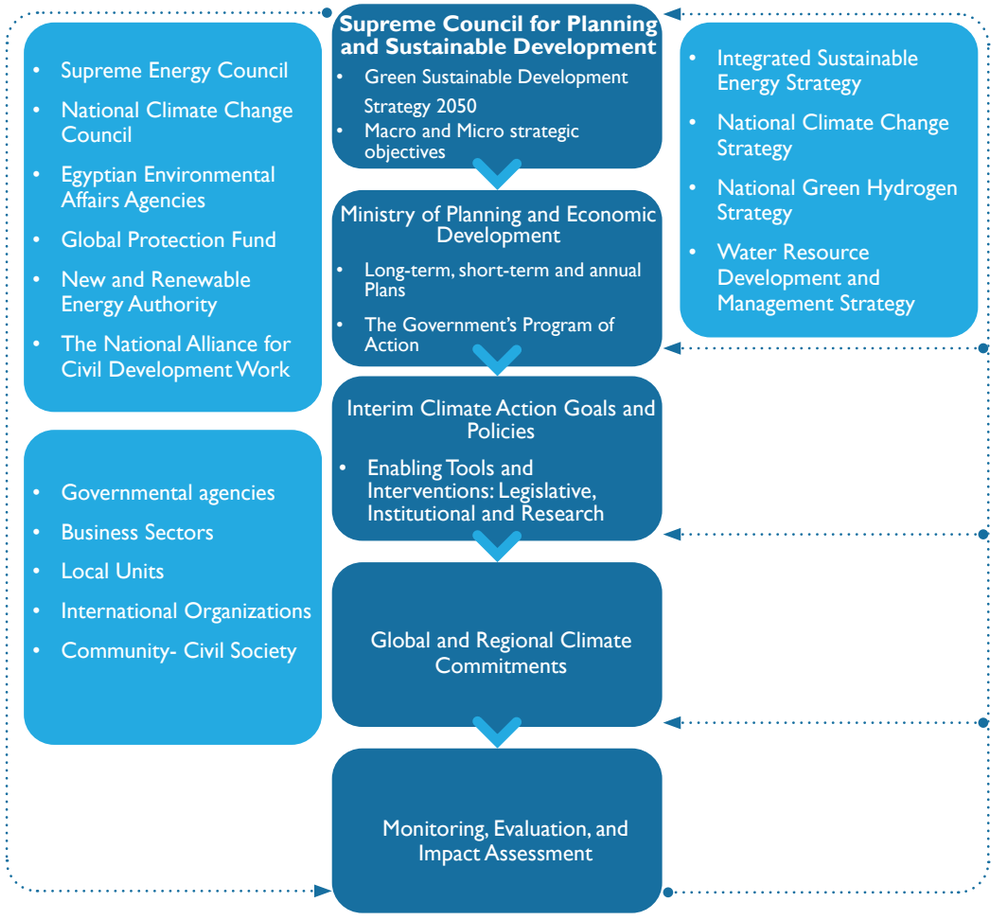
Considering the above-mentioned observations, experiences and developments, the paper presents a practical strategic framework for maximizing the role and impact of Egypt's climate response policies in support of sustainable development, as illustrated in figure (5), through:

- **Providing the Supreme Council for Planning and Sustainable Development with a central role** to coordinate and integrate climate response policies with an interactive participatory framework that achieves:

* **Effective localization of climate response policies,** within the framework of the «National Development Management System» to support the practical integration and coherence of climate policies with different development policies at all levels. This is to be achieved through the roles of the Supreme Council for Planning and Sustainable Development.
* **Effective utilization of different climate-related roles,** whether in the relevant councils, ministries, government agencies, businesses, and civil society sectors, as well as the roles of international organizations within the framework of a «National Development Management System». Hence, reducing gaps, overlaps, duplications, and conflicted roles.

- **Enhancing governance and objective evaluation of the developmental impact of climate response policies and projects** within the framework of the nationwide evaluation of sustainable development policies and projects conducted by the planning authority.

Figure 5: Proposed Strategic Framework for Coordinating and Integrating National Climate Response Policies



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- Ministry of International Cooperation – https://moic.gov.eg
- Ministry of Water Resources and Irrigation - https://www.mwri.gov.eg/

DECARBONIZATION OF THE ENERGY AND INDUSTRY SECTOR IN EGYPT

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Abstract

The objective of this article is to demonstrate Egypt's steps towards the road to decarbonizing in the energy and industry sector as both are the highest contributors of greenhouse gases according to the latest national inventory submitted to the United Nations Framework Convention on Climate Change (UNFCCC) for year 2015[1] (MoE BUR, 2018). The decarbonization pathway is in line with Egypt's Vision 2030 and Egypt's first Updated Nationally Determined Contribution (NDC), in addition to the National Climate Change Strategy 2050. With regards to the energy sector, the efforts put in the energy efficiency and renewable energy are highlighted, while for the industry sector the approaches to decarbonize the cement and fertilizer industries in particular are discussed.

Keywords: decarbonization, climate change, energy, cement, fertilizer, Egypt

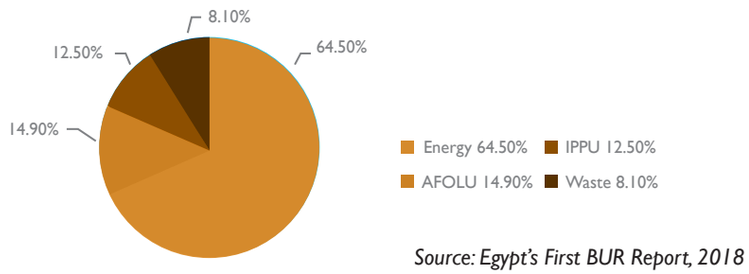
1. Introduction

The current overexploitation of Earth's natural resources is generating an enormous deficit for national economies. This is no longer a sustainable living model that is aggravated with the negative implications of climate change. The reduction of the Greenhouse Gases (GHGs) causing climate change or in other term "decarbonization" of major contributing sectors is the future sustainable development pathway especially for emerging and growing economies like Egypt.

Egypt has adopted Sustainable Development Strategy "Egypt's Vision 2030" in February 2016 that reflects the country's priorities in alignment to the Sustainable Development Goals (SDGs) under the United Nation's Agenda 2030. In relation to latest climate change direction, Egypt's first Updated Nationally Determined Contribution (NDC)[2] was submitted in June 2022 to UNFCCC outlines its climate change mitigation and adaptation priorities and needs for support to achieve the planned climate targets up to 2030. Last November 2022, the UNFCCC's COP27 was hosted in Egypt on behalf of the African continent. In addition to the National Climate Change Strategy 2050 launched in the same year in May 2022.

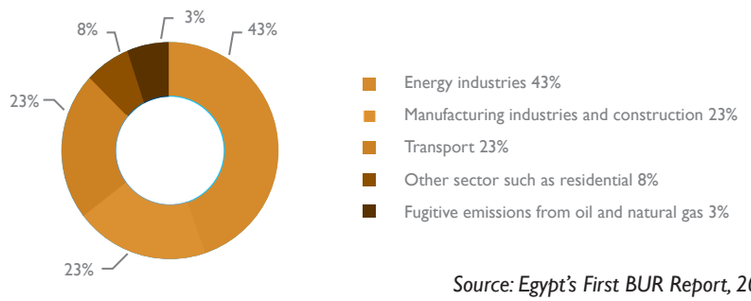
Energy is the highest GHG-emitting sector accounting for 64.5% of the total emissions for 2015 (210,171 Gg CO2e). The highest contributor to the energy sector is that of the energy industries (43%) followed by manufacturing industries and transportation each accounting for %23 of the total energy contribution.

Figure 1: GHG contribution of each sector to the total emissions for inventory year 2015



Source: Egypt's First BUR Report, 2018

Figure 2: GHG Contribution to the energy sector for inventory year 2015



Source: Egypt's First BUR Report, 2018

[1] A greenhouse gas (GHG) inventory is a list of emission sources and the associated emissions quantified using standardized methods.

[2] Egypt submitted its Intended Nationally Determined Contribution (INDC) in November 2015. After Egypt signed the Paris Agreement, the INDC was considered Egypt's first NDC.

Also, as shown in figure (1), the Industrial Processes and Product Use (IPPU) sector also account to 12.5% of the total emissions for 2015 and so it is clear that the industrial sector whether through the energy it uses or through the emissions associated with the industrial processes has a contribution of about 27.3% of the total. The emissions from the manufacturing industry is expected to have increased as the cement companies in Egypt since 2015 have switched to using high CO2 intensive fuels including coal and petcoke due to the gradual phasing out of the subsidies and the scarcity of natural gas and heavy oil fuels. This fuel switch is expected to significantly increase CO2 emissions from the Egyptian cement industry – up to 15% or from 710 to 820 kg CO2 per tonne cement (EBRD, 2016).

The energy and industry sectors are selected as a priority in this policy paper due to highest contribution to Egypt's total GHG emissions and significant sustainability and economic opportunities.

2. Decarbonization of the Energy Sector

Egypt's economic development hinges on the energy sector. Starting 2012, there was an imbalance between energy supply and demand causing electricity outages. However, since 2014 the Government of Egypt (GoE) has taken measures to improve the situation through multiple energy sector reforms. Nevertheless, this has signalled the growing importance of securing reliable sources of fuel supplies for the future. As a result, the GoE took the decision to diversify the energy mix under the Integrated Sustainable Energy Strategy (ISES) to 2035 (IRENA, 2018). This strategy involves stepping up the development of renewable energy and energy efficiency, in part through vigorous rehabilitation and maintenance programmes in the power sector.

Egypt has been a pioneer in the Middle East and Africa region in adopting renewable energy through rolling out supporting policy measures and promoting national mega-scale projects. Investments in renewable energy were encouraged by the Government of Egypt through multiple policy measures regulated under Renewable Energy Law (Decree No 203/2014) and other supporting legislations. The total installed wind and solar power plants in FY2019/20 are 3,016 MW which is 340% increase from FY2015/16 (887 MW). Under the umbrella of the Renewable Energy Initiative (REI), the Ministry of Electricity and Renewable Energy (MoERE) planned and installed one of the largest Solar Parks in the world of about 1.5 GW capacity in Benban-Aswan in only 2 years. In addition to numerous success stories in wind power in the Red sea coast, such as Zaafarana (542.3 MW), Gabal El-Zeit Wind Power Plant (580 MW), and Ras Ghareb (262.5 MW).

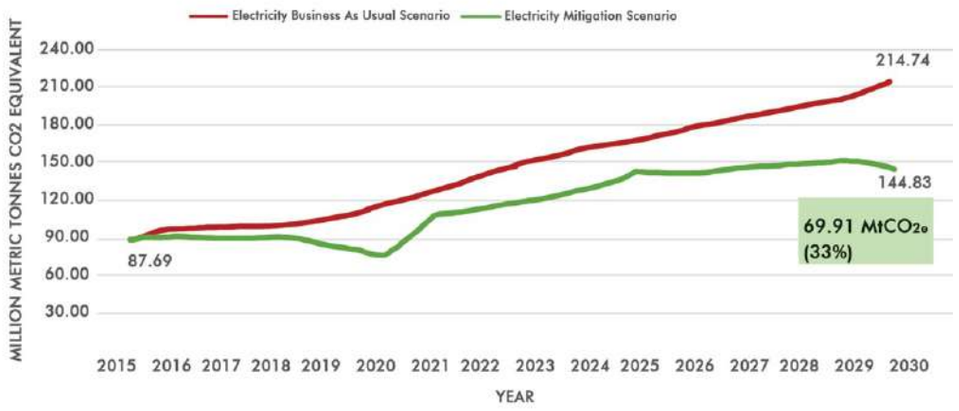
As to energy efficiency, in accordance to Egypt's first Energy Efficiency report (MoERE, 2021) the achieved fuel savings from extensive upgrade and replacement program for power plants amounted to USD 3,239 million in 2020/21, which is equivalent to 0.7% of GDP. Furthermore, the amount of energy consumed for electric power generation was uncoupled from the increase of the number of customers, but actually the rate of annual increase in demand for electricity dropped sharply between 2000-2015 (EEHC, 2000-2021). This has been all reflected in Egypt's grid emission factor that decrease in the past 15 years from 0.586 t-CO2/MWh to 0.458 t-CO2/MWh equivalent to 21.8% improvement.

Egypt's First Updated Nationally Determined Contributions has set a target to reduce GHG emissions by 33% by 2030 in electricity generation, transmission and distribution sectors.

This would be achieved through the following decarbonization measures:

- Installing additional renewable energy capacities to reach electric power contribution target of 42% by 2035 as per Egypt's Integrated Sustainable Energy Strategy 2035. Reaching the target includes accelerating the scale-up of on-grid renewable energy by reducing coal capacity in the generation mix and replacement of inefficient thermal power plants.
- Transform the electricity grid to "smart grid" through modern digital technology, smart metering, and flexible solutions appropriate to the local context and expand on regional interconnections.
- Continue the improvements of the energy efficiency of electricity generation by the maintenance, upgrade, and replacement programs for obsolete power plants.
- Activation of the role of electricity distribution companies in achieving energy efficiency improvements and promotion of large scale and smalls scale decentralized renewable energy systems for subscribers by implementing Sustainable Energy Action Plans required by the Electricity Law 87/2015.
- Improve and upgrade the transmission and distribution networks including Extra High voltage substations, control centers, and smart grids.

Figure 3: Egypt's GHG mitigation target for electricity in 2030

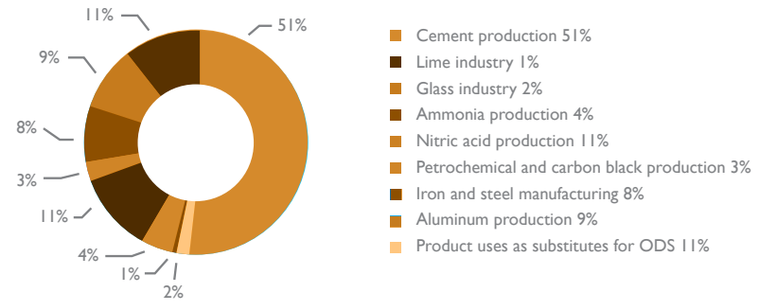


Source: Egypt's First Updated NDC, 2022

3. Decarbonization of the Industry Sector

The cement production as well as that of fertilizers (nitric acid production and ammonia production) are the largest contributors to the total emissions from the Industrial Processes and Product Use Sector in Egypt.

Figure 4: GHG Emissions per Category of the IPPU Sector for inventory year 2015



Source: Egypt's first BUR Report, 2018

Decarbonization of the cement production in Egypt is therefore an essential mitigation measure to reduce the total greenhouse gas emissions for Egypt. Mitigation actions can work on the energy side of the industry as well the production side.

According to Egypt's First Updated Nationally Determined Contributions, the objective is to "decarbonize the industrial sector by reducing the energy intensity, use of renewable and alternative fuels, and low carbon process improvements". This includes implementing low carbon roadmap for the Egyptian cement industry, improve energy efficiency in other resource-intensive sectors and with SMEs, motor system optimization programme, apply sector-specific process improvements, and promote eco-industrial parks.

The Low Carbon Roadmap for the Egyptian Cement Industry included a shift to less carbon intensive alternative fuels, such as waste, refuse derived fuel (RDF) and biomass, for heating kilns could decrease direct CO2 emissions as per the requirements of the new Egyptian coal regulation (Ministerial Decree 49/2021). The cement sector has already started using alternative fuel at a share of 6.4% in 2015 to replace a percentage of the coal used as the main fuel for the thermal energy (MoE, 2022).

For the production side, decreasing the amount of clinker that is used to produce cement will contribute to reducing the among of carbon dioxide emissions as emissions result from calcination, the chemical reaction that occurs when raw materials such as limestone are exposed to high temperatures. A percentage of the clinker can be replaced with other cementitious materials such as natural and calcined pozzolans, as well as industrial by-products such as fly ash and blast furnace slag.

Moreover, as the kilns constitute around 90 percent of the total energy consumption of cement production, and about half of Egyptian clinker kilns consume on average an excess of 14% of thermal energy compared to best available techniques (Alternative Policy Solutions, 2021). Improving the energy efficiency of the kiln to that of the best available technique will have a considerable impact on the thermal energy consumption of the plant thus reducing its emissions.

Other opportunities lie beyond cement and concrete. Alternative building materials and other approaches will likely play an important role in the decarbonization of the cement industry, though a great deal of uncertainty remains as to how much they will reduce emissions. Moreover, recycling of construction and demolition waste to be used as building material could be a major contributor to decreasing the demand on cement as long that there are building codes that include safe specifications.

However, the cement industry is facing many challenges along its way of decarbonization such as underdevelopment of the upstream waste value chain which affects the quantity and quality of the alternative fuels available for substitution of the high carbon fuel specifically coal. Moreover, although the Egyptian cement standard allows the production of many types of composite cements similar to the European cement standard, the construction codes prohibit certain cement types for reinforced concrete application and so most cement sold to the market is Ordinary Portland Cement (OPC) with no reduction of the clinker percentage. This challenge is also enhanced by the limited availability of good-quality clinker substituting materials such as granulated slag, fly ash and pozzolana in Egypt.

Similar to the case of cement where there is always a growing demand on its production and use, the fertilizer industry is also growing as the demand on fertilizer production is always increasing due to the expansion in the agriculture sector in Egypt as well as the need for land and desert reclamation. However, as shown in figure (4), nitric acid production as well as ammonia production contribute to 15% of the total greenhouse gas emissions of the IPPU sector. Nitrogen fertilizer production is an energy-intensive process due to its high consumption of fossil fuels.

In many facilities, ammonia is combined with the CO2 released during synthesis gas production to create urea, a solid, more easily transportable form of nitrogen-based fertilizer. However, the CO2 is released again to the atmosphere when the fertilizer is used, meaning that this use does not change the net emissions of CO2 to the atmosphere. In fact, decarbonizing ammonia use in fertilizer will require a shift away from urea toward forms of nitrogen fertilizer that do not contain carbon. Successful implementation of a low-carbon pathway requires action and collaboration across the value chain including the fertilizer industry, agribusiness, farmers, government, investors, and industry associations. Measures such as the implementation of Best Available Technologies (BAT) within existing fertilizer plants leads to energy efficiency improvements and reductions in nitrous oxide emissions (The Oxford Institute for Energy Studies, 2021).

From the raw materials side, replacement of some or all of the natural gas feedstock with green hydrogen lowers the carbon dioxide emissions from fertilizer production processes. Alternatively, carbon dioxide emissions from conventional production can be reduced using carbon capture and storage technology. On the other hand, from the fertilizers use side, responsible use of fertilizers through utilization of inhibitors and/or controlled-release fertilizers, improvements in irrigation, crop rotation, and other agricultural management practices also contributes to GHGs net reduction.

4. Recommendations

The decarbonization of the energy and industrial sectors in Egypt should be prioritized as it is aligned to the country's vision of sustainable development. Egypt is moving towards expanded industrialization, it would have required increased consumption of energy and natural resources. Decarbonization would reconcile the urgent need for rapid economic growth and poverty alleviation while still avoids the irreversible and costly environmental deterioration. Decarbonization would support Egypt's accelerated shift from a fossil fuel-based economy to a low carbon economy in accordance with the country's Nationally Determined Contribution and the National Climate Change Strategy 2050.

Furthermore, adopting low carbon pathway would provide a competitive edge to Egypt's export-oriented manufacturing sectors and boost their export opportunities due to growing consumer demand for environmentally friendly products globally. Specifically, Europe is an important market since about 30% of Egypt's exports are directed to the European Union.

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ESG AND ITS ROLE TO CATALYZE THE GENDER-CLIMATE ACTION

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Abstract

The 27th session of the Conference of the Parties of the UNFCCC or COP27 followed by Davos 2023 tapped on responsible business and highlighted Environment, Social and Governance (ESG) reporting to simultaneously manage risks and create positive impact. The paper explores how ESG can help accelerate progress towards gender equality (SDG5) and climate change (SDG13) at the same time. ESG is a framework that takes a holistic approach towards sustainability and helps stakeholders of a business understand how an organization is managing risks and opportunities. It is gaining momentum globally and in the MENA region. Despite the challenges it faces and the multiplicity of standards and regulations, there is a great window of opportunity by fully embedding ESG within organizations while paying attention to the interconnectedness between its factors, the environmental, the social and the governance. The paper looks closely at the intersection between gender equality and climate change and ends with a blueprint of how to use ESG to progress towards both outcomes. The recommendations include developing the business case for the gender - climate nexus, adopting a holistic approach towards ESG that embraces the interconnectedness of its factors, aligning corporate strategies with national strategies, embedding ESG into corporate strategies and policies, and catalyzing the growth of gender lens investing. To implement these recommendations, the engagement of all stakeholders and synchronization of public-private efforts is necessary.

Keywords: ESG, gender equality, climate change, gender lens investing, Sustainable Development Goals (SDGs)

Introduction

The 27th session of the Conference of the Parties of the UNFCCC or COP27 followed by Davos 2023, have brought to the forefront the need for collaborative efforts of governments and the private sector to set the resilience agenda and reach the net-zero commitments. Both meetings that brought together senior representatives from governments and top-level executives from global businesses brought the attention of the world to the challenges faced by businesses to balance risks while creating a positive impact. This is where the conversation around Environment, Social and Governance (ESG) factors becomes crucial.

Research by the University of Oxford Sustainable Finance Programme shows that an increase in company-level Environmental, Social and Governance (ESG) performance can result in a positive effect on a country's living standards (Zhou et al., 2020). Building on that premises, the paragraphs below aim to explore how ESG can best support achieving progress on the Sustainable Development Goals (SDGs) while focusing on two SDGs, gender equality (SDG5) and climate change (SDG13). Gender equality and environmental sustainability are closely intertwined and the move towards green transition will have its societal and economic impact. Hence, gender equality needs to be systematically embedded in all areas of action and threaded through every aspect of the transition. ESG Environment, Social and Governance (ESG) factors may be used as vehicle to drive achieving gender equality and climate change goals hand in hand. ESG practices are used to evaluate how well a company is performing on sustainability and corporate responsibility goals and it brings together multiple stakeholders including companies, investors, policy makers, consumer citizens and regulators.

Egypt and the neighboring countries in the Middle East and North Africa (MENA) region are putting in place stringent measures for sustainability reporting. The paper comes only few months after all EGX-listed companies and non-bank financial institutions are supposed to have submitted their first ESG reports to the Financial Regulatory Authority (FRA) precisely in January 2023. It is thus timely to take a deep dive into the ESG framework, understand its challenges and identify the opportunities that it may offer for businesses and for the nation.

In the coming sections we define ESG, the challenges encountered and the opportunities that come up as companies apply ESG framework. Throughout the paper, the analysis is centered around gender equality and climate change as ESG may support achieving results on both fronts simultaneously. However, this requires adopting a structured approach and at the end of the paper we present recommendations that are centered around the engagement of all stakeholders which is in line with discussions during COP27 and DAVOS 2023 that called for public-private collaboration.

1. Overview of ESG- Definition and Evolution

Keeping in mind the challenge of having a universal definition of ESG framework, we start by providing a common understanding of ESG for the purpose of this paper. The term ‹ESG› was coined as early as 2004 when the United Nations Global Compact and the Swiss Federal Department of Foreign Affairs published a report Who Cares Wins. IFC defines ESG as a set of environmental (E), social (S), and governance (G) factors that companies and investors take into consideration when making decisions with respect to risks, impacts, and opportunities. There is no "universal categorization" of ESG issues as those depend on the sector, type of industry and so on. However, in general terms, environment may refer to issues like pollution and climate change, social may refer to diversity and inclusion and supply chain, while governance may refer to issues like board structure, risk management, disclosure and transparency and others (IFC, 2021). It is not possible for a company to address all ESG concerns at one time, therefore, a materiality assessment is usually undertaken to decide on which issues to tackle (PricewaterhouseCoopers). The materiality assessment usually results in a firm identifying its ESG priorities which is then translated into specific goals and actions (McKinsey, 2021). As mentioned earlier, ESG priorities differ according to several factors like industry and geographical location.

ESG is a framework that helps stakeholders understand how an organization is managing risks and opportunities and it takes a holistic approach towards sustainability that goes beyond environmental issues. Other historical movements that gave way to ESG focused on health and safety, pollution reduction and corporate philanthropy. The three movements are Environmental, Health, & Safety (EHS), Corporate Sustainability and Corporate Social Responsibility (CSR). CSR became very popular by the 2000s and focused on how companies address social issues (Corporate Finance Institute, 2023).

Of the several features that differentiate ESG from the preceding movements, two are very distinctive. First, the shift from focusing only on shareholders to a more holistic approach that takes into consideration all stakeholders of the business acknowledging the link between stakeholders' welfare and company profitability. This comes in line with "Davos Manifesto" published by the World Economic Forum in 2020 that called for fostering a better kind of capitalism stating that "… a company serves not only its shareholders but all its stakeholders – employees, customers, suppliers, local communities and society at large." (IFC, 2021). Second feature of ESG is the global pressure to demonstrate real progress through disclosure and reporting that is enabled by tools and standards that companies may use to manage and disclose information. Popular standards include the Global Reporting Initiative (GRI), Principles for Responsible Investment (PRI), IFC Environmental and Social performance Standards, International Financial Reporting Standards (IFRS) and many others. Some of the standards, the GRI for example, link to the SDGs so that SDGs are embedded into the corporate reporting (GRI and UN Global Compact, 2022). Building on the above and comparing ESG to CSR, if CSR is the "philanthropic arm" of a business that focuses solely on social impact, ESG is a main component of a business's value creation and risk management strategy (McKinsey & Company).

2. Gender Equality and Climate Change: Building the Case

As we mention climate change, it becomes very clear that we are discussing the "E" component of ESG. However, as we first hear ESG, we stop for a moment as we are uncertain if the "G" in ESG refers to gender equality or if gender is reflected under the "S"! To the dismay of many gender equality advocates, it is not the "G". For most companies gender is rather hidden under the "S" or the "G" depending on the angle from which they choose to address equality. More to the dismay of our same group of advocates, gender equality for many companies is regarded solely as a human resources responsibility or

to increasing the number of women on boards or in leadership positions. Companies in many instances fail to see gender equality or empowerment of women as related to the "E" in ESG.

Failure to see how gender equality fits also within the "E" factor of ESG is very unfortunate and is a lost opportunity. In fact, research shows that climate change has unequal impact on men and women especially as we consider the unequal distribution of roles, the lack of access to land, to financial services, and unpaid caregiving (Marypat). Harvard Business Review (HBR) indicate that on average women have smaller carbon print when compared to men and they often take the lead on grassroots level or corporate level to invest time and effort in initiatives to protect the environment. It is also noteworthy to mention that women are major actors when it comes to household decisions, and they are more likely to change their consumption patterns to a more environmentally sustainable one. This becomes particularly important as we know that 72% of global greenhouse has (GHG) emission are related to household consumption including loss or waste food (OliverWymen and Club 30 Percent, 2021). Studies have also shown that there is correlation between having more women in executive positions or on boards and companies having enhanced environmental impact and social responsibility (Gloor et al., July 2022). A study in Australia has found that women entrepreneurs exhibit more commitment to sustainability goals and are more ready to engage in green business activities than their male counterparts (Strumskyte et al., 2022).

We can therefore agree that women are well positioned to be agents of change when it comes to climate change.

Unfortunately, when organizations address environmental sustainability, they tend to focus entirely on reducing emissions and technological advances ignoring the interconnectedness between environmental issues and social sustainability especially gender equality. Companies often tend to focus more on the "E" component especially that the social factors might be difficult to identify and/or quantify for reporting purposes (Coombs, December 2021). Broadly speaking, companies tend to address each factor of the ESG separately and the interconnectedness is often overlooked although an approach that integrates all three (E, S & G) might have an impact on accelerating net-zero emissions (Gloor et al., July 2022).

Failure to see the interconnectedness of ESG factors is coupled with considerable challenges that hinder the embedding of ESG within companies which are still grappling with the practice under different jurisdictions. Despite the progress and concerted efforts to provide international standards that would guide ESG, there is no common language for ESG. The multiplicity of standards and absence of a universal framework for ESG reporting makes comparing ESG performance across companies very difficult (Horoszowski, October 2022). The lack of unified standards contributes to the shortage of a pool of talent that can help companies fully integrate ESG into their business practices. The inconsistencies in the system created some skepticism from the public and investors and gave the surge to claims that ESG hurts local markets especially those producing fossil-fuel (McKinsey Quarterly, November 2022). In some instances, companies are accused of misusing ESG ratings to portray a false image of them being socially conscious or contributing to sustainability efforts. This is often described as "greenwashing" or "woke-washing" (OliverWymen Forum and Club 30 Percent, 2021). It is good news therefore that IFRS has announced during DAVOS 2023 that it is working on consolidating the multiplicity of standards and hopefully by the summer of 2023 updated standards will be launched (World Economic Forum, 2023).

3. Aligning Efforts for Gender Equality and Climate Change: The Opportunities

The ESG framework is evolving and companies in the MENA region are "in the start-up" phase when it comes to adopting ESG reporting as described by PricewaterhouseCooper (PwC) in their report, *Reimagining our region through ESG* (PwC, 2022). Consequently, there is a lot of room for adaptation and improvement.

The opportunity exists and with a structured approach we can use ESG framework to achieve results on both gender equality and climate change. Both issues have social and business impact and both issues are source of pressure from investors, governments and consumers. Delivering towards gender equality and towards climate change have similar requirements among which comes change in the business model, commitment of board and company leadership, instilling new values and building capacity of employees as well as rigorous data and research (OliverWymen Forum and Club 30 Percent, 2021).

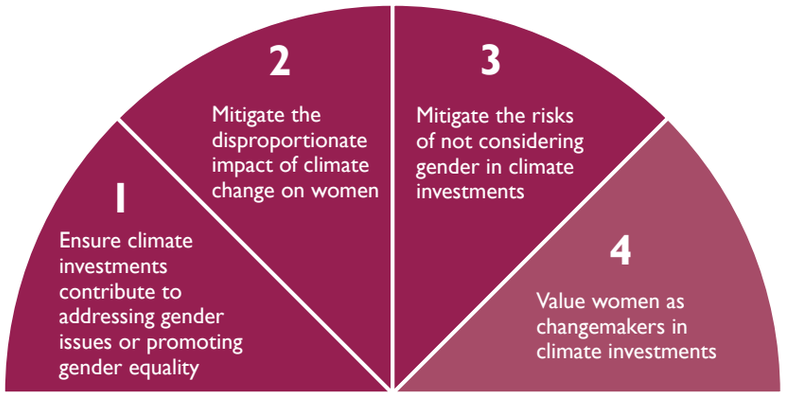
It is encouraging to seize the opportunity and explore how these similarities can be best employed to progress on both fronts. There are different approaches to do so, however, for the purpose of this paper, we will take the example of impact investment and namely gender lens investing. Impact investment is investing with the aim of intentionally generating social and environmental impact as well as financial returns (Coombs, 2021). ESG was ushered by public sector whereas impact investment evolved through the efforts of the private sector. Although they both work in different ways, yet, most impact investors integrate ESG factors into their investment process (Foroughi, 2022). Therefore, we will look at the gender lens investing model and borrow few ideas that may enhance the ESG framework.

Gender Lens Investing (GLI), sometimes referred to as gender-smart investing (GSI), is an impact investment that integrates gender-based factors and data into financial analysis to validate investment decisions. It aims to increase opportunities for women while optimizing returns on investment. GLI applies a gender lens at every stage in the investment process starting with sourcing, analysis and all the way through divestment. GLI may refer to investing to address a specific gender issue and it may refer to investing in enterprises that promote equality at the workplace and in the value chain. GLI includes also investing in enterprises that offer products and services that improve the lives of women and girls or enterprises that provide increased access to women and girls (ANGIN and UN Women, 2020).

Globally, GLI is gaining momentum among investors including an interest in new gender funds and new instruments like gender bonds. The 2X initiative is an interesting example to explore. The 2X initiative was launched at the G7 Summit in 2018 as a joint commitment by the world's development finance institutions (DFIs) to crowd in investors (e.g. DFIs, private equity and venture capital funds, asset & wealth managers…) and promote for a gender lens investing. The 2X Collaborative is a leading body for gender lens investing that was launched during the UN Generation Equality Forum 2021 in partnership with GenderSmart and the Investor Leadership Network (ILN). They aim to bring in investors and build their capacity to increase volume and impact of capital that aims to address gender equality and empower women adopting an approach that integrates gender considerations in all investment frameworks (Tobé, 2022).

GLI captures all the factors of ESG. Equality at the workplace capture the "G" where we look at women in leadership positions and board structure. GLI funds also capture the "S" as we look at external stakeholders including women consumers and supply chain diversity, product safety, and others. The "E" is also captured under GLI (Smucker, 2022). There is growing evidence that women investors are interested in investing in accordance with ESG factors and direct funds towards green projects as well as enterprises that integrate gender equality throughout (OliverWymen Forum, 2021). It is noteworthy to refer here to gender-smart climate finance which is a strategy that combines both gender-smart investing (or GLI) and climate finance with the goal of delivering towards climate outcomes as well as gender equality (2XChallenge, 2022). The Women in Finance Climate Action Group (WIFCAG) is a group of women leaders from business, the public sector and civil society – who assemble to drive increased gender equality when designing, delivering and accessing climate finance. Building on existing gender and climate frameworks, the group developed a framework that aims to help investors apply a gender lens to their climate investments and activities. This framework can be adapted to inspire a version that enables companies to collect data that can be integrated into their climate reporting and disclosure. The framework ensures that women are being holistically considered in terms of how they experience the negative impacts of climate change and how they are valued in climate solutions. To best utilize the framework (which is described in figure 1 below) organizations need to take key steps to ensure that internal governance and policies promote gender equality and that gender lens targets are included in setting climate targets and monitoring progress (OliverWyman, January 2023).

Figure 1: Four target outcomes for gender and climate that investors could adopt when applying a gender lens to their climate investments



Source: OliverWyman, 2X Global, & %30 Club. (2023, January). Applying a gender lens to climate investing: An action framework. Oliver Wyman Forum. Retrieved February 2023 ,3, from https://www.oliverwymanforum.com/climate-sustainability/2023/jan/applying-a-gender-lens-to-climate-investing.html

4. Recommendations: The Blueprint to Progress towards Both Outcomes, Gender Equality and Climate Change.

In the above paragraphs, we explained what ESG is about, we developed the broader connection between gender equality and climate change with some of the challenges that we may encounter as we deliver towards both outcomes under the ESG framework. Because ESG is an evolving framework especially in the MENA region, we were able to identify opportunities that allow for the synchronization of efforts on both outcomes. The Gender lens investing (GLI) strategy was used as an example to illustrate the opportunities that may exist. We conclude in the coming section with recommendations that may serve as the blueprint or roadmap to achieve progress on gender equality and climate change through embedding ESG factors within companies. The below mentioned recommendations require the collaborative effort of all stakeholders including board of directors, company management, employees, policy makers, citizen consumers, and regulators.

1. Develop the business case for the gender-climate nexus

Although there is growing research that shows the dual benefits of addressing environmental issues in parallel with gender equality and inclusion, yet more needs to be done in this area (WEDO et al., 2022). Showcasing of successful initiatives is needed with highlights of the role women play in climate action (either as leaders or on grassroots level) and their influence in promoting a low carbon print. Developing gender-environment indicators will substantiate the analysis of the differentiated impact of climate change on men and women. International organizations and governments should incentivize research institutions to undertake such task and incentivize the private sector to invest in these types of research may be through their R&D departments.

The Gender Climate Tracker App and website launched by Women's Environment and Development Organization (WEDO) in 2016 are a hub for information on gender equality and climate policy providing access to key data, research and policies on both themes (Gender Climate Tracker, 2016). More of these hubs on national levels can allow experts, researchers, and the private sector to share data, statistics and best practices to inform policymaking on one hand and to enable the private sector to have an informed approached towards gender and climate considerations.

2. Adopt an integrated approach to ESG

A recent McKinsey and NielsenIQ study brings the attention to the value added of adopting a holistic approach towards ESG that embraces the interconnectedness of its factors. The study finds evidence that consumers are more attracted to products that show multiple ESG-related claims (Frey et al., 2023).

Looking at the MENA region, PwC in their report *"Reimagining our region through ESG: The 2022 Middle East Report"*, point out to the fact that although ESG is gaining momentum in the region, yet most companies do not have a system in place or a dedicated team to perform the ESG functions. This might impose a challenge to embracing the holistic approach that we mention above (PwC, 2022).

However, the report also mentions that MENA companies are in the startup phase and ESG is still shaping in the region. The same report finds that gender equality is a focus of organizations in the region (PwC, 2022). There is therefore a great window to call for an integrated approach to ESG by promoting the interconnectedness between all three factors and look at gender equality across the E, S, and G.

Gender equality should be integrated across board, examples include:

- the range of products and services that organizations offer its consumers,
- diversifying the supply chain and supporting women owned businesses, for example, McKinsey have a "Responsible Buying program" that integrates ESG into their procurement processes promoting for reduction of emissions as well as diversity, equity and inclusion (McKinsey, 2021)
- promoting for increased women in higher paid STEM jobs especially in the energy sector and green jobs.
- scaling up vocational training programs for women in green jobs. With the technological advances, a shift in market trends is expected to result in demand for a new range of products and services as well as an increased market need for new and greener jobs (Corporate Finance Institute, 2023). The demand for new goods and services is well noticed with the introduction of new products like green hydrogen and blue bonds (PwC, 2022). This might lead to lack of skilled labor or a mismatch between existing talent and the labor market (Corporate Finance Institute, 2023).

Regarding the last two bullets, some initiatives may be cited from the MENA region. Masdar, a UAE based leading developer and operator of utility-scale renewable energy projects, launched a platform in 2015 which is dedicated to inspiring women to play an active role in addressing global sustainability challenges under the name 'Women in Sustainability, Environment and Renewable Energy' (WiSER). The platform works on building the capacity of women in climate leadership through mentorship, annual forums, training workshops, publishing white papers and others. The platform brings together government, private sector, research institutes and international development organizations. This platform may be replicated across the region and it can be a venue for the private sector and government to align their efforts on sustainability.

3. Align corporate strategies with national strategies

Many of the MENA countries have their national development plans that set the nation's priorities with respect to the environmental, social and governance factors. It is imperative that corporate strategies are aligned with those priorities. This approach shall not only magnify impact but will also put the private sector at a better position to grab the opportunities that may come up as a result of demand for new products or services that may emerge as a result of the green transition (PwC, 2022).

For example, Egypt has several national strategies and frameworks that address gender equality and climate action. We have Egypt Vision 2030, Egypt National Climate Change Strategy 2050, The National Strategy for the Empowerment of Egyptian Women 2030, Egypt's Global perspective: Women, Environment and Climate Change and other strategies. These strategies may provide an overarching structure for setting ESG priorities and KPIs for companies operating in Egypt.

4. Embed ESG into corporate strategies and policies

ESG needs to be embedded into the purpose of the business, strategy, monitoring and reporting, stakeholder engagement and all other aspects of the business. Education is a key success factor for any company that seeks to adopt ESG framework and it becomes more crucial if we call for embracing the interconnectedness of the " E", the "S" and the "G". The board of directors needs to fully understand and endorse the framework and the company needs to have the pool of talents that can work on applying this framework to the business. Employees are key stakeholders that should be engaged in the process of adopting ESG since it may entail new values at the workplace or new work models.

5. Catalyze the growth of gender lens investing (GLI) that brings together the "S" and the "E" in ESG

GLI is an untapped opportunity that may facilitate access to funds and investments in women founders and cofounders of startups in green technology, renewables, recycling and other green business. The challenge is that GLI products are still limited and typically focus on women in leadership, which is of course very important, yet it is not a sufficient indication of equity within the organization (Rainbow, 2022). Creating awareness and better understanding of GLI and how it can support women and climate action is crucial.

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INTEGRATING CLIMATE DATA WITH A TOURISM OPPORTUNITY INDEX: A CASE STUDY IN NEPAL

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Abstract

This research explores relationships between tourism and social and environmental vulnerability elements by creating a Tourism Opportunity Index (TOI). The Tourism Opportunity Index is created by combining climate, socioeconomic, infrastructure, and overtourism variables. Moreover, this research explores a new way to determine a region's tourism opportunity by analyzing observed local climate change within the context of a sustainable tourism development analysis. Using thirty years of a synoptic meteorological variable, the Gridded Weather Typing Classification (GWTC) helps to establish the basis for which Nepal's climate has changed and will continue to do so. For this case study of Nepal results indicate, among all its districts, Kathmandu has a high TOI score despite experiencing symptoms of overtourism. Additionally, the TOI indicates tourism within the Himalayan region as a whole is increasingly at risk due to observed climate change. This research and its recommendations will hopefully help facilitate an understanding of how climate change is currently negatively impacting the potential of Nepal's tourism system. Additionally, this work provides a baseline by which both climate and sociodemographic variables can be used together in an evaluation of tourism development.

Keywords: Tourism, Development, Sustainability, Nepal, GWTC, Climate Change, Index

1. Introduction

One of the many positive results of COP26, held in Glasgow, 2021 was the Glasgow Declaration on Climate Action in Tourism. This declaration was deemed a 'catalyst' that has jump-started climate action among stakeholders in the tourism sector. Much the same levels of momentum are seen today as were in 2017 when the United Nations General Assembly declared it the year of Sustainable Tourism for Development. The Glasgow Declaration refueled commitment to climate change and has seen globally over seven hundred signatories committing to deliver climate action plans with the goal to reduce tourism emissions by 50% by 2030 and reach net zero before 2050. This is in spite of research that forecasts CO2 emissions from tourism to increase by at least 25% by 2030 (UNWTO, 2021).

Today, after the completion of COP27 we face more opportunities and ideas for next steps. Among many ideas, we note in the Sharm el-Sheikh Implementation Plan: "just and equitable transition encompasses pathways that include energy, socioeconomic, workforce and other dimensions, all of which must be based on nationally defined development priorities and include social protection…" (VIII, 29). In adhering to this principle, we offer a geographically-transferrable index to be used within sustainable tourism development that assesses tourism potential using local assessments of climate change alongside socioeconomic factors. While many indices exist that attempt to assess tourism and development (de Freitas and Grigorieva, 2015), few of them incorporate both climate data and human development factors. In this case study of Nepal, we offer a methods-based approach in doing so.

2. Climate Change and its Impact on Tourism

Sustainable tourism is inherently linked with climate change and is particularly relevant in the most vulnerable, developing countries who have fewer resources to contribute to mitigation and adaptation. In a long-developing comprehension, sustainable tourism has increasingly been implemented among developing nations (Shakya, 2009) where it that looks for long-run profitability with collaboration at multiple levels (Byrd, 2007). Additionally, creating a policy-driven framework involves identification of environmental factors (Boselli, Caravello, Scipioni, & Baroni, 1997) and inclusion of necessary physical properties such as climate, topography, and landscape (Clegg, 2015).

In this paper we emphasize climate and climate change as a key factor in shaping an understanding of tourism development. Climate is an integral part of tourism and can attract or repel tourists (Gomez-Martin, 2005) thus, directly impacting the choice of recreation by limiting time and space for tourism activities (Scott, Jones, & Konopek, 2007). At the same time, those climate characteristics affect nature-based tourism in various ways, including the quality of a recreation/tourism experience. Comfortable and barrier-free climatic conditions attract tourists (Beniston, 2003) and changes in these factors can have a direct impact on the quality of their trips. Popular tourist destinations such as tropical islands, coastal areas, and mountainscapes are at a heightened risk of climate change impacts on tourism. Although the climate is not the only factor that tourists weigh, it is one of the most important considerations for a range of activities designed to satisfy tourists (Scott, Jones, & Konopek, 2007).

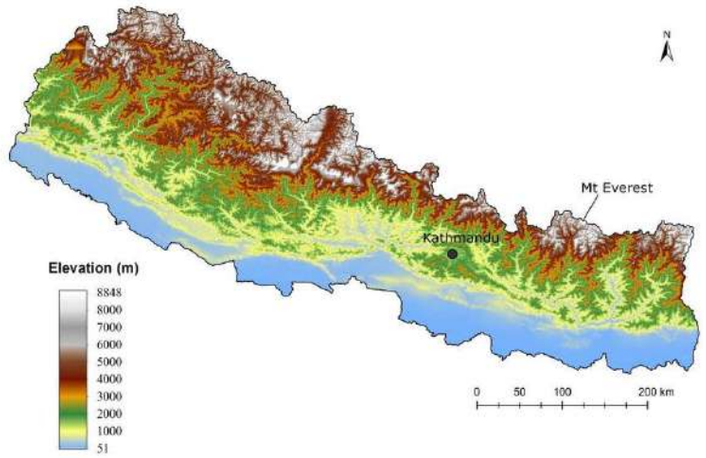
Climate change affects nature-based tourism by impacting those very natural resources on which tourism is based (Scott, Jones, & Konopek, 2007). Any change in the Himalayas climate characteristic could reduce the tourism flow negatively by altering the perceived attractiveness of the Himalayan environment. Ironically, even negative environmental changes (e.g., warming alpine areas) can potentially bring out new opportunities for a destination—at least in the short-term. For example, in mountain environments, warmer temperatures can provide opportunities for destinations to expand their tourism facilities. This can come at a cost, however, with other natural hazards developing. Understanding so is an important consideration because tourism and climate are the two interrelated components that can "pump and dump" the tourist industry simultaneously (Defreitas, 2005). Any change in the climate will affect tourism resources in both the short and long-term. Countries whose tourism is based on natural resources are even more vulnerable to the climate than the other countries based on indoor activities. As has been stated by Daniel Scott, chair of the World Meteorological Organization (WMO) Expert Committee on Climate and Tourism: "Weather can ruin a holiday, but climate can ruin a destination." (Curtis et al, 2011).

3. Case Study of Nepal

Tourism has been known as a potential pathway toward Nepal's prosperity and the sector capable of changing the country's economic position. That said, the Nepalese Himalayas can be adversely affected by climate change through glacier retreat, avalanches, landslides and flooding, gradual extinction of many flora and fauna species, and damage to forest ecosystems through fire and insect infestation. Any changes in the climate's physical characteristics have the potential to negatively affect tourism industries (Nyaupane & Chhetri, 2009). Because Nepal's tourism sector is strongly dependent on outdoor nature-based experiences, a changing climate has significant implications on the future sustainability of tourism.

Nepal is a landlocked country located in South Asia with China in the north and India in the south, east, and west. The country is divided into three geographical regions: the Himalayan, Hilly, and Terai regions. The Himalayan region is a mountainous region located in the northern part of Nepal lying above 3000 m altitude. It occupies 16% of the country's total land area and is home to around 8% of the country's population. Eight of the world's highest peaks (out of fourteen) that are above 8000 m lie in Nepal,

Figure 1: Elevation Map of Nepal



Map source: Chintala et al., 2018

including the world tallest MT. Everest (8848 m). The Hilly region is generally a mountain region with no snow ranging the altitude from 700 m to 3000 m. This region covers around 65% of the total land area and home to around 45% of the country's population. Many lakes and valleys are located in this region, including the Kathmandu Valley and Pokhara Valley. The Terai region lies in Nepal's southern part, ranging from 26,000 m to 32,000 m wide and varies in altitude from 60 m to 700 m. It is also known as the extension of the Gangetic plains of India. It covers about 19% of the total land area, which is known for its excellent farming land.

Nepal's climate is observed as pre-monsoon, monsoon, post-monsoon, and winter (DHM, 2008). Pre-monsoon season is in March, April, and May; Monsoon depicts in June, July, August, and September; Post monsoon in October November; and winter season in December, January, and February. Usually, Nepal receives 80% of its annual rainfall during the monsoon. The eastern region of Nepal receives more rainfall than the western region. Eastern Nepal receives about 2,500 mm (100 in) annually; the Kathmandu area about 1,400 mm (55 in.) and western Nepal about 1,000 mm (40 in.). The Koppen-Grieger classification study carried out by Karki et al. (2015) classifies four types of Koppen climate in Nepal. A (Tropical), B (Dry), C (Temperate), and E (Polar) climates occur in the Nepal territory with the temperature ranges from 26°C (in Terai region) to -12°C (at the mountaintops).

3.1 Climate Change in Nepal

Climate change is becoming a significant hazard to humankind. It is recognized as a significant threat to Nepalese rural communities, which are more dependent on natural resources (Maharjan, Sigdel, Sthapit, & Regmi, 2011). Nepal's temperature is increasing at a high rate in recent years, similar to the phenomenon observed globally. It is found that the average temperature in Nepal has increased consistently and continuously, at a rate of 0.05°C/year from 1971 to 2005 (DHM, 2008). Likewise, the maximum temperature increased by 0.06°C and minimum temperature increased by 0.03°C/year between 1975 to 2005 (Marahatta, Dangol, & Gurung, 2009). Significant warming trends in the Himalayan and Tibetan regions, higher than the global average, are reported in the literature (Shrestha, Wake, Mayewski, & Dibb, 1999). Such warming trends in the world's largest and highest mountain system will influence glacier and snow dynamics, leading to changes in water resource availability, particularly during spring and autumn (Maskey, Uhlenbrook, & Ojha, 2011).

The mean precipitation in Nepal is increasing annually by 13 mm (1978 to 2008), while the number of rainy days has decreased by 0.8 days/year during that same time period. Increases in summer river flow provide further evidence that high summer temperatures lead to fast glacier melt and retreating glaciers. A monsoon rainfall study from 1971 to 2005 shows an increasing trend of about 2.08 mm/year with a sizeable inter-annual variation (Baidya, Shrestha, & Sheikh, 2008). There is also an increase in the number of flood days in certain rivers in Nepal.

Understanding Nepal's cultural and physical geographic diversity, we develop a tourism opportunity index (TOI) intended for identifying the different regions within Nepal that might benefit most from tourism development. The index will consider tourism resources with varying environmental and social factors that impact human vulnerability. This index aims to provide a baseline guide or tool for local governmental agencies to determine if tourism is an available and appropriate tool for local economic sustainable development. Where this index is unique is that it includes a combination of traditional tourism development metrics but tempers those with a climate risk and tourism climatology index to give additional perspective on climate-related impacts.

3.2 Tourism Opportunity Index (TOI)

TOI looks more to development opportunities and less at social or economic needs (though the latter is indeed an important factor for future research). The geographic scale reports a score for each of Nepal's districts, encompassing the entire country. This index is organized based on a climate assessment and a development assessment, each of which has subcategories. The following variables are included in the making of the tourism opportunity score:

Table 1: Variables in the Tourism Opportunity Index (TOI).

Climate assessment indices	Development assessment indices
Climate Risk	Transportation
Tourism Climatology	Tourism Resource
	Socioeconomic Status
	Overtourism Condition

The overall score of the TOI is based on the following formula where the climate risk index represents a negative factor and the overtourism score either represents a negative or zero influence:

TOI =

[Tourism Climate – Climate Risk] +

[Transportation + Tourism Resource + Socioeconomic Status +/- Overtourism]

With the exception of the overtourism index, all indices and their subcategories were normalized according to a 1-5 scale based on an equal-interval evaluation of the respective data. Raw scores are noted in Appendix 1.

Climatic assessment

Assessment of climate in this research looks at observed synoptic climate variability and change in Nepal. We use the Global Weather Type Classification (GWTC) climatological data provided by Dr. Cameron Lee (Kent State University) for climactic analysis. The gridded weather typing classification (GWTC) system is a geographically and seasonally relative classification of multivariate surface weather conditions (weather types) for North America (Lee, 2014). Using six near-surface weather variables (temperature, dew point, sea-level pressure, cloudiness, wind speed, and wind direction) from the North American Regional Reanalysis (Mesinger et al., 2006), the GWTC classifies every day since 1979 into one of 11 different weather types (noted in Appendix 2).

Using the gridded weather pattern from 1979 – 2018, we divide the frequency of weather types into four decades for trend analysis. Here in this section, we define the terminology as follows: first decade means the climatic activities between 1979 – 1988; second decade indicates the meteorological activities during 1989 – 1998; third decade represents the weather between 1999 – 2008 and; fourth decade indicates the climatic activities between 2009 – 2018.

Climate indices

Areas with significant climate variability decade-to-decade score high and areas where the climate is steady across decades score low. The assumption here is that climatic change, particularly abrupt changes increase both tourism industry and human vulnerability. All eleven variables of the GWTC data set are used to calculate the Climate Risk Index. For this paper we chose to display only the GWTC variables that have the most profound impact on this index.

A humid weather type indicates above-normal humidity while at the same time, possessing an average temperature index (Lee C., 2014). This type of weather in Nepal occurs most often from Feb to May. During the first three-decades, humid classification days are typically low in the Himalayan region compared to the last decade and are active more in the Terai region in the first two decades, with about 11% average occurrence per decade. However, in the fourth decade (2009 to 2018), we see increases in the humidity in the Terai region and Himalayan region, especially in the central Terai region, where it occurs more than 26% of the time.

Figure 2: Synoptic Climate Classification with GWTC Data: Humid, 1979 to 2018:

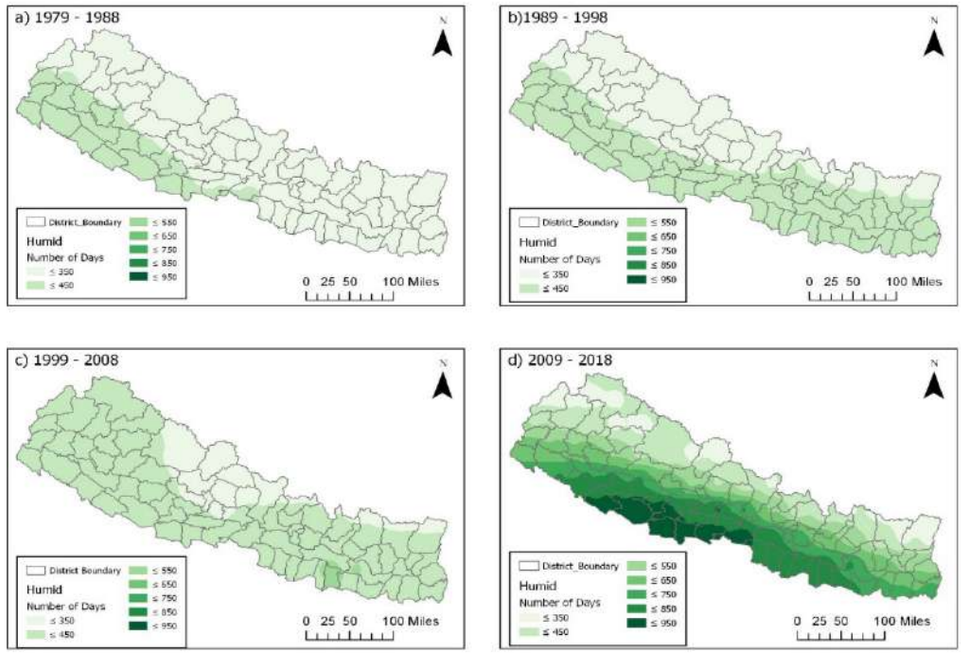


Figure by author, data obtained from the online database Gridded Weather Typing Classification. February, 2020, http://personal.kent.edu/~cclee/gwtc.html . Method source: Lee, 2015.

The Humid Warm (HW) weather type pattern indicates the weather pattern where humidity and temperature are both above average (Lee C., 2014). This type of weather pattern based on Figure (3) shows that HW is consistent throughout the first decade (1979 to 1988) but is relatively uncommon as HW weather type occurs only 2% of the time on average. However, in the fourth decade (2009 to 2018), we see a dramatic rise in humid warm days, especially in the central part of Nepal where its frequency increased more than 5% compared to the last decade.

Figure 3: Synoptic Climate Classification with GWTC Data: Humid Warm, 1979 to 2018

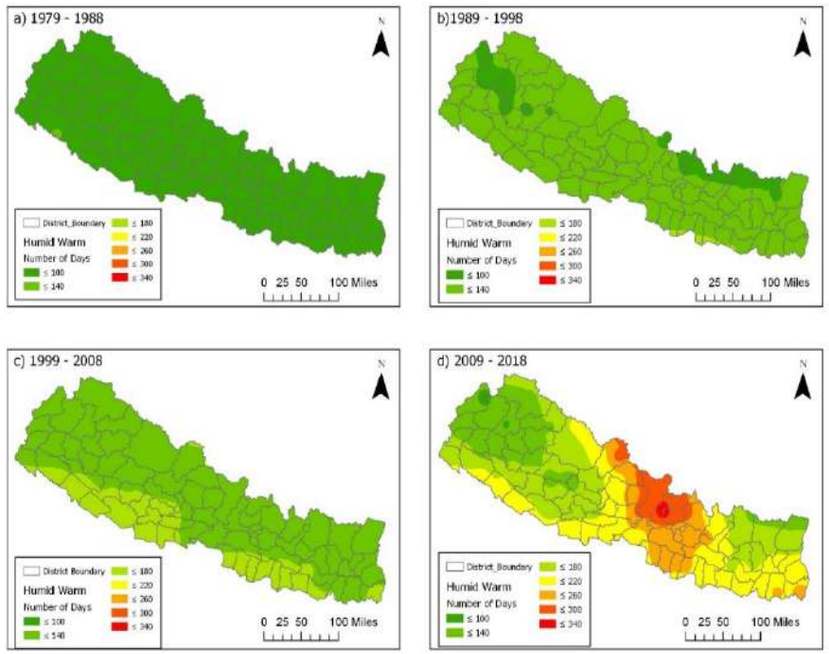


Figure by author, data obtained from the online database Gridded Weather Typing Classification. February, 2020, http://personal.kent.edu/~cclee/gwtc.html . Method source: Lee, 2015.

The warm weather type (figure 4) indicates a climatic condition where the average temperature condition is relatively warm but with the context of normal humidity (Lee C., 2014). During the third decade (1999 to 2008), we observe a rise in the warm weather type, where it occurs about 15.20% of the time in a decade with an increase of more than 5% compared to the last two decades. This can be partially explained by the very strong El Nino at the end of 1998 on the Pacific Ocean was the reason behind the change in climatic behaviors. Furthermore, we observe the rise in the warm weather type in the fourth decade (2009 to 2018). This is significant, though, as this impact predominately focuses on the Mt. Annapurna region, Mt. Langtang region, and Mt. Everest region, which are popular tourist destinations of Nepal.

Figure 4: Synoptic Climate Classification with GWTC Data: Humid Warm, 1979 to 2018

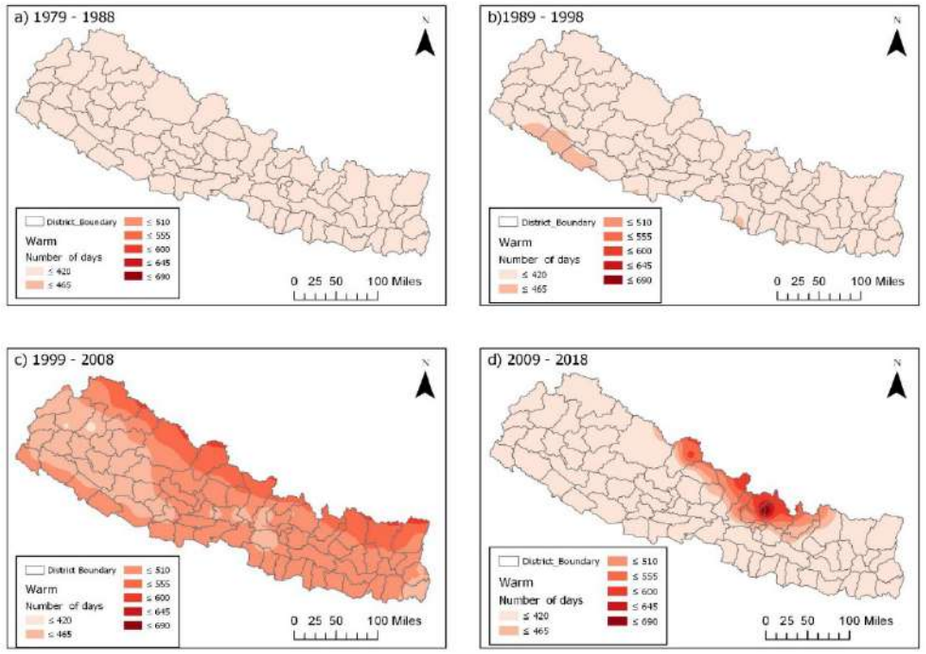


Figure by author, data obtained from the online database Gridded Weather Typing Classification. February, 2020, http://personal.kent.edu/~cclee/gwtc.html . Method source: Lee, 2015.

The Dry weather type (figure 5) represents weather types with relatively low dew points but with average temperature (Lee C. , 2014). This type of weather is more common during the pre-monsoon season of Nepal and is common in the southern Terai part of Nepal, occurring nearly 10-12 % during the first decade (1979 to 1988). During the second decade (1989 to 1998), we observe an increase in the dry days, especially in the western and eastern parts of Nepal, occurring 15-16% of the time. In this decade, Nepal's 1994 drought affected more than 35 districts of the western Hilly and Terai regions and contributed to the decadal numbers. Over time from 1999 to 2008, we observe a slight decrease in the overall dry weather types, but the trend is most active in the western Terai region, with the averages closer to 12% to 15% of the time. The frequent dry spells and wet monsoon after 2002, mainly drought in 2005, 2006, and 2008 depict the third decade's overall trend. We see more increase in the dry weather types during the fourth decade (2009 to 2018); however, the increase is focused only on the districts in the western hilly region and Himalayan region where they occur in between from 16% to 20% of the time, almost double the national average (9.58%).

Figure 5: Synoptic Climate Classification with GWTC Data: Dry, 1979 to 2018

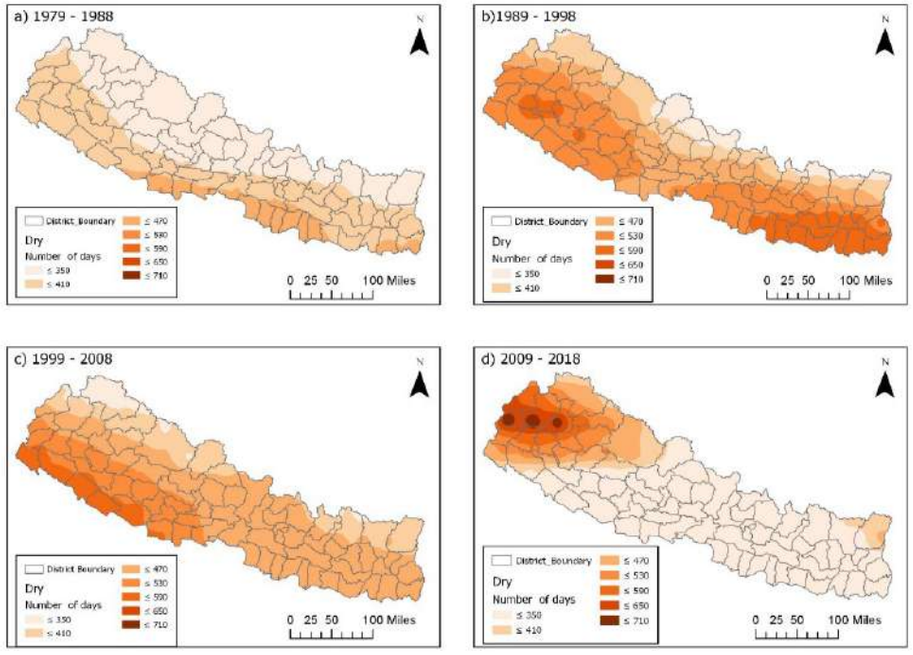


Figure by author, data obtained from the online database Gridded Weather Typing Classification. February, 2020, http://personal.kent.edu/~cclee/gwtc.html . Method source: Lee, 2015.

Figure (6) shows the calculated Climate Risk Index. It is apparent that the Himalayan region generally has a 'high' or 'very high' climate risk due to increased variability—particularly in the last two decades. Likewise, the Central part of Nepal, which is known for the tourism activities is highly vulnerable to climate change. The southwest region of Nepal encompassing both Terai and Hilly physiographic regions shows less variability and, therefore, a lower climate risk. Connecting the Climate Risk Index and synoptic climate maps (especially in the fourth decade), we observe that the Himalayan region has experienced significant climatic change and is extremely vulnerable. Outdoor-dependent tourism resources lie in the Himalayan and will be significantly impacted by the observed climate change.

Figure 6: Nepal's Climate Risk Index.

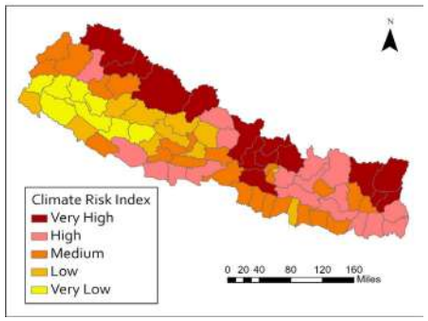


Figure by author, data assimilation by author using data from the online database Gridded Weather Typing Classification. February, 2020, http://personal.kent.edu/~cclee/gwtc.html . Method source: Lee, 2015.

Tourism Climate Index

Perkins (2021) chronicles general tourism thermal preferences among outdoor recreationalists across many contexts. Generally, a 'universal' preference exists in the warm/sunny moderate humidity realm of weather. With this in mind, the tourism climate index (figure 7) is based on GWTC conditions from the 1979 to 2019 data period that apply to warm/dry universal thermal preference, adapted for local context. For example, the same type of weather can be good for tourism activities in one location and at the same time might create a different result on another other destination. Humid warm climates can adversely affect the outdoor activities in the Terai region, but these humid climates can have a positive result for the outdoor activities in the cool Himalayan region. Despite the environmental implications, this variable is short-term focused, considering how weather and climate trends may facilitate an increase in tourists simply for sensory pleasure.

Himalayan districts—particularly in the northwest show some very good climatic conditions for outdoor activities like hiking trekking, and mountaineering. Usually, these areas are known as cold and/or cool places. The increase in the average temperature and humidity has helped increase the outside activity availability and creates a flexible environment for touristic behavior for the short term. Most of the Terai shows an unsatisfactory climate for tourism; as these flatlands are hot and humid places in Nepal. In this case, the humidity and temperature rise have worsened the tourism climate.

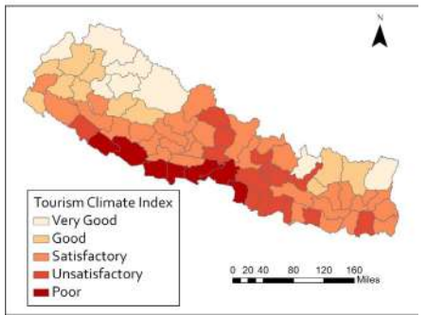


Figure 7: Nepal's Tourism Climate Index.

Figure by author, data assimilation by author using data from the online database Gridded Weather Typing Classification. February, 2020, http://personal.kent.edu/~cclee/gwtc.html . Method source: Lee, 2015.

Development assessment

Balancing social factors with climate change assessment, the Tourism Opportunity Index (TOI) includes several factors assessing the human development potential within Nepal including: transportation, tourism resources, socioeconomic status and overtourism. While these variables are presented separately and used additively to achieve a comprehensive assessment, it must be noted that development-related variables exist within a multidirectional feedback network with climate change. For example, climate change or environmental policy must consider not only emissions standards or rates of deforestation, but also the human condition that contributes to climate change and environmental damage as a whole such as poverty (Pattanayak, 2006).

Transportation is an important factor as both tourists and employees' need access to develop or utilize current and future tourism resources and amenities. To calculate the Transportation Status Index (figure 8), we analyze (1) Airport Facility (2) Road Facility and (3) Cableway Facility. We equally weight each variable to calculate an average index score which is normalized 1-5 using equal interval technique.

In total, there are fifty airports in Nepal, and many of them are seasonal or closed. Currently, the only international airport, Tribhuvan international airport (KTM), is the hub of all air services in Nepal and serves Kathmandu's national capital city. Out of fifty airports, only thirty one have regular flights, and the remaining nineteen airports are closed or not under the operation (Civil Aviation Authority of Nepal, 2020). According to flightRadar24, with the exception of Jomsom airport (JMO), all remaining twelve airports connect that destination with KTM with at least one flight per week. Tribhuvan International airport (KTM) has contributed significantly to the development of tourism in Nepal. According to Nepal Tourism Board statistics, annually, 761,000 visitors land in KTM, which is around four out of every five visitors who visit Nepal yearly. This airport has been the entrance gate and hub for the tourists by connecting more than forty destinations in seventeen countries, (Flight Connections, 2020). Due to the proliferating number of flights, and passenger loads through in this airport, as shown in Figure (13), the Nepal government is expanding the KTM airport and proposing to build three other international airports to overcome crowding and shift some air service out of the capital valley (Rai, 2018). Based on the data from the Civil Aviation Authority of Nepal (2020), we separate the airport facility of each district into five categories: No airport (1), domestic airports which are closed or not in operation (2), domestic airports which are under operation (3), regional airports or airport(s) under construction (4), international airport(s) currently operating (5).

The road network is one of Nepal's primary transport modes. Due to the Hilly and Himalayan regions' challenging topography, roadway construction is a complicated, costly, and time-consuming affair (Bhagat, 2017). Compared to most western countries, the existing road network is poor in Nepal, and vehicle accidents are frequent. Nepal's road network consists mainly of three types of road networks, Blacktop road (BT), Gravel road (GR), and Earthen Road (ER). In total, 6979.33 km (52%) of the constructed road has been categorized as Blacktop road, 2276.87 km (17%) Gravel, and 4194.42 km (31%) Earthen roads (Strategic Road Network Nepal, 2018). Traveling on blacktop roads would take less time to get to the destination than the gravel roads, and the earthen roads and gravel would be quicker than the earthen but slower than the blacktops. Therefore, we weight the roads by the average speeds one is likely to travel on each of the roads. This results in each road category receiving a network score based on the ratio of 6 (BT):3(GR):1(ER). After weighing the road network, a district was given 1-5 score based on road distance modified with road quality.

The ropeway in Nepal was introduced in 1922 for cargo service, but the first Cable Car in Nepal was established in 1998, the Manakamana Cable Car. Cableways have changed the whole tourism market scenario with the success of connecting the mountaintop Manakamana temple with lesser shrine complexes. This cable car provided increased visitation due to a lessened climbing hassle and faster access (Khatry, 2020). Each year, peak annual tourist numbers occur during the ten days of the Navaratra/Vijaya Dashami or Dashahara (in India) festival. Annapurna Himalayan range and Mt. Manaslu's scene and scenery further help draw the tourist's attention to this religious site. Due to its complex nature, we classify a cable car score based on geographical region; Terai region districts with no cable cars would not impact their overall score, and given Zero (0), the Himalayan region and hilly region with no cable cars get a score of negative one (-1). The districts with an operating cable car receive a score of one (1).

Figure (8) shows the transportation status index in Nepal. Results indicate the Kathmandu district is significantly advanced regarding transportation infrastructure development compared to the other Nepalese districts. Very good transportation districts are generally located along the southern border

with India, shaped by the enhanced road network, or the Pokhara area, due to increased airport access for tourism. Overall, the majority of Nepal's districts have low scores indicating weak transportation facilities. To expand tourism, Nepal needs to improve its entire transportation network.

Figure 8: Nepal's Transportation Status Index, figure by author

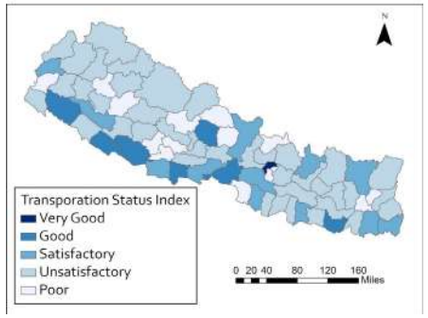


Figure by author, data assimilation by author using data from: Khatry, 2020; Strategic Road Network of Nepal, 2018; Flight Connections, 2020; Civil Aviation Authority of Nepal, 2020.

The tourism resource index (figure 9) shows the available number of resources each district has based on Nepal's current and potential tourism. Data is gathered from the Nepal Tourism Board and normalized to yield a score 1-5 based on an equal-interval method of division. The majority of established destinations like Kathmandu Valley, Pokhara Valley, Chitwan National Park are located in Nepal's central region. Additionally, gateway areas to 'hiking the Himalayas' in the north of Nepal yield a higher score. Eastern Terai region districts have the lowest number of established destinations.

Figure 9: Nepal's Tourism Resource Index

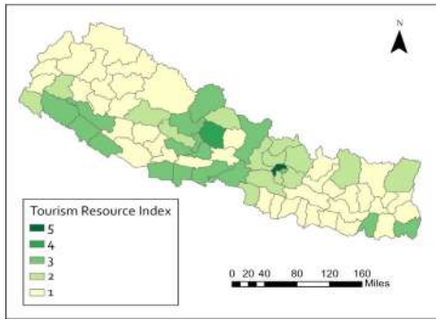


Figure by author, data assimilation by author using data from: Nepal Tourism Board, 2020

The Socioeconomic Status Index (figure 10) consists of three sub-variables: per-capita income, literacy rate, and the hotel/restaurant condition of the geographical region. The number of hotels/restaurants is used as a hybrid variable integrating both an economic employment variable and a tourism availability variable. We take an average score of each variable by giving equal weight and rank them from five (5) to one (1) using the equal interval technique. Per capita income illustrates the average income earned per person of Nepal's districts in 2013. The Central development region districts and Himalayan districts have the highest per capita income compared to Nepal's far western region, which generally has the lowest. The Manang district lies in the Himalayan region, and its overall economy is profoundly grounded on tourism activities based on the trekking and mountaineering. Both Manang and Kathmandu districts are rich in tourism amenities.

Historically, Nepal's formal education focused in the national capital city only; as a result, people who lived far from the capital have historically lacked formal education and educational facilities (Dhakal, 2018). Nepal's literacy rate is 67.9% (2018) - an increase from the 59.6% average over the last ten years. Despite the improvement, this rate places Nepal in 136th position out of 159 countries globally in terms of literacy rate standing (The World Bank, 2020). The Kathmandu district has the country's highest literacy rate of 86.3%. The lowest literacy rate is in the country's west

There are more than 25,000 hotels and restaurants in Nepal including guesthouses, starred hotels, and homestays. Although the facilities and options are in fewer quantities in the Himalayan districts, compared with Kathmandu Valley, one will still find accommodation with a full range of service offerings.

Figure (10) displays the results of the Socioeconomic Status Index. Kathmandu demonstrates stronger socio-economic conditions. Kaski and Manang in the north central Himalaya area follow Kathmandu with a highly rated overall socio-economic condition. Eastern districts and central Nepal's districts show some satisfactory socioeconomic status.

Figure 10: Nepal's Socioeconomic Status Index

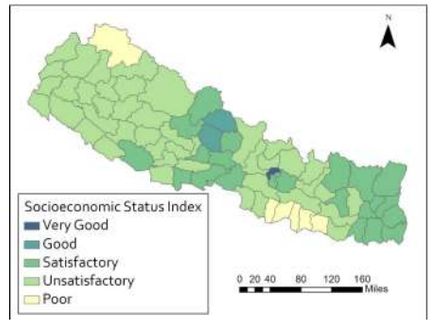


Figure by author, data assimilation by author using data from: The World Bank, 2020

Figure (11) displays the Overtourism Index which is based on previous work from Phuyal (2020) that explored areas of Nepal (Pokhara, Thamel City, Chitwan National Park) to determine if the unsustainable element of 'overtourism' existed. Based on this work, we include it into the TOI through three categories; negative two (-2) indicating an over-tourism condition and a need for urgent work, negative one (-1) where elements of over-tourism exist, and zero (0) indicating no overtourism.

Figure 11: Nepal's Overtourism Index

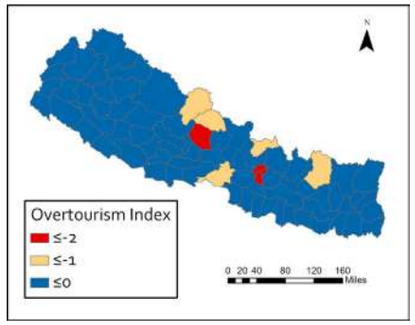


Figure by author, data assimilation by author using data from: Phuyal, 2020

Combining tall climate assessment and development assessment variables yields the Tourism Opportunity Index (figure 12). Results show Kathmandu and three other districts, Kailali, Kaski, and Surkhet, score the highest in Nepal. Despite showing an overtourism threat in Kathmandu's vicinity (Thamel), Kathmandu still has high potential because of its current development pathways, accessibility, and the restoration of its tourism resources. In comparison, the western district is less threatened by climate change and environmental degradation and it, therefore, also has excellent potential to develop in the longer-term. Most of the central and eastern Hilly region's districts have low potential with an unsatisfactory score index, including the culturally rich Bhaktapur district and famous trekking root of the Annapurna Mountain region of Manang and Mustang district.

Figure 12: Nepal's Tourism Opportunity Index

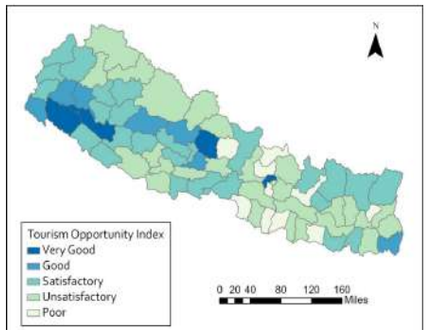


Figure by author, data assimilation by author using methods established in this research.

4- Conclusion and Policy Implications

Developing nations are often viewed as those most vulnerable to the impacts of climate change-related problems, while coincidentally also being the least to blame regarding the contributing environmental impacts to the global climate (Mertz et al., 2009; Klein, 2009). Despite the observation that vulnerable countries, in some cases, receive more support to aid in their adaptation to climate change (Betzold, 2017), in the case of Nepal, 88% of respondents from a nationwide survey indicated a 'lack of means or resources' when giving reasons for not undertaking coping or adaptation measures in light of climate-related hardship (Warner and van der Geest, 2013). Understanding both local climate change impacts and socioeconomic factors is imperative to interpreting the condition of development potential in a country and its varying regions. From the international climate policy perspective, it is important to emphasize how efforts to quell climate change do not end at environmental action as they can have larger social ramifications in terms of the potential a developing nation has to overcome climate-related problems.

Resultingly, this research proposed the tourism opportunity index by accessing a climate index, socioeconomic drivers, infrastructure conditions, and Nepal's overtourism condition. It proposed a new way to determine Nepal's tourism opportunity by analyzing climate and sustainable tourism development variables. It was also seen that observed climate change over the previous four decades, particularly within the Himalaya region, is already posing a great threat to Nepal's tourism development.

Future research in this realm should consider alternative weighting schemes to appropriately 'balance' the emphasis between climate and social variables. In the aspect of Nepal, attention to environmental factors should carry significant weighting values. Additionally, this study would be improved with more research on how tourism both positively and negatively impacts local residents and the culture of Nepal.

Finally, developing indices as such should have significant attention to ethics prior to implementation. For example, while warmer conditions in the Himalaya region, will likely increase the number of tourists - and thus improved the 'tourism climate' index score, environmentally speaking, it is very much a negative impact that carries many risks into the future.

While this case study concerned Nepal, the methodologies can be expressed and tailored for other geographies that seek to better understand and plan for sustainable tourism development in light of impending climate change.

From the perspective of Nepal, we offer the following policy recommendations resulting from the creation of this tourism opportunity index:

Table 2: Policy Recommendations

Conclusion	Policy Recommendation
Climate change and variability is most severe in the Himalaya region. An increased risk to tourists is likely to occur as a result.	Policies should attempt to refocus tourists outside of the Himalaya areas or implement area quotas to lessen direct environmental impact on a compromised ecosystem
Increased warming in the Himalaya region can be attractive to tourists, but will, over time alter the ecosystem and harm the tourism aesthetic.	These areas should implement plans for longer-term expectations rather than immediate tourism demand
Kathmandu and Pokhara regions still have good Tourism Opportunity scores; however, they must grow carefully considering climate change and overtourism	Management policies that lessen the social and environmental impacts of 'too many' tourists will be helpful rather than fast growth to accommodate more tourists
Despite development potential, areas in western and southwestern Nepal lack the appropriate socioeconomic status to support tourism growth	Focusing policy solutions more on community and social development for the local residents rather than capital investment will yield the highest benefits to take advantage of tourism

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Appendix 1: Score ranges for individual indices

	Index Score category based on Equal Interval Calculation				
Index	1	2	3	4	5
Climate Risk	1.59-1.82	1.83-2.04	2.05-2.26	2.27-2.48	2.49+
Tourism Climate	3.26-3.47	3.48-3.71	3.72-3.92	3.93-4.15	4.16+
Transportation Status	0.52-1.25	1.26-1.98	1.99-2.72	2.73-3.45	3.46+
Socioeconomic Status	0.99-1.81	1.82-2.61	2.62-3.41	3.42-4.21	4.22+
Tourism Resource	1-2	3-4	5	6	7+
Overtourism	Scored as -2, -1, or 0				
Tourism Opportunity (TOI)	1.33-1.66	1.67-2.01	2.02-2.33	2.34-2.67	2.68+

Appendix 2: Table of GWTC climate types

Type
Humid Cool
Humid
Humid Warm
Cool
Seasonal
Warm
Dry Cool
Dry
Dry Warm
Cold Front Passage
Warm Front Passage

THE POLICIES FOR CLIMATE MITIGATION AND CIRCULAR ECONOMY – PERSPECTIVES FOR THE GLOBAL NORTH AND GLOBAL SOUTH

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Abstract

The paper argues that circular economy strategies may complement climate policies importantly by forwarding a vision and a credible pathway to achieving resource efficient, low carbon sustainable production and consumption patterns. Such patterns make up the circular economy characterized by a high retention and recovery of resources.

The circular economy is only in its emerging stages, both in the Global North and in the Global South. Using evolutionary innovation theory, it is suggested to define the circular paradigm as pursuing a resource efficient technological trajectory, whereas the linear economy prevailing hitherto, has been following a wasteful technological trajectory. In the latter, it is legitimate and common practice to waste resources by using them sub-optimally. In the former, resources are systematically sought utilized at their highest possible level throughout the economy. Reuse, refurbishment, recycling and sharing of resources are core features. However, there is much friction in switching from a linear to circular economy. The paper highlights the many emerging radical policies from EU which aims ambitiously to guide the development of circular products in their entire lifecycle. Much stronger incentives are made for companies to pursue circular product innovation. We are hence in a critical stage in circular transformation. The paper warns that sometimes green solutions are wrongly termed circular without following circular economy principles but rather a wasteful trajectory.

The paper argues that Global South countries have opportunities for leapfrogging into the circular economy, taking advantage of the lower switching costs they have relative to the Global North countries.

Keywords: Circular Economy; Climate mitigation, Environmental Policy, Eco-innovation, Green Growth, Global South, Global North

1. Introduction

The United Nations Climate Conferences, the COPs, represent a core means of achieving global united action towards climate change and environmental degradation. The COPs, with more than 200 participants, illustrate the worldwide high political support for the green agenda and the strong call for climate action. There is, by now, a general agreement that economic development in both the Global North and the Global South should be decoupled from environmental degradation and hence we should pursue green growth and sustainable production and consumption patterns in all economic sectors (OECD ,2015).

However, at the recent COP27 in Egypt a main conclusion was that despite decades of political action to fight climate change the world is far from reaching the Paris Agreement goal of limiting global warming to 1.5°C. Rather, implementation of the newest planned national climate mitigation targets will only limit temperature rises to between 2.4-2.6°C by the end of the century (UNEP, 2022). UNEP's Emissions Gap Report 2022 calls for an urgent system-wide transformation to deliver a necessary massive cut of 45 per cent of greenhouse gas emissions already by 2030. UNEP's gap report fail, however, to identify what they call 'a credible pathway' for reaching the 1.5°C target (UNEP, 2022). Instead, climate policies focus increasingly on climate adaptation measures and carbon capture, i.e. curative measures rather than preventive measures.

This paper suggests that the circular economy framework and - policies may complement existing climate policies in important ways, possibly showing 'a credible pathway' that could take us closer to reaching the global climate targets, but also wider environmental goals. The climate agenda has dominated environmental policymaking the last nearly 20 years. Climate policies succeeded environmental policies with a main focus on pollution curation and prevention more generally. Still more preventive and integrated policy measures developed up through the 1980s, 1990s and zeros, promoting cleaner technologies, green business models and greening of markets (Andersen, 2008, Terao and Funatsu, 2021).

While the scope of the climate agenda is global, we may characterize it as a relative narrow green policy agenda, focusing primarily on energy targets. Core well-known features are a transition from fossil to renewable energy sources, promotion of energy efficiency and green transport measures. More lately, the climate mitigation agenda is starting to broaden in realizing the limitations in the measures undertaken so far. Noticeably, a transformation of the food sector is gaining climate attention with a core focus on shifting from animal to plant based production, recognizing the high importance of this sector for both climate change and biodiversity. However, as yet other sectors have not been subjected to similar attention when it comes to the need to change production and consumption patterns in order to reach climate goals.

The circular economy agenda is increasingly used for suggesting pathways to sustainable production and consumption more generally. The circular economy approach is a much broader agenda that the climate agenda. It offers a positive vision of a sustainable, resource efficient economy based on principles of intelligent use, retention and regeneration of resources, as unfolded further in the next section.

This paper applies evolutionary innovation theory in discussing the circular economy agenda and its relation to economic development and innovation in the Global South and Global North.

The paper argues, that climate policies have been unable sufficiently to address the fundamental structural challenges underlying the climate crisis, namely continued population growth and consumption growth on a finite planet. This necessarily leads to increased pollution (sink) and resource supply (source) problems unless mitigated by equivalent levels of eco-innovation. While this has been discussed by both researchers and policymakers for very long, since the 1970s (Ehrlich and Holdren, 1971), the attempt to develop green technologies and more sustainable consumption and production patterns have hither too not been able to keep up with the rises in population and consumption growth (OECD, 2015).

Three key megatrends, the fast rise of the middle class in the Global South, the aging population, and a still faster, globalizing economic development with rising transport needs, means these challenges are only going to rise in a foreseeable future (OECD, 2019).

Current climate policies address only some aspects of these challenges. The circular economy agenda, on the other hand, if rightly and ambitiously unfolded, may possibly offer key perspectives for a restructuring of the economy and the emergence of more sustainable production and consumption patterns. Ideally, this may allow a global development where further economic development is possible while decoupling it from environmental degradation (Stahel, 2016). However, transforming from a linear to a circular economy is going to be difficult both for the global North and South, as we shall expand on below. The more we understand and recognize the features and challenges of the circular transformation, the greater the possibility that we may achieve such a change.

This paper is structured as follows:

It first brings an introduction and discussion of key features of the circular economy concept and links it up to economic development of the Global North and Global South. Secondly, it discusses recent main circular policy trends. Third, it concludes with a discussion on circular perspectives for respectively the Global North and South and associated policy recommendations.

1.Circular Economy Perspectives

The circular economy is defined as a regenerative economy. While environmental strategies, including climate strategies, generally set negative targets (what we should not do) e.g. pollute and overexploit natural resources, the circular economy represents a positive vision of a modern, sustainable economy. Departing from our reigning linear 'take, make, waste' economy, the circular economy is the vision of a resource preserving, regenerative economic system. It mimics nature in aiming for a society that is regenerative by design and minimizes waste production (Stahel, 2016, Ellen Macarthur Foundation, 2017). Since greenhouse gas emissions to a very high degree are related to the products we produce and consume, the effect on climate mitigation in realizing a circular economy are substantial (Ellen Macarthur Foundation, 2017).

The idea behind circular economy builds on much of the earlier environmental research, including environmental economics, in calling for an economy where the resource use stays within the carrying capacity of the earth (Daly, 1974, Stahel, 2016). But the novel circular economy concept suggests specific

features and measures for how to unfold such a goal and implement them in business models and in process and noticeably product innovation more broadly.

Circular economy policies are often cornered by the 3Rs strategy: Reduce, Reuse, Recycle. 3R strategies are rapidly being picked up in Global South Countries as part of their environmental policies (OECD, 2016). However, the above commonly used definition and concepts are somewhat broad and lacks precision, which may give grounds for misinterpretations and misuse. The circular economy concept is often used on strategies and solutions that are not circular as we shall expand on further. It is only in very recent years, since 2015 and onwards, that strong circular economy strategies are taking root. We are, globally, only in the emerging stages of the transformation from a linear to a circular economy. In this early fluid stage, the friction and the costs to circular innovation and business development is high (Andersen, 1999).

In order for a strategy or a solution to be termed circular it should abide to circular economy principles. Circular economy principles we may define as the systematic pursuit to retain resources at their highest level throughout the economy. Through each production step, also called a loop or a cascade, resources should be sought utilized at their highest possible level, thereby achieving an overall resource efficient economy. This requires that we systematically use resources in an intelligent and preserving way (Stahel, 2016). Within an innovation theoretical framework, we may perceive the linear economy as defined by a dominating 'wasteful technological trajectory' and the circular economy as characterized by a dominating 'resource efficient technological trajectory' (Andersen, 1999). A technological trajectory is a pattern of problem solving behavior residing within a technological paradigm (Dosi, 1982). Hence in a wasteful technological trajectory, wasteful uses of resources are normal problem solving activities in R&D, production and consumption. In an economy characterized by a resource efficient technological trajectory, problem solving activities in the form of R&D and innovation routinely follows a resource efficiency paradigm.

Recycling, an important feature of the circular economy concept, is an old target in environmental policy making but has predominantly been directed at recovering parts of household waste only. As this was one of the first environmental policies affecting consumers (the voters) already back in the 1970s and 1980s it created much policy attention. The new circular economy agenda, however, is much more profound and disruptive. It shifts the attention from the easy 'add-on recycling', not affecting production processes, product development and consumption patterns, to integrated resource efficiency strategies, affecting especially product innovation but also business models. This shift is very disruptive and only emerging. Hence, design for the environment (DfE), entailing recycling, refurbishment, maintenance and durability, is only in its very infant stages making the costs of recycling high for many product categories. For low costs products such as packaging, this often means that the circular business case is poor, unless very large and pure waste streams are targeted.

At a basic level a circular economy strategy serves four main aims, namely securing:

1. Resource supply
2. Pollution mitigation (including GHG emissions)
3. Biodiversity, by freeing land through resource efficient use of bioresources.
4. Green growth via the seizing of circular business opportunities

More fundamentally, the circular economy represents novel production and consumption patterns based on a resource efficient – or simply a circular - technological trajectory. The most important goal is hence the integration of circular strategies and circular search within companies, that will allow circular principles to penetrate innovation. Hereby we move circular innovation more upstream in the value chains and into the product innovation process, as opposed to the linear praxis of dealing with waste more downstream, where waste - once it has become waste- is collected and processed by a recycling industry.

2. Circular Policy Trends – the Rise of Product Oriented Circular Policy

Circular strategies and policies are rapidly on the rise in both Global North and Global South countries. While Asia has been taking a leading circular role, particularly China and South Korea, it is now especially EU which in these years is launching a series of radical circular policies. Given the political and economic power of EU it is likely that these will set a new norm and disrupt business and innovation globally. Simultaneously, and supporting EU's new policies, decisive international formal standards are being developed under the umbrella of ISO/TC323 CIRCULAR ECONOMY established in 2018. The first six ISO standards are currently upcoming.

In the following, we will shortly highlight the core new EU policy signals. The main plan is the Green Deal, which plans to reduce CO2 emissions by 55% compared to 1990 levels by 2030. By 2050, the target is to make Europe the first climate-neutral continent. The initiative strives to prevent waste and keep the utilized materials in the EU economy for as long as possible, i.e a strong resource supply strategy, also indicated by the reference to building a resilient single market, see figure (1).

The EU Circular Economy Action Plan 2015 was revised in 2020 (CEAP, 2020), see figure (1). As part of this plan the EU Sustainable Products Initiative (SPI, 2022) EU is a set of legislations that aims to make all aspect of the design, production, use and sale of products placed on the EU market more environmentally-friendly and circular. The SPI aims at building in sustainability throughout the entire product lifecycle (not only end-of-life), starting at the design phase. Referring to the above, the Ecodesign for Sustainable Products Regulation (ESPR) initiative revises the Ecodesign Directive from 2009 which only targeted energy efficient products, and proposes legislative measures to cover the broadest possible range of products, i.e. moving beyond energy related products for the first time.

The new eco-design requirements include targeting product durability, reliability, reusability, upgradability, reparability, ease of maintenance and refurbishment. It also puts restrictions on the presence of substances that inhibit the circularity of products and materials and sets requirements for minimum recycled content in product. Finally, it targets the prevention and reduction of waste. Textiles and packaging are, as a start, targeted, including specifying ambitious recycling targets for these.

[2] *Denmark passed the first law on recycling in 1978, promoting recycling of post-consumer paper and beverages. https://www.iso.org/committee/7203984.html*

Figure 1: The EU Circular Economy Package

Overview of initiatives in the Circular Economy package

Source: European Commission EU Circular Economy Package EU COM (2022) 140

A key tool in the package is the digital product passport, see figure (2). Digital product passports (DPP) will be mandatory for all products regulated under the ESPR. It collects product related data conveyed through a unique identifier (the "passport"). In the central registry information about sustainability, circularity, value retention for reuse, remanufacturing, and recycling will be captured, adding much to the traceability and transparency of the resource flows.

[4] *70 % by weight of all packaging waste should be recycled by end 2030.*

Figure 2: The Digital Product Passport and its expected impacts

Tracking of raw materials extraction/production, supporting due diligence efforts

Enable manufacturers to create products digital twins, embedding all the information required

Tracking the life story of a product, enabling services related to its remanufacturing, reparability, re-use/ re-sale/second-life, recyclability, new business models

Benefit market surveillance authorities and customs authorities, by making available information they would need to carry out their tasks

Make available to public authorities and policy makers reliable information Enable to link incentives to sustainability performance

Allow citizens to have access to relevant and verified information related to the characteristics of the products they own or are considering to buy/rent (e.g. using apps able to read the identifier

Source: European Commission, from https://www.ds.dk/media/fbmagrdm/introduction-digital-product-pasport-9-november2022-.pdf

The digital product passports are expected to boost design for circularity considerably by enabling producers the create products digital twins based on all the information collected.

2.1 Extended Producer Responsibility and Eco-industrial Parks

Two main circular policy measures are 'extended producer responsibilities' and eco-industrial parks. Extended producer responsibility (EPR) schemes is a set of measures to ensure that producers or importers of products bear financial and/or organizational responsibility or for the management of the waste stage of a product's life cycle. In other words, the responsibility for handling the waste is transferred from the public to the private sphere. Typically, collective solutions are made within industries where a 'PRO' organization receives fees from member companies and based on this handles the waste collection and recycling. While EPR schemes have been around mainly in Europe since the early 1990s, in some countries quite widespread (OECD, 2016), EU has recently fortified EPR and made it a central part of their novel circular strategies. EPR schemes are now seen as a means of strengthening eco-design/design for recycling, by integrating stronger incentives for circular innovation in the schemes via eco-modulation of fees (companies pay more for less recyclable products) and setting up circular targets, e.g. for product durability, refurbishment and recycling (Laubinger, et al, 2021).

Many Global South countries are in these years picking up on the EPR schemes, again with Asian emerging economies in the lead but e.g. also emerging in Africa. Ideally, EPRs may contribute both to supplying funding and incentives for circular product innovation in the Global South. EPRs could, if well governed and (digitally) monitored, become a core means of achieving fast circular business development and -innovation. A challenge for the Global South is to secure the proper legislative framework timely (political instability and corruption may cause serious delays) and to integrate the informal sector into the EPR

schemes. Novel app solutions are emerging that may contribute to the latter (OECD, 2016).

Eco-industrial parks (EIPs) represent a very different circular policy measure. As the name implies they are environmentally friendly industrial parks, either planned from the onset (greenfields), or through circular retrofitting. The circular potential lies mainly in 'industrial symbiosis', which is when one firms (side stream) waste becomes a proximate companies' resource input. The co-location makes it possible to economize on the transport cost and to build trust in between the companies.

While much heralded for their circular potentials in the industrial ecology literature, the impact has hitherto been more disputed (Chernow, 2007). Currently, many eco-industrial parks are not very circular; e.g. they have limited or no industrial symbiosis and rely on traditional linear green solutions, such as a centralized waste water treatment plant and a biogas plant and renewable energy solutions. Since they are still following a wasteful trajectory, i.e. they lack a systematic resource optimization strategy, they do not qualify to be termed circular, even though their environmental performance may be considerable higher than other industrial production in the country. However, EIPs are being strongly pursued predominantly in the Global South as part of their industrialization strategies. In the Global North, EIPs are rare phenomenon, because the industrialization is at a mature stage and business locations are difficult to change. Industrial symbiosis cases are relatively rare and often among smaller business networks (UNIDO, 2017). The Global South has also here opportunities for circular leapfrogging and develop strategies for circular industrial parks, where industrial solid and liquid side streams could be systematically sought upcycled, excess heat utilized and where circular product innovations or some form of shared production could be pursued systematically.

2.2 Circular Policy Perspectives for the Global North and South

The green early mover countries in the Global North have invested heavily in a linear green technological trajectory the last 50-70 years, based on add-on eco-innovations, that is innovations which do not interfere with the production (Andersen, 2008). These are mainly centralized capital intensive waste incineration plants and waste water treatment plants, biogas plants and protected landfills. Some recovery of resources may take place from these in the more advanced solutions, most widespread is electricity and/or heat recovery. Such solutions have until recently been considered legitimate even advanced green solutions, and exported widely from the Global North to the Global South as state of the art. The problem is not the waste-to-energy solution per sé. The problem is that no prior efforts have been made for utilizing the valuable ingredients in the wastes prior to utilizing the energy content, i.e. circular economy principles have not been pursued. Also, the focus and investments have been on handling the waste as it is (add-on innovations), rather than avoiding waste production via integrated preventive process and product eco-innovations (Andersen, 2008). This and many other examples show the predominance of the linear green technological trajectory pursued globally, but which have led to the strongest lock-in in the Global North because of the longer time perspective and the large investments made here.

The Global South have generally started investing in green infrastructure for waste and waste water management much later and much less. Their waste management is relying to a very high degree on the informal sector (waste pickers) taking care of collection and sorting of waste for recycling, leading to health problems and poor recycling qualities as well as illegal dumping. Vulnerable communities are disproportionally affected by living at the landfills. Waste water treatment facilities are often inadequate and illegal waste water emissions widespread because of insufficient enforcement of the environmental regulations. While this means they are facing huge urgent pollution problems, it also implies that they may leapfrog directly into circular solutions. There is a need, though, for speedy, efficient action in the Global South given the urgent pollution problems which may cause a conflict of interest.

To sum up, while the Global North have a competitive advantage relative to the Global South in their strong economies, - R&D and - institutions, they also face higher switching costs from linear to circular green technologies, infrastructures and business models.

3. Conclusions

The paper has argued, that circular economy strategies may complement climate policies importantly. Creating a circular economy is much more than promoting the recycling of waste. Rather, it is a strategy to design out waste in all its forms, which more fundamentally entails switching from a wasteful technological trajectory towards a resource efficient technological trajectory. At the core of such a strategy is the promotion of circular strategizing, - process, and noticeably - product innovation among companies particularly upstream in the value chains and to provide the framework conditions that will support this. We need very well-designed policies and elaborated standards to set the direction for a circular economy in the complex globalizing world of the 21st century. The policy and standards and supporting digital infrastructure needed to allow this are coming into place in these years, allowing much better conditions for circular business development and innovation than hitherto.

The circular economy is going to have strong impacts on future economic development in both the Global North and Global South. While the Global North have a competitive advantage relative to the Global South in their strong economies, R&D and institutions, they also face high switching costs from linear to circular green technologies, infrastructures and business models. The Global South countries have interesting opportunities for leapfrogging into the circular economy. If visionary strategies can be formed, it may well be in the Global South we see promising circular businesses, innovations and infrastructures developing. There is, however, a risk that these circular opportunities will not be reaped, because of lack of understanding and knowledge on the circular economy or corruption among political leaders and businesses in the Global South. Or because donor investments continue to go to linear green well-proven cost-effective solutions in the short run. There is a need to direct attention and funding to support capacity development and collaboration with the Global South on developing the ambitious circular solutions that bear many promises, none the least for climate mitigation.

While focus is and should be very much on the core company strategizing and product innovation in the current intensive transformative stage of the circular economy, future steps should go even further and extend into rethinking our spatial structures so that circular cities and - regions may emerge. We are not so far yet in developing such systemic circular solutions but the principles and building blocks for making these are coming into place.

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[5] *E.g. .Denmark, considered a country with advanced green solutions, has until recently upheld that their waste strategy based largely on advanced waste incineration and minor post-consumer recycling (mainly in beverages and paper), has been a holistic solution because of the efficient energy recovery. It is only in the last years that Denmark is starting to reduce their incineration capacity to reduce their carbon emissions, and are starting to pursue ambitious recycling targets in accordance with EU targets.*

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INSIGHTS AND LESSONS LEARNED FROM COP27

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Abstract

According to UNFCC (2022), COP27 resulted in countries delivering a package of decisions that reaffirmed their commitment to limit global temperature rise to 1.5 degrees Celsius above pre-industrial levels. The package also strengthened government action to cut greenhouse gas emissions and adapt to the inevitable impacts of climate change and boosted the support of finance, technology and capacity building needed by developing countries. The cover decision, known as the Sharm el-Sheikh Implementation Plan, highlights that a global transformation to a low-carbon economy requires investments of at least USD 4-6 trillion a year. Delivering such funding will require a swift and comprehensive transformation of the financial system and its structures and processes, engaging governments, central banks, commercial banks, institutional investors and other economic actors.

This discussion paper presents the author's viewpoint on COP27 in Egypt. Evidence-based on constructive analysis was collected, as the researchers worked with academic institutions and led specialized workshops hosted by the National Institute of Governance and Sustainable Development (NIGSD). Attendees came from different backgrounds, such as industry, students, and academics. The researchers observed the COP27 event via newspapers, social platforms and conversations online with the local government and academics. This paper aims to provide critical views on COP27 and open dialogue for future avenues between government, businesses and policymakers. Using a conversation derived from masters' workshops hosted by NIGSD, Al Maktoum College of Higher Education, and other providers to form a catalyst for further actions.

Keywords: Lessons Learnt, Conference of Parties, COP27, Climate Change, Egypt, Africa, B Corp

1. Introduction

While the authors reflected on the outcomes and the big picture, they attempted to employ the concept of organisational learning, which is defined through different lenses and is understood as the creation of knowledge (Örtenblad, 2018). Organisational learning is often presented as a 'win-win' situation benefiting everyone' (Bratton et al. 2021). Critical views argue that learning is linked to culture, economics, power, and social aspects. It is also related to sustainability and COPs, which are bound to raise questions and choices for governments, organisations, and individuals in terms of implementing and reflecting on business activities (Fonseca et al., 2022). This discussion paper is structured in twofold: firstly, an overview of the literature to set the scene of the conference of parties, historical context, reflection on sustainability agenda aligned with COPs agenda, Secondly, reflections on COP26 towards COP27 and lessons learned from developed and developing countries context are presented. Finally, the conclusions draw attention to work in partnership with Africa to implement ESG and BCorp strategy to help businesses to tackle the net zero agenda.

1.1 COPs Historical Overview:

At the start of the 20th century, environmental issues entered the international and intergovernmental arena for the first time, and climate change was discussed as a theoretical scientific approach (Arrhenius, 1896; Crawford, 1997).

In 1972, the first international environmental summit took place in Stockholm, Sweden. This UN-convened conference marked a turning point in the development of international environmental politics. It led to the creation of the United Nations Environment Programme (UNEP) and commitments to coordinate global efforts to promote sustainability and safeguard the natural environment. It was the bottom line of the fundamental conference that marked a turning point in promoting sustainability and protecting the natural environment (Stockholm Declaration Report, 1972; Rio Declaration Report, 1992).

However, from the 1970s to the 1990s, the UK, led by prime minister Margaret Thatcher addressed the second world climate conference, and a new framework convention on climate change was launched. The convention was opened, and parties were invited to sign the Earth Summit agreement established in Brazil in 1992. This was historical remarkably. The first global agreement on climate change with 197 parties agreed to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Since then, a Conference Parties (COP) has been held annually. This is the decision-making body of the United Nations Climate Change. The two-week summits are the key space for stakeholders to discuss the climate crisis and set up a global strategy (Jacobs, 2022).

In 1997 Japan – COP3 – The Kyoto Protocol was launched and adopted by consensus with more than 150 signatories. The Protocol included legally binding emissions targets for developed country Parties for the six major GHGs: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride. The Protocol offered additional means of meeting targets through two market-based mechanisms: emissions trading, the Clean Development Mechanism (CDM), and Joint Implementation (JI). Under the Protocol, industrialised countries must be kept the emissions level monitored. This was the first era of environmental discussions.

The second era was held in Canada/Montreal in 2005 - It was a successor agreement to the Kyoto Protocol (named Paris Agreement). For the development and transfer of technologies, The parties addressed issues such as "capacity building, development and transfer of technologies, the adverse effects of climate change on developing and least developed countries, and several financial and budget-related issues, including guidelines to the Global Environment Facility. The Copenhagen Accord – signed in 2009 in COP15 - recognised the crucial role of reducing emissions from deforestation and forest degradation and the need to enhance the removal of greenhouse gas emissions by forests and agreed on the need to provide positive incentives for such actions to enable financial resources from developed countries. In COP15 the representatives from 197 countries realised that the Kyoto protocol failed with its targets and agreements (Jacobs, 2022).

In 2015, 169 parties and governments welcomed the ambitious goal of the Paris Agreement to keep temperatures well below 2°C' and to pursue efforts to limit the temperature increase to 1.5°C'. Areas of activity, including education, training, and public awareness, were discussed in Buenos Aires in 2010, and became part of the agreement and future strategies—the 17 goals. At the UN Sustainable Development Summit in September 2015, the world leaders agreed and adopted a new 2030 Agenda for sustainable development, which is 'a plan of action for people, planet and prosperity designed to 'shift the world onto a sustainable and resilient path' (UN, 2015 p. 1). At the heart of the universal world and transformative agenda are the 17 sustainable goals: (1) no poverty; (2) no hunger; (3) good health and well-being; (4) quality education; (5) gender equality; (6) clean water and sanitation; (7) affordable and clean energy; (8) decent work and economic growth; (9) industry, innovation, and infrastructure; (10) reduced inequality; (11) sustainable cities and communities; (12) responsible consumption and production; (13) climate action; (14) life below water; (15) life on land; (16) peace, justice, and strong institutions; and (17) partnerships for the goals. It was considered the third era, COP21 – Paris Agreement - the parties, governments and activists welcomed the ambitious goal to keep temperatures "well below 2°C" and "pursue efforts to limit the temperature increase to 1.5°C". But also, other topics such as education, training and public awareness and future strategies were developed.

Glasgow hosted COP26, and challenges were addressed, such sustainable development goals agenda, the 17 goals and 169 targets, the efforts to limit temperature to 1.5°C, the infrastructure, education and the urgency of science for effective climate action and policymaking (NFCCC, 2022).

In Egypt, 2022 COP27, countries came together to take action towards achieving the key challenges discussed in the past COPs. However, it was agreed to provide 'loss and damage' funding for vulnerable countries hit hard by climate disasters (United Nations Climate Change, 2022). The map (Figure 1) can illustrate the timeline of the COPs and the key debates.

Figure (1) : Timeline of the COPs and the Key Debates

Source: Developed by the authors

Despite what have been mentioned above about COPs, what happened over the years where COPs and their representatives came together and agreed on targets and pursued strategies and established policies?

The last two COPs, 26 and 27, took place in different scenarios; in COP26, the UK is a developed country, and in COP27, Egypt is a developing country. To compare the challenges is important to highlight the main aspects:

Table (1): COP26 and COP27 What and How - Questions and Reflections

What COP26 hoped to achieve?	What is UK doing about climate change?	What COP27 hoped to achieve?	What is Egypt doing about climate change?
To secure global net zero and keep 1.5 degrees.	The country was the first to pledge to reduce carbon emissions by 78 per cent by 2035, with the aim of phasing out coal power completely by 2024.	The agreement of the "loss and damage" the urgent action to ensure climate justice for Africa and vulnerable countries.	Over the past two decades, Egypt has made significant strives to mitigate climate change, including doubling its wind energy production.
Adapt to protect communities and natural habitats.	New petrol and diesel vehicles will no longer be sold by 2030 and legally binding targets will be introduced to restore nature and radical reforms to agricultural subsidies.	The secure funding to low- and middle-income countries (LMICs) to help them cover costs of climate-change impacts	The Egyptian government recently launched the National Climate Change Strategy. The private sector is scaling up adaptation efforts and will play a key role in this transition. To develop the green finance market, Egypt has also issued the region's first sovereign green bond to finance projects in clean transportation and sustainable water management. (IMF, 2023)
Mobilise finance, with developed countries making good on their promise of at least $100 billion in climate finance.	A Ten Point Plan for a green industrial revolution which aims to help the UK reach its climate commitments.	The ambitions, discussions and projects of phasing out fossil fuels that were misled.	Issued green bonds, allocating 750$ million towards sustainable water management and clean public transportation.
Finalising the Paris Rulebook that makes the Paris Agreement (COP21) work and accelerating action to tackle the climate crisis through collaboration between governments, businesses, and society.	At the same time, it should create thousands of highly skilled jobs with many more Britons earning a living from clean green jobs.	The reflection and action to keep the agenda to reduce the temperature to 1.5 °C	Egypt's lack of enthusiasm for reducing emissions has also drawn some criticism. Cairo updated its nationally determined contribution (NDC) – a country's voluntary strategy for cutting its emissions – more than a year after the Paris Agreement deadline.
Jacobs, 2022; NFCCC, 2022		Mahase, 2022; Atwoli et al., 2022, Massod et al, 2022.	Earth.Org (2023)

1.2 Reflection on Sustainability Agenda Intertwine With COPs Agenda

Sustainability has become a global buzzword in many sectors, especially after the publication of the United Nations Sustainable Development Goals (SDGs) agenda 2030 (Fonseca and Carnicelly, 2021). Sustainability addresses three key areas: people, the planet, and prosperity (Elkington, 1999). Sustainability is underpinned by an ethical principle that recognises that present actions impact and may be detrimental to future generations financially, socio-culturally, and environmentally (UNSDG Report, 2019b). The United Nations World Tourism Organisation (UNWTO, 2005) defines sustainability as the principles that refer to tourism development's environmental, economic, and socio-cultural aspects and emphasises that a suitable balance must be established between these dimensions (UNWTO, 2005). Sustainability is considered a concept in which businesses must develop strategies that integrate economic aspects (finances, assets, resources), social demand (quality and equity of people, community, and nations), and environmental issues (climate change and net-zero) (Lazlo and Zhexembayeva, 2017).

Historically, researchers and practitioners have used various labels to refer to organisational responsibility or responsible business, including corporate social responsibility, corporate citizenship, corporate sustainability, sustainable development, environmental stewardship, and sustainable entrepreneurship (Aguinis, 2011). The concept of organisational responsibility has evolved from conceptualisations of philanthropic, social action, and charitable programs, but also businesses need to engage in socially responsible practices considering their economic, legal, ethical, and discretionary responsibilities (Carroll, 1991, 2015). Sustainable Development Goals (SDGs) are another business responsibility regardless of size or sector (e.g., government, non-profit and for-profit). Albeit the SDGs are an international agenda but rest on the local and national level to implement within the strategic business plan.

The intertwining process of sustainability, sustainable development goals and conference of the parties (COP) framework is mapping against the sustainable development goals (SDGs) agenda. The COP – its agreement - does have globally negotiated and legally binding elements of climate actions (SDG 13), social justice (SDGs 1, 5, 6, 10, 16), economic (SDGs 11, 12), as well as the essential element - SDG 17 – partnerships for the goals (e.g., leaders meet to agree and discuss the goals). COPs 26 and 27 discussions and agreements were negotiated around SDG 16 – peace, justice, and strong institutions but also SDG 2 – zero hunger – Africa urgently needs support and strategy.

2. Take Action and Amplify Impact - Consider the role of stakeholders and organisational behaviour in bringing about change.

To understand why businesses must respond to social demands, scholars suggest that there are three stages for organisational behaviour (i) social obligation - organisations should respond to the legal and economic criteria; (ii) social responsibility – organisations should behave according to norms, values and stakeholder's expectations; and (iii) social responsiveness – organisations should anticipate and satisfy social demands as part of the individuals who possess an interest in the business ecosystem (Epstein, 1897; Aguinis & Glavas, 2012; Mullins & Christy, 2016). Businesses should respond to stakeholders' interests and consider the merit of urgency in responding to those who have legal or moral rights (Carroll & Buchholtz, 2015). From a management efficiency perspective, stakeholder power might influence business activities (Lahdesmaki et al.,2017; Johnson et al., 2011). Thus, the crucial functions of stakeholder management are to describe, understand, analyse, and finally manage the expectations of the various stakeholder groups (Freeman et al., 2020).

The United Nations Environment Programme (UNEP) suggests that overcoming the social and economic issues caused by the pandemic is only possible when environmental responses, plans, and policies are prioritised (United Nations 2019, 2021). An example of taking action in Scotland, 2022, the housing, construction, and infrastructure (HCI) sector received lots of incentives to implement the net zero agenda by 2050. The HCI sector needs support from policymakers, academics, and government bodies to ensure they will recover from the pandemic. The HCI sector is critical and crucial to Scotland, and in 2015 Scotland adopted the UN Sustainable Development Goals into the National Performance Framework (The Scottish Government, 2015). Researchers worked with 30 business champions to understand their impact on the environment by training them using the UN Global Impact (2020) SDG Action Manager Tool.

Using the UN SDG Action Manager tool assists companies in determining a beginning point. An organisation may use the UN Action Manager to understand which SDGs are most important to them based on their profile and act immediately. The firm will be able to comprehend and communicate the effect of the evaluation after it is completed. The progress toward the stated objectives may also be tracked. The UN SDG Action Manager enables cross-company collaboration, and co-workers can be invited to join the SDG Action Manager, where they can offer knowledge and track progress in real-time. The tool also provided benchmarking options and improvement guides. It was designed based on the B Lab's B Impact Assessment and the UN Global Compat's Ten Principles with their respective content and knowledge (Fonseca et al., 2022).

3. What Lessons Can Be Learnt from COP27 In Egypt?

To give an overview of COP27, Bozkhov (2022), stated that COP27, though resulting in mixed outcomes, did lead to some climate wins, with the most notable being the "loss and damage" agreement which is meant to eventually provide funding to vulnerable countries most impacted by climate change; this idea had previously faced opposition from developed countries, including the US and EU. Newly added to the official agenda, discussions on a loss and damage facilitated at COP27 led to breakthroughs, alongside related pledges of more than US$300 million by several European countries, including establishing a 24-country transitional committee to provide recommendations for operational modalities by COP28. From the devastating floods in Pakistan and Nigeria to severe droughts in East Africa, climate disasters have long been disproportionately felt by vulnerable populations, including low-income communities, racial and ethnic minorities, and women and girls. The goal of this fund – to call for developed nations (who are among the heaviest emitters) to be responsible, has been championed by UN Secretary-General Antonio Gutteres', who continues to emphasize that: "polluters must pay'.

- **It is no longer enough to make a commitment:**

Baddache, (2022) took a stock of key lessons from COP27, he highlighted that it is essential to accelerate the transformations necessary for climate adaptation by relying on the few companies committed to getting their ecosystems on board. For the few companies and investors, who have made commitments as per the science of the 1.5°C trajectory, this invites a first lesson to be drawn: It is no longer enough to make a commitment but to explore one's capacity to influence the commitment of one's ecosystem to adopt ambitious, rapid and scientifically calibrated climate trajectories. To this end, companies and investors should 1) Implement the trajectory and share efforts to show that the "4000" are taking action and not just making commitments 2) Organize support schemes by sector or territory to support companies that can be influenced in a low-carbon trajectory: Customers – via incentives and service offers, territorial partners – via offers to share decarbonisation projects or the use of territorial renewables, suppliers – via incentives and support schemes and 3) Give notice and set targets for commercial exclusion, we are already discussing with some clients thresholds that would make commercial exclusion eligible for new commitments by 2025, for suppliers who are not committed to 1.5°C by then, for example 100% of governments in-charge of climate negotiations are under pressure from the double-talk of too many economic actors. However, COP27 produced a text that "urges" the parties that have not yet communicated new or updated NDCs (national climate plans) to do so as soon as possible before COP28 in 2023. In particular, it calls for parties to revisit and strengthen their 2030 targets in order to align with the temperature targets stated in the Paris Agreement. To raise the ambitions of the States, it is important to take into account certain subjects which each have a strong leverage effect to amplify the climate trajectory of the States.

Biodiversity:

The COP27 underlines the importance of "protecting, conserving and restoring nature and ecosystems to meet the temperature targets of the Paris Agreement, through forests and other terrestrial and marine ecosystems acting as sinks and reservoirs of greenhouse gases and protecting biodiversity, while ensuring social and environmental safeguards".

Energy:

On energy, the text certainly "emphasizes" the "urgent need for immediate, serious, timely and sustained reductions in greenhouse gases by parties in all sectors, including through increased use of renewable energy, just energy transition, partnerships and other cooperative actions. But the text remains basically as explicit as what was agreed upon during COP26: riveted on the issue of coal while neglecting the other main fossil fuel sources of greenhouse gases – gas, oil. It's like saying that with a one-wheeled bike you can pedal 100 km: it doesn't work. The plan thus sticks to a "copy and paste" of the Glasgow pact while several delegations called for going beyond it. In the middle of the COP, India had proposed to include in the final decision the progressive reduction of all fossil fuels. A more ambitious proposal and a move also for it to no longer put pressure only on the large emerging countries heavily dependent on coal, but also on developed countries, more dependent on oil and gas.

- **Clarify climate transition plans and stop the double talk:**

Governments are called upon to act under increasing societal pressure and new regulatory requirements. Thus, it is urgent for the government to:

1. Project a business model adapted to the climate situation and organise the transition
2. Organize financing schemes, possibly in discussion with shareholders and financial partners. 2022 has seen record dividends in many sectors. Some sectors are operating with margins of over 25%. Many sources of financing can be partially allocated to a transition fund while reassuring financial partners and shareholders who can keep comfortable returns…
3. Align the internal discourse in organisations to ensure that the messages are consistent with the functions and interlocutors

4. Conclusion

The authors think Egypt could have worked more with African states to build a strong case on the damage caused by the industrial countries and how to recover the implications and contribute to NetZero cause, waste management, green factories and other crucial initiatives. Having said this, it is never too late as it will remain always work in progress. There is a great opportunity for Egypt to liaise with fellow African nations to develop an overarching approach to work together, it could attract funds for implementing ESG standards such as B Corp and also to develop the workers, industry leaders and policy-makers capacity in relation to climate change and sustainability causes. With uncertain governments and wary investors, there is a growing need for engineers, scientists, policymakers, the private sector, and financial institutions to come together and activate regional approaches to accelerate low-cost, low-carbon energy solutions by demonstrating the effectiveness of bankable projects. Building national and regional momentum is key to contributing to the UN Secretary-General's goal of achieving comprehensive decarbonisation by mid-century and ensuring energy access and economic growth opportunities for all (Bozhkov, 2022).

[3] *What the new «loss and damage» fund needs for success | United Nations Development Programme (undp.org)*

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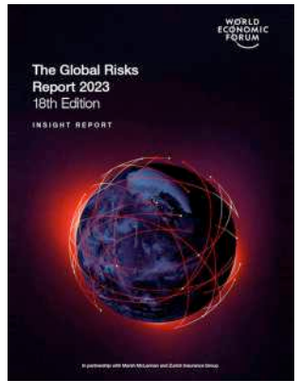
CLIMATE ACTION OUTLOOK: 2022 AND BEYOND

A-Publications and Reports:

1- The Global Risks Report 2023.



The Global Risks Report identifies risks that pose the most severe threat to each country over the next two years, as identified by over 12,000 business leaders in 121 economies by drawing on the findings of Global Risks Perception Survey (GRPS) and the World Economic Forum's Executive Opinion Survey (EOS).

According to GRPS data, climate and nature related risks are on the top 10 dangers that are anticipated to develop over the following ten years.

While each risk necessitates coordinated, targeted, and specialized activities, there are a number of overarching concepts that the WB states might help readiness across themes. Four guidelines are outlined for readiness in this new era of concurrent shocks:

Increasing risk identification and foresight, adjusting the present value of "future" hazards, investing in multi-domain risk preparedness, and improving preparedness and response coordination.

Source: World Economic Forum.

2- The Climate Change Performance Index 2023.

With 59 nations and the European Union (EU) collectively accounting for more than 90% of global greenhouse gas (GHG) emissions, the Climate Change Performance Index (CCPI) now assesses and compares the performance of climate protection in these nations and the EU.

The CCPI rates each nation's performance in four areas: GHG Emissions (which account for 40% of the total score), Renewable Energy (20%), Energy Use (20%), and Climate Policy (20%).

A total of 14 indicators, including international and national climate policies, the current level and historical trend of GHG emissions per capita, and the development of energy supply from renewable energy sources, are considered in order to provide a thorough and fair assessment of the diverse countries evaluated.

In this year's CCPI, Egypt moved up one place to 20th place, receiving an average overall score. In the four major CCPI categories, the nation receives a variety of ratings. It has high GHG emissions, high energy consumption, a medium climate policy score, but very low renewable energy scores.

The lack of an official commitment from the government to phase out subsidies for fossil fuels is criticized by the CCPI country specialists. For a fair energy transition in the nation, experts demand that Spain include civil society engagement in renewable energy projects.

Source: Germanwatch.

3- State of the Climate in Africa 2021.

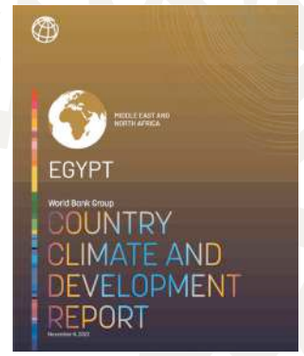
The State of the Climate in Africa report, offers reliable scientific data on climate trends, recorded extreme weather and climate events, and their effects on important vulnerable sectors. It also includes information on the mitigation and adaptation measures taken in Africa to deal with the effects of climate change.

The report indicates that climate impacts slow and obstruct the continent's progress toward attaining economic development (SDGs 1, 8, and 11), ending poverty and hunger (SDGs 1 and 2), and promoting good health (SDGs 2, 3, and 6).

The third edition in the series, released in 2021, gives particular attention to water resources because they are crucial to both the socioeconomic sustainability of Africa and the health of its people and ecosystems. It offers a set of recommendations to that end including investing in end-to-end drought and flood early warning systems and integrated Resources Water Management (IRWM) solutions.

Source: World Meteorological organization WMO.

4- Egypt Country Climate and Development Report.



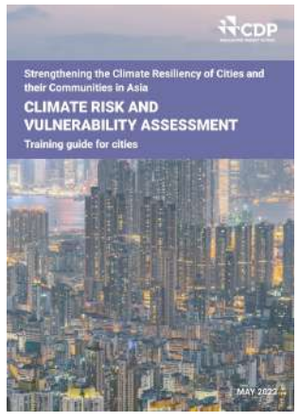
The report is a collaborative effort of the World Bank, the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA) and provides an overview of climate change in Egypt's development context.

Indications in the report point to the fact that climate change will exacerbate Egypt's current vulnerabilities with the potential to widen persisting spatial and human development gaps.

The report concludes with a set of priority actions encompassing: Better and more rationalized allocation of natural resources, raising awareness on climate change topics to propel collective action, increasing private sector financing on climate change priorities, strengthening regulatory frameworks, Including risks and mitigation measures related to climate change in budgeting improving Private Public Partnerships, including climate considerations in State-owned Enterprises' governance frameworks and improving carbon pricing, regulation and taxation policies.

Source: The World Bank Group.

5- Strengthening the Climate Resiliency of Cities and their Communities in Asia Climate Risk and Vulnerability Assessment



The guide was published in May 2022 by CDP and serves as a training guide for cities on conducting their climate risk and vulnerability assessment (CRVAs). It helps government officials and policy makers understand climate hazards, risks and vulnerability at the city level, increases their ability to conduct CRVAs and report them as part of wider city climate adaptation and resilience planning, action and financing.

Source: CDP.

6- Applying a Gender Lens to Climate Investing: An Action Framework

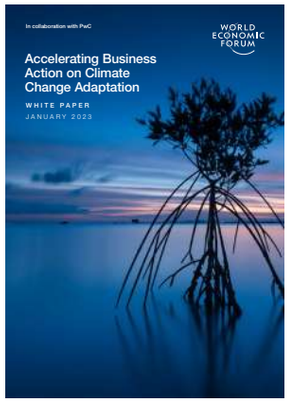
This Framework, developed by the Women in Finance Climate Action Group in partnership with Oliver Wyman, 2X Global and the 30% Club, is designed to help financial institutions to embed gender considerations into their climate investment decisions, to both mitigate the disproportionate impact of climate change on women and support women as change makers in the net zero transition. The framework provides practical guidance on target outcomes and is designed specifically for private institutional investors given the key role they play in financing the net zero transition.

Source: Oliver Wyman Forum.

7- Accelerating Business Action on Climate Change Adaptation (WEF and PwC)

The report shows how businesses can work with governments, international organizations and communities to adapt to the acute climate hazards facing the world today. Climate adaptation was a major focus at the COP27 Climate Conference in Egypt, especially in light of the devastating floods in Pakistan. Businesses have so far played a small role in global efforts on adaptation, with only 3% of funding coming from private sources. The report highlights opportunities for growth, new markets and risk management by investing in securing livelihoods and helping communities to adapt.

Source: World Economic Forum.



8- Climate Change 2022: Impacts, Adaptation and Vulnerability

The Working Group II contribution to the IPCC Sixth Assessment Report assesses the impacts of climate change, looking at ecosystems, biodiversity, and human communities at global and regional levels. It also reviews vulnerabilities and the capacities and limits of the natural world and human societies to adapt to climate change.

Source: UNEP.

9- Egypt's Country Program NWFE نُوَفِّي

Egypt's Country Platform, launched in July 2022, for the Nexus of Water, Food and Energy (NWFE) Program- نُوَفِّي aims to accelerate the national climate agenda. The Platform provides opportunities for mobilizing climate finance and private investments to support Egypt's green transition, reflecting the interlinkages and complementarity between climate action and development efforts. This is realized through the design, structuring and preparation of concrete and implementable climate action projects, moving the National Climate Change Strategy 2050 from pledges to implementation.

Source: Ministry of International Cooperation, Egypt.

10- Emissions Gap Report 2022

This is the 13th edition of the UNEP Emissions Gap Report. It assesses the gap between anticipated emissions in 2030 and levels consistent with the 1.5°C and 2°C targets of the Paris Agreement.

Source: UNEP.

11- Blue Skies, Blue Seas: Air Pollution, Marine Plastics, and Coastal Erosion in the Middle East and North Africa, March 2022

The report focuses on the impact of this degradation, estimating that the economic cost of MENA's deteriorating skies and seas is more than 3% of GDP per year in some countries. The report offers policy recommendations and solutions for governments to reverse the threat to this vital natural capital.

Source: World Bank.

12- Climate Change publications, 2022

The booklets are part of the non-periodic publications of the National Institute for Governance and Sustainable Development highlighting the technical terms used in the climate field and common abbreviations adopted in global climate discourses. The publication also draws important international and local agreements, international treaties and organizations working in the field of climate change.

Source: The National Institute for Governance and Sustainable Development.

13- The National Strategy for Climate Change 2050

Egypt launched the National Strategy for Climate Change 2050 to improve the citizens' quality of life and sustainable economic growth and preserve its natural resources. The five-point strategy tackles achieving sustainable economic growth by reducing CO2 emissions; adapting to climate changes with the country's ability to address this issue; governance framework of the state and society; improving the financial infrastructure; and improving scientific research and technology management.

Source: Ministry of Environment, Egypt.

B-Conferences/Meetings

1.The 2nd World Conference on Climate Change & Sustainability (Climate Week 2023)

The 2nd World Conference on Climate Change & Sustainability (Climate Week 2023) taking place in October 2023, in Italy is the annual gathering of climate leaders from the academic, business, public and nonprofit sectors, runs with this year's theme: "Advancing Nature and Positive Solutions for Net Zero and Sustainable Future ". Climate Week 2023 will include a highly actionable content-focused conference that will give attendees an exclusive platform to share and gain crucial insights into the most recent research, development, and analytics, as well as to facilitate networking with global peers, drive significant conversations, and identify new business opportunities in the burgeoning alternative energy sector. In order to make the world more climate-resilient, Climate Week 2023 will bring together a variety of key actors from institutions, governments, cities and towns, the commercial sector, and civil society, including young people, from all over the world.

Source: The People Events.

2."No Nonsense Climate Action" Summit 2023

The UN secretary general António Guterres says he will host a Climate Ambition Summit in September 2023. According to Guterres, the event would be "No nonsense" "no exceptions" and "no concessions," and it would put pressure on world leaders to devise "new, meaningful, and credible climate action to accelerate the speed of change" and address the "existential threat" posed by the climate issue. Guterres is pushing governments, corporations, cities, and civil society to step up their efforts and avoid breaking commitments after warning that countries' climate policies were falling "woefully short."

Source: The United Nations.

3. Loss and Damage Fund Transitional committee meeting.

One of COP27's wins is the agreement of the world's governments to set up a Loss and Damage (L&D) fund to aid vulnerable countries. The discussions resulted in the establishment of a transitional committee that aims to address the operationalization of the fund ahead of COP28. To feed into this process, the UNFCCC Secretariat will arrange for two workshops for institutions working on loss and damage to report their findings to the Committee. The most important talking points on the agenda of the committee are:

What is the money for?

Who pays into the fund?

Who receives funds and when?

Where does the fund fit in with other finance?

How will the fund be structured and governed?

The Committee will meet at least three times this year (meeting first in March 2023) to come up with recommendations on how the fund should run. These will be presented at a ministerial meeting in November to prepare the ground ahead of final decisions on the fund at COP28 in Dubai.

Source: Climate Analytics.

4. Climate and SDG Synergy Conference in July, Tokyo 2022

More than 2,000 participants at the UN Climate and SDG Synergies Conference, held in Tokyo and virtually on 20-21 July, generated an impressive range of potential solutions and proposals for how to better integrate efforts to tackle these interlinked global crises and accelerate action to address the climate emergency and recent reversals in achieving the Sustainable Development Goals.

Source: UN DESA.

5. 'Water at the Heart of the Climate Action': Cairo Water Week 2022

Cairo Water Week 2022 is organized by Egypt's Ministry of Water Resources and Irrigation in collaboration with national, regional, and international partners. It was held in preparation for the UN Climate Change Conference in Sharm El-Sheikh to also support the UN 2023 Water Conference. The event aims to provide water actors and stockholders from around the world with a platform to present and discuss critical issues, policies, strategies, plans, and measures related to climate-water challenges.

Source: World Water Council.

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