



**A MASTERPLAN FOR SUSTAINABLE COASTAL,  
MARINE TOURISM AND MINING ACTIVITIES TOWARDS  
CONSERVATION OF AQUATIC BIODIVERSITY AND  
ENVIRONMENTAL PROTECTION IN EGYPT**

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## ACRONYMS

Acronym	Definition
AU-IBAR	African Union Inter-Inter African Bureau for Animal Resources.
DARBE	Department of Agriculture, Rural Development, Blue Economy and Sustainable Environment
AUC	African Union Commission
PFRS	Policy Framework and Reform Strategy for fisheries and aquaculture in Africa
ABES	Africa Blue Economy Strategy
SIDA	Swedish International Development Cooperation Agency
SDGs	UN sustainable development goals.
GDP	Gross Domestic Product
CAPMAS	Central Agency for Public Mobilization and Statistics
FDI	Foreign Direct Investment
VAT	value-added tax (VAT)
LNG	Liquified Natural Gas
ILO	International Labor Organization
UNWTO	United Nations World Tourism Organization
CMT	Coastal and marine tourism
FDI	foreign direct investment
ECMR	Egyptian Company for Mineral Resources
EPC	Egyptian Phosphate Company
CAGR	Compound Annual Growth Rate
OGJ	Oil & Gas Journal
Tcf	trillion cubic feet
SEGAS	Spanish-Egyptian Gas Company
FSRU	floating storage and regasification unit
EMRA	Ministry of Petroleum and the Egyptian Mineral Resources Authority
CNGGC	China National Gold Group Corporation
EMRHC	Egyptian Mineral Resources Holding Company
MSP	marine spatial planning
EEAA	Egyptian Environmental Affairs Agency
MOT	Ministry of Tourism and Antiques
TDA	Tourism Development Agency
NGOs	Nongovernmental organizations
LFRPDA	Lake and fish resources protection and development agency
NAOS	Natural area open space
CAGR	Compound Annual Growth Rate
EIAs	Environmental Impact Assessments
GAMR	General Authority for Mineral Resources
EGSMA	Egyptian Geological Survey and Mineral Resources Authority
AMD	Acid Mine Drainage
EBM	ecosystem-based management
API	The American petroleum Institute
OGI	Oil and Gas Infrastructure
ENI	Italian Energy Company
EGAS	Egyptian Natural Gas Holding Company
EGPC	Egyptian General Petroleum Corporation

## Executive Summary:

Population pressure, particularly the growth of urban areas, combined with the rapid expansion of industry and tourism in coastal areas and extensive exploitation of marine resources has created a worldwide concern about the sustainable development of these areas and their natural and environmental resources. The harmful impacts of these human activities are visible all over the world. This course is largely based on resource and environmental conflicts and their resolution.

Coastal resources are used and exploited for economic and social objectives, urbanization, industry, tourism and recreation, fisheries and aquaculture, energy production, and transportation. These sectoral activities produce combined environmental impacts resulting in marine and freshwater pollution, air pollution, loss of marine resources, loss of natural land resources and land degradation, destruction of historic and architectural heritage, loss of public access to the coast, noise, and congestion. The evidence obtained shows that governmental policies to reduce or arrest coastal degradation have produced only limited results. Policies have been based on the sectoral approach and therefore failed to take into account the overall impact of coastal development on resources. Because of the sectoral approach preventive policies were difficult to develop and usually ineffective. In a few areas, where relatively high levels of coordination between sectoral policies were achieved, coastal resources were managed in an efficient and environmentally acceptable way.

Thus, the integrated management of coastal areas is required to lay the foundation for sustainable development which will reduce or eliminate pollution, rectify other impacts, and prevent these occurring in the future. Thus, the master plan objective is to set down the guidelines for such integrated management. It is addressed in the first place to national policymakers who need to provide the necessary political will, who can create the administrative and legislative framework, and who can generate the financial means to set up and operate biodiversity management. It also offers sufficient guidance for

the authorities responsible for implementing policy in a specific coastal area.

Master planning and marine areas management are defined as an adaptive process of resource management for sustainable development in coastal areas. Sustainable development requires that the quantity and quality of coastal resources are safeguarded so that they not only satisfy the present needs but also provide a sustained yield of economic and environmental services for future generations.

The most important elements in these phases are the application of environmental and economic evaluation techniques, the application of appropriate policy instruments, the employment of the necessary enforcement mechanisms, and the reevaluation and updating of the management process based on monitored results. To ensure proper implementation the guidelines propose a wide range of instruments for coastal resource management and environmental protection. In particular, they recommend the combined application of land-use controls and regulatory and economic instruments (such as charges and resource pricing) for pollution control and conservation.

As master planning is a complex process with many parties involved, where conflicts can arise, specific mechanisms need to be developed for their resolution. Guidelines are developed also for the formation of ad hoc committees or permanent bodies to discuss and resolve conflicting interests. The Masterplan for Egypt aims to achieve sustainable development of coastal and marine areas and to assist in the development of national guidelines for management and development, and thus contribute to the implementation of principles and recommendations adopted by the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992).

### 1. Intent:

It is the intent of Egypt that Master Plans be utilized to implement the goals and policies of the General Plan and not be used to circumvent the General Plan process in which general development policy is determined. Master Plans are an appropriate mechanism to expand the Urban Policy. The Master Plan shall describe measures that are being proposed to meet

biodiversity and environmental sustainability requirements.

## 2. Foreword:

The process of investment in environmental sustainability and aquatic biodiversity in Egypt requires great effort to ensure that the plan is consistent with the country's policies and priorities. This process affects both the negotiations with the national and/or external financing organizations as well as the management of the plan. African Union has promoted the preparation of Master Plans for Egyptian coastal and marine tourism, oil, and gas sectors.

The master plan is composed of a planning instrument and a management tool for investments in the short, medium, and long term. The master plan detailed in this report is part of a set of analytical instruments designed to strengthen national capabilities for planning, monitoring, and evaluation of investments in the economic maritime sector, as well as for mobilizing internal and external resources. These instruments are used for everything from sector analysis (where, among other things, they identify the need for investment in biodiversity) to providing management techniques for projects.

The following guidelines attempt to support this effort at improved investment in aquatic biodiversity and sustainability. The guidelines take into account the priorities set in the country for the tourism, oil and gas, and mineral mining sectors and are consistent with the technical cooperation framework established by the Governing Bodies.

This document was prepared in the context of the blue economy strategy, UN sustainable development goals (SDGs) goal number 13, African sustainable goals, and Egyptian vision for sustainability 2030 Initiatives.

In this context, A meeting of both experts and participants at the national level was organized from 18<sup>th</sup> to 20<sup>th</sup> February, 2024 in Cairo to analyze the effect of different sectors on sustainability and aquatic biodiversity in coastal and marine waters. The outputs of that meeting were utilized to prepare the current version of the guidelines.

## 1. Introduction:

The ocean is the largest and most important ecosystem on Earth: it is home to a stunning 94% of the entire planet's wildlife. The ocean covers about 71% of the Earth's surface and contains more than 97% of the water on the planet. The importance of oceans comes from the goods and services it provides us. The ocean has a very important ecological roles, as it is a carbon sink place, it absorbs huge amounts of CO<sub>2</sub>, one of the major causes of climate change. In addition, it regulates the climate on a global scale by moving heat around the planet. Warm currents move towards the Poles and circle back after having cooled down, affecting the Earth's weather patterns. Also, the oceans have a prime importance economic role as it provide millions of jobs, goods, and services for people around the world.

Humans have explored and made use of the resources found in the ocean since the beginning of time (Ocean Economy). The ocean provides us with food as It is a major source of food for people around the world through fishing and mariculture, energy as waves, tides, currents, and salinity and temperature gradients, can be used for the production of renewable energy, transportation as almost 90% of global trade is currently done using sea routes, the ocean contains all the most important trading routes on the planet. The sector of maritime transport is a source of jobs for millions of people and is part of a whole cluster of economic activities that create great economic value from the ocean. Recreation, which includes tourism, recreation, and entertainment represents another economy linked to the ocean and coastal waters.

Hence safeguarding marine ecosystems and biodiversity is therefore of the utmost importance to develop sustainable practices to protect our planet from climate change, and safeguard our health and that of all life on Earth.

As the importance of the resources of the ocean for human both ecologically and economically, the term "blue economy" was adopted. The blue economy or the ocean economy, is a term used to describe the economic activities associated with the oceans and seas. The World Bank defines the blue economy as the "sustainable use of ocean

resources to benefit economies, livelihoods, and ocean ecosystem health”. The activities commonly understood to represent the blue economy include maritime shipping, fishing and aquaculture, coastal tourism, renewable energy, water desalination, undersea cabling, seabed extractive industries and deep sea mining, marine genetic resources, and biotechnology.

African Union believed that the blue economy is an important issue to tackle for the wellbeing and prosperity of the continent. From his initiative role, he adopted the Africa Blue Economy Strategy, which has been developed, is comprehensive, all-inclusive, and incorporates best international

standards and practices in blue growth development as well as tailored to the needs and aspirations of the continent. The Africa Blue Economy Strategy was developed following the Sustainable Blue

Economy Conference that took place in Nairobi, Kenya in 2018.

The African Union has identified blue ocean economy development as a priority goal towards achieving the aspiration of ‘A prosperous Africa based on inclusive growth and sustainable development within the context of the African Union

For achieving the African blue economy, many initiatives and policies were adopted as Agenda 2063. Which stated the strategic framework for the socio-economic transformation of the continent over the next 50 years refers specifically to the Blue and Ocean Economy as Goal 6 for accelerated economic growth especially for the priority areas of Marine Resources and Energy; and Ports Operations and Marine Transport. Goal 7 also addresses BE by having priority areas such as Sustainable natural resource management and Biodiversity conservation; Sustainable consumption and production patterns; Water security; Climate resilience and natural disasters preparedness and prevention; and Renewable energy that are integral to BE Development in Africa.

To achieve the ambitious plan to achieve a blue economy in Africa, the African Union encourages its state to create a master plan to define the risks and opportunities and the best practices to

conserve biodiversity and environmental sustainability of marine and coastal areas and resources.

## 2. Background:

### 2.1. The African Union Inter-African Bureau for Animal Resources (AU-IBAR):

With a mandate to support and coordinate the utilization of livestock, fisheries, aquaculture, and wildlife as resources for both human well-being and economic development in the Member States of the African Union, the AU-IBAR - a specialized technical office of the Department of Agriculture, Rural Development, Blue Economy and Sustainable Environment (DARBE) of the African Union Commission (AUC)- is currently undertaking intervention in the fisheries, aquaculture sector. This intervention is guided by the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (PFRS), which aims at improving governance of the sector for increased sustainable contribution to food security, livelihoods, and wealth creation.

Deriving from the framework of the African Union 2063, the Africa Blue Economy Strategy (ABES) guides the development of an inclusive and sustainable blue economy that significantly contributes to continental transformation and growth, through advancing knowledge on marine and aquatic biotechnology, environmental sustainability, marine ecosystem utilization, management and conservation and carbon sequestration, the growth of Africa-wide shipping industry, the development of sea, river and lake transport, the management of fishing activities on these aquatic spaces, and the exploitation and beneficiation of deep-sea mineral and other marine resources.



## 2.2. The Implementation of ABES

To support the implementation of the Africa Blue Economy Strategy, AU-IBAR, with support from the Swedish International Development Cooperation Agency (SIDA), is implementing a three-year project on “Conserving Aquatic Biodiversity and Ecosystems in African Blue Economy”.

The overall objective of the Project is to enhance the policy environment, regulatory frameworks, and institutional capacities of AU member states and regional economic communities to sustainably utilize and conserve aquatic biodiversity and ecosystems.

The specific objectives of the project are as follows:

1. Ratify and/or align relevant international/regional instruments related to blue economy themes (with specific reference to protecting and conserving biodiversity);
2. Optimizing conservation and sustainable use of biodiversity while minimizing conflicts among blue economy sub-themes;
3. Strengthening measures for mitigating the negative impacts of coastal and marine tourism oil, gas, deep sea mining, and climate change on aquatic biodiversity and environment; and
4. Strengthening gender inclusivity in aquatic biodiversity conservation and environmental management

## 2.3. Background and Rationale for the Masterplan

As a portion of the component for the usage of ABES, key heading to guarantee naturally economical and climate versatile economies and enabled communities through the preservation of oceanic biodiversity and environments for Coastal and Marine Tourism (CMT) and mining exercises was proposed. In this respect, extend conducted a study to distinguish need issues and activities for economic coastal, marine tourism, and mining exercises for oceanic biodiversity preservation and environment security. The ponders finished the improvement of

a system for maintainable natural coastal and marine tourism, oil and gas investigation, and mineral mining for the AU member states and regional economic communities. Assist the created system for maintainable natural coastal and marine tourism, oil and gas investigation and mineral mining was the bolster to chosen AU member states for the detailing of national Masterplans and to fortify administrative systems to guarantee natural sustainability and biodiversity preservation within the improvement of coastal and marine tourism, oil and gas investigation and mineral mining. In this respect, Egypt was chosen to bolster Blue Economy through the improvement of masterplan arrangements as well as fortify policies and administrative systems that would direct and advance the economic advancement of coastal and marine tourism; oil and gas investigation as well as mining activities.

## 2.4 The National Consultancy and its Deliverables

A national consultant was enlisted by AU-IBAR, under the provision of the Swedish aquatic biodiversity project, and a consultancy service was procured, among others, to conduct the following assignments:

1. Review and reinforce national regulatory frameworks for sustainable coastal, and marine tourism and mining (oil, gas, and minerals) activities towards aquatic biodiversity conservation and environmental management in Egypt.
2. Bolster the national consultative workshop.
3. Create a national masterplan for economical coastal, marine tourism and mining (oil, gas and minerals) exercises in Egypt.
4. As contained in the terms of reference, the deliverables of the Consultancy include:
  - ✓ National consultative workshop facilitated;

- ✓ Priority issues and actions for sustainable coastal, marine tourism, and mining activities identified;
- ✓ Masterplan for sustainable coastal marine tourism, and mining activities (including oil, gas, and mineral exploration) developed for Egypt;
- ✓ Policy guidelines and regulatory measures developed to strengthen environmental sustainability and aquatic biodiversity conservation in the development of coastal and marine tourism in Egypt;
- ✓ Policy guidelines and regulatory measures developed to strengthen environmental sustainability and aquatic biodiversity conservation in mining activities, including oil and gas exploration in Egypt.
- ✓ Implementation mechanisms developed in the masterplan for rolling out the guidelines in Egypt; and
- ✓ A comprehensive report on the consultancy.

## 2.5. Methodology and Approach to the Consultancy:

The consultancy was implemented in a participatory manner to ensure quality delivery of expected outcomes of the assignment and engender ownership. Under the guidance of an AU-IBAR team and in line with the given terms of reference, the approach adopted to undertake this consultancy included:

1. Detailed briefings with relevant personnel at AU-IBAR on the tasks;
2. Extensive consideration of the report on the developed framework for sustainable environmental coastal and marine tourism, oil and gas exploration, and mineral mining and references endorsed by the African Union, including the ABES;
3. Identification of information repository relevant to the subject within Ministries, Departments and Agencies;
4. Desk review of relevant national regulatory, policy-related documents from ministries responsible for the environment, the tourism and mining sectors (Oil, Gas, Deep Sea,

Mineral sector), aquatic biodiversity (including fisheries and aquaculture);

5. Facilitation of a physical national consultative workshop with relevant sectorial stakeholders on the development of national masterplans and strengthening regulatory frameworks for environmentally sustainable coastal and marine tourism; oil and gas exploration and mineral mining;
6. Based on the outcomes of the national consultative workshop, priority issues and actions were then identified for the development of a national master plan; and
7. As part of the deliverable of the consultancy, regulatory and policy guidelines to strengthen environmental sustainability in the development of coastal and marine tourism, oil and gas exploration (mining), and practices in Egypt were developed including a detailed report of the whole consultancy.

## 2.6 The Development of a National Masterplan for Sustainable Coastal, Marine Tourism and Mining (Oil, Gas and Minerals) activities in Egypt:

A “Master Plan” is broadly defined as a plan that meets the parameters and intent of the Specific Plan statutes contained in the Arab Republic of Egypt, which requires a land use plan, an infrastructure plan, and implementation measures. The requirement for a Master Plan might be fulfilled by a variety of planning tools, including a Specific Plan, a Comprehensive Plan, a Community Plan, a Special Planning Area, or any combination thereof. The County's decision to utilize this planning process acknowledges that the project possesses complexity that requires a coordinated and comprehensive planning process.

The benefits of this planning process are:

1. Provides a clear picture of the future regarding development in Egypt. Allows predictability for the general public; the County government and its constituent departments and agencies; and the potential developer.
2. Allows for a broad range of detailed information, beyond that usually obtained in traditional zoning applications, combined into a complete package. This consideration of a

full range of issues provides an excellent foundation upon which to base land development decisions or future entitlements.

3. Provides detail about project phasing and infrastructure and precisely correlates infrastructure with project land use avoiding the costly oversizing or detrimental undersizing of infrastructure.
4. Provides an opportunity for citizen participation before the public hearing process developing understanding, acceptance, and support for the project design.
5. Allows some flexibility in zoning and development standards which results in developments that are more responsive to the unique conditions of the site and allows a project to respond to changing market conditions over time.
6. The ability to establish a “master” or “tiered” environmental document, including appropriate mitigation measures, thus facilitating the consideration of subsequent development proposals. In the case of a Specific Plan, the plan can build in reasonable flexibility to allow a response to changing market conditions or other unforeseeable events, consistent with the revision procedures of the Specific Plan ordinance.
7. Define a protective measure for environmental resources and ensure biodiversity and the balance between resource regeneration and exploitation through the carrying capacity concept.

## 2.7. Economic context:

The tourism, oil and gas, and mineral mining sectors in Egypt are very important economic sectors that contribute to GDP. Despite the many challenges faced by the tourism sector in Egypt due to geopolitical problems and the global pandemic of COVID-19, it is a very important economic sector as it contributes 6.5% of the Egyptian GDP and 20% of the foreign currency income to Egypt. After many disaster years, the sector regained its economic capability as the number of tourists increased from 14.7 million tourists achieved 12.5 billion dollars in 2010, to 15.6 million tourists achieved 14.0 billion dollars in 2023. On the other hand, the oil

and gas sector is very important in Egypt as it fulfills the domestic needs of oil products and exports abroad for foreign currency. This sector achieved 12.9 billion US dollars in 2021, increased to 18.2 billion US dollars in 2022. Oil production recorded 74 million tons, while gas production recorded 45 million tons during 2023. Despite the economic importance of these sectors their impacts on biodiversity and coastal and marine sustainability could be intensive, thus establishing a well-defined master plan is needed to exploit these resources without harming the coastal and marine environment to achieve the sustainable blue economy principle in Egypt.

The Economic Sectors Initiative, has a semi-structured agenda, multiple stakeholders, varied financing sources, and enormous investment requirements. But even with the potential availability of resources, the over-exploitation of these resources degraded the environment and affected the coastal and marine biodiversity. Thus, it is a must to rational use of the environmental resources in economic activities.

The country's ability to justify sector requirements and the lack of a well-articulated program that systematically defined the requirements and the priorities account for the sector's decreased priority. A frequent observation is that when investments are made, they do not always address the investment priorities set by the participants in the sector. On some occasions, no priorities have been enunciated. The sector rarely gives the impression of having a long-term strategy in which the different investments conjoined to create a clear global approach for the improvement of environmental sustainability.

In this context, reviewing each sector's investment policy is necessary. The short-term review will focus on the unavoidable need to undertake projects of physical infrastructure to recover the missing productive capacity. The medium and long term will deal with the challenges and opportunities arising from the processes of modernization and environmental issues in the Arab Republic of Egypt.

Indeed, the design of a policy for investments and the construction of the necessary strategic partnerships for carrying it out are part of the steering role of the authorities and it is the aim of

the master planning Initiative to strengthen the authorities' capacity to carry out this function. Such an investment policy is also needed to guarantee the sustainability of the process. Accordingly, it is an important notion that individual projects, which are independently indispensable, should be designed taking into account broader frames of reference (such as blue economy initiatives and SDGs) that improve the allocation of resources and environmental management.

It is important to recall that interdisciplinary work favors more timely and efficient detection and prioritization of needs, formulation of projects, mobilization of resources, and impact assessments.

## **2.8. What is the master plan for biodiversity and environmental conservation:**

**T**he Master Plan is a political and technical process, which is used to steer the development of the coastal and marine tourism, oil, and gas sectors within a specific political and administrative national context. The Master Plan takes into account the political, economic, social, and environmental contexts; identifies different sector problems; outlines strategies and actions to address those problems; and creates a portfolio of investment project proposals aimed at preventing, resolving, or alleviating them.

Two major factors need to be considered when formulating a Master Plan. The first group includes external factors that occur outside the sector yet affect its performance. The second group includes the internal factors affecting the sector's operation. The main external factors are the macroeconomic context, public policies, the national (or subnational) planning cycle, the evolution and composition of public investment, and the characteristics of the various participants in the investment processes. Especially important are the national system of public investment and the relationship between the health sector and funding sources, whether national or international.

Internal factors are the relevant elements of the political, environmental, economic, and social contexts; the national environmental priorities; the degree to which the environmental authorities have fulfilled the essential biodiversity and environmental sustainability functions; funding and sector expenditure, and the supply and demand for services. Also important are the delivery of services, inter-institutional relations; and the degree of efficacy, efficiency, and effectiveness in the coordination of components of the welfare environmental system.

## **2.9. Purpose of the Master Plan:**

**T**he Master Plan is a useful tool for decision-makers and opinion-shapers. It is a process that strengthens the environmental authority's steering biodiversity and environmental sustainability where necessary and meets the various needs of the implementing agency and other sector participants.

The Master Plan is a planning tool. It offers a framework for coordinating investment projects in all their phases, using the sector's strategic orientations and policies.

The Master Plan is a management tool. National authorities will have a tool for planning projects and monitoring their status over the short, medium, and long term. It is thus possible to set up a project database that is modular and flexible and can be adapted to each stage of the country's planning process and/or current environmental process. To function properly as a management tool, the Master Plan should incorporate criteria for accepting project proposals into the portfolio. One of those criteria should be the consideration of the real operational capacity of the applicants and the financial sustainability of the proposed investments. The Plan should include criteria for evaluating the outcome and impact of each project on environmental sustainability. It should also include procedures for periodic review of the portfolio throughout the life of the Master Plan. To fulfill its objective, the preparation of the Master Plan must meet two essential requirements. First, it must set out current national and sector policies, and describe the current debate and consensus about the environmental issues and their main problems.

Second, it should involve all those interested in categorizing and prioritizing biodiversity and environmental sustainability problems, identifying possible strategies and actions, and preparing the portfolio of investment-project Proposals.

### 3. Coastal and Marine tourism, oil and gas, and Mineral mining in Egypt:

#### 3.1. Coastal and marine tourism in Egypt:

##### A. Contribution to Gross Domestic Product (GDP):

**M**arine and coastal tourism is a vast industry that supports many activities in different fields such as transportation, accommodation, services ..etc. Tourism is one of the leading sources of income, crucial to Egypt's economy. At its peak in 2010, the sector employed about 12% of the workforce of Egypt, serving approximately 14.7 million visitors to Egypt, and providing revenues of nearly \$12.5 billion as well as contributing more than 11% of GDP and 14.4% of foreign currency revenues (Table, 1).

**Table 1:** Number of tourists, income, and GDP percentage in Egypt from 1995 to 2023.

Year	Number of tourists	Receipts	% of GNP
2023	15.6 m	14.89 bn \$	6.8%
2022	14.8 m	14.51 bn \$	6.6%
2021	15.2 m	14.62 bn \$	3.3%
2020	11.1 m	10.40 bn \$	3.6%
2019	8.03 m	8.26 bn \$	4.5 %
2018	11.35 m	12.70 bn \$	4.8 %
2017	8.29 m	8.64 bn \$	3.5 %
2016	5.40 m	3.31 bn \$	0.99 %
2015	9.33 m	6.90 bn \$	2.1 %
2014	9.88 m	7.98 bn \$	2.6 %

2013	9.46 m	6.75 bn \$	2.3 %
2012	11.53 m	10.82 bn \$	3.9 %
2011	9.85 m	9.33 bn \$	4.0 %
2010	14.73 m	13.63 bn \$	6.2 %
2009	12.54 m	11.76 bn \$	6.2 %
2008	12.84 m	12.10 bn \$	7.4 %
2007	11.09 m	10.33 bn \$	7.9 %
2006	9.08 m	8.13 bn \$	7.6 %
2005	8.24 m	7.21 bn \$	8.0 %
2004	7.80 m	6.33 bn \$	8.0 %
2003	5.75 m	4.70 bn \$	5.9 %
2002	4.91 m	4.13 bn \$	4.9 %
2001	4.36 m	4.12 bn \$	4.3 %
2000	5.12 m	4.66 bn \$	4.7 %
1999	4.49 m	4.36 bn \$	4.8 %
1998	3.21 m	2.94 bn \$	3.5 %
1997	3.66 m	4.05 bn \$	5.2 %
1996	3.53 m	3.58 bn \$	5.3 %
1995	2.87 m	2.95 bn \$	4.9 %

##### B. Contribution to foreign income earnings:

**T**he tourism sector contributed 6.8% of the total GDP in 2023, the fluctuation in the contribution of GDP in Egyptian national income was realized due to the political and unexpected events.

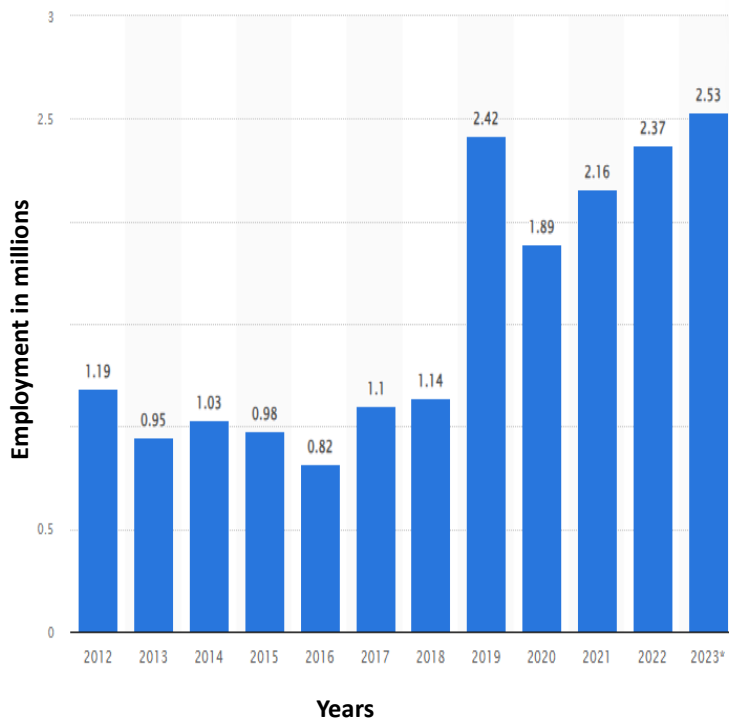
The Egyptian Revolution in 2011 decreased the tourism income by 9.33 bn \$ in 2011 after recording 13.63 bn \$ in 2010. The pandemic of COVID-19 in 2019 decreased the tourism income which recorded 8.26 bn \$ after 12.70 bn \$ recorded in 2018 (Table,1).

##### C. Contribution to Employment:

**T**he tourism sector in Egypt has contributed to huge job vacancies. In 2012 tourism sector provided 1.19 million jobs, which decreased gradually to reach 0.82 million jobs in 2016 before it began to increase again in 2017 to reach 1.1 million jobs. The jobs provided by the tourism sector showed its maximum number in

2023 reached 2.53 million jobs indicating the fast growth of the sector.

In 2020 after the pandemic of COVID-19 2019, the number of jobs available decreased to 1.89 million jobs as a result of ceased work at many tourism compounds in Egypt. Before it rose again in 2021 recorded 2.16 million jobs as a result of improving the tourism movement (Figure 7).



**Figure 1:** Number of jobs in the tourism sector in Egypt from 2012 to 2023.

#### D. Government revenue from CMT:

Coastal and marine tourism has emerged as a lucrative industry globally, attracting millions of visitors each year. By implementing effective policies, regulations, and revenue collection mechanisms, governments can harness the economic potential of this sector. This essay will explore the various ways in which governments generate revenue from coastal and marine tourism, highlighting its significance in fostering economic growth and supporting public investments.

According to a report by Research and Markets.com, the Egyptian tourism market is expected to grow at a Compound Annual Growth

Rate (CAGR) of around 8.8% from 2021 to 2026. While this includes all sectors of tourism, it gives an idea of the potential growth in the industry.

According to the World Bank data, Egypt's travel and tourism receipts (which include spending on transport, accommodation, food, and entertainment) have been fluctuating over the years due to political instability and other factors from 3.5 bn \$ in 2020 (due to the COVID-19 pandemic) to 9.7 bn \$ at 2010.

Government revenues from coastal and marine tourism play a vital role in driving economic prosperity and supporting public investments. Taxation, licensing and permit fees, entry fees, concessions and leasing, environmental levies, and marketing efforts are all mechanisms through which governments generate revenue. These funds contribute to infrastructure development, environmental conservation, and the improvement of public services. By effectively managing and reinvesting these revenues, governments can ensure the sustainable growth of coastal marine tourism while maximizing the economic benefits for local communities and the nation as a whole.

##### 1. Taxation:

Taxation is a primary source of government revenue from coastal and marine tourism. Governments impose taxes on a range of tourism-related activities, including accommodations, transportation, recreational services, and dining. These taxes often include value-added tax (VAT), hotel occupancy taxes, and tourism-specific levies. The revenue collected from these taxes contributes significantly to government coffers. As the number of tourists visiting coastal areas increases, so does the tax revenue, providing a stable and sustainable source of income for the government.

##### 2. Licensing and Permit Fees:

Governments typically require tourism operators, such as resorts, dive centers, and boat rental services, to obtain licenses and permits to operate in coastal areas. These licenses and permits involve fees that contribute to government revenues. By regulating tourism activities through licensing and permitting, governments can ensure the

quality and safety of services provided to tourists while generating revenue.

### **3. Entry Fees and Park Permits:**

Many coastal areas encompass protected sites, national parks, and marine reserves that attract tourists. Governments often charge entry fees and permit fees for access to these areas. These fees help fund the conservation and management of these natural treasures, ensuring their preservation for future generations. The revenue generated from entry fees and park permits supports environmental initiatives, such as habitat restoration, marine research, and visitor education programs, thereby promoting sustainable coastal tourism.

### **4. Concessions and Leasing:**

Governments may grant concessions and leases to private entities for the development and operation of tourism infrastructure in coastal areas. This can include resorts, marinas, restaurants, and souvenir shops. Concessionaires pay fees to the government, either as a percentage of their revenue or as fixed annual payments. These financial contributions contribute to government revenues and can be reinvested in infrastructure development, coastal management, and the improvement of tourist facilities.

### **5. Environmental Levies and Sustainability Funds:**

Recognizing the importance of environmental conservation, governments may impose environmental levies or require tourism operators to contribute to sustainability funds. These funds are dedicated to environmental protection and restoration efforts. By linking these levies to coastal marine tourism, governments ensure that the industry contributes to the preservation of natural resources and mitigates its environmental impact. The revenue generated from these levies supports initiatives such as beach clean-up programs, coral reef restoration, and waste management systems.

### **6. Marketing and Promotion:**

Governments play a crucial role in marketing and promoting coastal marine tourism destinations to attract visitors. Through

targeted marketing campaigns, participation in international travel fairs, and collaboration with tour operators, governments aim to increase tourist arrivals. As the number of tourists grows, government revenues rise through increased spending on accommodations, dining, transportation, and recreational activities. Moreover, the positive reputation built through effective marketing strategies can lead to sustained growth in coastal tourism and subsequent revenue generation.

### **7. Cruise Ship Fees:**

Coastal areas often serve as ports of call for cruise ships, attracting a significant number of tourists. Governments can generate revenue by charging fees to cruise ship operators for docking, disembarkation, and passenger services. These fees contribute to government revenues and can be used to improve port facilities, enhance security measures, and support local tourism infrastructure.

### **8. Tourism-Related Business Taxes:**

In addition to direct tourism activities, governments can generate revenue from indirect businesses that cater to coastal marine tourism. These include souvenir shops, restaurants, water sports centers, and transportation services. Governments can impose business taxes on these establishments, further increasing their revenue streams. This taxation ensures a fair distribution of the economic benefits generated by tourism and supports the development of local entrepreneurship.

### **9. International Cooperation and Grants:**

Governments can explore international cooperation and grants to support coastal marine tourism development. This can involve partnering with foreign governments, international organizations, or development agencies to secure funding for infrastructure projects, capacity building, and marketing initiatives. These collaborations can bring additional financial resources into the country, boosting government revenues and promoting sustainable tourism practices.

### **10. Research and Development Funding:**

Coastal marine tourism often requires ongoing research and development to enhance

visitor experiences, preserve natural resources, and address emerging challenges. Governments can allocate funds for research projects, innovation, and technology advancements related to coastal tourism. Such investments not only contribute to the development of the sector but also attract tourists seeking unique and sustainable experiences, thereby increasing government revenues.

#### **11. Public-Private Partnerships (PPPs):**

Governments can engage in public-private partnerships to stimulate coastal tourism development while generating revenue. By collaborating with private entities, governments can leverage their expertise, resources, and investment capital to develop tourism infrastructure, improve services, and enhance the overall visitor experience. These partnerships often involve revenue-sharing agreements, where the government receives a portion of the profits generated by private operators.

#### **12. Tourism Training and Certification Programs:**

To ensure the quality and professionalism of tourism services, governments can establish training and certification programs for tourism operators. By charging fees for training courses, certification exams, and licensing, governments generate revenue while promoting the development of a skilled tourism workforce. This, in turn, enhances the overall visitor experience, strengthens destination competitiveness, and contributes to higher tourism revenues.

#### **13. Destination Management Organizations (DMOs):**

Governments can establish DMOs or support existing ones to oversee the strategic planning, marketing, and development of coastal tourism destinations. DMOs can generate revenue through membership fees, partnerships with private sector entities, and destination marketing activities. These organizations play a crucial role in coordinating tourism efforts, attracting investments, and maximizing the economic benefits of coastal marine tourism.

### **E. Investment in CMT:**

**E**gypt, with its extensive coastline along the Mediterranean Sea and the Red Sea, possesses abundant natural beauty and historical treasures. Recognizing the economic potential of coastal and marine tourism, the Egyptian government has made significant investments in this sector.

The Egyptian government has been investing in various tourism projects to boost the sector. According to the Egyptian Ministry of Tourism and Antiquities, the government has allocated around EGP 10 billion (approximately USD 600 million) in 2020-2021 for the development and maintenance of tourism facilities. This includes investments in coastal marine tourism infrastructure, but it's not a specific figure dedicated solely to marine tourism.

Overall Egypt's investment in coastal marine tourism is a testament to the country's commitment to economic growth, job creation, and sustainable development. Through infrastructure development, diversification of tourism offerings, conservation efforts, marketing initiatives, and PPPs, Egypt has successfully positioned itself as a premier coastal tourism destination. The government's investments have not only generated significant revenue but also created employment opportunities, improved local economies, and contributed to the overall socio-economic development of the country. With continued investment and strategic planning, Egypt's coastal marine tourism sector is poised for further growth and continued success in the years to come.

The extensive efforts undertaken by Egypt to develop and promote coastal and marine tourism, highlight its impact on economic growth, job creation, and sustainable development.

#### **1. Infrastructure Development:**

Egypt has invested heavily in developing coastal tourism infrastructure to enhance visitor experiences and attract a diverse range of tourists. This includes the construction of world-class resorts, hotels, marinas, and cruise ship terminals along the coastal areas. Infrastructure projects like the Red Sea Riviera and the North Coast have transformed previously



undeveloped regions into thriving tourist destinations, offering a wide range of accommodations, recreational facilities, and entertainment options.

**2. Diversification of Tourism Offerings:**

To appeal to a broader spectrum of tourists, Egypt has focused on diversifying its coastal tourism offerings. Beyond the historical attractions of cities like Alexandria and Port Said, the country has invested in developing beach resorts, water sports facilities, diving centers, and marine parks. This diversification strategy aims to cater to the preferences of different types of travelers, including beach lovers, adventure enthusiasts, and nature seekers, thereby expanding the tourism market and boosting revenue.

**3. Preservation of Natural Resources:**

Egypt recognizes the importance of preserving and protecting its coastal ecosystems to ensure the long-term sustainability of marine tourism. The government has implemented various conservation measures, such as the establishment of marine reserves, coral reef protection programs, and strict regulations on fishing practices. By safeguarding these natural resources, Egypt aims to attract eco-conscious tourists and promote sustainable tourism practices, which, in turn, fosters long-term economic benefits.

**4. Promotion and Marketing:**

To attract international tourists, Egypt has implemented extensive marketing campaigns and participated in major travel exhibitions and fairs. The country's rich cultural heritage, stunning beaches, and underwater treasures are showcased through digital platforms, social media, and traditional advertising channels. Collaborations with international tour operators and airlines have also been instrumental in promoting Egypt as a premier coastal tourism destination. These marketing efforts have contributed to increased tourist arrivals, driving economic growth and government revenues.

**5. Public-Private Partnerships (PPPs):**

Egypt has actively encouraged private sector participation through public-private partnerships (PPPs) in coastal marine tourism development. These partnerships enable the government to leverage private sector expertise, investment, and resources while sharing risks and rewards. Through PPPs, the government has facilitated the establishment of luxury resorts, water sports centers, and entertainment complexes, creating employment opportunities, attracting foreign direct investment, and generating revenue for the government.

**6. Cruise Tourism:**

Cruise tourism plays a significant role in Egypt's coastal marine tourism sector. The government has invested in modernizing and expanding cruise ship terminals along the Nile River and the Red Sea, accommodating the increasing demand for cruise experiences. This investment has resulted in a boost to local economies through increased tourist spending on shore excursions, accommodations, and shopping. Furthermore, the government earns revenue through port fees and taxes on cruise ship operations.

**7. Training and Capacity Building:**

Recognizing the importance of a skilled workforce to deliver high-quality tourism services, Egypt has invested in training and capacity-building programs for individuals working in the coastal marine tourism sector. These programs cover areas such as hospitality, marine activities, customer service, and environmental conservation. By enhancing the skills of the workforce, Egypt aims to provide exceptional visitor experiences, improve the sector's competitiveness, and ultimately increase government revenues.

**8. Economic Multiplier Effect:**

Investments in coastal marine tourism have a significant multiplier effect on the economy. As the sector grows, it supports various ancillary industries such as transportation, food and beverage, retail,

and construction. These industries, in turn, generate employment and contribute to government revenues through taxes, licensing fees, and other revenue streams. The economic benefits extend beyond the coastal regions, positively impacting the national economy and supporting socio-economic development.

### 3.2. Oil and gas mining in Egypt:

#### A. Contribution of oil and gas to gross domestic products (GDP):

**E**gypt, a country with a rich history and diverse culture, has long been recognized for its abundant natural resources, particularly oil and gas. These resources have played a pivotal role in the nation's economic development and growth.

Today, Egypt is among the largest natural gas producers in Africa and a significant oil and gas exporter. The oil and gas sector accounts for a substantial portion of Egypt's GDP, contributing around 12.4% in the fiscal year 2020-2021, as reported by the Central Agency for Public Mobilization and Statistics (CAPMAS). Furthermore, the sector provides a steady source of income for the government, which is then used to fund public services and infrastructure projects, stimulating economic growth.

#### **Direct and Indirect Contribution to GDP:**

The oil and gas sector's contribution to Egypt's GDP can be analyzed through both direct and indirect means. Directly, the sector generates revenue from the sale of oil and gas, which is reflected in the GDP. Indirectly, the sector supports the development of ancillary industries, such as petrochemicals, refining, and engineering services, which in turn contribute to the overall GDP.

Moreover, the oil and gas sector had a multiplier effect on the economy. For instance, the income generated from the sector is used to fund government projects, which create employment opportunities and stimulate economic growth. This multiplier effect further emphasizes the importance of the oil and gas sector in Egypt's economy.

#### B. Contribution to foreign income:

**A** significant portion of Egypt's foreign income provides the country with a steady source of revenue. Egypt's oil and gas reserves have been a critical factor in its economic development, as the nation has become a significant oil and gas exporter. The country's oil and gas sector has contributed to its foreign income through exports, foreign direct investment (FDI), and other financial flows.

#### **Direct Contribution to Foreign Income:**

The most direct way the oil and gas sector contributes to Egypt's foreign income is through exports. Egypt exports crude oil, refined petroleum products, and natural gas to various countries, generating substantial revenue. In 2020, Egypt's oil and gas exports accounted for approximately 20% of the country's total exports, as reported by the Central Bank of Egypt. This export revenue plays a crucial role in the nation's foreign income, enabling Egypt to engage in international trade and maintain a favorable balance of payments.

#### **Indirect Contribution to Foreign Income:**

Apart from direct exports, the oil and gas sector also contributes to Egypt's foreign income indirectly through foreign direct investment (FDI). The sector attracts FDI from international oil companies and other investors, who are interested in exploring and developing Egypt's oil and gas resources. This FDI not only provides the government with much-needed capital but also creates job opportunities and stimulates economic growth.

The sector generates revenue for the government, which is then used to fund public services, infrastructure projects, and social welfare programs. These investments can lead to improved living standards, increased productivity, and a more attractive environment for foreign investors, further boosting Egypt's foreign income.

Foreign direct investment (FDI) in Egypt's oil and gas sector contributes significantly to the country's foreign income. According to the search results, nearly 75% of Egypt's FDI goes to the oil and gas sector.

In the fiscal year 2019/2020, FDI in the oil and gas sector increased from USD 9 billion in FY 2014/2015 to USD 47.8 billion.

The structure of oil and natural gas investments during the current fiscal year is 57.6% for the private sector and 38.4% for public companies

This suggests that both the private and public sectors are actively involved in attracting foreign investment in the oil and gas sector.

In summary, the oil and gas sector contributes a significant percentage of Egypt's foreign income through FDI. Nearly 75% of Egypt's FDI goes to the oil and gas sector, and FDI in this sector has increased significantly over the years.

### **C. Contribution to employment:**

**T**he oil and gas industry has long been a vital component of the global economy, playing a pivotal role in the economic growth and development of many countries. One of the most significant impacts of this industry is its contribution to employment generation, which can be observed through direct and indirect job creation.

#### **Direct Contribution to Employment:**

The most apparent contribution of the oil and gas sector to employment in Egypt is through direct job creation. The industry employs a vast workforce in various roles, including geologists, engineers, drillers, technicians, and support staff. These jobs are typically found in upstream (exploration and production), midstream (transportation and storage), and downstream (refining and distribution) activities.

Moreover, the oil and gas sector in Egypt has created numerous employment opportunities in ancillary industries. Companies that provide equipment, supplies, and services to the oil and gas industry create additional job opportunities, contributing to overall employment. This includes industries such as manufacturing, construction, transportation, and logistics.

#### **Indirect Contribution to Employment**

Apart from direct job creation, the oil and gas sector in Egypt also contributes to employment indirectly through its impact on other industries. The sector generates income for the nation, which is then spent on goods and services, creating job opportunities in other sectors of the economy.

This multiplier effect can be observed in various industries, such as construction, hospitality, retail, and transportation.

Furthermore, the oil and gas sector's indirect contribution to employment in Egypt can be seen through the development of ancillary industries. For example, the construction of pipelines, refineries, and other infrastructure required for the oil and gas industry may involve the import of specialized equipment and technology from other countries. This import activity generates job opportunities in the importing countries, contributing to the global employment landscape.

### **D. Government revenues from oil and gas:**

**E**gypt's oil and gas sector has been a cornerstone of the nation's economy since the early 20th century, contributing significantly to its Gross Domestic Product (GDP) and government revenue.

Egypt's revenue from the oil and gas sector can be quantified through various factors, including crude oil and natural gas sales, export earnings, taxes, and foreign direct investment (FDI) in the sector.

1. **Crude Oil and Natural Gas Sales:** Egypt has earned significant revenue from its oil and gas sales. For example, in 2020, Egypt's oil and gas revenues amounted to approximately \$10.3 billion, according to the Central Bank of Egypt.
2. **Export Earnings:** Egypt is a significant exporter of crude oil and liquefied natural gas (LNG), generating substantial foreign exchange earnings. In 2020, Egypt's oil and gas exports amounted to around \$8.5 billion, contributing to the nation's overall export earnings.
3. **Taxes:** The oil and gas sector is subject to various taxes, including corporate income tax, value-added tax (VAT), and petroleum profit tax. These taxes contribute significantly to the government's overall tax revenue. According to the Egyptian General Petroleum Corporation, the oil and gas sector contributed around 12% of the total tax revenue in the 2019-2020 fiscal year.

4. Foreign Direct Investment (FDI): Egypt's oil and gas sector has attracted substantial FDI from both domestic and international players. This investment has contributed to the development of the sector, leading to increased production, improved infrastructure, and job creation. In 2020, Egypt's oil and gas sector attracted around \$1.2 billion in FDI, according to the Central Bank of Egypt.

## E. Investment in oil and gas:

Egypt has made substantial investments in its oil and gas sector to develop and enhance its energy resources. The country plans to invest around \$38 billion in developing its petrochemicals sector over the next four years, representing about 12% of industrial production and generating significant revenues totaling USD 7 billion. Additionally, foreign direct investment (FDI) in Egypt's oil and gas sector has increased significantly, reaching USD 47.8 billion in the fiscal year 2019/2020.

Egypt's investment in the oil and gas sector can be quantified through various aspects, including infrastructure development, exploration and production (E&P) activities, research and development, and human capital development.

1. Infrastructure Development: In the 2020-2021 fiscal year, the ministry received a budget of EGP 12.8 billion (approximately \$790 million) for infrastructure development projects.
2. Exploration and Production (E&P) Activities: To maintain and grow its oil and gas reserves, Egypt has invested in E&P activities. around \$1.2 billion in foreign direct investment (FDI), according to the Central Bank of Egypt. A significant portion of this investment would have been allocated to E&P activities.
3. Research and Development (R&D): Egypt has invested in R&D to improve the efficiency and environmental sustainability of its oil and gas operations. The petroleum sector receives annual funding from the government to support its research initiatives.
4. Human Capital Development: A skilled and knowledgeable workforce is essential for the growth and development of the oil and gas sector. Egypt has invested in human capital

development through education, training programs, and partnerships with international institutions. The exact amount invested in human capital development is not publicly available; however, the Egyptian government has launched several initiatives to support skills development in the sector, such as the Petroleum Sector Development Program (PSDP) and the Technical and Vocational Education and Training (TVET) reform.

## 3.3. Mineral Mining in Egypt:

### A. Contribution to gross domestic product (GDP):

Mineral mining has played a significant role in Egypt's economy for centuries, contributing to its Gross Domestic Product (GDP). The contribution of mineral mining to Egypt's GDP is significant, as the sector represents about 12% of industrial production and generates revenues totaling USD 7 billion, equivalent to nearly 3% of GDP.

Mineral mining in Egypt primarily focuses on the extraction of phosphates, gypsum, limestone, and clays, among other minerals. The sector's contribution to Egypt's GDP can be analyzed through several factors, including direct and indirect economic impacts, employment generation, and export earnings.

1. Direct Economic Impact: Mineral mining directly contributes to Egypt's GDP through the revenue generated from the sale of mined minerals. According to the Central Agency for Public Mobilization and Statistics (CAPMAS), the mining and quarrying sector, which includes mineral mining, contributed 0.8% to Egypt's GDP in the fiscal year 2020-2021. This contribution may seem modest; however, it is essential to consider the sector's indirect economic impacts.
2. Indirect Economic Impact: Mineral mining has a ripple effect on other sectors of the economy, such as manufacturing, transportation, and construction. The sector supports ancillary industries by creating demand for goods and services, leading to increased economic activity and job creation. Additionally, mineral mining often leads to

the development of infrastructure, such as roads and ports, which further boosts the economy.

3. **Export Earnings:** Egypt's mineral mining sector contributes significantly to the nation's export earnings. The country exports a wide range of minerals, including phosphates, gypsum, and limestone, to international markets. In 2020, Egypt's mineral exports amounted to approximately \$1.8 billion, according to the Egyptian Ministry of Trade and Industry. These export earnings contribute to the country's foreign exchange reserves and support other sectors of the economy.

## **B. Contribution to foreign income earnings:**

**M**ineral mining has played a crucial role in Egypt's economy for centuries, contributing to its foreign income earnings through the export of various minerals. The mining, quarrying, and petroleum, gas, and other extraction sectors accounted for EGP 565.561 billion in gross value added at factor cost in FY 2021/22, marking a 37.5% growth compared to FY 2021/20. The contribution of mineral mining to Egypt's foreign income earnings is significant. According to the search results, Egypt's mining sector has the potential to increase its contribution to GDP tenfold by 2026, with a target of more than USD 20 billion by 2040.

Egypt's mineral mining sector primarily focuses on the extraction of phosphates, gypsum, limestone, and clays, among other minerals. These minerals are exported to international markets, contributing significantly to Egypt's foreign income earnings.

1. **Key Minerals:** Egypt's mineral mining sector exports a range of minerals, with phosphates being the most significant contributor to foreign income earnings. Egypt is one of the world's leading producers and exporters of phosphate rock, which is used in the production of fertilizers, detergents, and various industrial applications. Other key minerals include gypsum, limestone, and clays,

which are also exported in significant quantities.

2. **Export Destinations:** Egypt exports its mined minerals to various international markets, with key destinations including Europe, Asia, and Africa. According to the Egyptian Ministry of Trade and Industry, the top five export destinations for Egyptian minerals in 2020 were China, Italy, the Netherlands, Belgium, and the United States.
3. **Economic Impact:** Mineral mining's contribution to Egypt's foreign income earnings is substantial. In 2020, Egypt's mineral exports amounted to approximately \$1.8 billion, according to the Egyptian Ministry of Trade and Industry. These earnings contribute to the country's foreign exchange reserves and support other sectors of the economy, such as manufacturing, transportation, and construction.

## **C. Contribution to employment:**

**M**ineral mining plays a significant role in Egypt's economy, providing employment opportunities and contributing to the nation's overall socio-economic well-being. The mineral mining sector directly employs thousands of Egyptians, while indirectly supporting numerous ancillary industries. According to the International Labor Organization (ILO), the mining sector employed around 27,000 people in Egypt in 2020. This employment generation contributes to reducing poverty and improving the overall socio-economic well-being of the population.

## **D. Government revenues from mineral mining:**

**M**ineral mining has played a significant role in Egypt's economy, contributing to the nation's government revenue through various sources, such as taxes, royalties, and licensing fees.

1. The government revenue from mineral mining in Egypt has been substantial, with the mining, and quarrying. The Egyptian government derives revenue from mineral

mining through several channels, including taxes, according to the Egyptian Ministry of Petroleum, the country's mineral mining sector paid approximately EGP 4.5 billion in taxes in the fiscal year 2020/2021. Royalties, Royalties are a percentage of the market value of the mined minerals and serve as a direct payment to the government for the use of natural resources. In Egypt, the royalty rates vary depending on the type of mineral and the market price. For instance, the royalty rate for phosphate rock is 5%, while it is 3% for gypsum. And licensing fees, companies must obtain licenses from the government. Licensing fees are charged for the issuance and renewal of these licenses, providing the government with a steady source of revenue. The amount of licensing fees varies depending on the type and scale of the mining operation.

### **E. Investment in mineral mining:**

**E**gypt's mineral mining sector has witnessed significant investment in recent years, contributing to the nation's economic growth and employment opportunities.

Egypt's mineral mining sector has attracted investments from both domestic, such as Egyptian Company for Mineral Resources (ECMR) which is a state-owned enterprise that operates several phosphate mines and contributes significantly to the country's mineral production. International players, such as the Chinese company, Sinomine, have invested in Egypt's phosphate industry by acquiring a stake in the Egyptian Phosphate Company (EPC).

#### **Investment Trends in Egypt's Mineral Mining Sector**

The mineral mining sector in Egypt has witnessed several investment trends in recent years, including:

1. **Focus on Resource Exploration:** As Egypt's mineral resources face depletion, investors are increasingly focusing on resource exploration and the development of new mining sites. This trend aims to

maintain a steady supply of minerals and ensure the sector's continued growth.

2. **Sustainable Mining Practices:** With growing concerns about the environmental impact of mining, investors are increasingly adopting sustainable mining practices and promoting cleaner technologies. This trend not only addresses environmental concerns but also improves the sector's long-term viability and attractiveness to investors.
3. **Downstream Industry Development:** To add value to its mined minerals and diversify its revenue sources, Egypt is encouraging investment in the development of downstream industries, such as fertilizer and cement production. This trend aims to create additional job opportunities and promote economic diversification.

#### **Future Prospects for Investment in Egypt's Mineral Mining Sector**

To attract more investment and maintain the sector's growth, Egypt needs to address several challenges and create an enabling environment for investors.

1. **Improving the Investment Climate:** Egypt can attract more investment by improving the investment climate, ensuring transparency and fairness in business practices, and offering attractive incentives for investors. This includes simplifying bureaucratic procedures, providing tax incentives, and offering guarantees for foreign investors.
2. **Enhancing Infrastructure:** Developing the necessary infrastructure, such as roads, ports, and power facilities, is crucial for attracting investment in the mineral mining sector. This will facilitate the transportation of minerals and support the development of downstream industries.
3. **Promoting Research and Innovation:** Investing in research and innovation can help Egypt identify new mining opportunities, develop advanced mining technologies, and improve the sector's overall competitiveness. This can attract investment from technology-focused companies and promote the development of a knowledge-based economy.

## 4. Status of Coastal and Marine tourism, oil and gas, and Mineral mining in Egypt:

### 4. 1. Status of Coastal and Marine tourism in Egypt:

According to UN World Tourism Organization (UNWTO) definition and defines coastal tourism as nearshore tourism activities such as swimming, surfing, and diving and land-based tourism activities such as sunbathing, coastal hiking and driving, coastal heritage, recreation and sports activities that take place on or along the seashore. Marine tourism is defined as sea-based activities such as cruising, yachting, boating, recreational fishing, marine mammal watching (including whales and dolphins), and other nautical sports and includes their respective land-based services and infrastructure.

The Egyptian tourism sector is of prime importance in the Egyptian economy and it is located in third place regarding the income after the Suez Canal and foreign currency transformations from Egyptian abroad. Tourism history in Egypt started in 1952 with tourists standing at 0.1 million in 1952. Tourism became an important sector of the economy from 1975 onwards, as Egypt eased visa restrictions for almost all European and North American countries and established embassies in new countries like Austria, Netherlands, Denmark, and Finland. In 1976, tourism was a focal point of the Five Year Plan of the Government, where 12% of the budget was allocated to upgrading state-owned hotels, establishing a loan fund for private hotels, and upgrading infrastructure (including road, rail, and air connectivity) for major tourist centers along with the coastal areas. The tourist inflow increased to 1.8 million in 1981 and then to 5.5 million in 2000. Tourist arrivals reached a pinnacle in 2010 by reaching 14.7 million visitors. Revenues from tourism reached the highest point at \$12.6 billion in the fiscal year 2018–2019. In the year 2020, tourism-related revenues dropped by nearly 70% to \$4 billion.

During the Egyptian Revolution of 2011, the number of visitors plummeted by over 37% that year falling from 14 million in 2010 to 9 million by the end of 2011. This has impacted a diverse

range of businesses directly or indirectly dependent on tourism, from travel accommodation and tourist attractions to car rental and air transportation, as well as health and wellness industries. Tour operators offering heavy discounts to encourage tourists back have been somewhat successful at the Red Sea resorts where prices remain lower compared to 2011.

In the first half of 2014, the number of tourists further declined by 25% as compared with the same period in 2013, while revenues shrank by 25% as well. In 2017, Bloomberg said Egypt had "shed its years of social and political unrest" and made the top 20 list of 2017 travel destinations. The latest United Nations World Tourism Organization (UNWTO) has revealed that Egypt is one of the world's fastest-growing tourist destinations. In 2017, the number rose to 8 million tourists compared to the previous year which was about 5.26 million.

Before the global pandemic of COVID-19, tourism was one of the fastest-growing sectors in Egypt, supporting the livelihoods of millions of people. The global pandemic brought tourism to a standstill, highlighting the economic dependency of many coastal states including Egypt, and making the flaws of the traditional model for coastal and marine tourism visible. As the world begins to recover and reopen, destinations will have the opportunity to use this moment to invest in a more sustainable model of coastal and marine tourism that focuses on regeneration and resilience to ensure the long-term environmental, economic, and cultural well-being of coastal nations.

In a business scenario, it was estimated that by 2030, tourism would contribute an additional \$777 billion to the global economy and employ an additional 8.5 million people (OECD 2016; Dwyer 2018). Coastal and marine tourism is estimated to constitute 26 percent of the value generated by ocean-based industries by 2030 (OECD 2016).

#### **The tourism market in Egypt is divided into 6 major sectors:**

1. Red Sea Sector: This includes the Hurghada-Safaga zone, El-Qusier zone, and Marsa Alam zone with 1204 projects with an area of 194.641 million m<sup>2</sup>. The huge Safaga zone is the most condensed

zone with 600 projects with an area of 127.852 million m<sup>2</sup>.



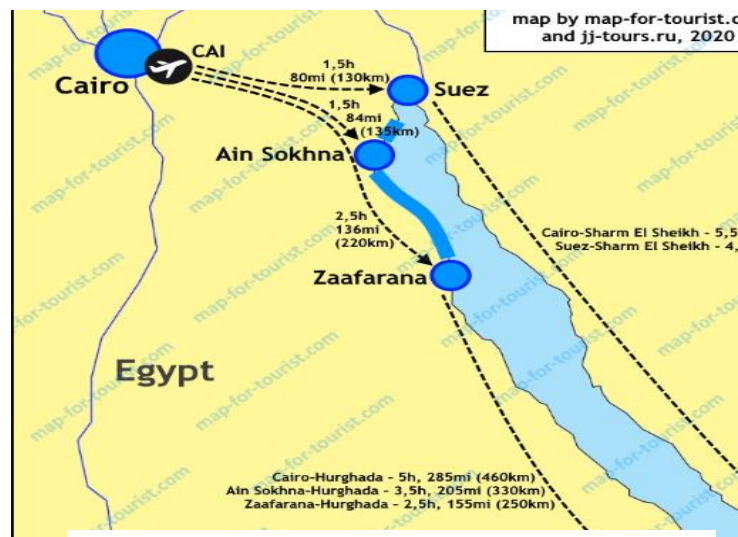
**Figure 2:** Map showing the tourism

2. Gulf of Aqaba Sector: This includes Sharm El-Sheikh zone and Taba-Nuweiba zone with 467 projects with an area of 41.949 million m<sup>2</sup>. The Sharm El-Sheikh zone is the most condensed zone with 335 projects with an area of 27.940 million m<sup>2</sup>.



**Figure 3:** Map showing the tourism

3. South Sinai sector: This includes Ras Suder zone, with 155 projects with an area of 21.350 million m<sup>2</sup>.
4. Gulf of Suez Sector: This includes Ain Sukhna zone with 311 projects with an area of 35.689 million m<sup>2</sup>.



**Figure 4:** Map showing the tourism compounds at the Egyptian Gulf of Suez sector.



**Figure 5:** Map showing the North western coast

5. Northwestern Coast Sector: This sector includes the northwestern Mediterranean Sea of Egypt, beginning from Alexandria to Salum City. With 157 projects with an area of 3500 million m<sup>2</sup>.





**Figure 6:** Map showing the tourism compounds at the Northern west tourism sector.

6. River Nile Sector: Tourism activities in the Nile are mainly cruises, with about 203 cruise boats. Cruises are offered along the Nile ranging from short tours between Luxor and Aswan to longer cruises that include the northern town of Dendera. In the past, it used to work from Cairo to Aswan for more than two weeks, but due to the development of the Nile, it stopped doing Nile Cruises from Cairo, and it is now working from Luxor to Aswan. Many cruises are aboard a larger vessel that functions as a floating hotel. Other Nile trips can be on a felucca, a traditional sailboat, on which overnight journeys may require passengers to sleep in the open air on deck and the sailors to double as cooks.



**Figure 7:** Map showing the tourism cruising sites through Egyptian River Nile.

## 4.2. Status of Oil and gas mining in Egypt:

**M**ining activities in coastal and marine regions of Egypt specifically focused on the Red Sea, have led to environmental concerns and impacts. Although there is no extensive focus on deep-sea mining in Egyptian territories, traditional mining activities such as dredging, oil and gas extraction, and marine diamond mining have resulted in adverse effects on the marine environment and local communities. Some specific examples of mining impacts on the Egyptian Red Sea include heavy oil pollution, coral reef degradation, petroleum hydrocarbon spills, Coastal habitat loss, biodiversity decline and overexploitation of resources. To address these issues, initiatives such as the Egyptian Red Sea Coastal and Marine Resource Management Project aim to improve the understanding of coastal environments and develop strategies to better manage the impacts of mining and other human activities.

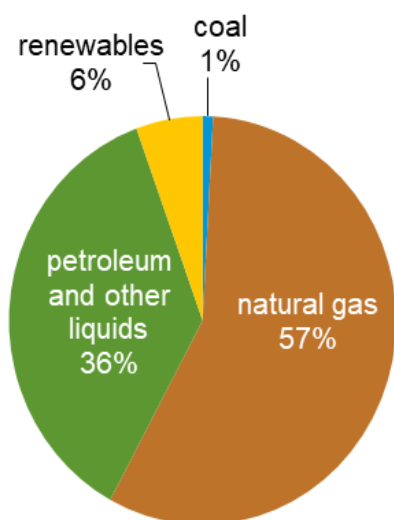
By implementing best practices and promoting responsible development, it is possible to reduce the negative impacts of mining on the marine environment and preserve the unique ecosystems of the Red Sea.

Egypt is the third-largest natural gas producer in Africa, following Algeria and Nigeria. Egypt operates the Suez Canal and the Suez-Mediterranean (SUMED) Pipeline, which are important transportation infrastructures in international energy markets. The Suez Canal is a transit route for oil and liquefied natural gas (LNG) shipments traveling

northbound from the Persian Gulf to Europe and North America. Shipments traveling southbound from North Africa and from countries along the Mediterranean Sea to Asia also move through the Suez Canal. Fees collected from these two transit points are significant sources of revenue for the Egyptian government.

### 1. Oil and gas consumption in Egypt:

According to the latest estimates in BP’s 2021 statistical review of world energy, Most consumed fuel in Egypt were petroleum and other liquids (36%) and natural gas (57%) in 2020. Renewable energy and coal accounted for 6% and %, respectively, of the country’s total consumption (Figure 8).



**Figure 8:** Primary energy consumption in Egypt, 2020.

Source: U.S. Energy Information Administration.

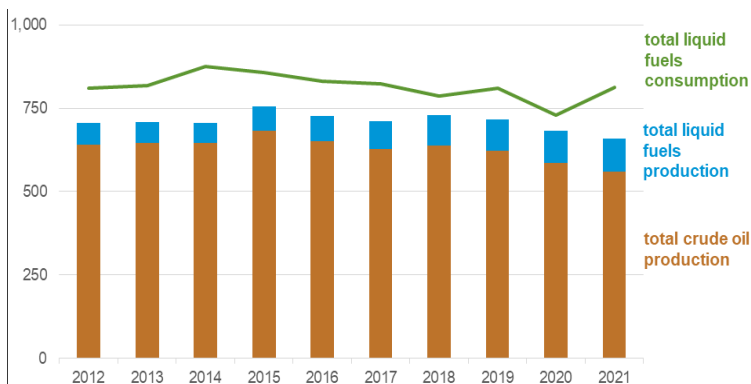
### 2. Exploration and production:

- According to the Oil & Gas Journal (OGJ), Egypt held proved oil reserves of 3.3 billion barrels as of January 2021.
- Egypt has three main crude oil blends. The Suez and Belayim blends come from aging offshore fields in the Gulf of Suez and are refined domestically, with only small quantities exported. The Suez and Belayim blends are medium, sour crude oil grades. The Western Desert blend comes from the newer onshore fields in the Western Desert and is a light, sweet crude oil (Table 2).
- Total liquid fuels production in 2021 was an estimated 660,000 barrels per day (b/d), about 561,000 b/d was crude oil and lease condensate (Figure 9).
- Egypt’s total liquid fuel consumption currently outpaces its oil production. Egypt’s total liquid fuels production has benefited from higher natural gas liquids production from the large offshore natural gas fields that came online in the mid-2010s. However, overall total liquid fuel production has been declining because of a lack of significant crude oil discoveries in recent years.

**Table 2:** Selected crude oil blends from Egypt.

Crude oil blend	API gravity	Sulfur content
Suez	30.4	1.65
Belayim	27.5	2.20
Western Desert	41.1	0.34

Source: U.S. Energy Information Administration, based on data from the Egypt Oil and Gas Group



**Figure 9:** Total annual liquid fuels production and consumption in Egypt, 2012-2021 .

Source: U.S. Energy Information Administration, based on data from International Energy Statistics data base, March,2022

### 3. Transport and storage:

The Suez Canal and the Suez-Mediterranean (SUMED) Pipeline are two major routes and transit chokepoints for crude oil and LNG shipments, and they give Egypt a significant role in global crude oil and natural gas trade. If both the Suez Canal and the SUMED Pipeline close, tankers would have to divert around the southern tip of Africa, adding approximately 8–15 days of transit to the United States or Europe and leading to increased shipping costs.

Egypt has crude oil storage facilities located at the Ain Sukhna and Sidi Kerir terminals, which are located at the beginning and the end of the SUMED pipeline. The Sidi Kerir terminal, located in the Mediterranean, has 27 storage tanks with a total capacity of 20 million barrels, while the Ain Sukhna terminal (located on the Red Sea) has 15 floating storage tanks with a total capacity of 10 million barrels.

The Ras Fanar Oil Terminal, located on the Gulf of Suez coast, is an important export hub for Egypt's petroleum products. It serves as a terminal for the export of crude oil and refined products from various fields in the region. The terminal plays a vital role in facilitating the transportation and shipment of Egypt's oil production to international markets.

### 4. Refining and refined oil products

- According to the EGPC, eight refineries with a total nameplate capacity of approximately 762,000 b/d exist in Egypt (Table 3).

- According to Egypt's Minister of Petroleum and Mineral Resources, the MIDOR refinery plans to expand and modernize by 60,000 b/d. This project will be completed in the first quarter of 2022, adding a crude oil distillation unit, a vacuum distillation unit, a diesel hydrotreater, and a hydrogen unit. This project, which will cost about \$2.3 billion, also increases operational efficiency and production capacity by upgrading and integrating other existing units.

- The Assiut refinery expanded and modernized its facilities to add a new naphtha complex and hydrocracking complex.

- The Mostorod refinery began operating commercially in 2019, and it was officially inaugurated in September 2020. The refinery has several different processing units, including a delayed coker unit, a naphtha and a diesel hydrotreating unit, a hydrocracker, and a sulfur recovery unit. The refinery was originally begin operations in 2018 but experienced delays during its construction phase.

- In April 2021, the Egyptian government and the state-owned Red Sea National Refining and Petrochemicals Company signed an agreement to build an integrated refining and petrochemicals complex in the Suez Canal Economic Zone at Ain Sukhna. The refining and petrochemicals complex will be used to produce a variety of petroleum and chemical products, including polyethylene, polyesters, and bunker fuel, and, when completed, will be the first and largest integrated facility in Africa. The proposed refining and petrochemicals project requires an overall investment of \$7.5 billion and, according to Egypt's Ministry of Petroleum and Mineral Resources, construction will likely be finished by the end of 2024.

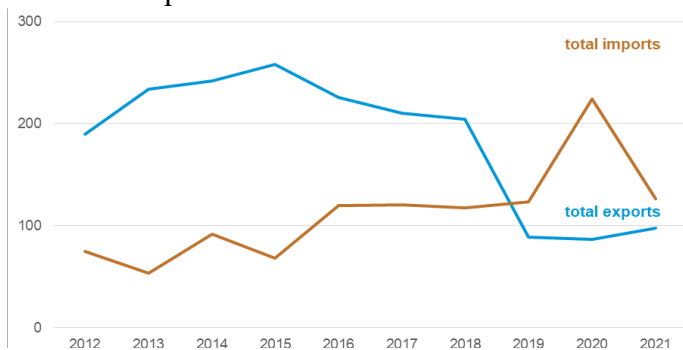
**Table 3.** Egypt's existing refineries

Refinery Name	Operator	Location	Capacity (barrels/day)
El-Nasr refinery	El-Nasr Petroleum Company	Suez	131,000
Mostorod refinery	Egypt Refining Company	Moscow (Cairo)	161,000
Alexandria refinery	Alexandria Petroleum Company	Alexandria	100,000
MIDOR refinery	Middle East Oil Refinery	Alexandria	100,000
Ameriya refinery	Ameriya Petroleum Refining Company	Egypt's Zohr field	80,000
Suez refinery	Suez Petroleum Processing Company	Suez	60,000
Assiut refinery	Assiut Petroleum Refining Company	Assiut	90,000
Tanta refinery	Cairo Petroleum Refining Company	Tanta	40,000
<b>Total</b>			<b>762,000</b>

Source: Table created by the U.S. Energy Information Administration, based on data from the Egyptian General Petroleum Corporation company website.

### 5. Petroleum and other liquids exports

• In 2021, Egypt imported about 127,000 b/d of crude oil and condensate and exported about 98,000 b/d (Figure 10). Over half of Egypt's crude oil exports went to India, and the remainder went to China and countries in Europe.



**Figure 10:** Egypt's total annual exports and imports of crude oil and condensate, 2012-2021 (Thousand barrels per day)

**Source:** U.S. Energy Information Administration, based on data from International Energy Statistics data base, and data provided by Global Trade Tracker.

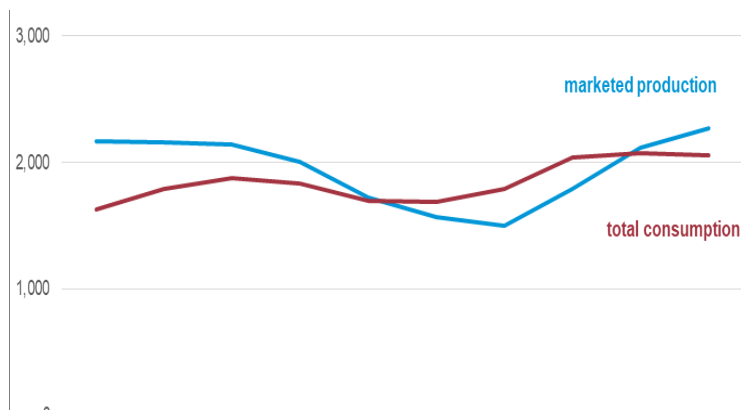
### 6. Natural gas Exploration and production:

According to OGJ, Egypt held 63 trillion cubic feet (Tcf) of proven natural gas reserves as of January 2021.

Egypt produced about 2.3 Tcf of dry natural gas in 2019 and consumed about 2.1 Tcf in that same

year (Figure 10). Egypt's natural gas production rose significantly as a result of major natural gas discoveries in the 2010s, such as the Zohr, Atoll, and West Nile Delta projects, which were fast-tracked for development. Natural gas consumption (including exports) has remained relatively flat, allowing Egypt to export some surplus natural gas via pipelines and as LNG. Egypt's Zohr field reached its peak production of 80,000 cubic feet per year in February and March 2021, but technical problems have decreased production; a major water breakthrough in the field to about 876 Bcf per year. Eni (operator) drilled additional wells to increase capacity, but the outcome remains uncertain.

In July 2020, Eni announced a new natural gas discovery at the Bashrush well in the North ElHammad concession, Greater Nooros area, located offshore in the Mediterranean. Initial testing at the well-placed production estimates at about 11.7 Bcf per year.



**Figure 11:** Annual natural gas production and consumption in Egypt, 2010-2019 (billion cubic feet per year)

**Source:** U.S. Energy Information Administration, based on data from International Energy Statistics data base.

### 7. Natural gas transport and storage: Pipelines

The Arab Gas Pipeline (AGP) is a natural gas pipeline that originates in Arish, Egypt and connects to other countries such as Jordan, Syria, and Lebanon. The AGP, which has a reported capacity of 234 Bcf per year, currently

supplies natural gas from Egypt to Jordan at between 26 Bcf and 44 Bcf per year.

### LNG

- Egypt currently has two LNG export facilities, the Spanish-Egyptian Gas Company (SEGAS) LNG facility and the Egyptian LNG facility (ELNG).

- Egypt has one floating storage and regasification unit (FSRU), and it is located at the SUMED port. North Idku Gas Plant: The North Idku Gas Plant is a major processing facility located on the Mediterranean coast. It receives gas from various offshore fields, including the West Nile Delta gas fields. The plant processes and liquefies the gas for export as liquefied natural gas (LNG). It has played a crucial role in Egypt's ambitions to become a regional gas exporter.

**Table 4:** Egypt liquefaction terminals

Project Name	ownership	Start Date	Location	Capacity (billion cubic feet per day)
SEGAS LNG	ENI (50%),EGAS (40%),EGPC (10%)	2004	Damietta	266
Egyptian LNG	Train 1- shell (35.5%); Petronas (35.5%); EGAS (12%); EGPC (12%); TotalEnergies (5%) Train2- Shell (38%); Petronas (38%); EGAS (12%); EGPC (12%)	2005	Idku	346
<b>Total</b>				<b>612</b>

Source: Table by the U.S. Energy Information Administration, based on data from the Global

Energy Monitor, Hydrocarbons Technology, NS Energy Business, Eni company website

## 8. Natural gas exports

Egypt primarily exports its natural gas as LNG, although, in 2018, it began exporting natural gas to Jordan via the AGP. Historically Egypt has been a net exporter of natural gas, but in the mid-2010s, Egypt had to import natural gas to meet increasing domestic consumption. Egypt's total natural gas exports have steadily increased since 2016, after some of its recent natural gas discoveries began producing, which created a surplus of natural gas for the country to export. Egypt's natural gas imports declined to nearly zero by 2019 after reaching a record high of 294 Bcf in 2016; Egypt exported about 177 Bcf in 2019.

Egypt exported about 64 Bcf of LNG in 2020, according to the latest estimates provided by BP's 2021 Statistical Review of World Energy. Most of Egypt's LNG went to countries in the Asia Pacific region, with Pakistan, China, and Taiwan as the three largest importers. The United Kingdom also imported about 6 Bcf, or 10%, of Egypt's total exports in 2020.

## 9. Petroleum fields in Egypt:

Egypt is recognized as a significant player in the global energy sector, with a long history of petroleum production. The country's vast reserves and strategic location make it an important hub for the exploration and extraction of oil and gas. The main information on petroleum fields in Egypt, highlighting their locations, reserves, and contributions to the country's energy industry is listed in table (5).

**Table 5:**Oil and Gas fields in Egypt, their location and description.

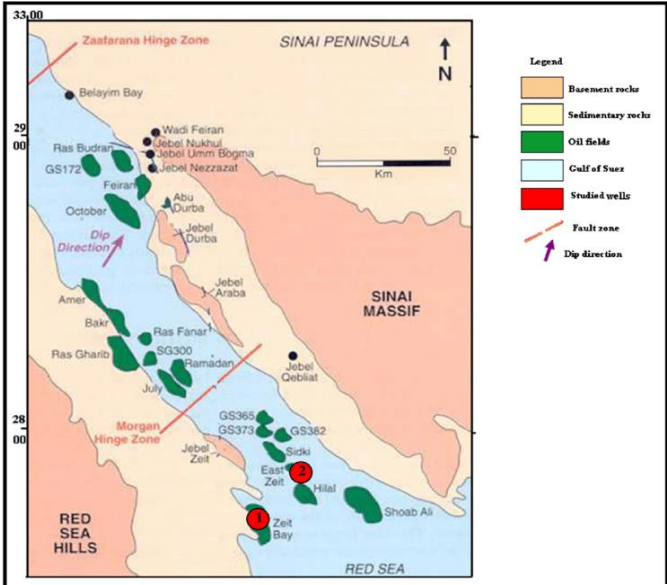
No.	Field name	Type	Location	Description
1	Zohr Gas Field	Gas	Mediterranean Sea, offshore.	<ul style="list-style-type: none"> <li>It is one of the largest natural gas discoveries in the world.</li> <li>Discovered in 2015.</li> <li>Began production in 2017.</li> <li>Reserves 30 trillion cubic feet</li> </ul>
2	West Nile Delta Gas Fields	Gas	Mediterranean Sea, offshore.	<ul style="list-style-type: none"> <li>Series of offshore fields</li> <li>Include the Taurus, Libra, Giza, and Raven fields.</li> <li>Become a regional gas exporter.</li> <li>Has significant gas reserves.</li> </ul>
3	Gulf of Suez Oil Fields	Oil	Gulf of Suez-offshore	<ul style="list-style-type: none"> <li>Including Ras Ghareb, Zeit Bay, and Morgan fields.</li> <li>Development activities continue to discover new resources and enhance production.</li> <li>Relatively mature reserves</li> </ul>
4	Eastern Desert Oil Fields	Oil	Eastern Desert, onshore	Contains numerous oil fields, including the Abu Gharadig, October, and Badr fields.
5	Mediterranean Offshore Fields	Oil Gas	Mediterranean offshore	Encompass various oil and gas fields, including the Rosetta, Baltim, and Abu Qir fields. Contribute to Egypt's energy mix and play a crucial role in the country's domestic demand for oil and gas.
6	Western Desert Oil Fields	Oil Gas	Western Desert onshore	It is a vast region in Egypt that contains several oil and gas fields. It is one of the most prolific hydrocarbon-producing regions in the country. It includes the Alamein, Khalda, and Bahariya fields.
7	North Sinai Gas Fields	Gas	North Sinai, Mediterranean offshore	Include several offshore gas fields, including the Temsah, Baltim South, and Obaiyed fields. It played a crucial role in meeting Egypt's growing demand for natural gas. They have also supported the country's efforts to become a regional gas hub and export gas to neighboring countries.
8	Red Sea Oil and Gas Fields	Oil Gas	Red Sea, offshore	The Atoll and Shorouk fields. Hold promising reserves and are attracting international oil companies to invest in their exploration.
9	Upper Egypt Oil Fields	Oil	Upper Egypt, onshore	Including the Hurghada and Safaga fields. Smaller in scale. The development of these fields supports local economies and provides job opportunities in the region.
10	Matruh Gas Fields	Gas	Northwest Egypt, offshore	Including the Scarab and Saffron fields. Having significant gas reserves contributes to Egypt's natural gas production and helps meet the country's energy needs.
11	Abu Rudeis Oil Field	Oil	Southern Gulf of Suez, offshore-onshore.	One of the oldest producing fields in Egypt (1960s) Played a significant role in Egypt's oil production. Contributed to Egypt's energy self-sufficiency and remains an important asset in the country's petroleum sector.
12	Ras Shukheir Oil Field	Oil	Gulf of Suez, near Ras Gharib, Offshore & Onshore	The field has both onshore and offshore components and has been instrumental in sustaining Egypt's oil industry.

13	Ras Bakr and Ras Budran Oil Fields	Oil	Gulf of Suez	Both fields have been producing oil since the 1980s and have contributed significantly to Egypt's petroleum output. They are part of the larger Gulf of Suez oil fields and continue to be important assets in the region.
14	Meleiha Oil Field	Oil Gas	Western Desert onshore	It has been in production since the 1990s. Contributed to the exploration and development of the Western Desert region, which has become a vital area for Egypt's hydrocarbon production.
15	Khalda/Khalda Offset Oil and Gas Fields	Oil Gas	Western Desert Onshore	Have significant oil and gas reserves. Contributing to the country's energy security and economic growth.
16	Qarun Oil Fields	Oil	Western Desert onshore	The fields, including the East and West Qarun fields, have been producing oil since the 1990s. They have contributed to Egypt's oil production and played a vital role in the development of the Western Desert region.
17	North Bahariya Concession	Oil Gas	Bahariya Oasis in the Western Desert onshore	Includes several oil and gas fields, including the Bahariya, Faras, and Sitra fields.
18	Morgan Oil Field	Oil	Gulf of Suez	Operating since the 1970s and continues to be a significant contributor to Egypt's oil production. The field is known for its complex reservoirs and has undergone various enhanced oil recovery techniques to maximize production.
19	Ramadan Oil Field	Oil	Gulf of Suez onshore and offshore	It has been in production since the 1980s and has played a crucial role in Egypt's oil industry. The field has contributed to the development of the Gulf of Suez region as a major hub for oil production.
20	Al-Jalalah Oil Field	Oil	Eastern Desert onshore	The field has had significant oil reserves producing since the 1980s.
21	South Umbarka Oil Field	Oil	Western Desert	The field has been in production since the 1990s.
22	South Disouq Gas Field	Gas	Nile Delta region, onshore	The field has significant natural gas reserves. Operating since 2015.
23	Petrobel Fields	Oil Gas		These fields include the Baltim South West, Tuna, and Belayim fields.
24	Atoll Gas Field	Gas	North Damietta Mediterranean Sea Offshore	It is approximately 80 kilometers north of Damietta. The field has substantial gas reserves and commenced production in 2018. The development of the Atoll field has supported Egypt's efforts to become a regional gas exporter.
25	North Alexandria Gas Fields	Gas	Mediterranean Sea, west of Alexandria. Offshore	Encompasses several gas discoveries, including the Qasr, Rosetta, and West Alboran fields.

26	East and West Mediterranean Deepwater Fields	Oil Gas	East and West Mediterranean offshore	These blocks are open for exploration and development, offering potential for both oil and gas discoveries. International oil and gas companies have been awarded exploration agreements in these blocks, and exploration activities are underway to uncover their hydrocarbon potential.
27	Gulf of Suez Deepwater Fields	Oil Gas	deepwater areas of the Gulf of Suez, offshore Egypt	These fields offer potential for oil and gas discoveries in deeper waters. Exploration and production activities in these deepwater fields aim to enhance Egypt's oil production from the Gulf of Suez region.
28	Wadi El Gemal Concession	Oil Gas	offshore area situated in the Red Sea	This concession area is known for its exploration potential and is open for oil and gas companies to explore and develop. The Wadi El Gemal Concession offers opportunities for future discoveries in the Red Sea region.
29	East Zeit Bay Field Gulf of Suez, off the coast of Egypt	Oil	Gulf of Suez, off the coast of Egypt Offshore	The field has been producing oil for several years. The field has supported Egypt's oil production from the Gulf of Suez area.

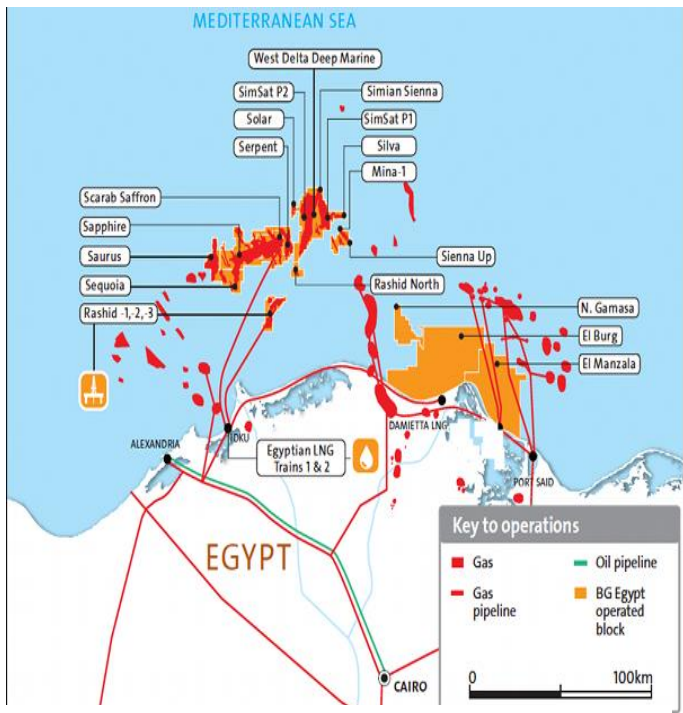
The offshore oil fields and concession areas in Egypt highlight the country's ongoing efforts to explore and develop its hydrocarbon resources. Through exploration agreements, production activities, and the opening of new blocks, Egypt aims to maximize its oil and gas production, attract foreign investments, and strengthen its position as a regional energy hub. The continued exploration and development of these offshore areas will contribute to Egypt's energy security and economic growth.

Egypt's offshore oil fields play a vital role in fulfilling the country's energy requirements and driving economic growth. These fields have contributed significantly to Egypt's oil and gas production, enhancing the country's energy security and establishing its position as a regional energy player. Ongoing exploration and development activities in these offshore fields will continue to shape Egypt's energy landscape and drive its aspirations for a sustainable and vibrant energy sector.



**Figure 12: Map for Oil and gas fields at the Red Sea and Gulf of Suez.**





**Figure 13:** Map for Oil and gas fields at the Mediterranean Sea..

#### 4. 3. Status of Mineral mining in Egypt:

Egypt's mining industry encompasses various minerals, including gold, iron ore, tantalite, coal, and heavy mineral sands. The country's rich mining history, combined with recent developments and efforts to attract private investment, highlights the potential for further exploration and discovery of valuable mineral resources. The Sukari Gold Mine remains a significant contributor to Egypt's economy, while ongoing exploration activities in the Eastern Desert offer promising opportunities for future mining projects.

Egypt is a country with a rich history of mining, in recent years, Egypt has been actively working to attract private investment in the mining sector. The government has implemented measures to modernize the industry, adopt advanced technologies, and maximize the value of Egypt's mineral wealth. The Ministry of Petroleum and the Egyptian Mineral Resources Authority (EMRA) are key entities involved in promoting and regulating the mining sector.

#### 1. Minerals raw materials:

1. **Gold:** Gold mining in Egypt has a long history, with evidence of gold mining in Upper Egypt dating back to predynastic times. The earliest known beryl mine in the world is located in the Wadi Sikait valley in the Eastern Desert. Gold mining started with alluvial workings and later expanded to shallow underground vein mining in Nubia during the New Kingdom period. The Sukari Gold Mine, operated by Centamin Egypt, is the country's only commercial gold mine and contributes significantly to Egypt's gross domestic product (GDP) with an annual contribution of up to \$900 million.
2. **Iron Ore:** Egypt is known for its iron ore deposits, with several mines scattered across the country. Iron ore mining in Egypt is primarily concentrated in the Eastern Desert region.
3. **Tantalite:** Egypt has the fourth-largest tantalite reserves in the world, with an estimated 48 million tons. Tantalite is a valuable mineral used in various industries, including electronics and aerospace.
4. **Coal:** Egypt has significant coal reserves, with an estimated 50 million tons. Coal mining in Egypt is primarily concentrated in the Sinai Peninsula and the Eastern Desert region.
5. **Phosphate:** Egypt is one of the major producers of phosphate rocks, with companies like Misr Phosphate playing a significant role in the industry. Phosphate rocks are essential for the production of fertilizers and are a valuable resource for agricultural purposes.

**6. Non-metallic ores:** Egypt is rich in non-metallic ores, which are used in various industries. Some of the notable non-metallic ores found in Egypt include phosphate, limestone, gypsum, dolomite, and quartz. Phosphate rocks are a valuable resource for the production of fertilizers, while limestone is used in construction and cement manufacturing. Gypsum is used in the production of plaster and other building materials.

**7. Industrial Minerals:** Egypt is also known for its industrial minerals, which have diverse applications. These minerals include calcium carbonate, talc, silica sand, kaolin, and feldspar. Calcium carbonate is used in various industries, including paper, plastics, and paints. Talc is used in cosmetics, ceramics, and pharmaceuticals. Silica sand is a key component in glass production, while kaolin and feldspar are used in ceramics and porcelain manufacturing.

The Egyptian government has been actively working to attract investment in the mining sector and promote sustainable development. Efforts have been made to modernize the industry, adopt advanced technologies, and improve regulations to ensure responsible mining practices. The Egyptian Mineral Resources Authority (EMRA) plays a crucial role in regulating and promoting the mining sector in Egypt.

Egypt possesses a wide range of mineral resources, including energy raw materials, metallic ores, non-metallic ores, and industrial minerals. These resources contribute to various industries and have the potential to drive economic growth. Ongoing efforts to attract investment and promote sustainable mining practices indicate a commitment to maximizing the value of Egypt's mineral wealth and supporting the country's development.

## 2. Egypt`s mining areas:

Egypt has several mining areas that are rich in various mineral resources. Here are some of the notable mining areas in Egypt:

1. **Eastern Desert:** The Eastern Desert is a significant mining region in Egypt, known for its gold deposits. Ancient Egyptians extensively mined gold in this area, and modern mining companies continue to explore and extract gold resources in the Eastern Desert.
2. **Sinai Peninsula:** The Sinai Peninsula is another important mining region in Egypt. It is known for its mineral resources, including copper, zinc, and lead. The region has a long history of mining, and exploration activities are ongoing to uncover its full potential.
3. **Red Sea Coast:** The Red Sea Coast is rich in mineral resources, particularly in the form of heavy mineral sands. These sands contain valuable minerals such as ilmenite, rutile, zircon, and monazite. Mining companies are actively involved in extracting and processing these minerals along the Red Sea Coast.
4. **Western Desert:** The Western Desert is a vast region in Egypt that holds various mineral resources. It is known for its deposits of iron ore, phosphate, limestone, and gypsum. Mining activities in the Western Desert contribute to the production of fertilizers, cement, and other industrial materials.
5. **Nile Valley:** The Nile Valley is not traditionally known for extensive mining activities. However, there are some smaller-scale mining operations in this region, particularly for building materials such as sand, gravel, and clay.

# GEOLOGICAL MAP OF EGYPT

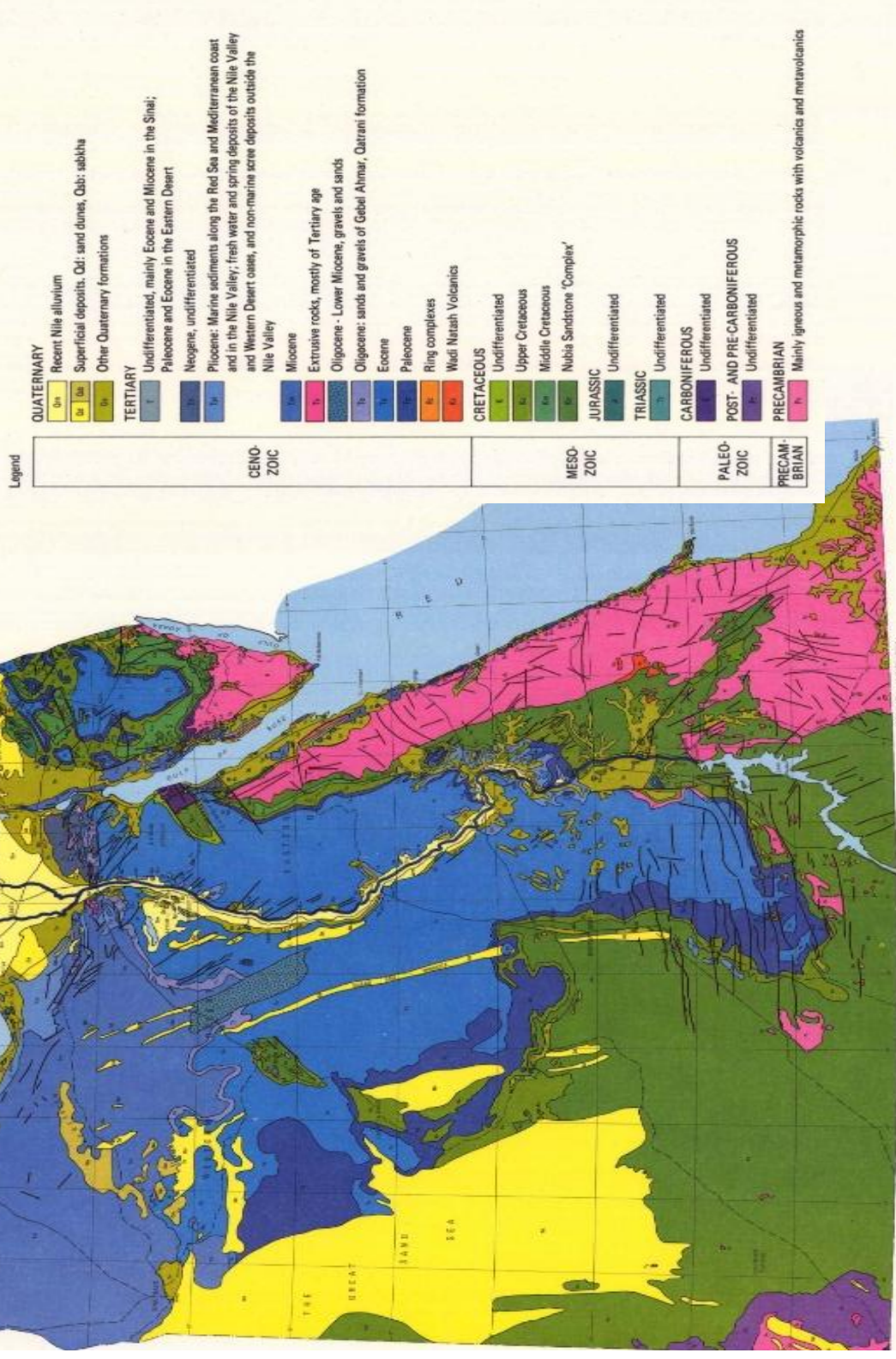
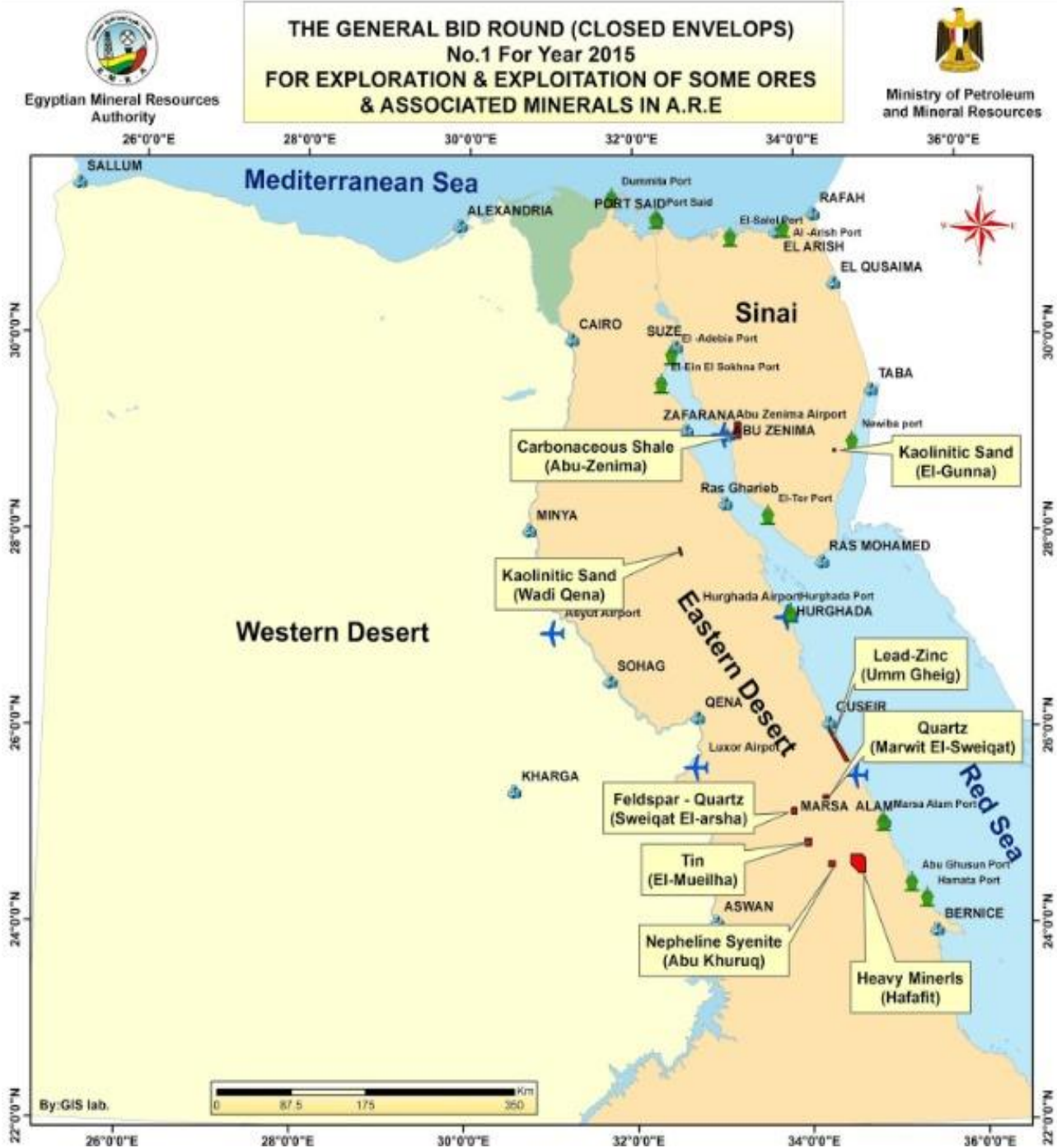


Figure 14: Geological Map of Egypt.



*Figure 15:* Map for the mining areas and mineral types extracted from Egypt.

## **4. 4. Diversity of Egypt's coastal and marine tourism (CMT), Oil and gas, and mineral mining:**

### **4. 4.1. Diversity of Egypt's coastal and marine tourism (CMT):**

**T**he coastal and marine tourism landscape in Egypt is characterized by a diverse array of attractions, experiences, and activities that cater to a wide range of interests and preferences. This rich tapestry of offerings has contributed to Egypt's reputation as a popular tourist destination, drawing visitors from around the world.

Egypt's coastal and marine regions boast a stunning array of natural attractions that captivate tourists. From the iconic Red Sea coral reefs, teeming with diverse marine life, to the serene beaches along the Mediterranean coast, visitors are spoiled for choice when it comes to experiencing Egypt's natural beauty. The Red Sea, in particular, is renowned for its crystal-clear waters, which offer exceptional opportunities for snorkeling, scuba diving, and underwater exploration. Additionally, the unique geological formations found in places like Ras Mohammed National Park and the Straits of Tiran provide awe-inspiring backdrops for a range of outdoor activities.

Egypt's coastal and marine tourism also encompasses a rich cultural heritage that dates back thousands of years. Ancient sites like the Pharaonic temples of Abu Mena and the underwater city of Thonis-Heracleion offer intriguing glimpses into Egypt's past, while the traditional fishing villages and coastal towns showcase the country's unique cultural identity. The Egyptian people's deep connection to the sea, evident in their folklore, music, and cuisine, further adds to the cultural richness of the coastal and marine tourism experience.

Adventure tourism is another key component of the diverse coastal and marine tourism offerings in Egypt. The country's extensive coastline and marine environment provide a playground for a variety of thrilling activities, such as windsurfing, kitesurfing, kayaking, and big-game fishing. Moreover, the Red Sea's unique topography and underwater landscapes make it an ideal

destination for water sports enthusiasts and professional divers alike.

The role of local communities in sustaining and enriching the coastal and marine tourism sector in Egypt cannot be overstated. The close-knit relationships between tourists and local communities contribute to a more authentic and immersive travel experience. Local communities are involved in various aspects of tourism, including guiding, boat services, and handicraft production, which helps preserve traditional practices and skills. Furthermore, community-based tourism initiatives, such as eco-tourism and sustainable fishing practices, promote responsible tourism and environmental conservation.

### **4.4.2. Diversity of oil and gas in Egypt:**

The oil and gas sector in Egypt has witnessed significant growth and diversification in recent years, contributing to the country's economic stability and development.

Firstly, the upstream segment of Egypt's oil and gas industry has seen substantial growth in recent years, primarily due to the discovery of new reserves and the implementation of advanced exploration techniques. The Zohr gas field, for instance, which was discovered in 2015, is the largest gas field ever found in Egypt and has significantly boosted the country's natural gas production. Moreover, the adoption of enhanced oil recovery (EOR) methods and the development of unconventional resources, such as shale gas, have further diversified the upstream sector.

Egypt's midstream and downstream segments have also undergone significant transformations in recent years. The expansion of the country's gas infrastructure, including the construction of new pipelines and liquefied natural gas (LNG) facilities, has facilitated the transportation and export of natural gas. Additionally, the establishment of new refineries and petrochemical complexes has bolstered the downstream sector, contributing to the development of a more integrated and sustainable oil and gas industry.

Keep in mind that the diversification of Egypt's oil and gas sector extends to the integration of renewable energy sources into the country's energy mix. The Egyptian government has set

ambitious targets for renewable energy, aiming to generate 42% of the country's electricity from renewable sources by 2025. To achieve this goal, Egypt has focused on the development of solar and wind power, with several large-scale projects already operational or under construction. Also, the construction of an El-Dabaa nuclear power station is another source of new energy in Egypt. The integration of renewable energy sources not only diversifies the country's energy portfolio but also contributes to reducing greenhouse gas emissions and promoting energy security.

In conclusion, the oil and gas sector in Egypt has experienced significant diversification across its upstream, midstream, and downstream segments, driven by technological advancements, strategic partnerships, and government initiatives. The integration of renewable energy sources into the country's energy mix further underscores the sector's commitment to sustainable development and energy security. As Egypt continues to invest in and develop its oil and gas industry, it can leverage this diversification to strengthen its position as a regional energy hub and drive further economic growth and development.

#### **4.4.3. Diversity of mineral mining in Egypt:**

The mineral mining sector in Egypt has witnessed considerable growth and diversification in recent years, driven by factors such as technological advancements, increased government support, and rising global demand for various minerals. This expansion has not only contributed to the country's economic development but also highlighted Egypt's potential as a significant player in the global mineral market.

Egypt is endowed with a diverse range of mineral resources, including gold, copper, zinc, iron ore, silver, and gypsum, among others. These resources have attracted the interest of both domestic and international investors, leading to the development of several large-scale mining projects across the country. For instance, the Sukari Gold Mine is one of the largest gold mines in Africa and has significantly contributed to Egypt's gold production. Similarly, the Sinai Iron Ore Project, led by the Egyptian Mineral Resources Holding Company (EMRHC), aims to

revive Egypt's iron ore mining industry and boost the country's steel production capabilities.

Foreign investment has played a crucial role in the diversification of Egypt's mineral mining sector. International companies have brought advanced technologies, expertise, and capital to support the development of new mining projects and the modernization of existing operations. For example, the Egyptian government has signed several agreements with foreign firms, such as the China National Gold Group Corporation (CNGGC) and the Russian Mineral Resources Group, to explore and develop gold and other mineral resources in the country. These partnerships not only provide the necessary resources for the growth of the sector but also foster technology transfer and capacity building within the Egyptian mining industry.

## **4.5. Infrastructure:**

### **4.5.1. Coastal marine tourism infrastructure:**

**C**oastal and marine tourism infrastructure plays a significant role in attracting tourists and supporting the growth of the tourism industry in Egypt. The quality and availability of infrastructure directly impact the overall tourism experience, including accommodation, transportation, and recreational facilities.

Egypt has witnessed a remarkable expansion in its coastal and marine tourism infrastructure over the years. This development has been driven by both public and private investments, aiming to cater to the growing number of domestic and international tourists visiting the country. The expansion has led to the creation of various accommodation options, ranging from luxury resorts to budget-friendly hotels, catering to different market segments. Additionally, the government has focused on improving transportation networks by constructing new airports, upgrading existing ones, and enhancing road and sea connectivity. These improvements have facilitated easier access to coastal and marine tourism destinations, making them more attractive to tourists.

#### **4.5.2. Oil and gas infrastructure:**

The oil and gas infrastructure in Egypt has undergone substantial development and modernization in recent years, playing a crucial role in supporting the growth of the country's energy sector. This investment in infrastructure has been driven by a combination of factors, including the discovery of new reserves, increasing demand for energy, and the need to improve the efficiency and sustainability of the oil and gas industry.

The transportation infrastructure for oil and gas in Egypt has seen significant improvements in recent years. The expansion of the country's pipeline network has facilitated the movement of natural gas and crude oil across the nation, connecting production sites to processing facilities and export terminals. Notable projects include the East Mediterranean Gas Pipeline, which transports natural gas from Egypt to Jordan, and the recent development of LNG infrastructure, such as the Idku LNG terminal and the planned expansion of the Idku and Damietta LNG facilities. These advancements have not only increased the capacity for gas transportation but also enabled Egypt to become a key player in the global LNG market.

Egypt's oil and gas infrastructure includes a network of storage facilities that play a vital role in ensuring the security and reliability of the country's energy supply. These facilities store crude oil, refined products, and natural gas, providing a buffer against supply disruptions and meeting the fluctuating demands of the domestic market and export commitments. The development of strategic petroleum reserves (SPR) has been a particular focus, with Egypt establishing SPR facilities in various locations across the country to safeguard against potential supply shocks.

#### **4.5.3. Mineral mining infrastructure:**

The mineral mining infrastructure in Egypt has seen substantial development in recent years, driven by the need to support the growth of the country's mineral mining sector and attract foreign investment. This investment in infrastructure has not only improved the efficiency and sustainability of mining operations

but also contributed to the overall economic development of the nation.

The transportation infrastructure for mineral mining in Egypt has been enhanced through the development of roads, railways, and ports, facilitating the movement of raw materials and finished products across the country and to global markets. For instance, the expansion of the Suez Canal has improved the accessibility of Egyptian ports for the export of minerals, while the construction of new railway lines has enabled the efficient transport of mining equipment and personnel to remote mining sites. Additionally, the development of national and regional road networks has improved connectivity between mining areas and urban centers, fostering economic growth and development.

The energy supply is a critical component of Egypt's mineral mining infrastructure, as it powers the extraction, processing, and transportation of minerals. The country has made significant strides in diversifying its energy sources, including the increased use of renewable energy, to ensure a reliable and sustainable energy supply for the mining sector. For example, the development of solar and wind power projects has contributed to reducing the carbon footprint of the mining industry while also providing cost-effective energy solutions. Moreover, the expansion of natural gas infrastructure, such as the East Mediterranean Gas Pipeline, has enabled the mining sector to transition from relying primarily on diesel-generated power to cleaner and more efficient energy sources.

## **5. Assessment of Impacts on environmental sustainability and aquatic biodiversity:**

### **1. Introduction**

**T**he coastal zone is an area of intense activity, interchange within and between physical, biological, social, cultural, and economic processes.

It is composed of multiple interacting systems: maritime, terrestrial, and riverine. Changes, at any point in any part of the systems, can generate chain reactions far from their point of origin and

possibly in a different system whose environmental conditions will be subsequently altered.

Because coastal areas are today attracting population faster than inland areas, competition is increasing. Typical conflicts occur over:

- Access to the coastline for some activities, such as marinas which require locations on the sea-land interface;
- Incompatible uses that cannot exist in just a position, such as recreation activities and aquaculture in marine areas;
- Private ownership, which prevents public use of or access to coastal resources;
- Long-term goals for conservation which inhibit immediate economic interests, e.g., whether to preserve or drain wetlands;
- Provision of environmentally protective infrastructure following the rate of economic development, e.g., the expansion of sewage collection and treatment in keeping with hotel construction.

The sustainable use of resources can be seriously affected by man-made or natural events or processes, such as:

- Impacts generated by major development projects;
- Accumulative impacts generated by several development projects which may be individually insignificant but which together may precipitate environmental damage;
- Gradual changes, such as climate change with a corresponding rise in global sea level which will particularly affect low-lying areas;
- Sudden natural episodic events of immense impact, such as earthquakes; and
- Sudden man-made disasters, such as major oil spills or accidental discharges of industrial wastes.

Resources have interlinked onshore and offshore (interdependence), Ex.:

1. The sand supply to beaches (What determined which beaches will be supplied with sand and which eroded). This pattern is dynamic.

2. Water-dependent habitats require an intricate mesh of saline and freshwater flows on- and offshore. Changes upstream - Changes downstream. Coastal resources, dependent on a delicate balance between water flows, may suffer severe stress from changes in hydrological conditions.
3. Man's activities along the coastline. Oil pollution from offshore spills and domestic and industrial sewage pollution from land-based sources will degrade the quality of beaches and inshore water for tourism and aquaculture.

## **2. Overview of challenges on environmental sustainability and aquatic biodiversity conservation:**

### **2. 1. Land and marine uses: their impacts on biodiversity of coastal and marine areas:**

#### **a) Urbanization and settlement**

**T**he main impacts of urbanization and settlement relate to:

- (1) physical needs for space (projects for land reclamation- infilling adjacent to the shoreline or the creation of offshore artificial islands with links to the shoreline) and
- (2) impacts generated by uncontrolled or untreated wastes.

Irreversible impacts (encroachment of building on arable land, forests, open space, the beach, or valuable habitats, such as wetlands).

Reversible impacts (the generation of effluents, emissions, wastes, and noise), could be prevented, abated, or reduced by preventive measures.

#### **b) Tourism and recreation:**

Irreversible physical impacts of development may cause damage to the very resources that attract visitors, such as fragile ecosystems, vulnerable visual landscapes, and valuable historic and archaeological sites.

massive influx of tourists (seasonal) has often been regarded as uneconomic and unjustified by coastal communities.



The tourist sector is becoming increasingly aware that protecting environmental quality is an essential basis for its success.

### **c) Fisheries and aquaculture**

Fishing remains a major source of nutrition in many areas.

It has suffered a decline largely through bad management, particularly by over-fishing; or pollution.

The need for an unpolluted marine environment for fishing.

Underwater artificial reefs.

Aquaculture may be responsible for impacts of pollution and disease affecting local fish populations due to impacts of wastes, and nutrients and upsetting the ecological balance for other fish species.

Overfishing and unsustainable harvesting practices have significant negative impacts on marine ecosystems, economies, and food security.

Overfishing leads to:

1. Ecosystem disruption: Overfishing leads to a decrease in the population of targeted species, which can cause a cascade effect on the entire marine ecosystem. This may result in the decline of other species that depend on the targeted species for food or habitat. Additionally, it can disrupt the balance between predator and prey populations, leading to further imbalances in the ecosystem.
2. Economic consequences: Unsustainable fishing practices can harm local and national economies that rely on the fishing industry for jobs, income, and exports. Overfishing can lead to a decline in fish stocks, which can result in reduced catch levels and income for fishermen and related industries. Moreover, it may necessitate costly measures like fishery closures or stock recovery programs.
3. Food security: Overfishing can contribute to a global decline in fish stocks, which can impact food security, particularly in developing countries that rely heavily on fish as a primary source of protein. A decrease in fish stocks can lead to

increased food prices, reduced availability, and potential malnutrition.

4. Habitat degradation: Unsustainable fishing practices can also cause damage to the marine environment, such as the destruction of coral reefs and seagrass beds. These habitats provide essential nursery and feeding grounds for various marine species, and their degradation can further exacerbate the negative impacts of overfishing.
5. Extinction risk: Overfishing can push certain species towards extinction, particularly those that are already vulnerable due to factors such as habitat loss or climate change. The loss of these species can have far-reaching consequences for the marine ecosystem and the human communities that depend on them.

### **d) Oil and gas production**

#### **Irreversible:**

physical spatial requirements on- and offshore. Plants not only require space for production, fuel supply, and storage but also impose constraints on land and marine uses in their vicinity.

Operational impacts include gaseous and particulate emissions, risks of oil leaks and spills, noise, and thermal pollution.

Many of the operational impacts can be reduced or prevented by pollution control measures.

Renewable sources of energy (solar, wind, biomass) in general hardly generate any of these impacts. However, siting of windmills and solar panels may have negative impacts on the landscape.

### **e) Transportation**

Road, rail, air, and maritime transport have extensive spatial requirements.

Not only do their linear alignments and the location of terminals and parking facilities require space, but transportation facilities also impose constraints on the use of the land around them by creating areas exposed to noise and pollution, and by imposing physical and ecological barriers on the land crossed by them.

Maritime transport is likely to have significant impacts on coastal resources for port and channel construction and maintenance, navigation routes, and other sea uses.

**closure Statement:**

It is apparent that the combined impacts of several economic sectors on coastal resources may be far more severe than the impacts of each sector alone.

Moreover, the damage to, or deterioration of coastal resources generated by one sector may undermine the resource potential or survival of another.

Some of the impacts may be irreversible, permanently changing the quantity or quality of coastal resources.

Others may be temporary and can be alleviated or abated without causing any long-term effects on, or alterations to the coastal resource base.

## **2. 2. Effect of economic activities on coastal resources and environmental sustainability**

### **a) Habitat degradation and destruction:**

**M**arine and coastal tourism has a profound and often detrimental impact on habitat degradation and destruction. The development of tourism infrastructure, such as hotels, resorts, and marinas, often requires the destruction of natural habitats. Mangroves, seagrass beds, and coastal wetlands, which serve as crucial nurseries and feeding grounds for many marine species, are frequently cleared or altered to make way for these developments. This loss of habitat disrupts the delicate balance of coastal ecosystems, leading to the decline of numerous species and impairing overall ecosystem health.

Marine and coastal tourism activities have a profound impact on habitat degradation and destruction, leading to the loss of critical ecosystems and the disruption of ecological processes. These activities contribute to the alteration and destruction of natural habitats, which are essential for the survival of numerous marine species and the overall health of marine and coastal ecosystems.

The habitat degradation occurred due to Construction and Infrastructure Development, Physical Damage from Recreational Activities, and Habitat Fragmentation and Displacement.

Furthermore, tourism activities themselves contribute to habitat degradation. Activities such as anchoring, diving, and snorkeling can cause physical damage to delicate habitats like coral reefs and seagrass beds. Reckless boating practices, such as propeller strikes and grounding, also result in direct physical damage to coastal habitats. These activities disrupt the intricate structures and delicate ecosystems of these habitats, further exacerbating their degradation.

The cumulative effect of habitat degradation and destruction due to marine and coastal tourism is the loss of biodiversity and the disruption of ecological processes. As habitats are destroyed or degraded, the species that depend on them for survival are displaced or lost entirely. This loss of biodiversity not only impacts the health of marine and coastal ecosystems but also affects the livelihoods of communities that rely on these ecosystems for their sustenance and economic well-being.

Oil and gas exploration and development have significant impacts on habitat destruction due to infrastructure development, leading to disruptions in migratory pathways, degradation of important animal habitats, and other environmental consequences.

Drilling disrupts wildlife habitats, introduces invasive species, causes noise pollution, and fragments ecosystems through road infrastructure development. This habitat destruction poses a significant threat to the conservation of natural environments and exacerbates the ongoing biodiversity crisis.

The danger of oil and gas exploration on habitat destruction due to infrastructure development strikes the urgent need for sustainable practices, stringent regulations, and conservation efforts to mitigate these adverse impacts.

Oil and gas exploration and infrastructure development can lead to far-reaching consequences for marine ecosystems, species, and human activities.

1. Loss of essential habitats: The construction of pipelines, platforms, storage facilities, and other infrastructure

required for oil and gas exploration can destroy critical marine habitats, such as coral reefs, seagrass beds, and wetlands. These habitats provide essential services, such as food, shelter, and breeding grounds for various marine species.

2. **Disruption of food chains:** Habitat destruction can disrupt food chains by eliminating essential feeding grounds for marine species. This can lead to a decline in species populations and affect the overall health of marine ecosystems.
3. **Fragmentation of habitats:** Infrastructure development can fragment habitats, making it difficult for marine species to navigate their environment and find food, mates, and suitable habitats for reproduction. Fragmentation can also increase the vulnerability of species to predation and disease.
4. **Increased susceptibility to pollution:** Habitat destruction can lead to increased susceptibility to pollution from oil spills, chemical leaks, and other forms of pollution. This can have severe consequences for marine life and the overall health of ecosystems.
5. **Impact on coastal communities:** Habitat destruction due to oil and gas exploration can negatively impact coastal communities that rely on these ecosystems for their livelihoods, such as fishing and tourism industries. The loss of habitats can lead to economic losses and reduced quality of life for these communities.

In addition, mineral mining can have significant impacts on land use and habitat destruction, as it often requires large-scale land clearing and excavation. These impacts can lead to the loss of critical habitats for plants and animals, fragmentation of habitats, Soil degradation, Erosion and sedimentation, disruption of ecological processes as well as the disruption of ecological processes.

In addition to mine abandonment, decommissioning, and repurposing can also result in significant environmental impacts, such as soil and water contamination.

The direct and indirect effects of mineral mining on land use and habitat destruction are

multifaceted and can be observed at multiple spatial scales, from site to regional and global levels. Mining activities can lead to the destruction of vegetation and soils, which in turn results in the release of carbon dioxide and other greenhouse gases. This contributes to climate change and has long-lasting consequences for the environment.

## **b) Marine pollution**

Marine and coastal tourism has a significant impact on marine and coastal pollution, posing serious threats to the health and sustainability of these ecosystems. The tourism industry generates various forms of pollution that have detrimental effects on water quality, marine life, and the overall ecological balance.

Most marine pollution is from land-based sources: domestic and industrial effluents, drainage from agricultural run-off, stormwater run-off in urban areas, or from solid waste disposal, airborne sources of pollution, and sediments from erosion or land reclamation.

Marine sources of pollution are operational discharges (waste and ballast) from marine transport and accidental discharges, including spills. The severity of the effects on coastal resources will depend on the composition of the pollution (nutrients, toxic substances), their quantity and level of concentration, and on hydrological conditions in the recipient waters.

Damage from marine pollution can affect the health of residents, reduce attractiveness to tourism and recreation, damage marine ecosystems, reduce revenues from fisheries and aquaculture, and reduce coastal property values.

While zero marine pollution is an unrealistic objective, the adequate prevention or collection and treatment of all wastes and effluents would considerably reduce levels of marine pollution.

Oil and gas exploration, production, and transportation activities can lead to oil spills and pollution incidents, which can have severe environmental, ecological, and socio-economic consequences.

1. **Accidents during exploration and extraction:** Drilling, production, and transportation activities involve complex

processes and equipment, increasing the likelihood of accidents that could result in oil spills. These accidents can be caused by human error, equipment failure, or extreme weather events.

2. **Release of pollutants:** Oil and gas exploration and production can release pollutants, such as volatile organic compounds (VOCs), methane, and other hazardous substances, into the environment. These pollutants can contribute to air pollution, which can have negative impacts on human health and the environment.
3. **Oil spills in marine environments:** Oil spills in marine ecosystems can have devastating effects on marine life, habitats, and human activities. Oil can smother organisms, disrupt food chains, and cause long-term damage to ecosystems. Cleaning up oil spills can be challenging and costly, often requiring extensive efforts to remove or disperse the oil and restore affected habitats.
4. **Impact on coastal communities:** Oil spills and pollution incidents can have severe socio-economic consequences for coastal communities that rely on fishing, tourism, and other industries that depend on healthy marine ecosystems. The loss of livelihoods and damage to the environment can lead to significant economic losses and reduced quality of life for affected communities.
5. **Difficulty in preventing and mitigating incidents:** Oil spills and pollution incidents can be challenging to predict and prevent, as they can result from various factors, such as equipment failure, human error, or extreme weather events. Effective mitigation strategies require constant monitoring, investment in technology, and well-trained personnel to minimize the risk of incidents and respond promptly when they occur.

Mineral mining has significant impacts on water pollution, affecting freshwater resources and ecosystems. These impacts include heavy use of water in processing ore and water pollution from discharged mine effluent and seepage. The release

of pollutants during mining operations leads to deteriorating water quality, posing risks to both environmental and human health.

Mineral mining can have significant impacts on water pollution, as it often involves the extraction, processing, and disposal of minerals, which can lead to the contamination of surface water and groundwater resources. The polluted activities include tailings and waste rock during processing, acid rock drainage, spills and leaks, discharge of process water, and Land use change and erosion.

### **c) Freshwater pollution**

Freshwater is polluted by the same land-based sources as marine pollution, but also by nonpoint sources from agriculture and by the intrusion of seawater into the coastal aquifer. The most serious consequence of freshwater pollution is the loss of safe drinking water.

Pollution of surface water bodies may also give rise to health risks and may reduce attractiveness to recreation if accompanied by odor. Adequate prevention, or collection and treatment of all wastes and effluents is essential. Further steps could be taken to protect freshwater catchment areas from polluting activities by imposing restrictions on the use of fertilizers and pesticides and by preventing excess extraction and dumping of wastes from Nile cruise boats.

of water from coastal aquifers because it takes decades for a polluted aquifer to recover.

### **d) Air pollution**

Air pollution from industry, energy production, traffic, and heating facilities consists of gaseous emissions, particulates, and odor. Under certain conditions, photochemical smog develops.

The severity of the effects on air quality will depend on the composition of the emissions, their quantity, their concentration, the height at which they are emitted, and the topographical and meteorological conditions for dispersal. Several coastal areas suffer particularly from a heavy concentration of air pollution sources and others from smog where dispersal conditions are inadequate.

Damage from air pollution is predominantly to the health of local inhabitants, but it may also degrade

the quality of the environment for tourism and result in damage to historic buildings and monuments. Air pollution is also an indirect cause of marine pollution.

Air pollution can be prevented by well-established technological measures. Filters and scrubbers can be incorporated at point sources and restrictions can be imposed on the Sulphur content of fuels burned. Non-point sources are more difficult to control, especially traffic and the use of agrochemicals. Pollution generated by road traffic can be reduced by technical measures (use of catalytic converters), but measures will still be needed to reduce traffic movement, e.g., by the encouragement of public transport.

Mineral mining can contribute to air pollution through various processes and activities, posing negative impacts on air quality, human health, and the environment, such as:

1. Particulate matter and dust: Mining activities, such as blasting, crushing, and transporting minerals, can generate high levels of particulate matter and dust. These fine particles can be inhaled by humans and animals, leading to respiratory problems and other health issues.
2. Emissions from vehicles and equipment: The use of heavy vehicles and machinery in mineral mining can result in the emission of pollutants, such as nitrogen oxides, carbon monoxide, and volatile organic compounds. These emissions can contribute to the formation of ground-level ozone, smog, and other air pollutants.
3. Emissions from energy production: Mining operations often require significant amounts of energy, which is typically generated from fossil fuels like coal, oil, or natural gas. The combustion of these fuels releases greenhouse gases and other pollutants, contributing to air pollution and climate change.
4. Emissions from chemical processes: Some mineral extraction processes involve the use of chemicals, such as cyanide, sulfuric acid, or other solvents. The handling, storage, and disposal of these chemicals can lead to the release of hazardous substances into the air, posing

risks to human health and the environment.

The impact of mineral mining on air pollution is a significant environmental concern with far-reaching implications for human health and the environment. Mining activities contribute to air pollution through the release of particulate matter (PMs), methane (CH<sub>4</sub>) gas emissions, and other pollutants at various stages of the mining process. Major sources of pollution in mining operations include unpaved roads, smelting processes, and artisanal gold mining, which is a leading source of human-caused mercury emissions. The release of pollutants during mining operations leads to deteriorating air quality, posing risks to both environmental and human health. Air pollution from mining activities is a global issue that requires immediate attention and effective solutions to mitigate its adverse effects. The destruction of vegetation and soils during land clearing for mining also results in the release of greenhouse gases like carbon dioxide, contributing to climate change.

### **e) Loss of marine resources and biodiversity**

Physical changes to marine resources by land reclamation and construction activities or by severe pollution can result in a permanent loss. Damage to living marine resources can cause a loss of revenue to the fishing sector and a loss of ecological resources of value for nature conservation.

Marine and coastal ecosystems, particularly wetlands and seagrass beds, are important as spawning grounds and nurseries for many commercially valuable species, are of high value for nature conservation and the preservation of biodiversity, and are potential habitats for aquaculture. Wetlands are vulnerable to surface alterations and changes in hydrologic patterns which disrupt their functioning. They can be protected by carefully defined and controlled management regimes.

The loss of sand or beach material is also a loss of a marine resource. It is frequently the direct result of extraction for building materials or the indirect

result of man-made interference in natural beach processes. Construction of coast protection and sea defense works or harbors and breakwaters for marine transport and marinas can easily interrupt sediment transport, resulting in a reduced supply of beach material, loss of beach width, and exposure of the property to flood damage. Preventive measures are based on principles of working with, not against, natural processes and imposing restrictions on offshore and onshore construction. The extraction of beach material can simply be stopped by regulation.

### **f) Loss of land resources of natural and visual value**

Coastal resources of especially high natural and visual value include (in addition to wetlands) river mouths, dunes, and rocky shores with headlands and bays. Urban, tourist, mining, or other physical development may disturb or degrade the special characteristics of the land resources by earthworks or by incongruous or monotonous development. They may also deplete the supply of green open spaces separating built-up areas and reducing the land options left open for future generations. Insensitive development will ultimately result in a loss of attraction for tourism. Some damage may be remedied by landscape reclamation or rehabilitation, harnessing damaged resources for new coastal uses. Others will be a permanent loss of resources, where no technology can stop the damage or replace the loss of open spaces.

Egyptian authorities now recognize the importance of protecting green open spaces and designate a considerable proportion of coastal land to be preserved for this and future generations.

### **g) Loss of historic and archaeological resources**

The heritage of cultural resources is found both on- and offshore where each civilization has left its remains. Ancient or traditional forms of building, historic sites and monuments, and archaeological remains are easily damaged by:

- demolition where their importance has not been recognized or where property values are high;

- neglect through abandonment and the lack of funds for maintenance;
- inappropriate additions where population density necessitates the creation of extra living space;
- concealment by new building; and
- corrosion of natural stone structures as a result of air pollution.

Historic and ancient structures are also readily damaged by seismic activity. The loss of such cultural resources represents a loss of the human and cultural heritage for present and future generations and a loss of tourist attractions.

Preventive measures include identifying and regulating sites that should not be allocated for any type of development, encouraging new but compatible uses that could maintain old buildings, imposing restrictions on construction height and building materials in historic areas, and rehabilitating structures damaged by air pollution, marine corrosion or tectonic movement.

### **h) Public access to space and resources**

Many of the problems and conflicts in coastal areas center around the issue of what constitutes public or common property. In many countries access to the coast is regarded as a public right, and any restriction of public access is a loss of resource, whether the land is actually in private or public ownership. In other countries marine resources, particularly fish, are regarded as common property to be retained by whoever captures them. The use of the sea as a communal basin for waste disposal reflects the attitude that coastal and marine resources are common property. Practices vary about resources found under the land: underground water sources and minerals may be considered common property or they may belong to the owner of the land surface. Access rights should be secured for the public to certain coastal and marine resources while respecting property rights and traditional uses and practices. The access rights may vary between countries but will usually include a right of physical access along the seashore and a right of access, as frequently as possible, from inland to the seashore. These may be secured by public purchase or easements. Public access rights to coastal and marine resources (fish, water,

minerals) have to be regulated to prevent mismanagement and over-exploitation.

Restrictions on public access to space and resources can have environmental costs and benefits. Loss of public access means loss of opportunities to residents and visitors but certain constraints on public access may be environmentally beneficial by acting to protect fragile resources.

### **i) Noise, visual, and congestion**

Noise and congestion are temporary effects that degrade, but do not damage, coastal resources. They are most commonly generated by traffic and transportation (road, rail, and aircraft movements) but are also generated by industry and occur at major concentrations of public activity (sports, entertainment, etc.).

Noise can easily be abated within buildings by acoustic treatment of openings and by the use of appropriate building materials. Noise abatement in open areas is not easy to achieve; noise barriers can be used to create "acoustic shadows." However, in coastal areas with mild or hot climates where much social activity takes place outdoors and late at night, noise can be a significant environmental disturbance to residential areas.

Mineral mining can contribute to both noise and visual pollution, affecting the quality of life for nearby communities and the overall aesthetic value of the environment.

1. **Noise pollution:** Mining operations involve the use of heavy machinery, vehicles, and blasting activities. These sources of noise can be particularly disturbing for nearby residents, especially during nighttime operations. Prolonged exposure to noise pollution can lead to stress, sleep disturbances, and other health issues.
2. **Visual pollution:** The expansion of mining sites often leads to significant changes in the landscape, which can be visually intrusive and disrupt the natural beauty of the surrounding environment. This can negatively impact tourism, recreation, and the overall quality of life for local communities

The impact of mineral mining on noise and visual pollution is a significant environmental concern that affects both the natural landscape and the well-being of nearby communities.

The propagation of noise from mines to nearby villages can have adverse effects on human health and quality of life, leading to stress, sleep disturbances, and other negative impacts. Furthermore, visual pollution from mining activities can degrade scenic landscapes, impact tourism, and reduce property values in affected areas.

### **j) Physical damage to coral reefs and other sensitive ecosystems:**

Physical damage to coral reefs and other sensitive ecosystems is a critical issue that poses significant threats to marine biodiversity and ecosystem health.

- **Human Impacts:** Human activities, both intentional and unintentional, contribute to physical damage to coral reefs and sensitive ecosystems.
- **Threats:** Careless swimmers, divers, poorly placed boat anchors, and activities associated with hotels and resorts can directly cause physical harm to coral reefs.
- **Anthropogenic Threats:** Human-induced threats like pollution, overfishing, and destructive fishing practices using dynamite or cyanide pose serious risks to coral reefs and their delicate ecosystems.

Physical damage to coral reefs and other sensitive ecosystems can have severe and far-reaching consequences for marine life, coastal communities, and global ecosystem services.

1. **Loss of habitat:** Coral reefs and other sensitive ecosystems provide essential habitats for a diverse array of marine species. Physical damage can lead to the loss of these habitats, forcing species to find alternative homes or face extinction. This can disrupt the delicate balance within ecosystems and impact food chains.
2. **Reduced ecosystem services:** Healthy coral reefs and other ecosystems offer numerous benefits, such as coastal protection, water filtration, and nursery grounds for fish. Physical damage can impair these services,

leaving coastal communities more vulnerable to storms, flooding, and reduced fish stocks.

3. Slower recovery rates: Sensitive ecosystems like coral reefs have slow recovery rates, meaning that once damaged, they may take a long time to recover or may not recover at all. This can have long-lasting impacts on the species that depend on these ecosystems for survival.
4. Economic consequences: The tourism, fishing, and coastal real estate industries rely on the health of coral reefs and other sensitive ecosystems. Physical damage can deter tourists, reduce fish stocks, and devalue coastal properties, leading to economic losses for local communities and nations.
5. Impacts on climate change: Coral reefs and other ecosystems play a crucial role in mitigating climate change by absorbing carbon dioxide and providing a home for marine species that help regulate the global climate. Physical damage to these ecosystems can exacerbate climate change and its associated impacts.

### **k) Seismic surveys and underwater noise:**

Oil and gas seismic surveys are a critical component of offshore exploration, but they also generate significant underwater noise that can have detrimental effects on marine life and ecosystems. Here is an assessment of the impact on oil and gas seismic surveys and underwater noise.

Oil and gas seismic surveys and underwater noise can have significant impacts on marine ecosystems, species, and human activities. They could cause disturbance to marine life, masking the communication of marine species, and habitat degradation as prolonged exposure to underwater noise can lead to habitat degradation, as marine species may avoid areas with high levels of noise pollution. This can result in the alteration of species distribution and the degradation of essential habitats, such as seagrass and coral reefs.

## **2.3. Climate change**

According to broad scientific consensus, "greenhouse gases" (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, chlorofluorocarbons) generated by human activities have already accumulated in the atmosphere to such a level that climate change may have started, and its continuation may now be inevitable.

The increase of greenhouse gases over the last 100 years may cause global warming in the range of 0.4-1.1°C, and predictions suggest that temperatures may increase by 1.5-4.0 °C in 20 to 30 years.

One of the major effects of global warming is a rise in sea level due to the melting of glaciers and thermal expansion of oceanic waters. It is known that in the recent historical period, the sea level has been rising at a rate of 0.5 - 1.5 cm a year. Estimates for the future indicate a possible rise of 13 - 39 cm by the year 2025 and 24 - 52 cm by 2050. Interacting with these changes will be the effects of local tectonic activity and subsidence.

The rises in temperature and global sea level could affect coastal and marine areas, particularly about:

- Surface and groundwater flow and river regimes (water supply availability, incidence of floods, and sediment transport);
- Movement of main water masses (waves, currents, tides, erosion of the coastline, tidal range);
- Natural ecosystems due to increased temperature and exposure to climatic extremes;
- Change in the frequency and intensity of extreme events (storms, floods, winds, draughts);
- Occupation and use of coastal land due to sea level rise.

The impacts of such changes may include:

- An increased seawater intrusion into the coastal aquifers;
- Further difficulties in obtaining freshwater;
- Changes in fisheries and aquaculture production;



- Increased inundation under storm conditions in unprotected coastlines and low-lying areas;
- Increased shore erosion;
- Loss of natural vegetation in marginal climatic zones or areas of poor soil;
- Possible increased risk of forest fires; and
- Alteration of the biodiversity composition and structure.

With a gradual increase in temperature and changes in precipitation, vegetation belts may shift northward. Another possible effect may be an extension of the tourist season, with consequent economic benefits together with an increased pollution load.

By the middle of the next century, damage to coastal settlements, harbors, coastal roads, and other infrastructural features could be considerable as most of these developments are only slightly above the present mean sea level.

#### **2.4. Risks and hazards**

**N**atural, man-induced, and man-made risks and hazards have to be taken into account in master planning. Natural risks are not necessarily predictable though their probability may be known and those areas most exposed to risk can be identified. Such risks include seismic activity, flooding, tsunamis (tidal waves), landslides, and volcanic eruptions. In some high-risk exposure areas, previous experience has already indicated what steps should be taken to reduce the loss of life and property. Some countries have adapted to the known risks and already incorporate risk management measures in their policies for coastal and marine areas. Elsewhere, scientific knowledge and experience are well known, and administrative steps may already have been taken (e.g., building codes), but lack of implementation has resulted in inappropriate development in high-risk exposure areas. Experience shows that where preventive measures have not been taken (e.g., residential development not by building codes in seismic risk areas) or where historic or ancient monuments are located in high-risk areas, large financial investment is needed over a long period to reduce risk levels.

Several coastal areas are seismically active zones, affected by earthquakes. Due to the present trends of urbanization and development, the possibility of severe damage to people and settlements has enormously increased. A prerequisite for the mitigation of seismic risk is the existence of a national policy defining the process of seismic risk management and the roles of involved authorities and other parties. An assessment of seismic risk within the master plan is indispensable, requiring land-use planning based on macro and micro zoning of seismic-prone areas and building methods and standards that provide for seismic events.

Coastal cliff instability is partly a natural risk and partly man-induced. Coastal cliff shores are dynamic: the rate of cliff recession depends on rock resistance, cliff-top drainage, wave energy, and whether or not there are natural or man-made forms of protection. Disturbing the cliff by earthworks, changes to drainage patterns, excavation, or removal of vegetation may cause destabilization. The zone along a cliff head may collapse and the zone along a cliff toe may be subject to rock falls.

Measures can be taken to prevent encroachment of buildings in the unstable areas at the cliff head and toe, to channel surface drainage away from the cliff face, and to design recreational and tourist development of cliff shores to include cliff stabilization measures that would not transfer the problem of instability up- or down shore.

Technical hazards are man-made. Some of those that occurred in the recent past had catastrophic dimensions. While all possible preventive measures may have been taken, there will remain a degree of risk from industrial processes which include hazardous substances, their storage, and safe disposal. The risk of accidents and the areas likely to be exposed to technical hazards and risks should be taken into account in the master plan.

## 6. Mitigation Strategies:

### 6.1. Establish and enforce sustainable tourism guidelines:

**M**arine and coastal tourism has become a significant contributor to the global tourism industry, offering unique experiences and economic benefits to both tourists and host communities. However, this growth has led to various environmental, social, and economic challenges, particularly in terms of aquatic biodiversity and environmental sustainability. Establishing and enforcing sustainable tourism guidelines can help mitigate these impacts and promote responsible tourism practices.

Sustainable Tourism Guidelines for Aquatic Biodiversity and Environmental Sustainability are a set of principles and best practices that aim to minimize negative impacts on the environment, respect local cultures, and ensure economic benefits for host communities. To address the challenges posed by marine and coastal tourism on aquatic biodiversity and environmental sustainability, these guidelines should focus on:

1. **Protecting Marine Ecosystems:** By emphasizing the importance of preserving marine ecosystems, including coral reefs, seagrass beds, and mangroves. This can involve limiting activities that may damage these ecosystems, such as overfishing, destructive fishing practices, and coastal development.
2. **Promoting Sustainable Practices:** Encourage sustainable practices in tourism activities, such as responsible waste management, water conservation, and energy efficiency. This helps minimize the environmental footprint of marine and coastal tourism and protect the natural resources on which it depends.
3. **Ensuring Environmental Monitoring and Assessment:** Provisions must be carried out for regular monitoring and assessment of the environmental impacts of marine and coastal tourism. This helps identify areas of concern and develop targeted solutions to mitigate negative effects on aquatic biodiversity and environmental sustainability.

4. **Supporting Research and Conservation:** Encourage tourism businesses and local communities to support research and conservation efforts related to aquatic biodiversity and the marine environment. This can involve collaborating with local scientists, conservation organizations, and government agencies to protect endangered species, restore damaged ecosystems, and promote environmental awareness.

Enforcing Sustainable Tourism Guidelines for Aquatic Biodiversity and Environmental Sustainability to ensure the effectiveness of sustainable tourism guidelines in mitigating the effects of marine and coastal tourism on aquatic biodiversity and environmental sustainability, their enforcement is crucial. This involves:

1. **Capacity Building and Training:** Providing training and support to tourism businesses, local communities, and government agencies can enhance their ability to implement and adhere to sustainable tourism guidelines. This includes raising awareness about the importance of sustainable practices and offering tools and resources for improvement.
2. **Incentives and Sanctions:** Governments can introduce incentives for businesses and communities that follow sustainable tourism guidelines, such as tax breaks or marketing support. Conversely, sanctions can be imposed on those who fail to comply, promoting adherence to the guidelines.
3. **Collaboration and Partnerships:** Establishing partnerships between governments, tourism industry stakeholders, and local communities is essential for the effective enforcement of sustainable tourism guidelines. This fosters a shared responsibility for environmental protection and encourages collaboration in addressing challenges related to aquatic biodiversity and environmental sustainability.

Benefits of Sustainable Tourism Guidelines for Aquatic Biodiversity and Environmental Sustainability when implementing and enforcing

sustainable tourism guidelines focused on aquatic biodiversity and environmental sustainability can bring about several benefits:

1. **Protection of Aquatic Ecosystems:** By promoting responsible practices and limiting negative impacts on marine and coastal ecosystems, sustainable tourism guidelines help preserve the natural beauty and biodiversity of these areas.
2. **Enhanced Environmental Sustainability:** Guidelines that prioritize sustainable tourism practices can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of tourism products, and fostering a positive image of the destination.
3. **Support for Research and Conservation:** Encouraging tourism businesses and local communities to support research and conservation efforts related to aquatic biodiversity and the marine environment contributes to the overall health and resilience of these ecosystems.

However, Marine and coastal tourism has the potential to bring significant economic benefits and unique experiences to both tourists and host communities. However, it also poses challenges to aquatic biodiversity and environmental sustainability. Establishing and enforcing sustainable tourism guidelines focused on these aspects can help mitigate these impacts and promote responsible tourism practices. By doing so, marine and coastal tourism can contribute to the preservation of aquatic ecosystems, ensure environmental sustainability, and support the long-term well-being of all stakeholders involved.

## **6.2. Promote responsible tourism practice:**

**T**he growth of tourism activities in coastal and marine areas has led to various environmental, social, and economic challenges, particularly in terms of aquatic biodiversity and environmental sustainability. Promoting responsible tourism practices can help mitigate these impacts and ensure a sustainable future for marine and coastal tourism.

Responsible tourism practices involve minimizing negative impacts on the environment, respecting local cultures, and ensuring economic benefits for host communities. To address the challenges posed by marine and coastal tourism on aquatic biodiversity and environmental sustainability, responsible tourism practices should focus on:

1. **Environmental Conservation:** Tourism businesses and visitors should adopt environmentally friendly practices, such as responsible waste management, water conservation, and energy efficiency. This helps minimize the environmental footprint of marine and coastal tourism and protect the natural resources on which it depends.
2. **Sustainable Use of Marine Resources:** Overfishing and destructive fishing practices can severely impact aquatic biodiversity. Promoting responsible fishing practices, such as catch and release for certain species and using sustainable fishing methods, can help maintain marine ecosystems' health and balance.
3. **Coastal Development and Infrastructure:** Careful planning and execution of coastal development and infrastructure projects can minimize their impact on marine and coastal ecosystems. This includes avoiding the destruction of critical habitats, such as coral reefs, seagrass beds, and mangroves, and implementing measures to mitigate the effects of coastal development on the environment.
4. **Support for Research and Conservation:** Encouraging tourism businesses, local communities, and visitors to support research and conservation efforts related to aquatic biodiversity and the marine environment can help protect endangered species, restore damaged ecosystems, and promote environmental awareness.

Promoting Responsible Tourism Practices for Aquatic Biodiversity and Environmental Sustainability to ensure the widespread adoption of responsible tourism practices in marine and coastal tourism, several strategies can be employed:

1. **Education and Awareness:** Raising awareness about the importance of responsible tourism practices among tourism businesses, local communities, and visitors is crucial. This can be achieved through educational campaigns, training programs, and the development of guidelines and best practices.
2. **Collaboration and Partnerships:** Establishing partnerships between governments, tourism industry stakeholders, and local communities can foster a shared responsibility for environmental protection and encourage collaboration in addressing challenges related to aquatic biodiversity and environmental sustainability.
3. **Incentives and Recognition:** Governments and private organizations can introduce incentives for tourism businesses and communities that adopt responsible tourism practices, such as awards, certifications, or preferential treatment in marketing and promotional activities.
4. **Monitoring and Evaluation:** Regular monitoring and evaluation of tourism activities against established responsible tourism practices can help identify areas of concern and develop targeted solutions to mitigate negative effects on aquatic biodiversity and environmental sustainability.

**Benefits of Promoting Responsible Tourism Practices:** Promoting responsible tourism practices in marine and coastal tourism can bring about several benefits:

1. **Protection of Aquatic Ecosystems:** By encouraging responsible practices and limiting negative impacts on marine and coastal ecosystems, responsible tourism practices help preserve the natural beauty and biodiversity of these areas.
2. **Enhanced Environmental Sustainability:** Tourism businesses that prioritize responsible practices can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of tourism products, and fostering a positive image of the destination.

3. **Support for Research and Conservation:** Encouraging tourism businesses, local communities, and visitors to support research and conservation efforts related to aquatic biodiversity and the marine environment contributes to the overall health and resilience of these ecosystems.

However, Marine and coastal tourism has the potential to bring significant economic benefits and unique experiences to both tourists and host communities. However, it also poses challenges to aquatic biodiversity and environmental sustainability. Promoting responsible tourism practices can help mitigate these impacts and ensure a sustainable future for marine and coastal tourism.

### **6.3. Develop education and awareness programs for tourists and local communities:**

**D**eveloping education and awareness programs for tourists and local communities is crucial in addressing the challenges posed by marine and coastal tourism on aquatic biodiversity and environmental sustainability. These programs should focus on:

1. **Promoting Environmental Conservation:** Educating tourists and local communities about the importance of responsible waste management, water conservation, and energy efficiency can help minimize the environmental footprint of marine and coastal tourism and protect the natural resources on which it depends.
2. **Raising Awareness about Sustainable Fishing Practices:** Informing tourists and local communities about the impacts of overfishing and destructive fishing practices on aquatic biodiversity can encourage the adoption of sustainable fishing methods, such as catch and release for certain species, and support the maintenance of marine ecosystems' health and balance.
3. **Teaching about Coastal Development and Infrastructure:** Educating tourists and local communities on the importance of careful planning and execution of coastal

development and infrastructure projects can help minimize their impact on marine and coastal ecosystems. This includes avoiding the destruction of critical habitats and implementing measures to mitigate the effects of coastal development on the environment.

4. **Advocating for Research and Conservation Support:** Encouraging tourists and local communities to support research and conservation efforts related to aquatic biodiversity and the marine environment can help protect endangered species, restore damaged ecosystems, and promote environmental awareness.

Strategies in developing education and Awareness Programs for Aquatic Biodiversity and Environmental Sustainability are adopted for effective education and awareness and include:

1. **Collaboration and Partnerships:** Establishing partnerships between governments, tourism industry stakeholders, and local communities can foster a shared responsibility for environmental protection and encourage collaboration in addressing challenges related to aquatic biodiversity and environmental sustainability.
2. **Incorporating Education into Tourism Products:** Integrating educational components into tourism products, such as guided tours, workshops, and interactive exhibits, can help raise awareness about the importance of responsible tourism practices and promote environmental sustainability.
3. **Utilizing Multiple Communication Channels:** Employing various communication channels, such as social media, websites, brochures, and signage, can help disseminate information about responsible tourism practices and reach a broader audience.
4. **Engaging Local Communities and Stakeholders:** Involving local communities and stakeholders in the development and implementation of education and awareness programs can help ensure their relevance and

effectiveness, as well as foster a sense of ownership and commitment to the cause.

Benefits from applying these strategies and programs include:

1. **Protection of Aquatic Ecosystems:** By educating tourists and local communities about responsible practices and limiting negative impacts on marine and coastal ecosystems, education and awareness programs help preserve the natural beauty and biodiversity of these areas.
2. **Enhanced Environmental Sustainability:** Tourism businesses and visitors who are well-informed about responsible tourism practices can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of tourism products, and fostering a positive image of the destination.
3. **Support for Research and Conservation:** Education and awareness programs that encourage tourists and local communities to support research and conservation efforts related to aquatic biodiversity and the marine environment contribute to the overall health and resilience of these ecosystems.

#### **6.4. Encourage the use of eco-friendly technologies and practices in tourism operations:**

**E**ncouraging the use of eco-friendly technologies and practices in tourism operations involves adopting environmentally friendly methods to minimize negative impacts on the environment. These include:

1. **Energy Efficiency and Renewable Energy:** Implementing energy-efficient technologies and practices, such as solar power, wind turbines, and energy-saving appliances, can help reduce the carbon footprint of marine and coastal tourism operations and promote environmental sustainability.
2. **Waste Management:** Adopting responsible waste management practices, such as recycling, composting, and proper

disposal of hazardous waste, can help minimize the environmental impact of tourism operations and protect the natural resources on which marine and coastal tourism depend.

3. **Water Conservation: Implementing water-saving technologies and practices, such as low-flow fixtures, rainwater harvesting systems, and efficient irrigation methods, can help reduce the consumption of freshwater resources and protect marine ecosystems from pollution.**
4. **Sustainable Building and Infrastructure: Employing eco-friendly construction materials and techniques, such as green roofs, energy-efficient insulation, and rainwater harvesting systems, can help minimize the environmental impact of tourism infrastructure development and promote environmental sustainability.**

To ensure the widespread adoption of eco-friendly technologies and practices in marine and coastal tourism operations, several strategies can be employed:

1. **Incentives and Recognition: Governments and private organizations can introduce incentives for tourism businesses that adopt eco-friendly technologies and practices, such as tax breaks, subsidies, or preferential treatment in marketing and promotional activities.**
2. **Collaboration and Partnerships: Establishing partnerships between governments, tourism industry stakeholders, and local communities can foster a shared responsibility for environmental protection and encourage collaboration in addressing challenges related to aquatic biodiversity and environmental sustainability.**
3. **Training and Capacity Building: Providing training and capacity-building programs for tourism businesses, employees, and local communities can help raise awareness about the benefits of eco-friendly technologies and practices and facilitate their adoption.**
4. **Monitoring and Evaluation: Regular monitoring and evaluation of tourism operations against established eco-**

friendly practices can help identify areas of concern and develop targeted solutions to mitigate negative effects on aquatic biodiversity and environmental sustainability.

Benefits of Encouraging the Use of Eco-Friendly Technologies and Practices include several benefits:

1. **Protection of Aquatic Ecosystems: By adopting eco-friendly technologies and practices, tourism businesses can help preserve the natural beauty and biodiversity of marine and coastal areas, reducing their impact on the environment.**
2. **Enhanced Environmental Sustainability: Tourism businesses that prioritize eco-friendly technologies and practices can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of tourism products, and fostering a positive image of the destination.**
3. **Cost Savings and Revenue Generation: The adoption of eco-friendly technologies and practices can lead to cost savings in energy and water consumption, waste management, and infrastructure maintenance, while also potentially generating revenue through eco-tourism products and services.**

## **6.5. Implement strict environmental regulations and monitoring programs:**

**T**ourism activities, Oil and gas, and mineral mining often pose threats to aquatic biodiversity and environmental sustainability due to their potential for oil spills, habitat destruction, and greenhouse gas emissions. Implementing strict environmental regulations and monitoring programs can help mitigate these impacts and ensure responsible utilization practices.

Implementing strict environmental regulations and monitoring programs involves adopting measures to minimize the negative impacts on the environment. These include:

1. **Preventing Oil Spills: Establishing strict guidelines for drilling, transportation, and storage of oil and gas can help prevent**

accidents and oil spills, which can have devastating effects on aquatic ecosystems and biodiversity.

2. **Protecting Habitats:** Enforcing strict environmental regulations to minimize habitat destruction during different activities, such as pipeline construction and seismic testing in oil and gas exploration and production, habitat protection during tourism activities can help preserve the natural resources on which aquatic biodiversity depends.
3. **Reducing Greenhouse Gas Emissions:** Implementing strict emissions standards for exploration activities, such as flaring and venting, can help reduce greenhouse gas emissions and mitigate the impacts of climate change on aquatic ecosystems and environmental sustainability.
4. **Ensuring Proper Waste Management:** Establishing strict guidelines for waste disposal and management can help minimize the environmental impact of oil and gas exploration and protect the natural resources on which it depends.
5. **Regulating Waste Disposal:** Governments and mining companies should establish and enforce strict guidelines for waste disposal, ensuring that waste materials are managed and disposed of in an environmentally responsible manner. This includes proper containment, treatment, and disposal of tailings and other waste materials generated during mineral mining exploration.
6. **Water Usage Regulations:** Mineral mining exploration often requires large volumes of water, which can lead to water scarcity and pollution. Implementing strict water usage regulations can help minimize these impacts, such as setting limits on water consumption, recycling and treating wastewater, and ensuring proper management of water resources.
7. **Emissions Standards:** Governments and mining companies should establish and enforce strict emissions standards for mineral mining exploration operations, including limits on air pollution and greenhouse gas emissions. This can be

achieved through the use of cleaner technologies, improved efficiency in energy consumption, and regular monitoring of emissions levels.

8. **Monitoring Programs:** Regular monitoring programs should be established to assess the environmental impact of mineral mining exploration activities and ensure compliance with established guidelines and protocols. This includes monitoring water quality, air quality, and habitat conditions, as well as conducting periodic audits and inspections to evaluate the effectiveness of implemented mitigation measures.

To ensure the effective implementation of strict environmental regulations and monitoring programs, several strategies can be employed:

1. **Strong Legislative Frameworks:** Governments should establish robust legal frameworks that clearly outline the environmental requirements and penalties for non-compliance in the oil and gas, tourism, and mineral mining industries.
2. **Regular Monitoring and Evaluation:** Conducting regular monitoring and evaluation of activities against established environmental standards can help identify areas of concern and develop targeted solutions to mitigate negative effects on aquatic biodiversity and environmental sustainability.
3. **Collaboration and Partnerships:** Establishing partnerships between governments, industry stakeholders, and local communities can foster a shared responsibility for environmental protection and encourage collaboration in addressing challenges related to aquatic biodiversity and environmental sustainability.

Benefits of Implementing Strict Environmental Regulations and Monitoring include:

1. **Protection of Aquatic Ecosystems:** By adopting strict environmental guidelines and monitoring programs, the oil and gas industry can help preserve the natural beauty and biodiversity of aquatic ecosystems, reducing their impact on the environment.

2. **Enhanced Environmental Sustainability:** Strict environmental regulations and monitoring programs can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of oil and gas products, maintaining the quality of mineral products, and fostering a positive image of the industry.
3. **Improved Public Trust and Reputation:** Implementing strict environmental standards and demonstrating a commitment to responsible exploration practices, responsible mineral mining exploration practices can help improve public trust in the industries and enhance its reputation as a responsible contributor to global energy production and economic growth.

## 6.6. Promote the use of advanced technologies to minimize impacts:

**O**il and gas exploration has the potential to bring significant economic benefits and energy resources to countries and communities. However, it also poses challenges to aquatic biodiversity and environmental sustainability. Promoting the use of advanced technologies in oil and gas exploration can help mitigate these impacts and ensure responsible exploration practices.

**Advanced Technologies for Aquatic Biodiversity and Environmental Sustainability in Oil and Gas Exploration:** Promoting the use of advanced technologies in oil and gas exploration involves adopting innovative methods to minimize the negative impacts on the environment. Some examples include:

1. **Enhanced Drilling Techniques:** Employing advanced drilling techniques, such as directional and horizontal drilling, can help reduce the number of wells required for exploration, thereby minimizing habitat destruction and disturbance to aquatic ecosystems.
2. **Seismic Imaging Technologies:** Utilizing advanced seismic imaging technologies,

such as 3D and 4D seismic surveys, can help improve the accuracy of exploration activities and reduce the need for repeated surveys, thus minimizing the impacts on aquatic ecosystems.

3. **Robotics and Automation:** Implementing robotics and automation technologies in exploration activities can help reduce human error, improve efficiency, and minimize the environmental footprint of oil and gas operations.
4. **Advanced Waste Management Technologies:** Adopting innovative waste management technologies, such as bioremediation and advanced wastewater treatment systems, can help minimize the environmental impact of oil and gas exploration and protect the natural resources on which it depends.

To ensure the widespread adoption of advanced technologies in oil and gas exploration, several strategies can be employed:

1. **Government Incentives and Support:** Governments can introduce incentives and support programs for oil and gas companies that invest in advanced technologies and practices, such as tax breaks, subsidies, or preferential treatment in licensing and permitting processes.
2. **Research and Development:** Encouraging research and development in advanced technologies for oil and gas exploration can help drive innovation and promote the adoption of eco-friendly practices in the industry.
3. **Collaboration and Partnerships:** Establishing partnerships between governments, industry stakeholders, and local communities can foster a shared responsibility for environmental protection and encourage collaboration in addressing challenges related to aquatic biodiversity and environmental sustainability.
4. **Training and Capacity Building:** Providing training and capacity-building programs for industry stakeholders, regulators, and local communities can help raise awareness about the benefits of



advanced technologies and facilitate their adoption.

Promoting the use of advanced technologies in oil and gas exploration can bring about several benefits:

1. **Protection of Aquatic Ecosystems:** By adopting advanced technologies and practices, the oil and gas industry can help preserve the natural beauty and biodiversity of aquatic ecosystems, reducing their impact on the environment.
2. **Enhanced Environmental Sustainability:** The use of advanced technologies can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of oil and gas products, and fostering a positive image of the industry.
3. **Improved Operational Efficiency:** Advanced technologies can help improve the efficiency and productivity of oil and gas exploration, leading to cost savings and potentially increased revenue for companies and governments.

### **6.7. Adopting Advanced Technologies and Innovative Practices:**

**M**ineral mining exploration plays a vital role in global economic growth and technological advancements. However, it also poses significant challenges to aquatic biodiversity and environmental sustainability due to its potential for habitat destruction, water pollution, and greenhouse gas emissions. Adopting advanced technologies and innovative practices in mineral mining exploration can help mitigate these impacts and ensure responsible extraction practices.

Adopting Advanced Technologies and Innovative Practices in Mineral Mining Exploration:

1. **Precision Mining:** Precision mining involves the use of advanced technologies such as drones, sensors, and geographic information systems (GIS) to optimize mineral extraction processes. This results in more efficient operations, reduced waste, and minimal environmental impact.

2. **Automation and Artificial Intelligence:** Implementing automation and artificial intelligence in mineral mining exploration can help improve efficiency, reduce human error, and minimize the environmental footprint of operations. This includes autonomous vehicles, robotic equipment, and intelligent monitoring systems that optimize resource utilization and minimize waste generation.
3. **Bioremediation:** Bioremediation is an innovative practice that uses microorganisms and natural processes to treat and neutralize contaminants in mining waste. By adopting bioremediation techniques, mineral mining exploration companies can reduce the environmental impact of waste disposal and contribute to the restoration of affected ecosystems.
4. **Green Energy Solutions:** Mineral mining exploration companies can adopt green energy solutions, such as solar, wind, and hydroelectric power, to reduce their dependence on fossil fuels and minimize greenhouse gas emissions. This can contribute to a more sustainable energy mix and reduce the overall environmental impact of mineral mining exploration.
5. **Remote Sensing and Monitoring:** The use of remote sensing technologies, such as satellite imagery and unmanned aerial vehicles (UAVs), can help monitor and assess the environmental impact of mineral mining exploration in real time. This enables early detection of potential issues and timely implementation of mitigation measures.

Benefits of Adopting Advanced Technologies and Innovative Practices in Mineral Mining Exploration include:

1. **Protection of Aquatic Ecosystems:** By incorporating advanced technologies and innovative practices, the mineral mining industry can help preserve the natural beauty and biodiversity of aquatic ecosystems, reducing their impact on the environment.
2. **Enhanced Environmental Sustainability:** The adoption of advanced technologies

and innovative practices can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of mineral products, and fostering a positive image of the industry.

3. **Improved Operational Efficiency:** Implementing advanced technologies and innovative practices can improve the efficiency of mineral mining exploration operations, leading to cost savings and increased productivity.
4. **Strengthened Public Trust and Reputation:** Demonstrating a commitment to responsible mineral mining exploration practices through the adoption of advanced technologies and innovative practices can help improve public trust in the industry and enhance its reputation as a responsible contributor to global economic growth and technological advancements.

## 6.8. Rehabilitation and Restoration of Mining Sites:

**R**ehabilitation and Restoration of Mining Sites in Mineral Mining Exploration include:

1. **Site Preparation:** Before commencing mineral mining exploration activities, it is essential to prepare the site by conducting environmental assessments, establishing baseline data, and developing site-specific rehabilitation and restoration plans. This helps in understanding the potential environmental impacts and identifying appropriate mitigation measures.
2. **Mining Site Rehabilitation:** Rehabilitation involves restoring the mining site to its original state or an alternative productive land use after mineral extraction. This includes soil and vegetation restoration, water management, and habitat restoration. Rehabilitation practices can help minimize the environmental impact of mineral mining exploration and promote the recovery of affected ecosystems.

3. **Monitoring and Maintenance:** Regular monitoring and maintenance of rehabilitated mining sites are crucial to ensure the long-term success of restoration efforts. This includes monitoring the health of vegetation, soil quality, and water resources, as well as addressing any issues that may arise during the rehabilitation process.
4. **Community Engagement and Education:** Engaging local communities and stakeholders in the rehabilitation and restoration process can help build trust and support for responsible mineral mining exploration practices. This includes raising awareness about the importance of rehabilitation and restoration, involving local knowledge and expertise, and fostering a sense of ownership and responsibility for the environment.

Benefits of Rehabilitation and Restoration of Mining Sites in Mineral Mining Exploration are:

1. **Protection of Aquatic Ecosystems:** By rehabilitating and restoring mining sites, the mineral mining industry can help preserve the natural beauty and biodiversity of aquatic ecosystems, reducing their impact on the environment.
2. **Enhanced Environmental Sustainability:** Rehabilitation and restoration practices can lead to long-term environmental benefits by ensuring the conservation of natural resources, maintaining the quality of mineral products, and fostering a positive image of the industry.
3. **Improved Public Trust and Reputation:** Demonstrating a commitment to responsible mineral mining exploration practices through rehabilitation and restoration efforts can help improve public trust in the industry and enhance its reputation as a responsible contributor to global economic growth and technological advancements.
4. **Economic Benefits:** Rehabilitated mining sites can be converted into alternative productive land uses, such as agriculture, forestry, or recreational areas, which can generate economic benefits for local

communities and contribute to overall environmental sustainability.

### 6.9. Marine Spatial Planning (MSP):

**I**t is the process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process. Adoption of MSP is crucial for conserving biodiversity and environmental sustainability.

To use marine spatial planning (MSP) as a mitigation procedure for challenges on aquatic biodiversity and environmental sustainability, it is crucial to follow a set of guidelines that ensure effective planning, implementation, and monitoring of mitigation strategies. These guidelines encompass various aspects, such as stakeholder engagement, ecosystem-based management, adaptive management, and research and innovation.

Sustainable guidelines for mitigation through MSP.

1. Establish clear objectives and goals: Begin by defining specific, measurable, achievable, relevant, and time-bound objectives and goals for MSP. These should encompass the conservation of aquatic biodiversity, environmental sustainability, and the sustainable use of marine resources. Clearly articulating these objectives will help guide the planning process and ensure that all decisions align with the overall vision.
2. Involve stakeholders in the decision-making process: Engage local communities, industry stakeholders, and other relevant parties in the MSP process to foster collaboration and ensure that plans are locally relevant and acceptable. This can be achieved through public consultations, workshops, and other participatory processes. Encourage stakeholders to share their knowledge, perspectives, and concerns, as this can lead to more informed and effective MSP plans.
3. Implement ecosystem-based management (EBM): Adopt an EBM approach that considers the interconnectedness of marine ecosystems and the impacts of human activities on them. This involves managing marine resources in a way that maintains ecosystem health and resilience while supporting sustainable economic activities. Key practices include reducing pollution, managing fisheries sustainably, and minimizing habitat degradation.
4. Designate marine protected areas (MPAs) and other spatial planning tools: Establish MPAs and other spatial planning tools to protect critical habitats and species from the adverse impacts of human activities. These areas can be designated for conservation, research, and recreation purposes, among others. By strategically placing MPAs and other spatial planning tools, we can maximize their conservation benefits while minimizing potential conflicts with other marine uses.
5. Embrace adaptive management: Regularly monitor and evaluate the effectiveness of implemented measures, and make necessary adjustments based on new information and changing conditions. This adaptive approach ensures that MSP remains a dynamic and effective tool for promoting aquatic biodiversity and environmental sustainability.
6. Invest in research and innovation: Strengthen our scientific understanding of marine ecosystems and develop innovative technologies for their conservation and sustainable use. By investing in research and development, we can improve our ability to predict and manage the impacts of human activities on marine environments, as well as identify new opportunities for sustainable resource use.
7. Foster interdisciplinary and cross-sectoral collaboration: Encourage collaboration among various sectors, such as fisheries, tourism, renewable energy, and conservation, to ensure that MSP plans address the diverse needs and interests of stakeholders. This can lead to more integrated and effective solutions for

promoting aquatic biodiversity and environmental sustainability.

8. Ensure long-term commitment and resource allocation: Secure long-term political, financial, and institutional support for MSP implementation, monitoring, and evaluation. This will help maintain the momentum and effectiveness of mitigation efforts through MSP and ensure that sustainable outcomes are achieved over the long term.

In conclusion, following these sustainable guidelines for mitigation through marine spatial planning can significantly contribute to the conservation of aquatic biodiversity and the pursuit of environmental sustainability. By adhering to these principles, we can develop and implement effective MSP plans that balance economic development with the preservation of marine ecosystems and their valuable resources.

#### **Strategies for marine spatial planning:**

Marine spatial planning (MSP) is a proactive approach to managing human activities in marine environments to promote the conservation of aquatic biodiversity and ensure environmental sustainability. By implementing effective mitigation strategies through MSP, we can strike a balance between economic development and the preservation of marine ecosystems.

1. Establishing marine protected areas (MPAs): Designating MPAs is a crucial step in protecting marine biodiversity and ensuring the long-term sustainability of marine ecosystems. These areas can be set aside for various purposes, such as conservation, research, and recreation, and can help safeguard critical habitats and species from the adverse impacts of human activities. By incorporating MPAs into MSP, we can ensure that these protected areas are strategically placed to maximize their conservation benefits while minimizing potential conflicts with other marine uses.
2. Implementing ecosystem-based management (EBM): EBM is a holistic approach to managing marine resources that considers the interconnectedness of ecosystems and the impacts of human

activities on them. By integrating EBM principles into MSP, we can promote the sustainable use of marine resources and minimize the negative effects of human activities on aquatic biodiversity. This can be achieved by adopting practices such as reducing pollution, managing fisheries sustainably, and minimizing habitat degradation.

3. Encouraging stakeholder participation: Engaging local communities, industry stakeholders, and other relevant parties in the MSP process is essential for ensuring the success of mitigation strategies.
4. Employing adaptive management: It is crucial to adopt an adaptive management approach in MSP. This involves regularly monitoring and evaluating the effectiveness of implemented measures, and making necessary adjustments based on new information and changing conditions. By being flexible and responsive to new data and insights, we can ensure that MSP remains a dynamic and effective tool for promoting aquatic biodiversity and environmental sustainability.
5. Investing in research and technology: Strengthening our scientific understanding of marine ecosystems and developing innovative technologies can significantly contribute to the success of MSP. By investing in research and development, we can improve our ability to predict and manage the impacts of human activities on marine environments, as well as identify new opportunities for sustainable resource use. This can lead to more informed decision-making and the development of cutting-edge tools and techniques for MSP implementation.

#### **Benefits of marine spatial planning:**

Marine spatial planning (MSP) serves as a strategic approach to managing human activities in marine environments, focusing on the conservation of aquatic biodiversity and the pursuit of environmental sustainability. By implementing mitigation strategies through MSP, we can unlock numerous benefits that contribute

to the overall well-being of marine ecosystems and the communities that depend on them.

Advantages of using MSP for mitigation in the context of aquatic biodiversity and environmental sustainability.

1. **Enhanced conservation of marine species and habitats:** By establishing marine protected areas (MPAs) and implementing ecosystem-based management (EBM) through MSP, we can effectively protect critical marine habitats and species from the adverse impacts of human activities. This leads to the preservation of genetic resources, ecosystem services, and the overall health of marine ecosystems, ensuring their long-term resilience and adaptability.
2. **Sustainable use of marine resources:** MSP promotes the sustainable use of marine resources by minimizing the negative effects of human activities on aquatic biodiversity. This can be achieved through practices such as reducing pollution, managing fisheries sustainably, and minimizing habitat degradation. By doing so, we can maintain the productivity and abundance of marine resources, ensuring their availability for present and future generations.
3. **Economic benefits and growth:** Implementing MSP can lead to economic benefits by fostering the sustainable development of marine industries such as tourism, fisheries, mining, and energy. By carefully planning and managing these activities, we can create jobs, generate revenue, and stimulate economic growth while minimizing the environmental impacts. This can result in a more resilient and diversified economy that is better equipped to withstand potential shocks and challenges.
4. **Improved stakeholder engagement and collaboration:** Involving local communities, industry stakeholders, and other relevant parties in the MSP process can lead to more effective and locally relevant plans that take into account the diverse needs and perspectives of those who depend on marine resources. This can

result in increased acceptance of MSP measures among the affected communities and foster a sense of ownership and responsibility for the conservation and sustainable use of marine resources.

5. **Adaptation to climate change and other environmental pressures:** By adopting an adaptive management approach in MSP, we can better respond to the challenges posed by climate change, ocean acidification, and other environmental pressures. Regular monitoring and evaluation of implemented measures, along with adjustments based on new information and changing conditions, enable us to maintain the effectiveness of MSP in promoting aquatic biodiversity and environmental sustainability.
6. **Strengthened scientific understanding and innovation:** Investing in research and development for MSP can lead to a deeper understanding of marine ecosystems and the development of innovative technologies for their conservation and sustainable use. This can result in more informed decision-making and the creation of cutting-edge tools and techniques that enhance the overall effectiveness of MSP.

In conclusion, the benefits of using marine spatial planning for mitigation in the context of aquatic biodiversity and environmental sustainability are multifaceted and far-reaching. By implementing MSP strategies, we can protect and conserve marine species and habitats, promote sustainable use of marine resources, foster economic growth, improve stakeholder engagement, adapt to environmental challenges, and strengthen our scientific understanding and innovation. These advantages contribute to the long-term well-being of marine ecosystems and the communities that rely on them.

## 7. Master plan for sustainable coastal and marine tourism, oil and gas exploration and production, and mineral mining for Egypt:

### 7.1. Vision:

The vision for the Egyptian master plan for environmental sustainability and aquatic biodiversity encompasses the preservation and responsible management of its natural resources. We aim to protect its diverse ecosystems, including coral reefs, wetlands, and river systems, and promote sustainable practices in sectors such as tourism, oil and gas, and mineral mining. Through the establishment of protected areas, implementation of conservation measures, and promotion of sustainable tourism practices, Egypt is striving to maintain the ecological balance, safeguard aquatic biodiversity, and ensure the long-term viability of its natural heritage. By engaging in international collaborations and adhering to conventions on biodiversity conservation, Egypt will demonstrate its commitment to promoting environmental sustainability and preserving the country's unique ecosystems for future generations.

By implementing this Master Plan Vision for Environmental Sustainability and Aquatic Biodiversity Conservation in Egypt, the country can work towards a future where its natural resources, ecosystems, and unique biodiversity are preserved and valued for generations to come.

### 7.2. Objectives of the master plan:

The Master Plan objectives for Environmental Sustainability and Aquatic Biodiversity Conservation in Egypt aims to create a sustainable future by preserving and enhancing the country's natural resources, ecosystems, and aquatic biodiversity.

To deliver on this objective, destinations will need to overcome the sustainability challenges of the 20th century and adapt to the new challenges of climate change, biodiversity loss, evolving

consumer preferences, and global production and consumption systems.

Transformation will require widespread recognition of the underlying systemic causes of the current fragile, unsustainable state of coastal and marine ecosystems; and recognition of the need to manage the growing demand for tourism, oil and gas exploration, and mineral mining experiences; The specific objectives include:

#### **Objective 1: Establish a Strong Policy and Legal Framework:**

- ✓ Review and update existing environmental and resource management policies and laws to align with international best practices and standards.
- ✓ Enhance the enforcement of environmental laws and promote public awareness of their importance.
- ✓ Develop a national strategy for sustainable development, integrating environmental, social, and economic aspects.
- ✓ Identify priority issues and actions to support informed policy formulation geared towards
- ✓ definition of sustainable coastal, marine tourism and, mining activities (including oil, gas
- ✓ exploration and mineral mining).
- ✓ Identify priority issues and actions and aid definition and strengthening of regulatory
- ✓ frameworks geared towards aquatic biodiversity conservation and environmental management in Egypt.
- ✓ phasing out of practices and strategies that are no longer fit for the future;
- ✓ Implementation of new practices across the entire marine and coastal resources value chain,
- ✓ Significant long-term policy and regulatory commitments from governments to attract and support investments targeting sustainability.
- ✓ Strengthen regulatory frameworks for environmental sustainability and aquatic biodiversity conservation in Egypt.

## **Objective 2: Assess and Monitor Environmental Status**

- ✓ Conduct a comprehensive assessment of Egypt's environmental status, including aquatic ecosystems, biodiversity, and natural resources.
- ✓ Establish a regular monitoring system to track changes and progress in achieving the set goals.
- ✓ Encourage collaboration with regional and international organizations for data sharing and expertise.
- ✓ Identify priority issues and actions to enhance sustainable coastal, and marine tourism and
- ✓ mining activities (oil and gas exploration and Mineral mining) to ensure conservation of
- ✓ aquatic biodiversity and sound environmental management.

## **Objective 3: Sustainable Resource Management**

- ✓ Promote the efficient and sustainable use of natural resources.
- ✓ Encourage the exploration and development of renewable energy sources to reduce dependence on mineral-based fossil fuels.
- ✓ Implement resource management plans that balance economic growth with environmental and biodiversity protection.
- ✓ Conserve, Protect, and Enhance Egypt's unique natural capital and heritage within the coastal and marine environment to strengthen the associated tourism sectors, and local and national economies through foreign exchange earnings.
- ✓ Reducing the negative impacts on the local environment, economy, and community
- ✓ Regenerating ecosystems, local markets, and communities
- ✓ Building resilience to threats and future shocks and crises.
- ✓ Identify the challenges and obstacles toward sustainable development
- ✓ Identify the priority areas and activities.

- ✓ Reduce direct pressures on biodiversity and promote sustainable utilization of biodiversity
- ✓ Improve the status of biodiversity by safeguarding ecosystems, species, and genetic diversity.
- ✓ Enable management to enhance the benefits of biodiversity and ecosystem services.
- ✓ Enhance management and implementation of biodiversity-related obligations through participatory planning, knowledge management, and capacity building.

## **Objective 4: Protected Areas and Biodiversity Conservation**

- ✓ Establish and expand a network of protected areas, including marine protected areas, to safeguard Egypt's unique aquatic biodiversity and ecosystems.
- ✓ Develop and implement conservation measures and management plans for these protected areas.
- ✓ Encourage ecotourism and responsible tourism practices to support local communities and conservation efforts.

## **Objective 5: Pollution Control and Waste Management**

- ✓ Implement strict pollution control measures to minimize the impact of human activities on the environment and aquatic ecosystems.
- ✓ Promote waste reduction, recycling, and efficient waste management practices.
- ✓ Invest in wastewater treatment facilities and other pollution control technologies.

## **Objective 6: Public Awareness and Education**

- ✓ Increase public awareness and understanding of environmental issues and the importance of sustainability through education, training, and public campaigns.
- ✓ Encourage community participation in environmental conservation efforts.
- ✓ Foster a culture of environmental responsibility among all sectors of society.

- ✓ Identify key stakeholders in the development of coastal and marine tourism, oil and gas exploration, and mineral mining;
- ✓ Enhance knowledge and awareness of priority issues and needed actions for sustainable coastal, marine tourism, and mining activities for the conservation of aquatic biodiversity and environment management.

### **Objective 7: Research and Development**

- ✓ Invest in research and development to improve our understanding of Egypt's aquatic ecosystems, biodiversity, and environmental challenges.
- ✓ Use research findings to inform policy decisions, management practices, and conservation efforts.
- ✓ Collaborate with national and international research institutions to share knowledge and expertise.

### **Objective 8: Cross-sectoral Coordination**

- ✓ Foster collaboration and coordination among various government agencies, NGOs, and stakeholders to ensure the effective implementation of the Master Plan Vision.
- ✓ Establish a central coordinating body to oversee the implementation of the plan and ensure its alignment with national development goals.
- ✓ Encourage partnerships and collaborations between the public and private sectors for the achievement of shared environmental objectives.
- ✓ proactive co-operation and collaboration across all stakeholders to create business models to deliver sustainable experiences.

## **7.3. Mission and purpose of the master plan:**

The mission of the master plan is to enhance the biodiversity and aquatic sustainability of Egypt in context of economic development in CMT, Oil and gas, and mineral mining sectors. And foster progress to implement the Egypt's vision and values.

As a planning framework, the Master Plan mission and purposes of Egypt is to:

- 1) Integrate the management for the protection, restoration, and utilization of biodiversity in an efficient way to halt biodiversity loss through participation at all levels.
- 2) Increase policy and management importance, raise social awareness on roles and importance of biodiversity to sustainable development and green economy, including livelihood and way of life of the people.
- 3) Set proper laws and revise the existing ones.
- 4) Achieve Full cooperation between different parties.
- 5) Determined our priority fields.
- 6) Developing a sustainable Blue Economy including Integrated, multi-level ocean governance Science, research, and technology development.
- 7) Achieve human capacity development and Stakeholder partnerships.
- 8) proposed monitoring and surveillance programs.
- 9) Develop MSP as an enabler of the Blue Economy and a practical tool for promoting a more rational use of the ocean, promoting the rapid and environmentally sound development of ocean-based activities, and growth of the Blue Economy.
- 10) Increasing investor confidence by introducing transparency and predictability, which can act as a catalyst for investment in innovation and developing blue technologies.
- 11) Provides an avenue for focused and rationale intervention for the maximization of tourists' satisfaction and attractions through enhancing the healthy coastal and marine ecosystems, and sound environmental conservation;
- 12) Provides a mechanism for advocacy protection and compensation of project-affected persons and communities in the event impacts attributable to the activities and/or development of coastal marine tourism and, oil, gas, and mineral mining;
- 13) Provides advocacy towards environment-friendly coastal and marine tourism with regards to spatial and temporal planning and siting of infrastructure and activities (including festivals, water sports, skydiving, etc.) while minimizing impacts on aquatic biodiversity



and environments for sustained social economic growth.

#### **7.4. Indicators:**

Indicators play a crucial role in assessing environmental sustainability and aquatic biodiversity, providing valuable insights into ecosystem health, human activities, and climate change impacts. These indicators serve as effective tools for summarizing and communicating key aspects of the ecosystem state, aiding in marine conservation policy and management.

##### **Ecological Indicators for Aquatic Biodiversity**

The ecological indicators for aquatic biodiversity focus on monitoring and assessing the state of marine ecosystems, species diversity, and habitats. These indicators help in managing human activities that impact biodiversity, such as fishing, shipping, coastal development, and energy production. They also address indirect pressures like climate change that threaten marine biodiversity.

##### **Importance of Biodiversity Indicators**

Biodiversity indicators help measure and monitor various aspects related to environmental sustainability, including trends in land and water use, habitat loss, invasive species, species health, ecosystem integrity, conservation efforts, and benefits to people. These indicators range from fine-scale assessments for local decision-making to broad-scale evaluations informing national environmental policies and conservation investments.

##### **Sustainable Ocean Economy Indicators**

In the context of a sustainable ocean economy, indicators are essential for tracking progress toward goals related to marine ecosystem health, resource management, and human well-being. These indicators provide insights into the pressures on marine biodiversity like resource over-exploitation, pollution, habitat disturbance, climate change, and invasive species. Monitoring these indicators helps assess the benefits generated for human well-being and supports policy-making directed at achieving a sustainable ocean economy.

**Table 6:** Indicators of sustainable coastal and marine tourism.

Pillar	Baseline issue	Indicator
Environmental	Sustainable Tourism Public Policy	Percentage of tourism enterprises or establishments in the destination using a voluntary certification or labeling for environmental quality and sustainability and/or corporate social responsibility
	Diversity of coastal and marine ecosystems and pollution/water quality	Flora and fauna; number and population volume of species Level of pollution in seawater (e.g. turbidity; chlorophyll; concentration of nitrogen, phosphorous other pollution index) Harmful algae blooms (i.e. number of events, intensity or concentration, duration) Number of days per year the beach/shore is closed due to contamination Percentage of beaches awarded the Blue Flag
	Reducing the impact of travel to/from	Average travel (kilometers) by tourists and same-day visitors from home to the destination
	Energy management	Per capita energy consumption of energy from all sources (total, tourist-related sectors, per person day) Percentage of businesses participating in energy conservation programs or applying energy-saving policies and techniques Percentage of energy consumption from renewable sources (total, tourist-related sectors) Greenhouse gas emissions (total, by sector) Percentage of tourism enterprises involved in climate change mitigation schemes, such as carbon dioxide (CO <sub>2</sub> ) offset, low energy systems, etc. Percentage of the annual amount of energy consumed from renewable sources (megawatt hours) compared to overall energy consumption at destination level per year Availability of renewable energy sources CO <sub>2</sub> equivalent sequestered at the destination through regenerative coastal management, blue carbon projects, and living shorelines or green infrastructure adaptations
	Water availability and consumption	Water use (total volume, per capita, per tourist, per day) Water saving (percentage reduced, recaptured, or recycled)
	Drinking water quality	Percentage of tourism establishments with water treated to international standards Reported cases of waterborne diseases per week/month (total, tourists)
	Development control	Use of a land-use or development planning process, including tourism Percentage of area subject to control by type (e.g. density, design)
	Sewage avoidance or treatment	Percentage of sewage from tourism-related businesses avoided, reduced, or treated (primary, secondary, tertiary) Availability of treatment systems Percentage of tourism establishments with treatment systems

	Solid waste management, Conservation and restoration	<p>The waste volume produced in the total, tourism sector (e.g. tonnes per month)</p> <p>Volume and percentage of waste recycled by waste type</p> <p>Volume of litter in public areas (total, tourism sites)</p> <p>Availability of waste management facilities</p> <p>The volume of organic waste composted</p> <p>Percentage of tourism enterprises separating different types of waste</p> <p>Percentage of total waste recycled per tourist compared to total waste recycled per resident per year</p>
		<p>Area and volume of sand nourishment</p> <p>Percentage of natural/cultural heritage places restored through tourism certification</p> <p>Percentage of visitors actively contributing back to conservation (e.g. tourist volunteer hours)</p> <p>Percentage of natural/cultural heritage places restored</p> <p>Percentage of ecosystems restored through tourism</p> <p>Area of restored ecosystems by ecosystem type</p> <p>Status or population density of economically important species of touristic importance (e.g. sea turtles, sharks, whales, etc.)</p> <p>Coral reef density or similar health indicator</p>
Economic	Sustaining tourist satisfaction	<p>Level of satisfaction by visitors</p> <p>Perception of value for money</p> <p>Percentage of return visitors</p> <p>Percentage of visitors having exceptional experiences</p> <p>Number of incidents of visitor safety</p>
	Tourism seasonality	<p>Visitor arrivals by month/quarter</p> <p>Accommodation occupancy rates by month/quarter</p> <p>Percentage of year-round versus seasonal businesses</p> <p>Number and percentage of permanent, seasonal, and temporary tourism jobs</p>
	Economic benefits of tourism	<p>Tourism employment (domestic: foreign, gender ratios, and wage differentials)</p> <p>GDP/revenue generated by tourism as a percentage of total revenues</p> <p>Businesses offering training and Business networks</p> <p>Visitor expenditure</p> <p>Innovation index</p> <p>Number of local people employed in tourism (also ratio of tourism employment to total employment)</p> <p>Tourism revenue stays with the destination (or country)</p> <p>Percentage of products sourced locally</p>
	Diversification of the tourist market	<p>Ratio of international versus domestic visitor</p> <p>Types of tourism segment in self-identified visitor surveys</p>
Socio-cultural	Local satisfaction with tourism	<p>Local satisfaction level with tourism</p> <p>Percentage who believe that tourism has helped bring new services or infrastructure</p>
	Effects of tourism on communities	<p>The ratio of tourists to locals (average and peak period/days)</p> <p>Number of incoming and outgoing passengers per port per month</p>

	<p>Number of berths and moorings for recreational boating</p> <p>Percentage who believe that tourism has helped bring beneficial services or infrastructure</p> <p>Social services available to the community (number and capacity attributable to tourism)</p> <p>Total kilometers of open-access beaches relative to total kilometers of beaches</p> <p>Percentage of beaches accessible to all</p>
Indigenous representation	<p>Percentage of tourism enterprises where management positions are held by an Indigenous person</p> <p>Ratio of local employment</p>
Inclusion and accessibility	<p>Percentage of rooms in commercial accommodation establishments accessible for people with disabilities</p> <p>Percentage of tourist attractions that are accessible to people with disabilities and/or participating in recognized accessibility information schemes</p>
Health and well-being of local community	<p>Satisfaction index amongst local tourism workforce</p>
Cultural heritage	<p>Percentage of visitors who seek to experience culture and/or heritage</p> <p>Amount of visitor expenditures reinvested into culture and/or heritage</p> <p>Percentage of natural/cultural heritage places restored through tourism certification</p> <p>Number of initiatives supporting indigenous/traditional owners</p> <p>Percentage of indigenous/traditional-owned/operated businesses</p> <p>Percentage of bilingual signs and interpretation</p> <p>Number of tourism businesses contributing to the community</p> <p>Percentage of the destination's events that focus on traditional/local culture and heritage</p> <p>Number of households speaking ancestral languages</p> <p>Number of students graduating from educational programs that emphasize ancestral knowledge and cultural heritage</p>

## 7.5. Expected outcomes:

This report identifies priority opportunities for action to help catalyze destination-wide systemic changes in coastal and marine sustainability as part of recovery efforts:

- ✓ Develop guidelines for environmental protection and biodiversity enhancement.
- ✓ Focus policies, plans, product development, and marketing on attracting stakeholders who wish to engage genuinely with the communities and support in the regeneration of the local environment, economy, and community.
- ✓ Develop strategies to increase sustainable and resilient financing for conservation and restoration activities, including MPA management and enforcement.
- ✓ Building long-term solvency through the establishment and endowment of conservation trust funds to ensure conservation funding is resilient to downturns in visitation.
- ✓ Collect, integrate, and maintain data on sustainability indicators.
- ✓ Inform local authorities on how to manage operational externalities, target appropriate investment for sustainability requirements, and move beyond an over-reliance on GDP.
- ✓ Utilize co-operation and collaborative management arrangements, such as destination management structures, to promote engagement of all stakeholders in decision-making and implementation of tourism policies and plans, share expertise and resources, and promote a common set of objectives.
- ✓ Implementation of new practices across the entire marine and coastal resources value chain, proactive co-operation, and collaboration across all stakeholders to create business models to deliver sustainable experiences.
- ✓ Analysis of the opportunities for sustainable development.
- ✓ Strengthen regulatory frameworks for environmental sustainability and aquatic biodiversity conservation in Egypt.
- ✓ Mitigate the impact of marine and coastal tourism, oil and gas exploration, and mineral mining.

- ✓ Develop a National Master plan for Egyptian marine and onshore resources and biodiversity.

## 7.6. CMT and Social-Economic Development in Egypt:

Coastal and marine tourism plays a significant role in the socio-economic development of Egypt, contributing to the nation's growth and prosperity. With an extensive coastline along the Mediterranean Sea and the Red Sea, Egypt has a plethora of natural resources that attract millions of tourists every year. These tourists not only enjoy the stunning beaches, coral reefs, and marine life but also contribute to the country's economy in various ways.

The tourism industry provides ample job opportunities for the Egyptian population. From hotel staff and tour guides to divers and marine biologists, a wide range of professions are created to cater to the needs of the tourists. This, in turn, leads to a reduction in unemployment rates and an improvement in the overall standard of living for Egyptians.

Revenue generated from coastal and marine tourism has a direct impact on the country's GDP. With a steady influx of foreign currency from tourists, Egypt can invest in infrastructure, education, healthcare, and other essential services that benefit the entire population. Moreover, the growth of the tourism industry encourages the development of new businesses, such as restaurants, souvenir shops, and water sports centers, which further stimulate the economy. Coastal zone tourism in Egypt has brought significant economic benefits to host communities, generating substantial revenue and creating numerous job opportunities. The Red Sea region, including popular destinations like Hurghada and Sharm El Sheikh, has become a premier tourism destination, attracting over 1.2 million tourists annually and contributing over \$1.2 billion in foreign exchange while creating more than 275,000 jobs.

Coastal and marine tourism promotes cultural exchange and understanding between Egypt and other nations. As tourists from various backgrounds and nationalities visit Egypt, they learn about the country's rich history, traditions,

and customs. This exchange fosters a sense of global citizenship and mutual respect, which can contribute to international peace and cooperation. Marine tourism, specifically, has a positive impact on the conservation of Egypt's marine ecosystems. With the increasing awareness of environmental issues, many tourists are drawn to eco-friendly and sustainable tourism practices. This encourages the Egyptian government and local communities to protect and preserve the country's marine resources, ensuring their long-term viability for both tourism and the local ecosystem.

Coastal and marine tourism contributes to the development of local communities along the Egyptian coast. As tourists visit these areas, they bring in revenue that can be used for community projects, such as improving local schools, healthcare facilities, and infrastructure. This, in turn, enhances the quality of life for residents and creates a sense of pride in their local heritage and environment.

Coastal marine tourism development in Egypt has brought significant economic benefits, it has also posed challenges to environmental sustainability. Efforts to address these challenges include promoting sustainable practices, raising awareness about environmental conservation, and implementing policies to protect fragile marine ecosystems while ensuring continued economic growth from tourism activities.

Coastal and marine tourism plays a vital role in Egypt's socio-economic development. By providing job opportunities, generating revenue, promoting cultural exchange, supporting conservation efforts, and aiding local community development, this sector contributes significantly to the well-being of Egypt and its people. As the country continues to invest in and develop its tourism industry, it can expect to reap the benefits of a thriving, sustainable, and prosperous future.

Egypt's coastal and marine tourism development has numerous threats emanating from civil strikes, terrorism, and more recently, global pandemics including COVID-19. To catapult Egypt's coastal and marine tourism to greater heights, several issues were identified, ranging from environment, ecological, socio-economics, and governance. The key identified issues include habitat degradation, pollution from industrial

effluents, sewage effluents, encroachment and grabbing of marine coastline, effluent/discharge from ships and oil spills from boats, coastal and marine debris.

**Table 7. Key issues, challenges, priority actions, and institutional arrangements in CMT.**

Key issues in CMT	Challenges	Priority actions	Institutional arrangement
Over-capacity building of tourist resorts.	<ul style="list-style-type: none"> <li>- Population pressure in coastal areas</li> <li>- Extensive exploitation of marine resources</li> <li>- Resource and environmental conflicts.</li> <li>- Increase pollution loads (i.e. marine litter)</li> <li>- Building wastes through resort implementation.</li> <li>- Reduce public access to the sea.</li> </ul>	<ul style="list-style-type: none"> <li>- Creation of coastal zonation.</li> <li>- Coastal monitoring and surveillance.</li> <li>- Define special open zones between resorts for public access.</li> <li>- Implementation of a building capacity load.</li> <li>- Strengthen the regulations and laws.</li> <li>- Regular using Earth Observation (E.O.) / satellites</li> <li>- EIA studies &amp; regular inspection&amp; re-evaluation.</li> <li>- Ocean governance and management.</li> <li>- Public awareness.</li> <li>- Diving operation management.</li> <li>- Marine installation management.</li> <li>- Maintain tourist market</li> </ul>	<ul style="list-style-type: none"> <li>- Egyptian Environmental Affairs Agency (EEAA)</li> <li>- Ministry of Tourism and Antiques (MOT)</li> <li>- Tourism Development Agency (TDA)</li> <li>- Ministry of Water Resources and Irrigation</li> <li>- Governorates</li> <li>- NGOs</li> </ul>
Marine Pollution	<ul style="list-style-type: none"> <li>- Loss of biodiversity.</li> <li>- Destruction of sensitive habitats (seagrasses, corals, wetlands, mangrove habitat).</li> <li>- Environmental degradation.</li> <li>- Destruction of Coral reef areas (bleaching, black and white diseases).</li> <li>- Low water quality.</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthen the assimilative capacity.</li> <li>- Obligate all the tourism resorts to initiate proper sewage treatment plants with tertiary treatment operation, by using active bacteria in the treatment process.</li> <li>- Monitoring the water effluent from the STP to be applied with the law's limits.</li> <li>- Confirm and surveillance the rational disposal of treated water (used in green areas irrigation).</li> <li>- Ascertain of proper disposal of brine water resulting from the desalination plants (in deep wells or far distance into the sea far from the sensitive communities).</li> <li>- Carry out a water dispersion model before discharging the brine water into the sea.</li> </ul>	<ul style="list-style-type: none"> <li>- EEAA</li> <li>- MOT</li> <li>- TDA</li> <li>- Ministry of Water Resources and Irrigation</li> <li>- Wells and groundwater authority</li> <li>- Governorates</li> <li>- NGOs</li> </ul>

<ul style="list-style-type: none"> <li>- Marine activities</li> <li>- Diving and Snorkeling.</li> <li>- Boat operation.</li> <li>- Marine construction (walkways, jetties, and marinas).</li> <li>- Water sports.</li> <li>- Maritime transport.</li> <li>- Yachts cruising</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Loss of biodiversity.</li> <li>- Destruction of sensitive habitats (seagrasses, corals areas, mangrove habitat).</li> <li>- Environmental degradation.</li> <li>- Destruction of Coral reef areas (bleaching, black and white diseases).</li> <li>- Low water quality.</li> <li>- Lack of receptor facilities at ships.</li> <li>- Discharge from ships and oil spills from ships.</li> <li>- Untrained and unqualified divers.</li> <li>- Coral breaking through marine sports, diving, snorkeling, and water sports.</li> <li>- Condensation in activities in certain areas.</li> <li>- Boats gather densely in certain diving offshore sites.</li> <li>- Increase of pollution loads (i.e. ml/ sewage water/...etc.).</li> </ul>	<ul style="list-style-type: none"> <li>-</li> <li>- Public awareness.</li> <li>- Proper diver training.</li> <li>- Strengthen the surveillance and management.</li> <li>- Cruise boat license.</li> <li>- Mutual working of diving sites to allow them to replenish.</li> <li>- Close sites for a certain time if necessary.</li> <li>- Limit the number of boats in each diving site.</li> <li>- Rehabilitation of coral areas and regeneration of coral communities</li> <li>- Determined the area and dimensions of marine installations according to the sensitivity of each area.</li> <li>- The deck of the walkways or marinas must not be concrete and must have spaces between wooden plates to eliminate the shadow effect, with no permission for solid closed installation in the sea especially concrete marinas.</li> <li>- Forcing the installation of receptor facilities at boats.</li> <li>- Proper training for divers (licenses by MOT &amp; ETF)</li> <li>- Regulating the number of divers according to zone sensitivity.</li> <li>- Warning &amp; information signs</li> </ul>	<ul style="list-style-type: none"> <li>- Protectorates</li> <li>- EEAA</li> <li>- LFRPDA</li> <li>- NAOS</li> <li>- MOT</li> </ul>
<ul style="list-style-type: none"> <li>- Beach activities.</li> </ul>	<ul style="list-style-type: none"> <li>- Shoreline instability.</li> <li>- Unplanned location of beach activities.</li> <li>- Destruction of natural resources, habitats &amp; biodiversity.</li> <li>- Congestion in beach areas.</li> </ul>	<ul style="list-style-type: none"> <li>- Regular inspection</li> <li>- Raising local communities awareness.</li> <li>- Awareness signs on the beach.</li> </ul>	<ul style="list-style-type: none"> <li>- Protectorates</li> <li>- EEAA</li> <li>- LFRPDA</li> <li>- NAOS</li> <li>- MOT</li> <li>- NGOs</li> </ul>



<p>Recreational fishing (sport/cruise)</p>	<ul style="list-style-type: none"> <li>- Pollution from ships (i.e. ML &amp; solid wastes)</li> <li>- Interaction between recreational and commercial fisheries)</li> <li>- Overfishing</li> <li>- No Records &amp; fisheries statistics (IUU)</li> <li>- Local fishing activities (recreational fishing)</li> </ul>	<ul style="list-style-type: none"> <li>- Limiting/ prevent (adopt) of new licenses.</li> <li>- Regular monitoring of water quality&amp; ML and take proper actions</li> <li>- Control fisher behaviors</li> <li>- Raising awareness of fishers &amp; local communities</li> </ul>	<ul style="list-style-type: none"> <li>- Protectorates</li> <li>- EEAA</li> <li>- LFRPDA</li> <li>- NAOS</li> <li>- MOT</li> <li>- NGOs</li> </ul>
<p>Localization of high tourism activities in some areas such as Hurghada, Qusier Safaga sector, Western Gulf of Suez, Gulf of Aqaba, Western Northern coast</p>	<ul style="list-style-type: none"> <li>- High pressure on marine ecosystems.</li> <li>- Shortage of utilities (water, electricity,..etc).</li> <li>- Higher activities at a small distance.</li> <li>- Habitat destruction.</li> <li>- Environmental degradation.</li> </ul>	<ul style="list-style-type: none"> <li>- MSP</li> <li>- Habitat restoration.</li> <li>- Monitoring and evaluation.</li> <li>- Strategic planning of the areas.</li> <li>- Strengthen surveillance.</li> <li>- Technical aids.</li> <li>- Stewardship and assistance.</li> </ul>	<ul style="list-style-type: none"> <li>- Protectorates</li> <li>- EEAA</li> <li>- NAOS</li> <li>- Scientific organizations</li> <li>- MOT</li> <li>- NGOs</li> </ul>
<p>unexpected accidents (COVID-19, shark attacks, World political disturbances, and conflicts)</p>	<ul style="list-style-type: none"> <li>- Reduce tourist flow.</li> <li>- Difficulties with resident communities.</li> <li>- Unfixed tourism seasons.</li> <li>- Labor reduction</li> <li>- Financial problems.</li> <li>- Reduction in GDP</li> </ul>	<ul style="list-style-type: none"> <li>- Variation in tourism markets</li> <li>- Abroad publicity.</li> <li>- Participating in abroad markets.</li> <li>- Advertisement in global tourism markets.</li> <li>- Diversification in tourism services.</li> <li>- Fundraise and social security associations.</li> </ul>	<ul style="list-style-type: none"> <li>- MOT</li> <li>- NGOs</li> <li>- The Ministry of Social Solidarity</li> </ul>
<p>River Nile's unsafe practices</p>	<ul style="list-style-type: none"> <li>- Polluting the Nile.</li> <li>- Water quality reduction.</li> <li>- Solid wastes in Nile berths.</li> <li>- Liquid wastes from cruise boats</li> <li>- Cruise boat congestions.</li> <li>- Illegal uncontrolled berths</li> <li>- Heavy traffic inside the Nile and cruise</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthen surveillance on Nile boats.</li> <li>- Obligatory and well-confined licensing system.</li> <li>- Penalties and non-compliance fees on violating boats.</li> <li>- Boats must be equipped with sewage collection facilities.</li> <li>- Strong surveillance at the berths.</li> <li>- Provide a Solid waste management system.</li> <li>- Control points on berths.</li> <li>- Cancel and forbid illegal berths.</li> </ul>	<ul style="list-style-type: none"> <li>- EEAA</li> <li>- NAOS</li> <li>- Scientific organizations</li> <li>- MOT</li> <li>- NGOs</li> </ul>

	<ul style="list-style-type: none"> <li>boats congestion on the berths</li> <li>- Land base resource pollution from discharges from small villages at the Nile banks.</li> <li>- Unproper use of the Nile stream e.g. animal bathing in the Nile.</li> <li>- Interference between the fishing boats and the cruise boats.</li> <li>- Crocodile diversity in Lake Naser.</li> </ul>	<ul style="list-style-type: none"> <li>- Public awareness.</li> <li>- Public meetings.</li> <li>- Traffic regulation through the Nile's stream.</li> <li>- Berthing regulation in different areas.</li> </ul>	
- Mutual interferences with other activities	<ul style="list-style-type: none"> <li>- Interference with harbor operation.</li> <li>- Maritime Transportation</li> <li>- Maritime routes.</li> <li>- Fishery areas.</li> <li>- Aquaculture areas.</li> <li>- Oil exploration areas.</li> </ul>	<ul style="list-style-type: none"> <li>- Enforcement of compliance mechanisms for plastic and litter dumping.</li> <li>- Development of Ocean governance policy.</li> <li>- Development of MSP.</li> <li>- Comply with the national laws.</li> </ul>	<ul style="list-style-type: none"> <li>- EEAA</li> <li>- NAOS</li> <li>- Ministry of Transportation</li> <li>- Harbors administrations</li> <li>- Scientific organizations</li> <li>- LFRPDA</li> <li>- NAOS</li> <li>- MOT</li> <li>- NGOs</li> </ul>
- Labor and coastal human communities	<ul style="list-style-type: none"> <li>- Market fluctuations.</li> <li>- Service seasonality.</li> <li>- Workers dispensing.</li> <li>- Economical difficulties</li> </ul>	<ul style="list-style-type: none"> <li>- Income diversification.</li> <li>- Alternative job vacancies.</li> <li>- Social sporting.</li> </ul>	<ul style="list-style-type: none"> <li>- NGOs</li> <li>- The Ministry of Social Solidarity</li> <li>-</li> </ul>

## 7.7. Oil and Gas Mining and Social-Economic Development in Egypt:

Oil and gas have been instrumental in Egypt's socio-economic development, significantly contributing to the nation's growth and prosperity. With vast reserves of natural resources beneath its soil, Egypt has been able to capitalize on these assets to drive its economy forward and improve the lives of its citizens. The oil and gas sector has had various positive impacts on Egypt's development, including economic growth, job creation, infrastructure development, and energy security. The oil and gas industry has been a major source of revenue for Egypt. The sale of petroleum products and natural gas on both domestic and international markets has generated substantial foreign currency, which has been instrumental in financing various development projects and improving the country's overall economic stability. It's expected that Egypt's Oil and Gas Market size will be estimated at USD 7.48 billion in 2024 and is expected to reach USD 8.68 billion by 2029, with a Compound Annual Growth Rate (CAGR) of 3.01% during the forecast period. The oil and gas sector has been a significant job creator in Egypt. From exploration and production to refining and distribution, numerous professions are required to maintain the industry's operations. The oil and gas industry in Egypt has made 52 discoveries, including 39 crude oil discoveries and 13 gas discoveries in various regions like the Western Desert, Gulf of Suez, Mediterranean, Sinai, and Eastern Desert. These discoveries are expected to reduce the unemployment rates and an improvement in the overall standard of living for Egyptians. Moreover, the growth of this sector has encouraged the development of new businesses, such as logistics, engineering, and construction companies, which further stimulates the economy. The oil and gas industry has contributed to Egypt's infrastructure development. The revenue generated from the sector has been used to fund the construction of roads, bridges, ports, and other essential facilities that support the transportation of oil and gas, as well as other goods and services. This improved infrastructure has facilitated the

growth of other industries, leading to a more diversified and robust economy.

The oil and gas sector has played a crucial role in ensuring energy security for Egypt. Domestic production of oil and gas has reduced the country's reliance on imported energy sources, providing a stable and affordable supply of energy for households, industries, and transportation. This energy security has been essential for Egypt's economic growth and has also provided a buffer against global energy price fluctuations.

The oil and gas industry has fostered technological advancements and knowledge transfer in Egypt. As international oil companies operate in the country, they bring in advanced technologies, expertise, and best practices, which have helped to modernize Egypt's energy sector. This transfer of knowledge has also led to the development of human capital, as Egyptians are trained and employed in various technical and managerial roles within the industry.

The oil and gas sector has had a profound impact on Egypt's socio-economic development. By providing revenue, creating jobs, developing infrastructure, ensuring energy security, and fostering technological advancements, this industry has played a significant role in shaping Egypt's growth and prosperity. As the country continues to invest in and develop its oil and gas resources, it can expect to reap the benefits of a stable, diversified, and thriving economy that benefits all Egyptians.

In the oil and gas mining sector, the specific areas of concern include the destruction and degradation of critical marine flora & fauna; seismic noise that affects marine mammals; disturbance of underwater heritage sites; habitat loss and degradation; loss of breeding and spawning habitats; disruption of food chains and food webs; potential of oil spills; degradation of water quality (suspended sediments); gas flares; contamination and bioaccumulation of toxic/hazardous material; disruption of fishing and recreation (snorkeling, diving, sport fishing) activities; disruption of navigation routes; competition for maritime space; inequitable benefit sharing likely to drive social unrest, grievances, and agitations; outsourcing (foreign) technical/professional jobs; outsourcing of oil and gas exploration, and maritime

disputes among others.

**Table, (8). Key issues, challenges, priority actions, and institutional arrangements in the Oil and gas mining Sector.**

Key issues in oil and gas/ mining	Challenges	Priority actions	Institutional arrangement
Marine Pollution	<ul style="list-style-type: none"> <li>-Loss of biodiversity.</li> <li>-Destruction of sensitive habitats (seagrasses, corals, wetlands, mangrove habitat).</li> <li>-Environmental degradation.</li> <li>-Destruction of Coral reef areas (bleaching, black and white diseases).</li> <li>-Low water quality.</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthen the assimilative capacity.</li> <li>- Developing a database to provide information regarding previous incidents, responses, and impacts; exploring possibilities to promote common simulation models for oil spill behavior,</li> <li>-Developing guidelines for the use of dispersants,</li> <li>• Assessing hazardous and noxious substance spills and other toxic substances and the related responses and equipment required,</li> <li>• Stimulating innovation of oil pollution response equipment with the aim of improved performance in heavy weather conditions.</li> </ul> <p>Ocean governance and management. Public awareness</p>	EEAA Ministry of Petroleum and Mining
Marine activities <b>1. Drilling platform</b> <b>2. Transportation of oil</b>	<ul style="list-style-type: none"> <li>-Pollution zone around drilling</li> <li>-Noise pollution during implementation</li> <li>-Effect on sea bed biodiversity</li> <li>-Seismic effects.</li> <li>-Petroleum transportation</li> <li>-Ballast water</li> <li>-Oil spills</li> <li>-Oil pipelines</li> <li>-Refining stations of oil (water and air pollution)</li> </ul>	<ul style="list-style-type: none"> <li>- EIA studies and inspection.</li> <li>- Applying EEAA guidelines.</li> <li>- New technologies for offshore activities.</li> <li>- Creation of coastal zonation (MSP).</li> <li>- Coastal monitoring and surveillance.</li> <li>- Strengthen the regulations and laws</li> </ul> <p>Regular using Earth Observation (E.O.) / satellites). Seismic mitigation action plan. Marine installation management</p>	EEAA Ministry of Petroleum and Mining
Environmental issues	<ul style="list-style-type: none"> <li>-Petroleum transportation</li> <li>-Ballast water</li> <li>-Oil spills</li> <li>-Oil pipelines</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring programs (advanced technologies)</li> <li>- Contingency plans and treatment</li> <li>- Assessment of equipment and tools</li> <li>- Modeling of oil spills.</li> </ul>	EEAA Ministry of Petroleum and Mining

	Refining stations of oil (water and air pollution)	- Sea bed conservation.	
climate change	<ul style="list-style-type: none"> <li>-Vast pollution margins on offshore areas facing drilling platform</li> <li>-Pollution (i.e. solid wastes/ sewage, etc.)</li> <li>-Intersection between tourism land transportation and oil land transportation</li> <li>-Impacts on biodiversity.</li> <li>-Impacts of other sectors (fishery, tourism, harbors, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- introducing regulations and incentives to protect biodiversity.</li> <li>- Marine Spatial Planning (MSP).</li> <li>- Monitoring air and water pollution.</li> <li>- Reduction of greenhouse gas emissions.</li> </ul>	ECAA Ministry of Petroleum and Mining
Talent Shortage	-Not enough qualified personnel to fill critical positions. This is largely due to the aging population in the industry, with many experienced workers retiring or leaving the sector.	<ul style="list-style-type: none"> <li>- High training programs</li> <li>- Qualified persons in process especially youth.</li> <li>- Focus on Talent Acquisition and Retention.</li> </ul>	ECAA Ministry of Petroleum and Mining Research centers and universities
<b>Offshore logistics</b>	<ul style="list-style-type: none"> <li>-Vast pollution margins on offshore areas facing drilling platform</li> <li>-Pollution (i.e. solid wastes/ sewage, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Marine spatial planning (MSP)</li> <li>- Waste treatment management</li> <li>- EIA studies</li> <li>- Regular inspection re-evaluation</li> <li>- Donation for local communities &amp; job opportunities and environment restoration</li> </ul>	MOP ECAA MOT Research centers Ministry of Transportation

	<ul style="list-style-type: none"> <li>-Intersection between tourism land transportation and oil land transportation</li> <li>-Impacts on biodiversity.</li> <li>-Impacts of other sectors (fishery, tourism, harbors, etc.)</li> </ul>		
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### 7.8. Mineral Mining and Social-Economic Development in Egypt:

Mineral mining in Egypt dates back to ancient times, with substantial mineral resources including 48 million tons of tantalite, 50 million tons of coal, and an estimated 6.7 million ounces of gold in the Eastern Desert. The total real value of minerals mined was about E£102 million (US\$18.7 million) in 1986, up from E£60 million (US\$11 million) in 1981.

Mineral mining has been a crucial component of Egypt's socio-economic development, contributing to the nation's growth and prosperity. With a variety of mineral resources, including gold, copper, zinc, and iron, Egypt has been able to capitalize on these assets to drive its economy forward and improve the lives of its citizens. The mineral mining sector has had various positive impacts on Egypt's development, including job creation, revenue generation, infrastructure development, and technological advancements.

The mineral mining industry has been a significant job creator in Egypt. From exploration and extraction to processing and refining, numerous professions are required to maintain the industry's operations. This has led to a reduction in unemployment rates and an improvement in the overall standard of living for Egyptians. Moreover, the growth of this sector has encouraged the development of new businesses, such as logistics, engineering, and construction companies, which further stimulates the economy.

The revenue generated from mineral mining has been instrumental in financing various development projects and improving the country's overall economic stability. The sale of minerals on both domestic and international markets has provided substantial foreign currency, Egypt recorded \$550 million in profits from the Sukari Gold Mine located in the Eastern Desert over the past decade. The government has introduced new regulations to attract global investments and shift towards more investor-friendly terms and conditions. The country is hosting events like the 'Egypt Mining Forum' to promote investment opportunities in the sector. which has been used to invest in infrastructure, education, healthcare, and other essential services that benefit the entire population.

The mineral mining industry has contributed to Egypt's infrastructure development. The revenue generated from the sector has been used to fund the construction of roads, railways, ports, and other essential facilities that support the transportation of minerals, as well as other goods and services. This improved infrastructure has facilitated the growth of other industries, leading to a more diversified and robust economy.

The mineral mining sector has fostered technological advancements and knowledge transfer in Egypt. As international mining companies operate in the country, they bring in advanced technologies, expertise, and best practices, which have helped to modernize Egypt's mining sector. This transfer of knowledge has also led to the development of human capital, as Egyptians are trained and employed in various

technical and managerial roles within the industry.

Mineral mining has played a crucial role in Egypt's industrialization process. The extraction and processing of minerals have led to the development of downstream industries, such as manufacturing and construction, which utilize the extracted minerals as raw materials. This has further diversified Egypt's economy and created additional job opportunities for its population.

The mineral mining sector has had a significant impact on Egypt's socio-economic development. By providing job opportunities, generating revenue, developing infrastructure, fostering technological advancements, and promoting industrialization, this industry has played a vital role in shaping Egypt's growth and prosperity. As the country continues to invest in and develop its mineral resources, it can expect to reap the benefits of a stable, diversified, and thriving economy that benefits all Egyptians.

There are several key issues, spanning illegal mining, over-exploitation, compensation, environmental, socio-Economic, artisanal mining, technology, mining from seawater (salt, etc.), offshore exploration and mining, information/data unavailability, natural disasters, as well as cultural and, health and safety concerns. Specifically, the key issues

highlighted include low level of education and awareness/sensitization; poor implementation of land owners compensation and resettlement; poor revenue sharing between national government/counties/community; poor remuneration of workers; biodiversity loss; physical

land alteration and poor rehabilitation of degraded lands; poor management of erosion, storm-water and sedimentation; pollution from dust emissions, poor / lack of mine waste

management; poor mine design; lack of mine closure and rehabilitation; lack of access to financing, markets, and technology for small-scale miners; inadequate information on the effect on the marine ecosystem; the intrusion of seawater into groundwater; environmental and biodiversity disruption; and conflicts between community heritage sites and mining activities among others.

**Table, (9). Key issues, challenges, priority actions, and institutional arrangements in the mineral mining Sector.**

<b>Key issues in mining</b>	<b>Challenges</b>	<b>Priority actions</b>	<b>Institutional arrangement</b>
Environmental issues	Habitat Destruction. Soil and Water Contamination. Disruption of Ecosystem Functioning Fragmentation of Habitats. Introduction of Invasive Species	Environmental Impact Assessments (EIAs). Sustainable Mining Practices. Biodiversity Conservation Plans. Stakeholder Engagement and Collaboration. Responsible Supply Chain Management. Technology and Innovation. Mine Site Rehabilitation	Ministry of Petroleum and Mineral Resources. Egyptian Mineral Resources Authority (EMRA). General Authority for Mineral Resources (GAMR). Egyptian Geological Survey and Mineral Resources Authority (EGSMA). Egyptian Environmental Affairs Agency (EEAA). Egyptian Mineral Resources Development Company (EMRA).
Climate change	Contribute to greenhouse gas emissions. Significant threats to biodiversity, including altered temperature and precipitation patterns. habitat loss. Increased vulnerability to natural disasters	- EIA studies and inspection. - Applying EEAA guidelines. - Strengthen the regulations and laws	Ministry of Petroleum and Mineral Resources. Egyptian Mineral Resources Authority (EMRA). General Authority for Mineral Resources (GAMR). Egyptian Geological Survey and Mineral Resources Authority (EGSMA). Egyptian Environmental Affairs Agency (EEAA). Egyptian Mineral Resources Development Company (EMRA).
<b>Legal</b>	- Illegal mining. - Land owner compensation. - Revenue sharing between different	- Compliance and Enforcement. - Research and Knowledge Sharing	Ministry of Justice. Ministry of Interior. Egyptian Environmental Affairs Agency (EEAA).



	parties involved.		
<b>Overexploitation</b>	<ul style="list-style-type: none"> <li>- Mineral reduction.</li> <li>- Uneven distribution of income revenue.</li> </ul>	<ul style="list-style-type: none"> <li>- Long-Term Planning</li> </ul>	Ministry of Petroleum and Mineral Resources. Egyptian Mineral Resources Authority (EMRA). General Authority for Mineral Resources (GAMR). Egyptian Geological Survey and Mineral Resources Authority (EGSMA). Egyptian Environmental Affairs Agency (EEAA). Egyptian Mineral Resources Development Company (EMRA).

## 7.9. Constraints to sustainable CMT, OGM, and mineral mining activities for the conservation of aquatic biodiversity and Environment:

### A. Constraints for Coastal marine tourism:

The conservation of aquatic biodiversity and the environment faces several constraints in the context of sustainable coastal marine tourism. These constraints arise from various factors, including economic considerations, inadequate regulations, and limited awareness and capacity for conservation.

One of the primary constraints is the economic pressure to maximize profits from tourism activities. In some cases, the focus on short-term financial gains can lead to the prioritization of tourism development over conservation efforts. This can result in the destruction and degradation of coastal habitats, such as the clearing of mangroves or the construction of infrastructure in sensitive areas, the breaking of coral reefs due to diving activities, and boats grounding and anchoring.

The lack of comprehensive and enforceable regulations also poses challenges for sustainable coastal marine tourism. Inadequate policies and weak governance frameworks can result in uncontrolled development, unsustainable fishing

practices, pollution, and the degradation of marine ecosystems. Without proper regulations and enforcement mechanisms, it becomes difficult to ensure that tourism activities align with conservation goals and minimize their impact on aquatic biodiversity and the environment.

Limited awareness and capacity for conservation among stakeholders, including tourists, local communities, and even some tourism operators, present another constraint. Without a clear understanding of the importance of biodiversity and environmental conservation, there is a risk of unsustainable practices and a lack of support for conservation initiatives. Education and awareness programs are crucial to promote responsible tourism behaviors and enhance the appreciation of the value of marine ecosystems.

Inadequate infrastructure and limited resources for monitoring and management can hinder effective conservation efforts. Insufficient funding and technical capacity may impede the implementation of conservation measures, including the establishment and management of protected areas, monitoring of biodiversity, and enforcement of regulations.

Economic pressures and the desire for short-term profits often conflict with conservation objectives. Development projects may prioritize tourism infrastructure over the protection of critical habitats, such as mangroves seagrass beds, and coral reefs. This imbalance can lead to habitat loss, fragmentation, and the displacement of

species, threatening the overall health and resilience of coastal ecosystems.

## **B. Constraints for oil and gas:**

**O**ne of the primary constraints is the risk of oil spills and leaks during exploration, extraction, and transportation processes. These incidents can have catastrophic consequences for marine ecosystems, leading to the contamination of water bodies, the death of marine organisms, and long-term damage to habitats. The challenge lies in implementing robust safety measures, strict regulations, and effective monitoring systems to prevent and respond to oil spills effectively.

Another constraint is the disturbance and destruction of critical habitats during the construction of infrastructure, such as offshore drilling platforms and pipelines. These activities can result in the loss of important breeding and feeding grounds for aquatic species, impacting their populations and disrupting the overall ecological balance. Mitigating this constraint involves comprehensive environmental impact assessments, the adoption of best practices to minimize habitat disturbance, and the restoration of affected areas.

The extraction and burning of fossil fuels also contribute to greenhouse gas emissions and climate change, which pose significant challenges to aquatic biodiversity and the environment. Rising sea temperatures, ocean acidification, and sea-level rise can have detrimental effects on marine ecosystems, including coral reefs, mangroves, and coastal wetlands. The constraint lies in transitioning to cleaner and renewable energy sources to reduce dependence on fossil fuels and mitigate the impacts of climate change on aquatic biodiversity.

Additionally, the water-intensive nature of oil and gas extraction processes poses a challenge to water resources. High volumes of water are required for drilling and hydraulic fracturing, which can strain freshwater supplies and impact aquatic habitats and ecosystems. The constraint here is to implement efficient water management practices, including recycling and minimizing freshwater usage, to reduce the strain on water resources and protect aquatic biodiversity.

**Underwater Noise:** Oil and gas exploration and extraction activities often generate significant underwater noise, which can be detrimental to marine life. Marine mammals, such as whales and dolphins, rely heavily on sound for communication, navigation, and foraging. Excessive noise from seismic surveys and drilling operations can disrupt their behavior, leading to stress, displacement, and even strandings. Minimizing underwater noise through the use of quieter technologies and implementing buffer zones can help mitigate this constraint.

**Chemical Pollution:** The use of chemicals in oil and gas operations, such as drilling fluids and produced water discharge, can result in chemical pollution of water bodies. These chemicals can be toxic to aquatic organisms and disrupt the balance of marine ecosystems. Proper containment and treatment of wastewater, as well as the use of less toxic alternatives, are essential for minimizing chemical pollution and protecting aquatic biodiversity.

**Habitat Fragmentation:** The construction of pipelines, access roads, and other infrastructure associated with oil and gas operations can lead to habitat fragmentation, particularly in coastal and wetland areas. Fragmentation can impede the movement of aquatic species, disrupt migration patterns, and reduce genetic diversity. Implementing measures such as wildlife corridors and habitat restoration can help mitigate the negative effects of habitat fragmentation.

**Climate Change Impacts:** The extraction and burning of fossil fuels contribute to greenhouse gas emissions, which contribute to climate change. Rising temperatures, ocean acidification, and sea-level rise have severe consequences for marine ecosystems. Coral bleaching events, the loss of sea ice habitats, and altered ocean currents are some of the impacts that can negatively affect aquatic biodiversity. Transitioning to cleaner and renewable energy sources is crucial for mitigating climate change and protecting marine environments.

**Cumulative Impacts:** The cumulative impacts of multiple oil and gas projects in a region can exacerbate environmental challenges. The combined effects of habitat destruction, pollution, and climate change can have compounding negative impacts on aquatic biodiversity.

Assessing and managing the cumulative impacts of oil and gas activities through comprehensive environmental planning and coordination among stakeholders is necessary to ensure sustainable practices.

**Limited Data and Scientific Knowledge:** There is often a lack of comprehensive data and scientific knowledge about the potential impacts of oil and gas activities on aquatic biodiversity. This can hinder effective decision-making and the implementation of appropriate mitigation measures. Enhancing monitoring programs, supporting scientific research, and promoting knowledge sharing are essential for better understanding and addressing the constraints to sustainable oil and gas operations.

### **C. Constraints for mineral mining:**

One of the primary constraints is the alteration and destruction of aquatic habitats during mining operations. Excavation, infrastructure development, and sedimentation can lead to the loss of critical habitats, such as rivers, streams, and wetlands. This habitat destruction disrupts the natural balance and can negatively impact aquatic species.

Water pollution is another significant constraint of sustainable mineral mining. Mining activities often require large quantities of water for extraction and processing, leading to the potential contamination of water bodies. Effluents from mining operations can contain heavy metals, toxic chemicals, and sediment, which can harm aquatic life and degrade water quality. Proper waste management systems, including the treatment and containment of mining effluents, are essential for mitigating water pollution and preserving aquatic biodiversity.

Mining activities can introduce contaminants such as mercury, cyanide, and sulfuric acid into ecosystems. These substances can have severe impacts on aquatic organisms, leading to ecosystem disruptions and long-term ecological consequences. Implementing strict regulations, robust monitoring systems, and effective remediation measures can help minimize the release of harmful substances and mitigate their impacts.

Furthermore, the extraction of minerals often requires the clearing of land and vegetation, leading to deforestation and habitat fragmentation. This habitat loss can further contribute to the degradation of aquatic ecosystems, as it disrupts connectivity and reduces the availability of resources for aquatic species.

**Acid Mine Drainage:** Certain mineral deposits, such as sulfide ores, can produce acid mine drainage (AMD) when exposed to air and water. AMD is highly acidic and can contain toxic metals, polluting nearby water bodies. It poses a significant threat to aquatic ecosystems, as it can lower pH levels, and harm fish, and other aquatic organisms. Proper management and treatment of AMD through techniques like neutralization and wetland remediation are crucial for minimizing its impact.

### **7.10. Policy intervention, strengthening of legal frameworks:**

**B**ecause of the current status of coastal and marine tourism in Egypt, and the oil and gas, and mineral mining sectors, there is a need for policy interventions while strengthening existing legal, regulatory, and institutional frameworks to ensure sustainability while supporting the conservation of aquatic biodiversity and environment in Egypt. The key policy reforms, strategies, and action steps together with the required institutional arrangements are highlighted in the tables below for Coastal and Marine Tourism, Oil and Gas, and Mineral Mining sectors.

**Table (10). Policy interventions, strategies, action steps, and regulatory guidelines formulation for aquatic biodiversity and environmental sustainability for CMT.**

Priority actions / Policy Area	Baseline / Context	Policy objective	Expected Outcomes	Strategies and Actions	Existing Policy/ documents	Existing Legislative (regulations) frameworks	Proposed revisions / Actions if any
Creation of coastal zonation	Interference of different activities that negatively affect marine biodiversity and increase risks	establish marine spatial planning (MSP) and intersectoral policy between different economic activities	<ol style="list-style-type: none"> <li>1. Identification of alternative spatial management measures;</li> <li>2. Identification of criteria used to evaluate the management measures;</li> <li>3. Evaluation of alternative management measures; and</li> <li>4. A comprehensive, integrated management Plan.</li> <li>5. Enhance environmental sustainability and reduce risks.</li> </ol>	<ol style="list-style-type: none"> <li>1. “trend scenario” or “forecast” that illustrates how the marine region will look if present trends continue;</li> <li>2. Alternative spatial scenarios that illustrate how the marine region will look given different goals and objectives;</li> <li>3. Selection of a “preferred scenario” or “vision”-the basis for identifying and selecting management measures.</li> </ol> <p>The actions include:</p> <ol style="list-style-type: none"> <li>1. Identify the areas and the activity included.</li> <li>2. Determined the action plan which includes:</li> <li>3. Maximizing natural conservation.</li> <li>4. Maximize economic development.</li> </ol>	National Environment Policy (1994) Protected areas strategy (1983)	Environmental law no 4 year 1994 and no. 9 year, 2009 Law No. 102 of 1983 (on Natural Protected Areas).	Revision of intersectoral policy. Revision of the policy of each sector involved.

Coastal monitoring and surveillance	Inadequate monitoring and surveillance	Increase monitoring and surveillance	Protection of marine areas and enhance biodiversity	<p>Regular using Earth Observation (E.O.) / satellites.  EIA studies &amp; regular inspection &amp; re-evaluation.  Strengthen the surveillance and management.  surveillance of the rational disposal of treated water.  Regular monitoring of water quality &amp; ML and takes proper actions.  Strong surveillance at the berths.  Enforcement of compliance mechanism for plastic and litter dumping.  Strengthen surveillance on Nile boats.  Strong surveillance at the Nile berths  Control points on berths.  Cancel and forbid illegal berths.  Traffic regulation through the Nile's stream.  Berthing regulation in different areas.</p>	<p>National Environment Policy (1994)  Blue economy roadmap policy.  Cop2 for climate change  First blue economy conference at Suez university (2019)  Adoption of Stockholm convention (2002).  Adoption London convention (2006).  Climate Change Strategy 2050  Biodiversity strategy and action plan  Tourism strategy and best practices manual for tourism activities  Green tar certificate for environmentally friendly resorts</p>	<p>Environmental law no 4 year 1994 and no. 9 year, 2009  Law No. 102 of 1983 (on Natural Protected Areas).  Law No. 12 of 1982 on Irrigation and Drainage, and its amendments  Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks, waste management law (Law No. 202 of 2020)</p>	<p>Revision of tourism policy.  Revision Law no.93 of 1962 on Discharge of Wastewater in Sewerage Networks, Revision of waste management law (Law No. 202 of 2020)</p>
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				Enforcement of compliance mechanism for plastic and litter dumping.	Green Globe certificate for green resorts Green fins for marine activities		
Define special open zones between resorts for public access.	Inadequate public access	Increase public access	Public rights to reach the sea	Define special open zones between resorts for public access	National Environment Policy (1994) The policy of public rights	Environmental law no 4 year 1994 and no. 9 year,2009 Law No. 102 of 1983 (on Natural Protected Areas). Environmental Law no. 4 year 1994 to determine the setback area by 200 m.	Open more public access
Implementation of a building capacity load	Congestion of tourist resorts on Egyptian coasts	adopt the implementation plan and the capacity-building action plan.	enable competent authorities, to effectively and efficiently fulfill their obligations. Respond to and prevent unintentional and illegal building movements and implement the handling, and identification requirements.	Establishment of a national budget allocation mechanism for biosafety; capacity-building, resource mobilization, cooperation, and public awareness, education, and participation. carry out scientifically sound risk assessments, and manage and control	Tourism Development Authority policy for building capacity not exceed 20% of the total resort area	The unified building law no. 119 year 2008 New Building Law, 2023. Law of Touristic Compounds and Hotels no. 8 the year 2022.	Reviewing the numbers and areas of tourism compounds on different Egyptian coasts. Consider the building capacity load before

			Strengthening capacities for taking into account socioeconomic considerations and access to resource materials on socioeconomic considerations.	<p>identified risks to prevent adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health.</p> <p>Promote and facilitate public awareness, education, and participation</p> <p>Enhance cooperation and coordination on biosafety issues at the national level.</p> <p>identifying key areas for capacity-building related to the different goals of the Implementation Plan.</p> <p>Fostering a coherent and coordinated approach to capacity-building.</p> <p>Improved the availability and exchange of relevant information</p> <p>Develop, update, and maintain interactive support tools</p>			issuing new tourism compound licenses.
Strengthen the regulations and laws	Inadequate implementation of laws and regulations	Adopt the strength of laws and regulations	Better management of environmental sustainability.	Increase monitoring and surveillance by the Ministry of Environment and	National Environment Policy (1994)	Environmental law no 4 year 1994 and no. 9 year,2009	Revised some laws as

			<p>Enhancing biodiversity. Control the activities in coastal and marine areas.</p>	<p>Tourism Development Authorities. Implement the penalties for not applying to the laws and regulations. Public awareness about the regulations and needs. Periodic meetings with the investors and stakeholders to solve the problems and agree on the implementation of regulations and laws. Discussing the obstacles for stakeholders in applying the laws and helping them with mysterious issues. Giving incentives for the stakeholders that are applying the regulations. Provide technical and practical assistance to governmental agencies.</p>	<p>Blue economy roadmap policy. Cop2 for climate change First blue economy conference at Suez university(2019) Adoption of Stockholm convention (2002). Adoption London convention (2006). Climate Change Strategy 2050 Biodiversity strategy and action plan Tourism strategy and best practices manual for tourism activities Green tar certificate for environmentally friendly resorts Green Globe certificate for green resorts Green fins for marine activities</p>	<p>Law No. 102 of 1983 (on Natural Protected Areas). Law No. 12 of 1982 on Irrigation and Drainage, and its amendments  Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks, waste management law (Law No. 202 of 2020)</p>	<p>environmental laws. Contact with stakeholders for the better application and implementation of laws and regulations.</p>
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Regular using Earth Observation (E.O.) / satellites)	Inadequate use of scientific and technical programs	Introduction monitoring scientific programs for biodiversity conservation	Better monitoring and evaluation of biodiversity. Providing enough and reliable data for the coastal and marine areas. Early warning system for biodiversity threatened.	Better management of biodiversity. Set a group of programs to be applied in monitoring biodiversity. Using satellite image programs for monitoring the shoreline, coastal, and marine areas for illegal construction and observations. Periodically surveillance of the coastal and marine areas by using high technological applications.	National Environment Policy (1994) Blue economy roadmap policy. Scientific research policy. National Remote Sensing policy	National Authority of Remote Sensing no. 61 year, 1963 Presidential decree no.489 year, 1991	Revised satellite and GIS programs and choose the suitable application for each economic activity and environmental conservation policy.
EIA studies & regular inspection& re-evaluation	The problem in studies revisions. Some of the consultants are unqualified. Unsuitability of some studies required by governmental agencies to the concerned activity.	Strengthen Environmental studies. Set proper studies needed for each activity. Reviewed the qualifications of the consultants.	Proper analysis of the procedure of environmental conservation. Acquire reliable information about the project in progress and its effect on environmental management. Improving biodiversity and coastal and environmental sustainability.	EIA studies were introduced for all the projects before construction. Revised the studies set the important issues and set terms of obligation for the projects. Monitor the outcome results in the construction and operation of the projects. - Evaluate the effect of the project's activities	Environment Policy (1994) Blue economy roadmap policy. Scientific research policy. National Remote Sensing policy	Environmental law no 4 year 1994 and no. 9 year,2009 Law No. 102 of 1983 (on Natural Protected Areas). Law No. 12 of 1982 on Irrigation and Drainage, and its amendments	Reassess the implementation of the existing studies and procedures. Reevaluation of the consultants and exclude the incompetent ones.

			Providing database information about the biodiversity and coastal and marine areas.	on environmental sustainability.		Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks, waste management law (Law No. 202 of 2020)	
Ocean governance and management	inadequate ocean governance	Strengthen ocean governance	Better management of marine areas and biodiversity	Implementation of a building capacity load. Strengthen the regulations and laws. Strengthen the assimilative capacity. Provide a Solid waste management system. Initiate proper sewage treatment plant. Monitoring the water effluent from the STP to be applied with the law's limits. Confirm and Proper disposal of brine water resulted from the desalination plants. Development of Ocean governance policy. Development of MSP. Comply with the national laws. Cruise boat license.	National Environment Policy (1994)	Law of Ministry of Water Resources and Irrigation no. 147 year 2021 and its executive list. Environmental Law no. 4 year 1994. Environmental Law no. 9 the year 2009 Law of initiating tourism development authority and its obligation and duties. Waste management law no.202 year 2020	Develop an integrated maritime policy

						International and national agreements Law of protected areas no.102 year 1983	
Public awareness	Inadequate information, public meetings, and information flow	To increase public awareness	Enhanced awareness	Raising awareness of fishers & local communities Awareness signs on the beach Control fisher behaviors Technical aids. Stewardship and assistance. Public meetings, workshops	National Environment Policy (1994) Blue economy roadmap policy. Cop2 for climate change First blue economy conference at Suez university (2019)	Law of Ministry of Water Resources and Irrigation no. 147 year 2021 and its executive list. Environmental Law no. 4 year 1994. Environmental Law no. 9 the year 2009 Law of initiating tourism development authority and its obligation and duties. Waste management law no.202 year 2020 Oil and gas production wells	Raising awareness

						Drill exploration wells International and national agreements Law of protected areas no.102 year 1983	
Diving operation management	Poor diving operation management	To strengthen diving management	Better ecosystem Coral area flourishing Higher biodiversity	Mutual working of diving sites to allow them to replenish. Close sites for a certain time if necessary. Limit the number of boats in each diving site. Proper training for divers (licenses by MOT & ETF) Regulating the number of divers according to zone sensitivity. Warning & information signs Regular inspection Rehabilitation of coral areas and regeneration of coral communities.	National Environment Policy (1994) Blue economy roadmap policy. Cop2 for climate change First blue economy conference at Suez university(2019) Adoption of Stockholm convention (2002). Adoption London convention (2006). Climate Change Strategy 2050 Biodiversity strategy and action plan	Law of Ministry of Water Resources and Irrigation no. 147 year 2021 and its executive list. Environmental Law no. 4 year 1994. Environmental Law no. 9 the year 2009 Law of initiating tourism development authority and its obligation and duties. Waste management law no.202 year 2020	Develop management policy

					Tourism strategy and best practices manual for tourism activities Green tar certificate for environmentally friendly resorts Green Globe certificate for green resorts Green fins for marine activities	Oil and gas production wells Drill exploration wells International and national agreements Law of protected areas no.102 year 1983	
Marine installation management	Lack of harmony between different marine installation	Increase management of marine installation and have better performance.	Better performance. Biodiversity protection	Determined the area and dimensions of marine installations according to the sensitivity of each area. The deck of the walkways or marinas must not be concrete and must have spaces between wooden plates to eliminate the shadow effect, with no permission for solid closed installation in the sea especially concrete marinas. Forcing the installation of receptor facilities at boats.	National Environment Policy (1994) Blue economy roadmap policy. COP2 for climate change First blue economy conference at Suez university(2019) Adoption of Stockholm convention (2002). Adoption of London convention (2006). Climate Change Strategy 2050	Environmental law no 4 year 1994 and no. 9 year,2009 Law No. 102 of 1983 (on Natural Protected Areas). Law No. 12 of 1982 on Irrigation and Drainage, and its amendments  Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks,	Develop management policy

				Limiting/ prevent (adopt) of new licenses.	Biodiversity strategy and action plan Tourism strategy and best practices manual for tourism activities Green tar certificate for environmentally friendly resorts Green Globe certificate for green resorts Green fins for marine activities	waste management law (Law No. 202 of 2020)	
Maintain touristic market	The fluctuation in the tourist market due to unexpected accidents	Maintain the tourist flow to Egypt	The fixed flow of tourists increases national and individual income.	Variations in tourism markets Abroad publicity. Participating in abroad markets. Advertisement in global tourism markets. Diversification in tourism services. Fundraise and social security associations. Obligatory and well-confined licensing system. Penalties and non-compliance fees on violating boats.	National Environment Policy (1994) Blue economy roadmap policy. Cop2 for climate change First blue economy conference at Suez university(2019) Adoption of Stockholm convention (2002). Adoption London	Environmental law no 4 year 1994 and no. 9 year,2009 Law No. 102 of 1983 (on Natural Protected Areas). Law No. 12 of 1982 on Irrigation and Drainage, and its amendments  Law No. 93 of 1962 on Discharge of	An economic plan to increase touristic income

				Boats must be equipped with sewage collection facilities.	convention (2006). Climate Change Strategy 2050 Biodiversity strategy and action plan Tourism strategy and best practices manual for tourism activities Green tar certificate for environmentally friendly resorts Green Globe certificate for green resorts Green fins for marine activities	Wastewater in Sewerage Networks, waste management law (Law No. 202 of 2020	
River Nile protection	River Nile's unsafe practices Polluting the Nile. Water quality reduction. Solid wastes in Nile berths. Liquid wastes from cruise boats Cruise boat congestions. Illegal uncontrolled berths	Protecting of River Nile. Using Safe practice and environmental sustainability Achieve Good water quality.	Good practice Nile cruises. Improve Nile Water Quality. Enhance biodiversity and sustainability. Protect the monuments and temples on the Nile banks.	Strengthen surveillance on Nile boats. Obligatory and well-confined licensing system. Penalties and non-compliance fees on violating boats. Boats must be equipped with sewage collection facilities. Strong surveillance at the berths.	National Environment Policy (1994)	Law No. 12 of 1982 on Irrigation and Drainage, and its amendments  Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks, waste management	Strengthen regulations and surveillance at Nile berths. Revised the laws concerned the activities and penalties at River Nile.

	<p>Heavy traffic inside the Nile and cruise boat congestion on the berths</p> <p>Land-based resource pollution from discharges from small villages at the Nile banks.</p> <p>Improper use of the Nile stream e.g. animal bathing in the Nile.</p> <p>Interference between the fishing boats and the cruise boats.</p>			<p>Provide a Solid waste management system.</p> <p>Control points on berths.</p> <p>Cancel and forbid illegal berths.</p> <p>Public awareness.</p> <p>Public meetings.</p> <p>Traffic regulation through the Nile's stream.</p> <p>Berthing regulation in different areas.</p>		<p>law (Law No. 202 of 2020</p>	
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**Table (11) Policy interventions, strategies, action steps, and regulatory guidelines formulation for aquatic biodiversity and environmental sustainability for Oil & Gas/mining.**

Priority actions / Policy Area	Baseline / Context	Policy objective	Expected Outcomes	Strategies and Actions	Existing Policy/ documents	Existing Legislative (regulations) frameworks	Proposed revisions / Actions if any
Creation of coastal zonation (MSP)	Interference of different activities that negatively affect marine biodiversity and increase risks	- Establish marine spatial planning (MSP) and intersectoral policy between different economic activities	<ol style="list-style-type: none"> <li>1. Identification of alternative spatial management measures;</li> <li>2. Identification of criteria used to evaluate the management measures;</li> <li>3. Evaluation of alternative management measures; and</li> <li>4. A comprehensive, integrated management Plan.</li> <li>5. Enhance environmental sustainability and reduce risks.</li> </ol>	<ol style="list-style-type: none"> <li>1. Forecast how the marine region will look if present trends continue;</li> <li>2. Alternative spatial scenarios that illustrate how the marine region will look given different goals and objectives;</li> <li>3. Selection of a “preferred scenario” or “vision”--the basis for identifying and selecting management measures.</li> </ol> <p>The action includes:</p> <ol style="list-style-type: none"> <li>1. Identify the areas and the activity included.</li> <li>2. Determined the action plan which includes: Maximizing natural conservation.</li> </ol>	National Environment Policy (1994) Protected areas strategy (1983) Global Biodiversity Framework (2020) Cartagena Protocol on Biodiversity (2003) Convention of biological diversity (1992).	Environmental law no 4 year 1994 and no. 9 year,2009 Law No. 102 of 1983 (on Natural Protected Areas). General Petroleum Authority laws.Law no.20 year1976 Laws no. 47& 48 year1978	Revision of Petroleum Policy, 1976 Rearrangement spatial planning to identify petroleum, tourism, and Fishery zones.

				3. Maximize economic development.			
Monitoring and surveillance - Develop a database to provide information regarding previous incidents, responses, and impacts; - Exploring possibilities to promote common simulation models for oil spill behavior, - Developing guidelines for the use of dispersants,	Inadequate monitoring and surveillance	Strengthen monitoring and surveillance. Provide an information system for previous incidents, responses, and impacts.	Protection of marine areas and enhance biodiversity. Database for oil accidents and management. Rational use of dispersant.	- Develop a database to provide information regarding previous incidents, responses, and impacts; -Exploring possibilities to promote common simulation models for oil spill behavior, - Use water base dispersants only,	National Environment Policy (1994) Protected areas strategy (1983) Global Biodiversity Framework (2020) Cartagena Protocol on Biodiversity (2003) Convention of biological diversity (1992).	Environmental law no 4 year 1994 and no. 9 year,2009 Law No. 102 of 1983 (on Natural Protected Areas). General Petroleum Authority laws.Law no.20 year1976 Laws no. 47& 48 year1978	Develop a monitoring system. Forbidden organic-based dispersants and strengthen the use of water-based dispersants.
Ocean governance and management	Inadequate ocean governance  High carbon content	Strengthen ocean governance  Reduce carbon emission	Better management of the marine areas and biodiversity.  Reduction of carbon emission.	- Strengthen the assimilative capacity. - Provide a Solid waste management system. - Increasing taxes for carbon emissions and introducing	National Environment Policy (1994) Blue economy roadmap policy. Cop2 for climate change Egyptian petroleum act	Environmental Law no. 4 year 1994. Environmental Law no. 9 the year 2009 Law of initiating tourism development authority and its	Develop an integrated maritime policy.

			<p>Marine Pollution Reduction.</p> <p>Air pollution reduction</p>	<p>more stringent standards for the extraction and transport of oil and gas.</p> <ul style="list-style-type: none"> <li>- Invest more in renewable energy sources.</li> <li>- reduce emissions and meet environmental targets.</li> <li>- Minimize Environmental Impact.</li> <li>- Use technologies such as carbon capture and storage (CCS) to reduce environmental impact.</li> </ul>		<p>obligation and duties.</p> <p>Waste management law no.202 year 2020</p> <p>Oil and gas production wells</p> <p>Drill exploration wells</p> <p>International and national agreements</p>	
Climate change	Increase global warming	Decrease global warming. Reduce sea level Rise	Reduction of greenhouse gas emission	<ul style="list-style-type: none"> <li>- introducing regulations and incentives to promote the adoption of low-carbon fuels.</li> <li>- Monitoring water temperature.</li> <li>- Monitoring current regimes.</li> </ul>	<p>National Environment Policy (1994)</p> <p>Blue economy roadmap policy.</p> <p>Cop2 for climate change</p> <p>Egyptian petroleum act</p>	<p>Environmental Law no. 4 year 1994.</p> <p>Environmental Law no. 9 the year 2009</p> <p>Law of initiating tourism development authority and its obligation and duties.</p> <p>Waste management law no.202 year 2020</p>	<p>Develop a road map policy to reduce emissions and effects on marine and coastal areas</p>

						Oil and gas production wells Drill exploration wells International and national agreements	
Public awareness of environmental Issues	Inadequate information , public meetings, and information flow	To increase public awareness	Enhanced environmental awareness.	Raising awareness of fishers & local communities Awareness signs on the beach Control fisher behaviors Technical aids. Stewardship and assistance. - Public meetings, workshops	National Environment Policy (1994) Blue economy roadmap policy. Cop2 for climate change First blue economy conference at Suez university (2019)	Law of Ministry of Water Resources and Irrigation no. 147 year 2021 and its executive list. Environmental Law no. 4 year 1994. Environmental Law no. 9 the year 2009 Law of initiating tourism development authority and its obligation and duties. Waste management law no.202 year 2020 Oil and gas production wells Drill exploration wells International and national agreements Law of protected areas no.102 year 1983	Raising awareness
Provide Talent staff	Not enough qualified personnel	To get enough	Provide qualified persons	- High training programs	National Environment Policy (1994)	Environmental Law no. 4 year 1994.	Well-organized training program

	to fill critical positions. This is largely due to the aging population in the industry, with many experienced workers retiring or leaving the sector.	qualified personnel		<ul style="list-style-type: none"> <li>- Qualified persons in process.</li> <li>- Focus on Talent Acquisition and Retention</li> </ul>	Blue economy roadmap policy. Cop2 for climate change Egyptian petroleum act	<p>Environmental Law no. 9 the year 2009</p> <p>Law of initiating tourism development authority and its obligation and duties.</p> <p>Waste management law no.202 year 2020</p> <p>Oil and gas production wells</p> <p>Drill exploration wells</p> <p>International and national agreements</p>	
Marine installation management	Lack of harmony between different marine installation	Increase management of marine installation and have better performance.	Better performance. Biodiversity protection. Reduction of seismic effect.	<p>Determined the area and dimensions of marine installations according to the sensitivity of each area.</p> <p>The oil well-drilled operation must be controlled.</p> <p>Establish preventive measures for marine pollution.</p> <p>Mitigate the effect of heavy machinery to reduce seismic effects.</p>	<p>National Environment Policy (1994)</p> <p>Blue economy roadmap policy. Cop2 for climate change</p> <p>First blue economy conference at Suez university(2019)</p> <p>Adoption of Stockholm convention (2002).</p> <p>Adoption London</p>	<p>Environmental law no 4 year 1994 and no. 9 year,2009</p> <p>Law No. 102 of 1983 (on Natural Protected Areas).</p> <p>Law No. 12 of 1982 on Irrigation and Drainage, and its amendments</p> <p>Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks, waste management law (Law No. 202 of 2020)</p>	Develop management policy

					<p>convention (2006).  Climate Change Strategy 2050  Biodiversity strategy and action plan  Tourism strategy and best practices manual for tourism activities  Green tar certificate for environmentally friendly resorts  Green Globe certificate for green resorts  Green fins for marine activities</p>		
Reduction and control of pollution zones and oil spills.	Inadequate controlling program for pollution contamination	To enhance controlling pollution programs	Enhanced controlling pollution programs	<ul style="list-style-type: none"> <li>- EIA studies and inspection.</li> <li>- Applying EEAA guidelines.</li> <li>- New technologies for offshore activities.</li> <li>- Anti-pollution centers.</li> <li>- Oil pollution-fighting equipment (floating pontoons, scrappers, equipped ships)</li> </ul>	<p>National Environment Policy (1994)  Blue economy roadmap policy.  Cop2 for climate change  Egyptian petroleum act</p>	<p>Environmental Law no. 4 year 1994.  Environmental Law no. 9 the year 2009  Law of initiating tourism development authority and its obligation and duties.  Waste management law no.202 year 2020  Oil and gas production wells</p>	Develop Contingency plan

						Drill exploration wells International and national agreements	
Develop MSP and buffer zone area	Reduction of offshore works on other sectors and activities	To prevent the negative effect of oil and gas/ mining operations on other activities	Control the pollution from offshore logistics and prevent it from affecting the other areas.	<ul style="list-style-type: none"> <li>- Develop Marine spatial planning (MSP)</li> <li>- Waste treatment management</li> <li>- EIA studies</li> <li>- Regular inspection re-evaluation</li> <li>- Donation for local communities &amp; job opportunities and environment restoration</li> </ul>	National Environment Policy (1994) Blue economy roadmap policy. Cop2 for climate change Egyptian petroleum act	Environmental Law no. 4 year 1994. Environmental Law no. 9 the year 2009 Law of initiating tourism development authority and its obligation and duties. Waste management law no.202 year 2020 Oil and gas production wells Drill exploration wells International and national agreements	Develop Marine spatial planning (MSP)
EIA studies & regular inspection& re-evaluation	The problem in studies revisions. Some of the consultants are unqualified .  Unsuitability of some	Strengthen Environmental studies. Set proper studies needed for each activity. Reviewed the qualifications of the consultants.	Proper analysis of the procedure of environmental conservation. Acquire reliable information about the project in progress and its effect on environmental management. Improving biodiversity and	EIA studies were introduced for all the projects before construction. Revised the studies set the important issues and set terms of obligation for the projects. Monitor the outcome results in the construction and	Environment Policy (1994) Blue economy roadmap policy. Scientific research policy. National Remote Sensing policy	Environmental law no 4 year 1994 and no. 9 year,2009 Law No. 102 of 1983 (on Natural Protected Areas). Law No. 12 of 1982 on Irrigation and Drainage, and its amendments  Law No. 93 of 1962 on Discharge of	Reassess the implementation of the existing studies and procedures. Reevaluation of the consultants and exclude the incompetent ones.

	studies required by governmental agencies to the concerned activity.		coastal and environmental sustainability. Providing database information about the biodiversity and coastal and marine areas.	operation of the projects. Evaluate the effect of the project's activities on environmental sustainability.		Wastewater in Sewerage Networks, waste management law (Law No. 202 of 2020)	
Regular using Earth Observation (E.O.) / satellites)	Inadequate use of scientific and technical programs	Introduction monitoring scientific programs for biodiversity conservation	Better monitoring and evaluation of biodiversity. Providing enough and reliable data for the coastal and marine areas. Early warning system for biodiversity threatened.	Better management of biodiversity. Set a group of programs to be applied in monitoring biodiversity. Using satellite image programs for monitoring the shoreline, coastal, and marine areas for illegal construction and observations. -Periodically surveillance of the coastal and marine areas by using high technological applications.	National Environment Policy (1994) Blue economy roadmap policy. Scientific research policy. National Remote Sensing policy	National Authority of Remote Sensing no. 61 year, 1963 Presidential decree no.489 year, 1991	Revised satellite and GIS programs and choose the suitable application for each economic activity and environmental conservation policy.
Sea bed conservation	Polluted sea bed.	Protect sea bed biodiversity.	Protecting sea bed fauna and biodiversity.	-Prevent oil leakage from offshore wells. -Existence and inspection of pollution control	Environment Policy (1994) Blue economy roadmap policy.	Environmental law no 4 year 1994 and no. 9 year,2009	Reassess the implementation of the existing studies



	<p>Environmental destruction</p> <p>Habitat destruction</p>	Reduce pollution at sea bed.		<p>equipment at each site (e.g. floating pontoons, skimmers ..etc.).</p> <p>-Use dispersion models for monitoring and expecting the oil passway for proper control.</p>	Scientific research policy.	<p>Law No. 102 of 1983 (on Natural Protected Areas).  Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks, waste management law (Law No. 202 of 2020).</p> <p>petroleum Authority laws.Law no.20 year1976  Laws no. 47&amp; 48 year1978.</p>	and procedures.
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**Table (12) Policy interventions, strategies, action steps, and regulatory guidelines formulation for aquatic biodiversity and environmental sustainability for mineral mining.**

Priority actions / Policy Area	Baseline / Context	Policy objective	Expected Outcomes	Strategies and Actions	Existing Policy/ documents	Existing Legislative (regulations) frameworks	Proposed revisions / Actions if any
EIA studies & regular inspection & re-evaluation	The problem in studies revisions. Some of the consultants are unqualified. Unsuitability of some studies required by governmental agencies to the concerned activity.	Ensuring sustainable and responsible mining practices. Minimize adverse environmental impacts. Comprehensive Assessment. Public Participation. Strict Regulatory Framework. Rehabilitation and Restoration. Technology and Innovation. Continuous Monitoring and Evaluation. Capacity Building and Training	Proper analysis of the procedure of environmental conservation. Acquire reliable information about the project in progress and its effect on environmental management. Improving biodiversity and coastal and environmental sustainability. Providing database information about the biodiversity and coastal and marine areas.	Conduct comprehensive EIAs before any mining activity begins. Assessments must evaluate potential impacts on biodiversity, ecosystems, and local communities. Consider alternative mining methods and locations to minimize harm.	Environment Policy (1994) Blue economy roadmap policy. Scientific research policy.	Environmental law no 4 year 1994 and no. 9 year, 2009 Law No. 102 of 1983 (on Natural Protected Areas). Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks,	Reassess the implementation of the existing studies and procedures. Reevaluation of the consultants and exclude the incompetent ones.
Sustainable Mining Practices.	Illegal mining (limestone).	Develop and implement a comprehensive framework that integrates	Minimizing the environmental footprint of mining operations, - -	Promote and enforce sustainable mining practices. Minimize environmental damage and	Environment Policy (1994) Blue economy roadmap policy. Scientific research policy.	Environmental law no 4 year 1994 and no. 9 year, 2009	Revised Minimize environmental damage and prioritize biodiversity

	<p>Lack of capacity to enforce. Inadequate awareness.</p> <p>Lack of Environmental Performance.</p> <p>Weak Social Responsibility.</p> <p>Weak Economic Sustainability.</p>	<p>environmental, social, and economic considerations into the decision-making process of mining operations.</p> <p>Strengthen and enforce regulatory frameworks to ensure that mining companies adhere to strict environmental and social standards.</p> <p>Encourage active involvement of local communities, stakeholders, and interested parties in the decision-making process.</p> <p>Enhance understanding of sustainable mining practices and responsible mining operations</p> <p>Adoption of advanced technologies and innovative practices to minimize the environmental footprint of mining operations</p>	<p>Ensuring the preservation of natural habitats, and maintaining ecological balance.</p> <p>- Reducing waste, emissions, and pollution, as well as implementing effective land reclamation strategies.</p> <p>-Ensuring the well-being of local communities.</p> <p>-Generating sustainable economic benefits for all stakeholders.</p> <p>-Optimizing the use of resources.</p> <p>-Ensuring the long-term viability of mining operations by adapting to market changes.:</p>	<p>prioritize biodiversity conservation.</p> <p>Develop and Implement Sustainable Mining Policies.</p> <p>Adopt Innovative Technologies.</p> <p>Enforce strict environmental and social standards for mining operations through robust regulatory frameworks.</p> <p>Regularly assess the environmental, social, and economic performance of mining operations and make necessary adjustments to improve sustainability.</p> <p>Optimize the use of resources.</p> <p>Support Research and Development.</p>		<p>Law No. 102 of 1983 (on Natural Protected Areas).</p> <p>Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks,</p>	<p>conservation policy.</p> <p>Revised the used technology and its suitability to achieve environmental sustainability.</p>
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		<ul style="list-style-type: none"> <li>- Foster partnerships between mining companies, government agencies, non-governmental organizations, and local communities to promote sustainable mining practices.</li> <li>- Monitoring and Evaluation Regularly assess the environmental, social, and economic performance of mining operations and make necessary adjustments to improve sustainability.</li> </ul>	Enhancing the understanding and expertise of all stakeholders involved in the mining process.				
Biodiversity conservation plan	<ul style="list-style-type: none"> <li>- Lack of ecological Assessment.</li> <li>- Inadequate species Inventory.</li> <li>- Insufficient habitat Mapping.</li> <li>- No landscape</li> </ul>	<ul style="list-style-type: none"> <li>- Implement proactive measures to prevent or minimize the negative impacts of mining on biodiversity and ecosystems.</li> <li>- Develop and enforce strategies for the restoration and rehabilitation of</li> </ul>	<ul style="list-style-type: none"> <li>- Minimize the negative effects of mining on ecosystems and species (ecological outcome).</li> <li>- Enhance community engagement and participation: in the biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>- Assessment of the ecosystems, habitats, and ecological processes present in the area affected by the mining project.</li> <li>- Identifying different types of vegetation, assessing soil quality, and</li> </ul>	Environment Policy (1994) Blue economy roadmap policy. Scientific research policy.	Environmental law no 4 year 1994 and no. 9 year, 2009 Law No. 102 of 1983 (on Natural Protected Areas). Law No. 93 of 1962	Revised biodiversity policy in mining activity. Discuss new regulations to safeguard biodiversity.

	<p>Connectivity.</p> <p>- Lack of baseline Environmental Monitoring</p>	<p>affected habitats and ecosystems.</p> <p>- Establish measures to protect and conserve species affected by mining activities</p>	<p>conservation plan.</p> <p>- Development and adoption of sustainable mining practices, reducing the long-term costs associated with environmental damage and degradation.</p> <p>- Increased investment in conservation and restoration.</p>	<p>evaluating the presence of water bodies, such as rivers, lakes, and wetlands.</p> <p>- Identifying endemic, rare, or threatened species, as well as keystone or indicator species that play a crucial role in maintaining ecosystem health and balance.</p> <p>- Create detailed maps of the different habitats.</p> <p>- Assess the existing landscape connectivity.</p> <p>- Establish a baseline for key environmental indicators, such as air and water quality, soil health, and noise levels.</p> <p>- Develop and strengthen legal and policy frameworks that support the integration of biodiversity</p>		<p>on Discharge of Wastewater in Sewerage Networks,</p>	
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				conservation into mining practices.			
Mine sites rehabilitation.	<ul style="list-style-type: none"> <li>- Financial Constraints.</li> <li>- requires a long-term perspective, as the process can take years or even decades to complete.</li> <li>- Environmental Uncertainty.</li> <li>- Problems in Regulatory Compliance.</li> <li>- Technological Limitations.</li> <li>- Land Use Conflicts.</li> <li>- Adapting rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>- Establish clear, enforceable, and progressive legal and regulatory requirements for mine site rehabilitation.</li> <li>- Financial Commitment.</li> <li>- Promote meaningful engagement with local communities.</li> <li>- Encourage the development, adoption, and sharing of innovative technologies and best practices for mine site rehabilitation.</li> <li>- Foster a long-term perspective.</li> <li>- Recognize the need for adaptive management in mine site rehabilitation due to environmental uncertainties</li> <li>- Encourage ongoing monitoring,</li> </ul>	<ul style="list-style-type: none"> <li>- Environmental Restoration.</li> <li>- Improved Land Use.</li> <li>- Enhanced Social Acceptability.</li> <li>- Economic Benefits.</li> <li>- Compliance with Regulatory Requirements.</li> </ul>	<ul style="list-style-type: none"> <li>- Develop comprehensive rehabilitation plans that are integrated with the overall mine planning process.</li> <li>- Implement pre-mining rehabilitation activities, such as site preparation, erosion control, and habitat restoration.</li> <li>- Establish a robust monitoring and evaluation system to track the progress of rehabilitation efforts, identify potential issues, and make necessary adjustments to improve outcomes.</li> <li>- Use Innovative Technologies and adopt cutting-edge technologies and best practices</li> </ul>	<ul style="list-style-type: none"> <li>Environment Policy (1994)</li> <li>Blue economy roadmap policy.</li> <li>Scientific research policy.</li> </ul>	<ul style="list-style-type: none"> <li>Environmental law no 4 year 1994 and no. 9 year, 2009 Law No. 102 of 1983 (on Natural Protected Areas).</li> <li>Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks,</li> </ul>	Revised the regulatory Requirements

	strategies to account for climate change can be challenging.	evaluation, and adjustment of rehabilitation strategies.		for mine site rehabilitation. - Develop a comprehensive financial plan for mine site rehabilitation. - Develop plans for the post-mining use of rehabilitated sites. - Strengthen regulatory frameworks and enforcement mechanisms.			
Compliance and enforcement	- Inadequate Regulatory Frameworks. - Insufficient Resources for Regulatory Agencies. - Lack of Public Participation and Transparency.	- Strengthening Regulatory Frameworks. - Enhancing Regulatory Capacity. - Promoting Transparency and Public Participation. - Enhancing International Cooperation. - Encouraging Sustainable Practices. - Establish mechanisms for the regular evaluation and adaptation of legal compliance	- Improved Environmental Protection. - Enhanced Mine Site Rehabilitation. - Increased Public Trust: by fostering transparency, public participation, and effective communication. - Strengthened Regulatory Capacity. - Harmonized Regulatory Frameworks and	- Developing Comprehensive Regulatory Frameworks. - Strengthening Regulatory Capacity, investing in the resources, personnel, and expertise needed for effective enforcement. - Encourage openness and public involvement in decision-making processes related to mining activities and rehabilitation plans.	Environment Policy (1994) Blue economy roadmap policy. Scientific research policy.	Environmental law no 4 year 1994 and no. 9 year, 2009 Law No. 102 of 1983 (on Natural Protected Areas). Law No. 93 of 1962 on Discharge of Wastewater in Sewerage Networks,	- Revision of regulatory Frameworks. - Inclusion of International Cooperation.

	<ul style="list-style-type: none"> <li>- Limited Technical Expertise.</li> <li>- Lack of International Cooperation.</li> <li>- Insufficient Penalties and Sanctions.</li> <li>- Limited Public Awareness and Education.</li> </ul>	and enforcement policies.	<ul style="list-style-type: none"> <li>increased international cooperation.</li> <li>- Raise understanding of mining laws, rehabilitation requirements, and environmental impacts.</li> </ul>	<ul style="list-style-type: none"> <li>- Develop incentives and support mechanisms to adopt sustainable practices.</li> <li>- Establish mechanisms for the regular evaluation and adaptation of legal compliance and enforcement policies.</li> </ul>			
Long term planning	<ul style="list-style-type: none"> <li>- Uncertainty in Resource Availability.</li> <li>- Fluctuating Market Conditions.</li> <li>- significant environmental impacts, including habitat destruction, water pollution,</li> </ul>	<ul style="list-style-type: none"> <li>- Encouraging Sustainable Mining Practices.</li> <li>- Strengthening Regulatory Frameworks.</li> <li>- Foster Community Engagement and Social Responsibility.</li> <li>- Enhancing Environmental Protection.</li> <li>- Supporting Research and Innovation.</li> <li>- Ensuring Financial Sustainability.</li> </ul>	<ul style="list-style-type: none"> <li>- Reduced Environmental Impact.</li> <li>- Improved Community Relations.</li> <li>- Improve environmental sustainability.</li> </ul>	<ul style="list-style-type: none"> <li>- Promote sustainable mining practices.</li> <li>- Reducing waste, maximizing resource efficiency, and minimizing environmental impacts.</li> <li>- Prevent water and air pollution.</li> <li>- Protect ecosystems, and mitigate the impacts of mining on local flora and fauna.</li> <li>- Support research and development</li> </ul>	<ul style="list-style-type: none"> <li>- Environment Policy (1994)</li> <li>- Blue economy roadmap policy.</li> <li>- Scientific research policy.</li> </ul>	<ul style="list-style-type: none"> <li>- Environmental law no 4 year 1994 and no. 9 year, 2009 Law No. 102 of 1983 (on Natural Protected Areas).</li> <li>- Law No. 93 of 1962 on Discharge of Wastewater in</li> </ul>	<ul style="list-style-type: none"> <li>- Revision waste management techniques.</li> <li>- Revision of policy and regulation.</li> </ul>



	and greenhouse gas emissions	- Develop policies and strategies to address the potential impacts of climate change.		to promote the discovery of new mining technologies, that contribute to long-term environmental sustainability and resource efficiency.		Sewerage Networks,	
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## 7.11. Legislation, laws, and Legal arrangements:

Legal arrangements are needed at different levels. Many countries enacted a Coastal Area Management Act which sets out various institutional arrangements, property rights, user rights, access to judicial process, the right of the public to intervene in the management process, and financing mechanisms for coastal planning.

At the same time, many other acts and regulations are in force in coastal areas dealing with a variety of activities (shipping, fisheries, general environmental, conservation, transport, and local government laws, etc.).

### 1. Environmental laws:

To ensure environmental sustainability and aquatic biodiversity for coastal marine tourism in Egypt, several key environmental laws and policies should be focused on. These include:

1. Egyptian Environmental Law No. 4 of 1994: This law serves as the primary framework for environmental protection and conservation in Egypt, covering issues such as pollution control, waste management, and the preservation of natural resources.
2. The Egyptian Cabinet Decision No. 1055 of 2016: This decision designates the Red Sea Governorate as a special development area, emphasizing sustainable tourism development and environmental conservation. It outlines guidelines for planning, investment, and infrastructure development in the region, aiming to minimize negative impacts on the environment and aquatic biodiversity.
3. The Egyptian Red Sea Protected Areas Project: This initiative aims to establish a network of marine protected areas (MPAs) along the Red Sea coast to conserve unique marine ecosystems and protect endangered species. It includes guidelines for sustainable tourism practices and restrictions on certain activities within the protected areas, ensuring the preservation of aquatic biodiversity.

4. The Egyptian Environmental Affairs Agency (EEAA): The EEAA is responsible for implementing and enforcing environmental laws and policies in Egypt. It plays a crucial role in monitoring and regulating coastal marine tourism activities to ensure compliance with environmental standards, thus protecting aquatic biodiversity.
5. The Egyptian Tourism Development Strategy 2030: This strategy focuses on promoting sustainable tourism growth in Egypt, including coastal marine tourism. It emphasizes the importance of environmental conservation, community engagement, and the development of eco-friendly tourism infrastructure, which contributes to the preservation of aquatic biodiversity.
6. The Egyptian Sustainable Tourism Charter: This voluntary initiative encourages tourism businesses in Egypt to adopt sustainable practices that contribute to environmental conservation and the preservation of aquatic biodiversity. It covers aspects such as waste management, energy efficiency, and responsible water use.
7. The Red Sea Governorate Law No. 137 of 1999: This law specifically focuses on the protection and development of the Red Sea Governorate, a significant coastal marine tourism destination in Egypt. It addresses issues such as coastal zone management, tourism development, and environmental protection, which are crucial for maintaining aquatic biodiversity.

### Environmental projects:

Several environmental projects in Egypt contribute to the preservation of environmental sustainability and aquatic biodiversity for coastal marine tourism. Some of the most important ones include:

1. The Egyptian Red Sea Protected Areas Project: This project aims to establish a network of marine protected areas (MPAs) along the Red Sea coast to conserve unique marine ecosystems and protect

endangered species. By creating these protected areas, the project promotes sustainable tourism practices and ensures the preservation of aquatic biodiversity.

2. The Hurgada Environmental Protection and Conservation Association (HEPCA): HEPCA is a non-governmental organization dedicated to protecting the marine environment and promoting sustainable tourism in the Red Sea area. They implement various projects, such as coral reef restoration, marine pollution control, and environmental education for locals and tourists.
3. The Red Sea Reef Conservation Project: This project, led by the International Union for Conservation of Nature (IUCN), focuses on the conservation and sustainable management of the Red Sea coral reefs. It involves research, monitoring, and capacity building for local communities and stakeholders to better understand and protect the marine environment.
4. The Ras Mohammed National Park Development Project: This project aims to enhance the management and conservation of Ras Mohammed National Park, a significant marine protected area in Egypt. It involves improving infrastructure, visitor management, and environmental education to ensure the sustainable use of the park's resources and the preservation of aquatic biodiversity.
5. The Sustainable Tourism in the Red Sea Governorate Project: Funded by the European Union, this project supports the sustainable development of tourism in the Red Sea Governorate by promoting eco-friendly practices, improving waste management, and increasing community engagement in environmental conservation efforts.
6. The Coastal Ecosystem-Based Adaptation in the Red Sea Project: This initiative, supported by the Global Environment Facility (GEF), focuses on enhancing the resilience of coastal ecosystems in the Red Sea area to climate change impacts. It includes activities such as mangrove

restoration, sustainable fisheries management, and the promotion of eco-tourism practices.

7. The Coral Reef Rehabilitation and Management Project in the Red Sea: This project, led by the Egyptian Environmental Affairs Agency (EEAA) and other partners, aims to restore and protect coral reefs in the Red Sea through various interventions, including coral nurseries, artificial reefs, and community-based conservation efforts.

#### **Environmental treaties:**

Several international environmental treaties and conventions are crucial for promoting environmental sustainability and aquatic biodiversity for coastal marine tourism in Egypt. Some of the most important ones include:

1. United Nations Convention on the Law of the Sea (UNCLOS): This comprehensive international agreement establishes the legal framework for the world's oceans and their sustainable use. It covers various aspects, such as marine environmental protection, resource management, and the conservation of marine species and ecosystems.
2. Convention on Biological Diversity (CBD): The CBD is an international treaty aimed at promoting the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources. It provides a framework for countries to develop strategies for the conservation and sustainable use of their aquatic biodiversity.
3. United Nations Framework Convention on Climate Change (UNFCCC): This convention addresses the issue of climate change and its potential impacts on marine ecosystems, including those relevant to coastal marine tourism. It encourages countries to develop and implement strategies to reduce greenhouse gas emissions and adapt to climate change, which can indirectly contribute to the preservation of aquatic biodiversity.
4. Convention on the Conservation of Migratory Species of Wild Animals (CMS)

or "Bonn Convention"): This treaty aims to conserve terrestrial, marine, and avian migratory species throughout their migratory range. It provides a platform for countries to collaborate on the conservation of migratory species and their habitats, including those relevant to coastal marine tourism in Egypt.

5. Regional Seas Programs: Egypt is a part of two Regional Seas programs – the Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution and the Red Sea and the Gulf of Aden Environment Program (RGMEP). These regional agreements focus on environmental protection, sustainable development, and the conservation of marine and coastal ecosystems in their respective regions.
  6. The Ramsar Convention on Wetlands: This international treaty aims to conserve wetlands and their ecosystems by promoting wise use and sustainable development. Egypt has several wetland sites designated under the Ramsar Convention, which can contribute to the preservation of aquatic biodiversity and support coastal marine tourism.
  7. The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA): This treaty aims to safeguard the habitats of African-Eurasian migratory Waterbirds, including those in Egypt's coastal marine areas. By joining AEWA, Egypt commits to the conservation of these species and their habitats, which can contribute to the overall health of aquatic biodiversity in the region.
2. Executive Regulations of the Petroleum Act (Ministerial Decision No. 1236/2008): These regulations provide further details on the implementation of the Petroleum Act, including provisions related to environmental protection, safety, and health standards for oil and gas operations.
  3. Environmental Law No. 9/2009: This law aims to protect the environment, prevent pollution, and ensure sustainable development in Egypt. It establishes the legal framework for environmental management and outlines the responsibilities of government agencies, companies, and individuals in preserving the environment.
  4. Offshore Petroleum Resources Regulations (Ministerial Decision No. 1237/2008): These regulations govern the exploration and production of offshore petroleum resources in Egypt, including those in the Red Sea and the Mediterranean Sea. They include provisions related to environmental protection, such as requirements for environmental impact assessments (EIAs) and environmental management plans (EMPs) for offshore projects.
  5. Executive Regulations of the Environmental Law (Ministerial Decision No. 472/2010): These regulations provide further details on the implementation of the Environmental Law, including provisions related to environmental permitting, monitoring, and enforcement.
  6. Red Sea Petroleum System (RSPS) Environmental Management Plan (EMP): This plan, developed by the Egyptian General Petroleum Corporation (EGPC) and other stakeholders, outlines the environmental management framework for oil and gas activities in the Red Sea. It includes measures to minimize environmental impacts and protect aquatic biodiversity in the region.
  7. Egyptian Natural Gas Holding Company (EGAS) Environmental Policy: EGAS, the state-owned company responsible for natural gas infrastructure and distribution

## 2. Oil and gas laws:

1. Petroleum Act (Law No. 160/1998): This act governs the exploration, production, and export of petroleum resources in Egypt. It establishes the legal framework for the oil and gas sector and outlines the responsibilities of the Petroleum Ministry, the Egyptian General Petroleum Corporation (EGPC), and the Egyptian Natural Gas Holding Company (EGAS).

in Egypt, has an environmental policy that outlines its commitment to sustainable development, pollution prevention, and environmental protection.

### 3. Mineral mining laws:

1. Egyptian Mineral Wealth Law No. 147 of 1955, as amended: This law provides the legal framework for the exploration, extraction, and utilization of mineral resources in Egypt, including those in coastal marine areas. It outlines the responsibilities of the government and private entities in managing mineral resources and emphasizes the need for environmental protection and sustainable development.
2. Executive Regulations of the Egyptian Mineral Wealth Law: These regulations provide detailed provisions for implementing the Mineral Wealth Law, including requirements for Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs) for mineral mining projects with potential environmental impacts. They also establish procedures for monitoring and reporting on the environmental performance of these projects.
3. Presidential Decree No. 144 of 2004: This decree establishes the Egyptian Environmental Affairs Agency (EEAA) as the primary governmental body responsible for environmental protection, conservation, and improvement in Egypt. The EEAA is responsible for issuing permits, monitoring compliance, and enforcing environmental laws and standards related to mineral mining activities in coastal marine areas.
4. Presidential Decree No. 221 of 2005: This decree establishes the Egyptian Petroleum Sector Strategy, which includes provisions for environmental protection and sustainable development in the mineral mining sector. It emphasizes the importance of adopting best environmental practices and incorporating

environmental considerations into project planning and implementation.

5. Presidential Decree No. 281 of 2008: This decree establishes the Egyptian Natural Gas Holding Company (EGAS) as the sole entity responsible for the import, export, storage, and distribution of natural gas in Egypt. It also outlines the company's role in promoting environmental sustainability and ensuring compliance with environmental laws and standards related to mineral mining activities in coastal marine areas.
6. Best Practices and Guidelines: Adhering to international best practices and guidelines, such as those from the International Council on Mining and Metals (ICMM) and the Global Mining Initiative (GMI), can further enhance the environmental performance of mineral mining projects in Egypt's coastal marine areas.

#### Mineral mining projects:

1. Suez Iron Ore Project: The Suez Iron Ore Project, operated by the Egyptian Mineral Resources Holding Company (EMRHC), is one of the largest iron ore mines in Egypt. The project has implemented measures to reduce its environmental footprint, such as rehabilitating mined-out areas, controlling dust emissions, and managing waste materials.
2. Phosphate Mining in the New Valley: The New Valley Phosphate Mining Project, operated by the Egyptian Company for Mineral Resources (ECMR), aims to extract phosphate rocks for domestic consumption and export. The project incorporates environmental considerations in its planning and operations, including rehabilitation of mined-out areas, dust control, and waste management.
3. Silver and Gold Mining in the Eastern Desert: The Silver and Gold Mining Projects in Egypt's Eastern Desert, operated by several companies including Centamin, El-Sewedy Cable Company, and Thar Misr for Geo Exploration, are focused on extracting precious metals.

These projects implement environmental management systems, conduct regular environmental monitoring, and adhere to international best practices to minimize their environmental impacts.

4. Salt Mining in the Wadi Natrun Area: The salt mining projects in the Wadi Natrun area, operated by the Egyptian Salt Company, have been in operation for decades. These projects have evolved to incorporate modern mining techniques and environmental management practices, such as rehabilitating mined-out areas and controlling dust emissions.
5. Future Mineral Exploration and Mining Projects: As Egypt continues to explore and develop its mineral resources, future projects are expected to incorporate the latest environmental technologies and best practices to minimize their environmental impacts. This includes conducting comprehensive Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs) to identify and mitigate potential environmental risks associated with mineral mining activities.

## 7.12. Funds and financing arrangement:

Three types of financing requirements are generally essential for an effective Master plan:

1. **financing of the administrative structure,** to finance the administrative structure and related expenditures the money will have to come from the budgets of national, regional, and local authorities;
2. **financing the infrastructure and pollution control expenditures;** to finance infrastructure and pollution control, amounts of money can be largely generated from user charges and costs can be partially passed on to industry.
3. **financing of conservation measures.** financing of conservation can be undertaken partly from private voluntary financing and partly from visitors' fees etc. of reserved areas.

## 1. ECONOMIC INSTRUMENTS

Economic instruments have always been used for implementing resource management

policies, but in recent years they have found application also in environmental management, particularly in pollution control. The wider use of economic instruments developed for several reasons. **Firstly**, regulatory instruments were found insufficient, particularly in their role of promoting technical progress in clean technologies, or in new pollution control processes.

**Secondly**, there was a disenchantment with the relative speed of their effectiveness. This was particularly the case with large bays and estuaries where the rehabilitation of ecosystems is particularly difficult and time-consuming. **Thirdly**, regulatory instruments do not generate funds that would allow, for example, cross-subsidizing without contravening the Polluter Pays Principle.

### (i) Charges and Resource Pricing

Today a variety of charges are in use and they have different incentives (pollution reduction), revenue raising, resource use, and redistributive effects. Normally, all these effects should be considered in the selection of the charges.

**Effluent or pollution charges** are imposed according to discharges into the environment and are based on the quantity and/or quality of pollutants released. Effluent charges can be imposed in all media: they are most widely used in the field of water pollution, but also for air, noise, and industrial waste. In the case of waste, these are imposed on private operators who treat or store waste and thereby contribute to pollution.

**User charges** are probably the most widely used economic instruments both in pollution control and resource management. In pollution control, they are applied as payments for the cost of collective public treatment of effluents and waste, for example for collection and disposal of solid waste. In resource management, they are payments for the use of the resources, such as for irrigation water and forest products.

**Product charges** are charges laid upon the price of products that are polluting in the manufacturing or consumption phases, or of which a disposal system has been organized.

Their use includes charges on various types of fuels, containers, pesticides, fertilizers, and on "feedstocks". Again the idea behind the scheme is partly to provide an incentive (to reduce the use of polluting substances) and/or to generate funds for pollution control, or environmental policies in general.

**Administrative charges**, of which there are many varieties (such as control and authorization fees), are payments for authority services; these include, for instance, registration fees for certain chemicals, or implementation and enforcement of regulations.

**Tax differentiation** is aimed at creating a more favorable process for environmentally friendly products, or vice versa. Tax differentiation in practice is the same as negative or positive product charges.

### **(ii) Subsidies**

Governments provide many types of financial assistance usually described with the general term "subsidies". Their objective is to assist polluters to undertake pollution control expenditures and the subsidy is usually tied to measures or performance. In principle, subsidies conform with the Polluter-Pays Principle, but they are widely used under the various exceptions foreseen by the Principle. The various types of subsidies are:

- ❖ *Grants* are straight-out financial transfers of government funds to polluters; one particular variation on the subsidy scheme is "self-financing", where subsidies are paid from pollution charges to avoid the burden on the public purse and also to soften the burden of the charge on the polluting industry.
- ❖ *Soft loans* are repayable loans but provided under favorable conditions, such as a below-market rate of interest, or a long repayment period; in some countries, depending on the tax system, firms prefer soft loans to grants, because grants are taxable, while interest payments are deductible.
- ❖ *Tax allowances* are given on expenditures for pollution control to reduce the cost impact of these expenditures of profit, and in this way, they have an incentive effect.

### **(iii) Deposit-refund system**

These are used to impose a refundable charge on potentially polluting products. This system is particularly widely spread on drink and food containers and, in some countries, on car hulks. These systems are usually operated by private companies but helped by government regulations.

### **(iv) Market Creation**

Governments can create artificial markets to assist pollution control. Various alternatives are in operation:

**Emissions trading** can be regarded as a substitute for the use of pollution charges. Under this scheme, the discharger can sell his pollution "rights" if he is discharging less than his allowable discharges. The buyer then has the right to discharge more than his allowable discharge. These trades can take place within a plant, within a firm, or among different firms.

Emissions trading is so far limited to very few countries and found few applications in the case of water resources, and hasn't so far been applied to non-point sources. Its greatest advantage appears to be in innovation in pollution control technology, in modernization, and better industrial productivity.

**The market intervention** aims at creating or maintaining markets for residuals. This could again take various forms: freight discount provided for transporting waste material; stabilizing funds for waste paper prices; or assistance for a waste exchange market. Some of these are organized at the municipal level.

**Liability insurance** is a recent development in the environment field and is used to establish legal liability of polluters for environmental damage, or clean-up costs associated with emission or storage of waste. Such liabilities create a market in insurance premiums. The incentive will be to lower the cost of the premiums through better industrial processes or fewer accidents.

### **(v) Financial enforcement incentives**

These are legal rather than economic instruments for potential or actual non-compliance with regulations.

**Non-compliance fees** are paid for failing to comply with regulations, and the charge is by the financial benefit gained through non-compliance.

*Performance bonds* are paid by potential "polluters" in expectation of compliance with the already imposed regulations. These payments are refunded when the regulations have been complied with.

## 8. Conclusions and Recommendations:

In conclusion, the Coastal and Marine sector faces several challenges including inadequate information dissemination mechanisms; Inadequate policies on ocean governance; Low compliance augmented by the absence of compliance frameworks; and mechanisms, weak enforcement, low regard for indigenous knowledge; Low compliance and adherence to conservation regulations and best practices augmented by inadequate incentives, lengthy compensation processes; Inadequate safety & security frameworks & measures to counter transboundary crimes, illegal trafficking; Inadequate capacity building and knowledge, ecotourism.

Coastal marine tourism, while offering significant economic benefits, poses several challenges to aquatic biodiversity and environmental sustainability. These challenges, if left unaddressed, can lead to the degradation of marine ecosystems and hinder the long-term viability of coastal tourism. Some key challenges include overexploitation of resources, pollution, habitat destruction, disturbance to marine life, introduction of invasive species, and the impacts of climate change.

Overexploitation of resources, such as unsustainable fishing practices and extraction of marine resources, can lead to the depletion of aquatic biodiversity and disrupt the balance of marine ecosystems. Pollution from solid waste, plastic debris, oil spills, and untreated sewage can harm marine life and affect water quality, negatively impacting the health of aquatic ecosystems.

Habitat destruction due to infrastructure development for coastal marine tourism can result in the loss of essential breeding and feeding grounds for various marine species, affecting their ability to reproduce and survive. Disturbance to marine life caused by recreational activities like

boating, snorkeling, and scuba diving can lead to stress or injury, potentially altering the behavior of marine organisms.

Invasive species introduction through the movement of boats, aquarium trade, and ballast water discharge can cause significant damage to native aquatic biodiversity. Climate change, with its consequences such as rising sea levels, ocean acidification, and changes in water temperature and currents, can lead to shifts in marine species distribution and alter marine ecosystems, making them more vulnerable to other stressors.

Lastly, insufficient regulation and monitoring of coastal marine tourism activities can exacerbate these challenges, resulting in the continued degradation of aquatic biodiversity and environmental sustainability. To mitigate these issues, it is crucial to adopt sustainable tourism practices, enforce environmental protection policies, and promote responsible tourism behaviors. This includes investing in eco-friendly infrastructure, adopting sustainable fishing practices, reducing pollution, and preserving critical marine habitats.

The oil and gas sector in Egypt faces several challenges that threaten aquatic biodiversity and environmental sustainability. These challenges can be broadly categorized into three main areas: pollution, habitat degradation, and climate change impacts.

The oil and gas industry generates various types of pollution, including air, water, and noise pollution. Oil spills, gas leaks, and wastewater discharge from drilling and production activities can have severe consequences on aquatic ecosystems, affecting both marine life and human health. In Egypt, the lack of proper waste management systems and inadequate monitoring of pollution levels exacerbate the situation, leading to long-term damage to aquatic biodiversity.

Habitat Degradation: Oil and gas exploration and production activities often involve the construction of infrastructure, such as pipelines, storage facilities, and platforms. These developments can lead to habitat loss and fragmentation, disrupting the balance of ecosystems and affecting the survival of various species. In Egypt, the expansion of the oil and gas sector without proper environmental impact



assessments and mitigation measures has resulted in significant habitat degradation, particularly in coastal and marine areas.

**Climate Change Impacts:** The oil and gas sector is a significant contributor to greenhouse gas emissions, which are the primary driver of climate change. As a result, the sector's activities indirectly impact aquatic biodiversity and environmental sustainability in Egypt. Rising temperatures, sea-level rise, and more frequent extreme weather events can lead to the loss of critical habitats, disruption of migration patterns, and increased vulnerability of marine species.

To address these challenges, the Egyptian government and the oil and gas industry must implement strategies that prioritize environmental protection and sustainability. This includes investing in cleaner technologies, improving waste management systems, conducting regular environmental impact assessments, and developing policies to mitigate climate change impacts. Collaboration between the public and private sectors, along with local communities and international partners, is essential to ensure the long-term preservation of aquatic biodiversity and environmental sustainability in Egypt's oil and gas sector.

The mineral mining sector in Egypt faces several challenges when it comes to maintaining aquatic biodiversity and environmental sustainability. These challenges can be categorized into three main areas: direct impacts of mining activities, indirect impacts, and socio-economic factors.

Direct impacts of mining activities include habitat destruction, water pollution, and soil degradation. Mineral extraction often leads to the removal of vegetation and soil, which can result in the loss of natural habitats for aquatic species and increased erosion. Additionally, the use of chemicals and waste materials during the mining process can contaminate water sources, affecting both aquatic life and human health.

Indirect impacts on aquatic biodiversity and environmental sustainability in the mining sector are often linked to the increased demand for resources and infrastructure. The expansion of mining operations may lead to deforestation, land conversion, and the fragmentation of habitats, which can have cascading effects on aquatic ecosystems. Furthermore, the construction of

roads, dams, and other infrastructure may disrupt water flow patterns and alter the natural balance of aquatic habitats.

Socio-economic factors play a significant role in the challenges faced by the mineral mining sector in Egypt. Rapid population growth, urbanization, and increasing demand for resources can put pressure on the industry to prioritize economic growth over environmental conservation. This can lead to inadequate regulation and enforcement, as well as a lack of public awareness and support for sustainable practices.

It is crucial to develop and implement strategies that balance the economic benefits of mineral mining with the preservation of aquatic biodiversity and environmental sustainability. This can be achieved through improved regulatory frameworks, increased public awareness, and the adoption of eco-friendly operational practices by the mining industry.

To achieve the successful implementation of the Masterplan, the following recommendations need to take into consideration:

1. **Promoting Sustainable Practices:** Encourage sustainable practices in tourism activities, such as responsible waste management, water conservation, and energy efficiency. This helps minimize the environmental footprint of marine and coastal tourism and protect the natural resources on which it depends.
2. **Sustainable Tourism Planning:** Developing comprehensive tourism plans that prioritize environmental conservation and community engagement is vital. These plans should incorporate best practices for sustainable tourism, such as ecotourism, responsible waste management, and habitat restoration. Additionally, they should consider the carrying capacity of coastal areas to avoid overcrowding and negative impacts on marine ecosystems.
3. **Marine Protected Areas (MPAs):** Establishing and effectively managing MPAs can significantly contribute to the preservation of biodiversity in Egypt's coastal waters. These protected areas should be designed to safeguard critical habitats and species, as well as provide

- opportunities for research, education, and ecotourism. Collaboration among stakeholders is crucial for the successful implementation and monitoring of MPAs
4. **Responsible Diving and Snorkeling:** Promote responsible diving and snorkeling practices among tourists and dive operators. Emphasize the importance of not touching or damaging coral reefs, maintaining proper buoyancy, and avoiding the use of harmful chemicals, such as sunscreen, that can harm marine life.
  5. **Sustainable Fishing Practices:** Encourage sustainable fishing practices in coastal tourist areas to support the conservation of fish stocks and protect the marine food chain. Promote catch-and-release practices, implement size and bag limits, and educate fishermen about sustainable fishing techniques.
  6. **Ensuring Environmental Monitoring and Assessment:** Include provisions for regular monitoring and assessment of the environmental impacts on biodiversity and sustainability. This helps identify areas of concern and develop targeted solutions to mitigate negative effects on aquatic biodiversity and environmental sustainability.
  7. **Monitoring Programs:** Regular monitoring programs should be established to assess the environmental impact of mineral mining exploration activities and ensure compliance with established guidelines and protocols. This includes monitoring water quality, air quality, and habitat conditions, as well as conducting periodic audits and inspections to evaluate the effectiveness of implemented mitigation measures.
  8. **Community Engagement:** Engaging local communities and stakeholders in the rehabilitation and restoration process can help build trust and support for responsible mineral mining exploration practices. This includes raising awareness about the importance of rehabilitation and restoration, involving local knowledge and expertise, and fostering a sense of ownership and responsibility for the environment.
  9. **Collaborative Efforts:** Establishing strong partnerships among various stakeholders, including the Egyptian government, international oil companies, local communities, and environmental organizations, is essential for sustainable development in the oil and gas sector. These partnerships should aim to share knowledge, resources, and expertise to develop and implement responsible practices that benefit the economy and the environment.
  10. **Restoration and Rehabilitation:** Implementing restoration and rehabilitation programs in areas affected by mineral mining activities is essential for the preservation of biodiversity. This includes habitat restoration, species reintroduction, and monitoring programs to ensure the long-term success of these initiatives.
  11. **Supporting Research and Conservation:** Support research and conservation efforts related to aquatic biodiversity and the marine environment. This can involve collaborating with local scientists, conservation organizations, and government agencies to protect endangered species, restore damaged ecosystems, and promote environmental awareness.
  12. **Education and Awareness:** Raising awareness about the importance of responsible tourism practices among tourism businesses, local communities, and visitors is crucial. This can be achieved through educational campaigns, training programs, and the development of guidelines and best practices.
  13. **Waste Management:** Adopting responsible waste management practices, such as recycling, composting, and proper disposal of hazardous waste, can help minimize the environmental impact of tourism operations and protect the natural resources on which marine and coastal tourism depend.

14. **Water Conservation:** Implementing water-saving technologies and practices, such as low-flow fixtures, rainwater harvesting systems, and efficient irrigation methods, can help reduce the consumption of freshwater resources and protect marine ecosystems from pollution.
15. **Sustainable Building and Infrastructure:** Employing eco-friendly construction materials and techniques, such as green roofs, energy-efficient insulation, and rainwater harvesting systems, can help minimize the environmental impact of tourism infrastructure development and promote environmental sustainability.
16. **Enhanced Drilling Techniques:** Employing advanced drilling techniques, such as directional and horizontal drilling, can help reduce the number of wells required for exploration, thereby minimizing habitat destruction and disturbance to aquatic ecosystems.
17. **Seismic Imaging Technologies:** Utilizing advanced seismic imaging technologies, such as 3D and 4D seismic surveys, can help improve the accuracy of exploration activities and reduce the need for repeated surveys, thus minimizing the impacts on aquatic ecosystems.
18. **Government Incentives and Support:** Governments can introduce incentives and support programs for oil and gas companies that invest in advanced technologies and practices, such as tax breaks, subsidies, or preferential treatment in licensing and permitting processes.
19. **Emissions Standards:** Governments and mining companies should establish and enforce strict emissions standards for mineral mining exploration operations, including limits on air pollution and greenhouse gas emissions. This can be achieved through the use of cleaner technologies, improved efficiency in energy consumption, and regular monitoring of emissions levels.
20. **Building long-term solvency through the establishment and endowment of conservation trust funds to ensure conservation funding is resilient to downturns in visitation.**
21. **Utilize co-operation and collaborative management arrangements, such as destination management structures, to promote engagement of all stakeholders in decision-making and implementation of policies and plans, share expertise and resources, and promote a common set of objectives.**
22. **Implementation of new practices across the entire marine and coastal resources value chain, proactive co-operation, and collaboration across all stakeholders to create business models to deliver sustainable experiences.**
23. **Strengthen regulatory frameworks for environmental sustainability and aquatic biodiversity conservation in Egypt.**
24. **Pollution Control and Waste Management:** Implement strict pollution control measures to minimize the impact of human activities on the environment and aquatic ecosystems. Promote waste reduction, recycling, and efficient waste management practices. Invest in wastewater treatment facilities and other pollution control technologies.
25. **Research and Development:** Invest in research and development to improve our understanding of Egypt's aquatic ecosystems, biodiversity, and environmental challenges. Use research findings to inform policy decisions, management practices, and conservation efforts. Collaborate with national and international research institutions to share knowledge and expertise.
26. **Cross-sectoral Coordination:** Foster collaboration and coordination among various government agencies, NGOs, and stakeholders to ensure the effective implementation of the Master Plan Vision. Establish a central coordinating body to oversee the implementation of the plan and ensure its alignment with national development goals. Encourage partnerships and collaborations between the public and private sectors for the

achievement of shared environmental objectives.

27. Implement ecosystem-based management (EBM): Adopt an EBM approach that considers the interconnectedness of marine ecosystems and the impacts of human activities on them. This involves managing marine resources in a way that maintains ecosystem health and resilience while supporting sustainable economic activities. Key practices include reducing pollution, managing fisheries sustainably, and minimizing habitat degradation.
28. Embrace adaptive management: Regularly monitor and evaluate the effectiveness of implemented measures, and make necessary adjustments based on new information and changing conditions. This adaptive approach ensures that MSP remains a dynamic and effective tool for promoting aquatic biodiversity and environmental sustainability.
29. Foster interdisciplinary and cross-sectoral collaboration: Encourage collaboration among various sectors, such as fisheries, tourism, renewable energy, and conservation, to ensure that MSP plans address the diverse needs and interests of stakeholders. This can lead to more integrated and effective solutions for promoting aquatic biodiversity and environmental sustainability.
30. Ensure long-term commitment and resource allocation: Secure long-term political, financial, and institutional support for MSP implementation, monitoring, and evaluation.

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