EU - Gulf Cooperation Council (GCC) Dialogue on Economic Diversification

EU – GCC Dialogue on Economic Diversification Gulf Cooperation Council (GCC) countries

Project Identification No.
EuropeAid/138630/DH/SER/Multi
Service Contract No. PI/2017/393165

Assessment of the challenges and opportunities for the development of Blue Economy projects in GCC member countries

April 2021

This project is funded by the European Union

A project implemented by

GFA Consulting Group

Centre for European Policy Studies

DMI Associates

Your contact persons within
GFA Consulting Group GmbH are

Mr. Lukas Kudlimay (Project Director)
Mr. Douglas Aitkenhead (Team Leader)
Ms. Daniela Stratulativ (Key Expert, Trade and Foreign Direct Investment)

EU-GCC Dialogue on Economic Diversification
Gulf Cooperation Council (GCC) countries

Contract Number PI/2017/393165

Policy Paper: Assessment of the challenges and opportunities for the development of 'Blue Economy' projects in GCC member countries.

Author:
Spyros Kouvelis

Disclaimer

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of GFA Consulting Group GmbH and Spyros Kouvelis, and do not necessarily reflect the views of the European Union.

GFA Consulting Group GmbH

Eulenkrugstr. 82
D-22359 Hamburg
Germany Phone: +49 (40) 6 03 06 170
Fax: +49 (40) 6 03 06 159
E-mail: lukas.kudlimay@gfa-group.de

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by

Table of Contents

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
EDMI Global vision for local solutions
CEPS

1 - Executive Summary

The objective of the report is to assess the challenges and the opportunities existing in the development of a Blue Economy in the six countries of the Gulf Cooperation Council (GCC): Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, aiming to identify the existing and emerging openings for increased cooperation between the region and the European Union (EU).

The Blue Economy is a field of economic activity that has emerged strongly in the EU over the last few years, with a number of sub-sectors already being dynamic and forming a significant part of EU Member States' GDP, entrepreneurship and employment (for example: shipping, fisheries, aquaculture, coastal tourism), while other sectors are emerging and rapidly becoming - or are expected to become in the near future - very significant, both in terms of economic importance, but also as innovative sectors providing sustainable solutions to socio-economic challenges related to climate change, to food security, and others (for example: offshore wind, ocean energy, biotechnology).

The Blue Economy is not much developed as such in the GCC region, with some notable exceptions (such as shipping, coastal tourism, and in some cases fisheries and aquaculture). Under the predominant role of oil and gas production and exports for many decades, the Blue Economy was not seen as a development priority until recently. However, due to the double shock of low oil prices and the effects of the COVID-19 pandemic, GCC countries are increasingly turning towards the diversification of their economies, and the Blue Economy is recognized by most countries as an important development dimension, that will allow them to put to good use the resources and geo-political location of the region, and to serve the diversification objective in line with the development *Visions* of the countries.

Starting from the fact that in most countries, with the exception of some regulatory frameworks existing for specific sub-sectors (e.g., fisheries), integrated policies for the Blue Economy as a whole and for Blue Economy sectors do not exist, the study is looking at the policy setting in Section 3 - **Socio-Economic and Policy background**, that provides an overview of the Blue Economy in the GCC region. The section includes the analysis of the status of the sub-sectors making up the Blue Economy activities, looking at both existing and emerging sectors.

Next, the study presents in Section 4 the **Gap Analysis** between the existing practices and policies in the GCC region by comparison to those in the EU, aiming to identify the openings and opportunities for collaboration in policymaking and practices between the two regions. The analysis follows the definitions and classification of the Blue Economy used by the EU (as per the EU Blue Economy Reports 2018-2020, for instance), as a point of reference since the EU is considered a global leader in the field.

In Section 5, a detailed analysis of each of the existing and emerging Blue Economy sectors is presented, aiming to outline the **Contribution that the EU and the International Ocean Governance can make to the GCC Blue Economy policy**. The regional dimension is discussed first at the level of specific sub-sectors in both established and emerging ones. This regional analysis is followed by a country-level analysis for all six GCC countries. In this way, the study aims to provide readers with an overview of the sectors and then allowing to focus-in on specific fields of interest in the countries, and to enrich the information provided on specific policies, plans, and projects.

Section 6 provides a set of **Policy, Fiscal and Administrative.** Seen at a different level of analysis from the sectoral approach of the Blue Economy in the region and each country discussed in previous sections, this section aims to discuss a number of fundamental policies that need to be addressed in order to establish the Blue Economy in the GCC region on solid foundations of policy and methodological tools. In the same section, the specific role that the GCC SG can play as a catalyst and a reference point for the development of a Blue Economy policy at a regional level is discussed.

The opportunities for effective collaboration between the EU and the GCC regions are approached at the activity level in Section 7. Specific **Types of Projects** that could be of interest at an institutional level for the EU or the Member States, as well as for the engagement of private entities with counterparts in the GCC are described, thus offering a ground-level view of the opportunities.

Section 8 provides a discussion on the **Enabling Environment** for the implementation of such collaboration and for the establishment of a Blue Economy in the GCC region. It outlines basic pre-conditions that need to be in place to secure the effective development of business and entrepreneurship, and to allow the development and implementation of an integrated Blue Economy policy at national and regional level.

The Annex provides **references and** a **list of contacts** in the GCC region for readers who will be interested to delve deeper into the information, and to develop linkages to the region in the field of Blue Economy.

In closing, it can be expected that, owing to the need to diversify their economies in combination with the need to address significant challenges resulting from climate change, natural parameters and resource limitations (such as freshwater, arable lands etc.) the GCC countries will be making a significant turn towards developing their Blue Economy sectors in the next few years. This constitutes an excellent opportunity, and at the same time a challenge for the EU and its institutions and private sector to be actively present and engage constructively, sharing its knowledge and expertise in this sector with GCC counterparts. If properly developed, it may create win-win synergies for both sides through the development of a sustainable Blue Economy, and ultimately the establishment of a mutually beneficial strategic cooperation.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

2 - Methodology

The methodology employed by the expert consisted in carrying out a combination of desktop review of appropriate documentation and reports, exchanges and discussions with key relevant persons in the field of the Blue Economy in the GCC region, briefings/debriefings with the EU-GCC Dialogue on Economic Diversification Project's Team Leader and Key Expert on Trade and Foreign Direct Investment.

The approach to the assignment included the following activities:

Project setup

- Coordination meetings and exchange of information between the expert and the project management team.

Background information collection and review

- Background review of the EU Blue Economy Policy and directions, including:
  - Review of the EU Blue Economy Report 2018
  - Review of the EU Blue Economy Report 2019
  - Review of the EU Blue Economy Report 2020
  - Blue Economy Development Framework (BEDF) – EU Commission / World Bank
  - Blue Economy Finance Principles

- Background review of GCC regional and national documentation:
  - Outcomes of the 2014 Abu Dhabi Blue Economy Summit
  - Outcomes of the 2019 Muscat Ocean Economy and Future Technology Conference
  - Outcomes of the 2019 Abu Dhabi World Ocean Summit
  - National report on the GCC countries economy
  - Vision documents of the GCC countries – specific references to Blue Economy sectors

- Desktop study / Web search to identify national policy documents and publications by International sources relating to Blue Economy sectors, including national reports and publications on GCC region and country specific policies and development in the overall sector of the Blue Economy, and / or regarding specific sectors.

A complete detailed list of all publications and articles is attached in the Annex at the end of this report.

Conducting Gap Analysis

- Socio-Economic (including Fiscal and Administrative) and Policy context of Blue Economy developments in the GCC.
  - General regional overview between the EU and the GCC region, including key findings.
  - Country-level key findings.

- Drafting of the Gap Analysis document between EU Blue Economy policy and practice and the current practices in the GCC. The Gap analysis was based on the information collected on socio-economic, policy, fiscal, administrative, and business practices at a GCC regional and national level for all six countries, for the different sectors of the Blue economy, and analysed against the set policies and practices of the EU, as they are defined in the relevant legislation and EU reports.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

Formulating Policy Recommendations & Project proposals

- Direct contacts / interviews of resource persons by the expert, based on contacts identified through the desktop analysis, with support by the management team for additional contacts.
- Contacts with national authorities / embassies in order to enrich the above list.
- Policy Recommendations at a regional and (if and as appropriate) country level.
- Proposals for investible projects at a regional and (as appropriate) country level.
- Recommendations on the enabling environment to support and incentivize investments and innovation.

A complete list of contacts (institution and role) will be prepared is included in the Annex at the end of this report.

Drafting of the report and incorporated feedback

- The expert submitted draft versions of the report and incorporated the feedback received from the project team in several iterations.

Online workshop will be conducted following the report approval by the European Commission.

3 - Socio-Economic and Policy background

3.1 - Blue Economy developments in the GCC

For more than five decades, and in particular since the 1970s following the quadrupling of oil prices, economic development in the GCC countries has delivered strong growth and social prosperity. Relying on oil as the main source of export and fiscal revenues, GCC governments have increased public sector employment and spending on infrastructure, and social services such as education and health throughout this period, and have considerably raised living standards. At the same time, they have been supporting the private sector activity, and in particular its growth and operation around non-tradable (in the sense of locally produced and traded) goods and services.

However, this growth model has shown significant structural weaknesses, leading to the globally accepted understanding that economic diversification is strongly required. Reducing exposure to instability and unpredictability regarding the global oil prices, and as a result the precariousness of economic output and dependability, creation of jobs that will not be dependent on the public sector, development of the private sector as a key part of an economy leading to increased productivity and sustainable growth is key to establishing an economy not dependent on oil. As oil revenues start - and are expected to continue - to shrink significantly, a diversified future for the economy and growth is needed.

Reforms and plans to diversify economies in the GCC countries have been planned and implemented, aiming to reduce this dependence on oil exports and the recently aggravated volatility. Focusing on strengthening business outlook, establishing a low-inflation economy, providing good quality education to all, creating favourable conditions for foreign direct investment (FDI) and global trade, and strengthening and modernizing the financial sector were among the reforms undertaken. All countries have announced their National Development Plans (most commonly under the overall title of a *Vision*) towards the next 2-3 decades, their full engagement to further modernise and diversify their economies, and invest strongly in the human capital, strengthen the private sector, and develop new business sectors that can employ high-skilled labour.

Diversifying from an oil-based economy is not an easy task, and diversification strategies have so far produced mix results. The share of non-hydrocarbons output in GDP has increased, but is still highly correlated with oil prices, and progress with export diversification, a key ingredient to sustainable growth, has been more limited. Supporting though appropriate incentives and institutional and regulatory frameworks the development of the private sector, while encouraging business to develop export markets, and supporting entrepreneurs and workers to acquire skills and education and pursue new and upcoming sectors based on innovation, responding to current and future challenges, are key ingredients of change.

Further to the difficulties faced with initiating a fully-fledged and effective diversification pattern in the region, the double shock of Covid-19 pandemic and lower oil prices has exposed important deficiencies. On an industry level, the largest declines will be borne by travel and tourism, (-7.4 per cent), and entertainment and media (-5.6 per cent). Consumer goods and agriculture are expected to suffer smaller losses. Overall GDP decrease in the GCC region is expected to be around -3.8 per cent in 2020. That is smaller than the GDP slump in the United States (-5.4 per cent) and EU (-8.6 per cent), and this is partly attributed to fast and significant intervention by GCC governments, which however has drawn significantly on existing reserves that are not easily replenished without strong oil prices. This double shock has demonstrated how dependent all national GCC economies remain on government spending, which mostly derives from the energy sector.

In the light of this challenging situation, governments need to further strengthen their efforts to supplement oil and gas and develop a sustainable private sector, thereby reducing their dependency on oil and making their economies and the region more resilient to external shocks, by developing sectors and industries that generate net value for the economy, have high growth potential, foster innovation, and are resilient to energy price and hazard shocks. Most of the Blue Economy sectors are among them, as they have demonstrated their potential to create jobs and guarantee successful economic diversification.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

3.2 - Regional overview: Blue economy context in the GCC

For many decades, and certainly before the Covid-19 pandemic, economic stability in the region was assured mainly by oil production and exports, with additional sectors having an increasing, but still linked to oil, contribution to the GDP. The GCC countries have increasingly been seeking to diversify their economies in recent years, to decrease resource dependency on the black gold, as demonstrated by their respective *Vision* documents, and have been implementing new reforms and economic development plans to attract foreign investment.

The Blue Economy was to a differing extent a focal point of this diversification. In their history, especially before the development of oil as the productive, export, and revenue sector, the GCC countries had important maritime activities, especially in transportation and in fishing for both food and pearls, with the former making a significant part of their food security, and the latter a source of export revenue.

The reach of the GCC countries to the sea incudes the *Gulf of Oman*, the *Gulf of Suez*, the *Gulf of Aqaba*, the *Strait of Hormuz*, the *Red Sea*, and the *Arabian Sea*, giving the region direct opening to the *Indian Ocean*. This geographical position provides the region with access to seas that give it importance in terms of trade routes, a significant wealth in terms of fish stocks (which however varies significantly depending on the specific locations as in some cases very high salinity leads to feeble biological stocks), and a long coastline that offers significant possibilities for coastal tourism, including recreation and underwater activities, especially in the Red Sea (Saudi Arabia), the Gulf of Oman (Oman, UAE), and the Persian Gulf (Bahrain, Qatar, UAE).

It must be noted that, in contrast to the above-mentioned relation to the sea and abundance of Blue Economy activity opportunities, the sea has not been a central part of the countries' economies, especially in terms of GDP output, with the exception for subsistence employment in the case of fisheries in the past.
The issue of reduced contribution to the GDP is also reflected in the fact that the governance framework of the Blue Economy sectors is mostly dispersed among different government authorities: there is division and lack of coordination and participatory governance especially with reference to combining economic and environmental protection. Marine Spatial Planning is mostly a result of *ad hoc* decisions rather than being an underlying infrastructure.

The limited cross-border collaboration and collaboration among government agencies within each country are significant governance issues in terms of controlling and reversing environmental degradation: substantial changes have taken place in marine environment of the GCC region, especially over the last couple of decades. The naturally high levels of temperature and salinity make habitats in the region interesting but also vulnerable to climate change effects. The marine environment and habitats face significant problems and deterioration as a result of serious impacts resulting from industrial, residential, and tourism activities, infrastructure, sea-bottom dredging, and deposition in shallow water to extend land, also leading to sedimentation and changes to water flows.

In the recent years, also in relation to all GCC countries becoming signatories of the UN 2030 Agenda and the SDGs, as well as the Paris Agreement on Climate Change, things have started to change, with most GCC countries also engaging in one way or another in initiatives related to the Blue Economy, as explained in the next part of this report.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

Source: GeographicGuide.com

3.3 – National focus on Blue Economy in the region

The development of the different sectors and activities in the field of Blue Economy varies significantly among the GCC countries. A detailed analysis of the activity in Blue Economy sectors for each of the GCC countries is provided in chapter 5.3 of this report. Following are summaries for each of the countries.

In Bahrain, although there is no specific mention to Blue Economy, coastal tourism in coordination with the protection of coral reef ecosystems and aquaculture are outlined as the most prominent sectors for the development of the Blue Economy. A white paper entitled "The Blue Economy: new investment potential in Bahrain"[1] that saw coverage in the national press, highlights how the country could earn major revenue from investments in fish farms, mangroves, and coral reefs preservation.

Kuwait is not different: its Vision, focused on the country's diversification from the oil sector towards a finance and trade hub, does not specifically address any points about the Blue Economy. Nevertheless, the fishing sector in Kuwait remains an important activity, being the second largest export industry after oil. Ports are also of central importance, with the development of the Mubarak al Kabeer port and its connection to the new Silk City planned project.

In Oman, the fisheries sector as well as further development of coastal tourism are parts of the implementation plan for its 2040 Vision. Equally important is the role of aquaculture as a source of food security and economy diversification.

Qatar's Vision focuses on sustainable development, and although there is no specific focus for the Blue Economy, the sectors that are developed in the context of the Vision bear direct relation to the Blue Economy. Such sectors and activities include environmental protection, with special attention to the marine environment and ecosystems, coastal and marine tourism, aquaculture, and ports.

[1] Written by Bahraini Shaikha Aya bint Hisham Al Khalifa, Boston University.

For Saudi Arabia, Vision 2030 identifies the sea and the coastline as fundamental components of the Kingdom's heritage and identifies a number of marine-based industries set to develop strongly under the Vision, including sustainable desalination, coastal tourism and marine recreation and sports, aquaculture and fisheries, shipping, and to some extent marine energy, although for the latter there is no activity yet.

In the case of the UAE, although the Vision document approaches the future development of the country in more generic terms such as innovation, sustainable development and social development, the role of the sea to the country is recognized as a foundation for diverse economic activities, the most important of which are shipping and ports, aquaculture, coastal tourism, and the need to protect the marine environment and manage the coastal region in a sustainable way.

In less than a decade, the GCC region has hosted a number of events focused on Blue Economy development and the role that economic activities related to the sea and coastal zone may play in the diversification of the economy.

In 2014, Abu Dhabi held the Blue Economy Summit in the UAE. The adopted "*Blue Economy, Abu Dhabi Declaration*" recognised the significant contribution that the Blue Economy can make towards the alleviation of hunger, poverty eradication, creation of sustainable livelihoods and mitigation of climate change in Small Island Developing States (SIDS) and coastal countries.

In 2019 Oman hosted the international "*Ocean Economy and Future Technology Conference*" in Muscat. The event focused on the need for open dialogue in order to reinforce investment and innovation in Blue Economy sectors as a key economic sector in the Sultanate's 5-year national planning cycle and its longer term '*Vision 2040'*.

In March 2019, Abu Dhabi hosted the 6th edition of the *World Ocean Summit* in the UAE. This was the first time that this international conference was held in the GCC and the entire Middle East region.

Under the patronage of His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi, the Summit provided a forum for a global gathering of over 500 delegates, including heads of state, political leaders, policymakers, corporate heads, investors and academics from more than 26 countries, to share dialogue on how best to innovate, govern and promote a sustainable blue economy, and explore new ways to mitigate the adverse impacts of human pressures on ocean health. The three-day event explored the role of Finance, Technology and Innovation, and Governance in the future of the ocean as its key themes.

The *Oman Maritime Confex* was scheduled for March 2020 in Muscat, Oman, but had to be postponed to a date that will be announced at a later stage due to the Covid-19 pandemic. The event was aiming to attract local and international experts from different fields, sectors and activities related to the Maritime Sector to present different experiences, expertise and exchange information, statistics, and knowledge. Speakers were invited to share the challenges and opportunities related to activities in the Maritime sectors including but not limited to, fisheries, marine transport, marine tourism, and other relevant sectors. The first of its kind to be held in Oman, the event was expected to take a holistic view of the capabilities of the Sultanate's and the region's marine resources in terms of the blue economy, and to facilitate the development of projects, discuss the scope of investments in sectors such as maritime history, statistics & information, research, fisheries, marine professions, customs, shipping, packaging export, fishing and boat tools and accessories and tourism in the region.

3.4 - Currently active and upcoming Blue Economy sectors

Mostly the sectors considered as "*Established*" by the EU, including (indicatively) fisheries and aquaculture, port activities, maritime transport, and coastal tourism, are among the most common Blue Economy activities to be found in some or all GCC countries, with their contribution to GDP and employment varying among the countries, as outlined in chapter 5 for each country. In addition to those,

"*Emerging*" sectors, as per the EU classification[2] include desalination as a source of freshwater, an important activity in most GCC countries, and marine minerals in the form of marine aggregates such as sand and gravel and other minerals on the seabed.

Most of those sectors were affected by the Covid-19 pandemic, with a significant decrease in sea-based trade and human-based marine activity for 2020. There has been an increase in the cost of marine insurance, since both the logistics challenge and risk has increased. Ships' crew wages have also been raised. The tourism and hospitality sectors are two of the most significantly affected, due to the closure of borders, especially in Dubai, where the 173-day EXPO 2020 has been postponed to 2021. Aside from the impact of lockdowns on shipping and tourism, the fishing industry, which constitutes an important source of protein and food has been critically affected. Reports also confirm an increase in illicit fishing during the crisis, which will directly disturb the sustainability of the sector. The effect of Covid-19 on these sectors, although having significantly impacted them, presents at the same time an opportunity for modernization and restructuring, with a view to more efficient operation and increased competitiveness.

Based on the experience of the EU and the sectors and tools that have been important building blocks for the development of its Blue Economy, as well as global experience and expertise, some further sectors that present opportunities for development in the field of Blue Economy in the GCC region could include: sustainable blue finance and investment, linked to the established banking and capital market sector of the GCC countries, environmental protection of the sea and management of marine ecosystems, innovative technologies for sustainable fishing and management of the fisheries value chain, aquaculture development, onshore and offshore renewable energy, and research and development of new technologies and biotechnology for the marine and coastal areas.

These sectors, depending on the comparative advantages and opportunities for each GCC country are discussed in subsequent chapters as potential fields for their development in the context of the Blue Economy.

Box 1 – Impacts and Opportunities emerging from the COVID-19 pandemic for the Blue Economy in the GCC region

The pandemic, with its manifold consequences, has affected Middle Eastern countries' economic plans and timelines. The main source of economic stability in the region has been oil production and exports for many decades. In recent years, Middle Eastern countries had increasingly been seeking to diversify their economies, to decrease resource dependency on the black gold, and had been implementing new reforms and economic development plans to attract foreign investment. In the post COVID-19 era, it is expected that the countries will focus more on new fields, including attention given to the Blue Economy.

The disruption of the pandemic has affected various traditional and emerging sectors within the blue economy. Globally, Covid-19's impact on tourism has caused on average a 25% drop in income, amounting to a $7.4 billion loss, and could put 75 million jobs at risk. Once the pandemic is over, it could take 10 months to two years for the tourism industry to recover, with effects felt especially at the level of Small and Medium-sized enterprises.

According to Gita Gopinath, economic counsellor and director of the IMF's Research Department, the so-called "Great Lockdown" will represent "the worst recession since the Great Depression, and far worse than the Global Financial Crisis". Among the Gulf Cooperation Council states, Qatar is predicted to see a 4.3% contraction in its economy this year – a worse outcome than forecast for the UAE (-3.5%), Oman (-2.8%), Saudi Arabia (-2.3%) and Kuwait (-1.1%)[3].

[2] In accordance with the *EU Blue Economy report 2020*

[3] World Economic Outlook, April 2020: The Great Lockdown, IMF, 2020

An EU funded project mana Service for Foreign Policy Instruments (FPI) Implemented by GFA CONSULTING GROUP DMI CEPS

In the GCC countries there has been an increase in the cost of marine insurance since both the logistics challenge and risk have increased. Ships' crew wages have also been raised. The fishing industry has been critically affected, and reports confirm an increase in illicit fishing during the crisis, which directly disturbs the sustainability of the sector.

The effects on the already vulnerable food security situation in the region, mostly due to its extensive dependence on imports from the region and worldwide, as a result of the unfavourable climate, soil and water availability conditions for agricultural production locally, have been felt from the early days of the pandemic, mostly in the sense of reduced security, rather than shortages. Disruption in food exports and the tendency of many exporting countries to ensure that food reserves remained secured for their own populations, led to insecurity about the possibility to procure sufficient food supplies.

The GCC-Stat forecast of GDP growth suggests that, taken as a whole, the GCC economy will contract by 0.4% in 2020, before it could slowly rebound in 2021 if the pandemic is effectively contained. A significant factor is that the ongoing spread of the virus, with its associated unknown consequences, has led to a fall in consumer confidence and spending.

The tourism and hospitality sectors are two of the most significantly affected, due to the closure of borders, especially in Dubai, where the 173-day EXPO 2020 has been postponed till 2021. The UN Economic and Social Commission for West Asia (UNESCWA) estimates that the economic slowdown caused by the pandemic will cause an additional 8.3 million people to fall into poverty in the Arab region.

The double crisis of the coronavirus pandemic and the collapse in the price of oil have hit the GCC countries hard. However, within the challenges posed by these crises lies the opportunity to reshape both the direction and speed of future economic recovery and the economic diversification agenda in the region. This opportunity to reshape the future of the GCC is timely and cannot be missed.

Some indicative reforms that can be implemented as a response to the COVID-19 pandemic while also boosting significantly the Blue Economy are to:

- Implement new laws and policies to encourage corporate companies to shift their businesses to a sustainable and inclusive blue economy.
- Support vulnerable businesses within the blue economy.
- Embrace innovation and technologies for ocean business and the environment.
- Allocate budgets for science, research and development.
- Reinforce Marine Spatial Planning within the region.
- Create innovative financing solutions dedicated to the ocean's economy.
- Enhance collaboration between the public and private sectors, civil societies, and local communities.
- Develop e-learning within the various sectors of the blue economy.
- Encourage new skillsets along within the value chain of the blue economy.

On 1 May 2020 (International Labour Day), ships around the world sounded their horns for fifteen seconds in recognition of the efforts of seafarers to maintain supply chains and keep maritime trade going during the pandemic. Amidst the disruption, difficulties and tragedy, people's resilience and the stories of heroic acts have continued to inspire.

Covid-19 was a wake-up call and a reminder of the importance of the clean oxygen that we breathe. Over 50%of it comes from the seas, therefore there is no healthy planet without a healthy ocean. We must continue to take all steps necessary to protect our marine environment, despite the present challenges.

Most of the Gulf countries have enough financial firepower to cope with the challenges they now face. In a recent research note, Ahmed Esam, assistant economist at Oxford Economics, said "GCC countries, with the exception of Bahrain due to its affected manufacturing sector, are the most

resilient in the MENA region to structural shocks owing to their stronger economic positions"[4]. It should be the case that while deploying the means to face up to this unprecedented challenge, the opportunity to establish a resilient and sustainable Blue Economy sector in the regions should not be missed.

[4] Middle East Set for Sharp Economic Fall Due To Covid-19 "Great Lockdown", Forbes, April 2020

4 - Gap analysis: EU and GCC practices in blue economy policy making

The European Union has been a leader in the field of the Blue Economy for more than a decade, having adopted specific policies and tools that allow the development of a number of mature (*Established*) and developing (*Emerging*) sectors of economic activities. By establishing regulation and legislation targeted onto the Blue Economy, in tandem with other EU policies related to broader issues, such as food, finance, and space technologies, it has made significant advances in the development of all sectors, as well as in their governance, socio-economic and environmental aspects.

The present chapter is looking at the key policies and tools developed and in use by the EU for the development and regulation of the Blue Economy, and compares those policies and tools with what is the current state of play in the GCC region and countries, aiming to identify the gaps and opportunities for collaboration.

4.1 - Blue Economy as an integrated sector

In the EU, the development of the Blue Economy and related Blue Growth refers to the long-term approach and strategy that support sustainable growth in the marine and maritime sectors as a whole. It is understood that the seas and coastal zones constitute important drivers for the European economy and have great potential for innovation and growth. The Blue Economy represents roughly 5.4 million jobs In the EU and generates a gross added value of almost €500 billion a year, and further growth is expected. It is for this reason that the development of policies and tools happens under an overall coordinated policy - the Blue Economy - which allows the combination of approaches between different sectoral or horizontal policies and approaches, which in some cases are specific to the maritime environment, and in some other cases are not.

The **Integrated Maritime Policy (IMP)** of the European Union is a holistic approach to all sea-related EU policies. It is based on the idea that the Union can draw higher returns from its maritime space with less impact on the environment by coordinating its wide range of interlinked activities related to oceans, seas, and coasts. Hence, the IMP aims at strengthening the Blue Economy, encompassing all sea-based economic activities.

By contrast, in the GCC region and countries, the Blue Economy is not yet addressed as an integrated sector. Although some work has started over the last decade, with focus beginning to emerge as a result of regional Blue Economy conferences and the hosting of global Blue Economy events in the region, an analysis of the strategic (Vision) documents of all six GCC countries reveals that activities pertaining to the development of Blue Economy are seen in most cases as self-standing economic activities and sectors, without reference to the common medium for their development, which is the maritime and coastal environment.

In this sense, the opportunities for developing policies that would allow the interconnection of sectors within the Blue Economy, as well as the connection of the overall maritime and coastal sector with cross-cutting national policies are lacking in most cases, and thereby the opportunities to reaping the combined benefits of balanced and sustainable development are to a large extent missed.

In addition, regional cooperation across the GCC countries for addressing the challenges related to the Blue Economy seem to be still at an early stage[5], with some references made specifically to Climate Change (but not in relation to the Blue Economy specifically), whilst other cross-border issues including marine pollution, biodiversity and fish stocks, and others are not addressed at all.

[5] Climate change: The game changer in the Gulf Cooperation Council Region, Hilal M.S. Al-Maamary, Hussein A.Kazem, Miqdam T.Chaichanc, 2017
Promoting GCC Regional Integration: An Environmental Perspective, Mohamed Abdelraouf, 2014

The need to develop integrated Blue Economy policies in the GCC region and within the countries themselves suggests a gap for which collaboration with the EU, the global leader in this field, will allow the transfer of know-how, experience and expertise, so that sectoral and cross cutting policies may be developed, and the appropriate tools for supporting the development of Blue Economy and the relevant economic activities can be significantly fostered, while ensuring the optimal use of financial, human and environmental resources, with the maximum benefit for sustainable growth of the economies, and diversification from the oil sector.

4.2 - Blue Economy Governance

Healthy seas and maritime and coastal environment ensure the long-term returns to society of economic activities such fisheries, extraction of minerals, transport and coastal tourism, as well as new, fast-growing industries such as offshore wind, ocean energy, and blue biotechnology. Pressures associated with resources over-exploitation, pollution and the effects of climate change are leading to declining ecosystems and ultimately, to a decrease in the well-being of societies.

EU policies, including the conservation of marine biological resources under the common fisheries policy, EU action under the Marine Strategy Framework Directive and the establishment of marine protected areas are key EU policies when it comes to protecting the marine environment. They are complemented by recent environmental legislation such as the Directive on single-use plastics to reduce marine litter.

The appropriate coordination among government institutions, the business sector, finance and investment, academia, civil society, and all stakeholders with involvement or interest in the Blue Economy sectors is paramount to achieve the implementation of such policies and ultimately sustainable use of maritime and coastal resources. The EU has engaged in a number of participatory governance processes, including not only the development of rules and regulations through the EU Institutions (European Parliament, European Council and Councils of Ministers) but very importantly the establishment of procedures for the involvement of Social and Economic stakeholders (for example the Economic and Social Committee – EESC, and various open consultation processes) through which such policies, legislation, and means of implementation are developed and constantly updated, therefore ensuring that all participate in the process of a sustainable Blue Economy.

At a regional and global level, the European Union is an active player in protecting oceans and shaping ocean governance. It has made progress by taking measures in a series of areas that are presented in the following section (4.3), including: maritime security, marine pollution, sustainable blue economy, climate change, marine protection, and sustainable fisheries; by working towards the United Nations 2030 Agenda sustainable development SDG14 goal on oceans, (Sustainable Development Goal 14: "Life below water"[6].); and by taking part in the development of international negotiations for the development of guidelines and legally binding instruments for the protection and management of seas and oceans. In encouraging the Blue Economy, the EU also recognizes the environmental responsibilities that go along with it.

In the GCC region, Blue Economy governance is still lacking to a large extent. Coordination among government institutions at a regional level, as well as among them within each country, and of those institutions with other socio-economic stakeholders as the ones mentioned above is at an early stage. Sectoral approaches (often described as *the silo effect*) are still predominant in the region, resulting to overlapping responsibilities[7], while the involvement of the private sector and of academia and civil society, although specifically mentioned in most strategic (*Vision*) documents of the countries, still needs to become part of the everyday application of policies. Specific connection to SDG14 and the sub-targets for the protection and sustainable development of the marine environment under the UN

[6] The official wording is to "Conserve and sustainably use the oceans, seas and marine resources for sustainable development".

[7] "Recognising that for many States transition to a Blue Economy will entail a fundamental, systemic change in policy, legal and governance frameworks", Blue Economy Abu Dhabi Declaration, 2014

2030 Agenda needs to be strongly enhanced within sectoral and cross-cutting policies, in the context of integrated Blue Economy policies, while the development of Blue Economy will also contribute to GCC countries' goals with regards to economic diversification and SDG8 goal (Sustainable Development Goal 8: "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all") targets for economic diversification, entrepreneurship, job-creation.

Finally, trans-regional cooperation in the GCC, with the possible exception of Climate Change action that is starting to appear as a field of cooperation, is not yet achieved: in terms of pollution control, effects of living (such as fishing) and non-living (such as mining) resource extraction, biodiversity conservation, maritime security, and other challenges, each country has developed to a varying extent national policies, but regional cooperation for addressing issues that go beyond the realm of national territories is mostly absent.

4.3 - EU Policies and Tools

Common Fisheries Policy (CFP)

The EU CFP aims to ensure that fishing and aquaculture are environmentally, economically, and socially sustainable and that they provide a source of healthy food for EU citizens. Its goal is to foster a dynamic fishing industry and ensure a fair standard of living for fishing communities. The CFP aims to make sure that fishing practices do not harm the ability of fish populations to reproduce.

Both fisheries and aquaculture are important activities in the GCC countries. In that sense, Oman for example, has a strong focus on developing its fishing activity towards a modern sector that will almost quadruple its contribution to the national GDP and attract young and trained Omani young professionals, while aquaculture is under rapid development in most GCC countries investing and developing the sector with examples such as Saudi Arabia having identified the sector as a priority targeting annual production to 40,000 tonnes and Bahrain having designated specific sites for aquaculture development[8].

In this context, drawing from the experience and expertise of the EU CFP to address existing gaps in relation to policies on fisheries and stock management, especially in trans-national waters could be important to make fast and efficient progress. Sustainable aquaculture development policies are also needed to establish the necessary sustainability principles and practices that will allow long-term sustainable yields, as well as quality control across the value chain, thereby making their products competitive at an international scale.

Marine Strategy Framework Directive (MSFD)

A key policy tool of the EU is the MSFD (also mentioned as the *Marine Directive*) under which the EU and member states aim at achieving Good Environmental Status of EU marine waters. The Directive defines Good Environmental Status (GES) as "*The environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive. This means that the different uses made of the marine resources are conducted at a sustainable level, ensuring their continuity for future generations."*

The Directive is based on the *Ecosystem Approach,* which involves consideration of all ecosystem components – physical and biological - in an integrated and holistic way, and a strong emphasis on stakeholder participation, and *eleven qualitative descriptors* which describe what the environment will look like when GES has been achieved:

1. *Biodiversity is maintained*
2. *Non-indigenous species do not adversely alter the ecosystem*

[8] See more in section 5.2

3. *The population of commercial fish species is healthy*
4. *Elements of food webs ensure long-term abundance and reproduction*
5. *Eutrophication is minimised*
6. *The sea floor integrity ensures functioning of the ecosystem*
7. *Permanent alteration of hydrographical conditions does not adversely affect the ecosystem*
8. *Concentrations of contaminants give no effects*
9. *Contaminants in seafood are below safe levels*
10. *Marine litter does not cause harm*
11. *Introduction of energy (including underwater noise) does not adversely affect the ecosystem*

In the case of the GCC marine and coastal environment, it is recognised by most national-level assessments that significant pressures are exerted to it, as economic activities within the Blue Economy spectrum generally tend to apply pressures on it, and properly regulated and appropriate mitigation measures need to be taken. Overfishing, discharges such as sewage, plastics, chemicals including POPs and nutrients, and pollution from industrial, harbour and energy production facilities, large-scale coastal zone transformation to reclaim land for real estate development, shallow water dredging and alteration in water currents, degradation of natural underwater ecosystems, diffuse noise and energy released underwater, and many other pressures are threatening the environmental status of the marine and coastal environment, and therefore jeopardize its capacity to provide services and wellbeing.

Developing a regional policy that will in turn inform the national policies on the model of the EU Marine Strategy Framework Directive, allowing the necessary components of policy and action to be undertaken at regional and national level, for example in addressing the transboundary character of pollution, and to identify focus areas in relation to critical threats, establish a regional system and methodology for data collection and analysis[9], and appropriate governance structures at a regional and national level for the coordination of efforts among different institutions and government authorities, is a field in which a significant gap could be addressed.

Marine Data and Knowledge

Comprehensive marine research, as well as the collection and integration of marine data, are key for the sustainable development of sea-based activities. Addressing this need, the EU launched the European marine and maritime research strategy in 2008. It suggests concrete measures and mechanisms to improve marine and maritime research, and the need to promote excellence in marine research and technology development.
The Strategy sets out:

- To address system complexity and interactions through enhanced integration of knowledge and research. It looks at bridging traditional boundaries between science and policymaking, science and technology, scientific disciplines, and industrial sectors. Means of promoting excellence, as well as multi-disciplinary and multi-sectoral research and innovation, are defined;
- To bring about new forms of governance in research that will seek consensus among all concerned parties and establish a continuous dialogue between scientists, policymakers, industrialists, and representatives from society.

In the GCC region, national efforts are starting to focus on research and data collection on marine and coastal systems, notably with the example of work in the King Abdullah University of Science and Technology (KAUST) and King Fahd University of Petroleum and Minerals (KFUPM) and the deployment of four research vessels in the case of Saudi Arabia, and the Kuwait Institute for Scientific Research (KISR) in Kuwait.

An integrated, appropriately planned and coordinated effort for research, collection of data and knowledge is still missing in the GCC. The region would certainly benefit from the use of data for addressing the numerous environmental and management issues related to the marine and coastal zone, and the establishment of a knowledge base as a guiding foundation for the development of

[9] See below analysis on Marine data and knowledge

appropriate policies and tools. Important results can also be expected from close collaboration with the EU along the lines of the EU marine and maritime research strategy.

Integrated maritime surveillance

A safe and secure marine environment is essential for the development of marine economic activities in the context of the Blue Economy. Integrated maritime surveillance aims to provide common ways to share information and data among authorities involved in different aspects of surveillance, such as maritime pollution and the marine environment, fisheries control, and law enforcement, amongst others.

The EU set out the guiding principles towards the development of a *Common Information Sharing Environment (CISE)* for the EU maritime domain since 2009. It intends to improve the efficiency and cost-effectiveness of maritime surveillance by enabling appropriate, lawful, secure and efficient data sharing across sectors and borders throughout the EU. Maritime CISE is also an important cornerstone of the *EU Maritime Security Strategy (EUMSS)*. Activities also need to be aligned with the *European Data Strategy* in an ever more-digital world.

Maritime surveillance is closely connected also with the **European Union Space Policy**, that seeks to promote EU space programmes worldwide, in particular *EU Global Navigation Satellite Systems (EGNSS)* by enabling market uptake for EGNSS-based products and services in high-potential markets and strategic target countries, and the *European Geostationary Navigation Overlay Service (EGNOS)* used to improve the performance of global navigation satellite systems (GNSSs), such as GPS and Galileo, the EU programme with global outreach that provides state-of-the-art satellite positioning, timing and synchronisation.

EGNSS are unique vis-à-vis other GNSS systems in that they are under civil control: indeed, they are entirely developed, financed, and managed by the EU and by the associated countries to the EU Space Programme. By comparison, all other GNSS are military in nature. This makes EGNSS more transparent and trustworthy to EU partners worldwide.

In connection with the need to secure dependable data and information for sustainable management of the marine and coastal environment and resources, and safe and secure maritime activity in the context of the Blue Economy in the GCC region, collaboration with the EU in terms of best practices for the establishment of Integrated Maritime Surveillance solutions and information sharing as appropriate on a regional level, will allow the GCC countries to provide a secure environment for attracting Blue Economy investment and business, and to address challenges of transboundary character, including pollution and climate change.

The EU policies and technology, operating under civil control, offer the GCC countries a dependable and reliable option for collaboration in the field of cutting-edge space applications, including, for example, geo-positioning and maritime traffic security, sustainable management of fisheries and fish stocks, and early warning and mitigation of marine pollution incidents. Indicative sectors and application where such collaboration could bear significant results are:

- Coastal and Marine Exploitation and Preservation
- Fisheries with improved fleet and fish stock management
- Aquaculture
- Monitoring Coastal Urban environment
- Water Quality and Pollution control
- Coastal and Offshore Renewable Energy
- Air Quality
- Insurance and Response for Natural Disasters

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

Maritime Spatial Planning (MSP)

Increasing human impacts on the oceans, together with the fast-growing demand and competition for maritime space for different purposes, such as fishing activities, marine and coastal tourism, offshore installations and ecosystem conservation, underline the need for integrated management.

Maritime spatial planning is the process by which the relevant authorities analyse and organize human activities in marine areas to achieve ecological, economic, and social objectives. It is seen as an integrative process to cope with the increasing demand for maritime space from traditional and emerging sectors while preserving the proper functioning of the marine ecosystems.

Among others, MSP provides a number of advantages:

- Reduces conflicts between sectors and create synergies between different activities;
- Encourages investment – by creating predictability, transparency and clearer rules;
- Increases cross-border cooperation – between EU countries to develop energy grids, shipping lanes, pipelines, submarine cables and other activities, but also to develop coherent networks of protected areas;
- Protects the environment – through early identification of impact and opportunities for multiple use of space.

The EU has the intention of playing a leading role at global level. This is why the European Commission and UNESCO's Intergovernmental Oceanographic Commission (IOC) adopted a Joint Roadmap to accelerate MSP processes worldwide in 2017.

Regarding the GCC region, specific MSP activities have not yet been undertaken, although the pressures for space use in the marine and coastal area is high[10] and can be expected to grow significantly over the next few years, with more and more activities within the sphere of the Blue Economy being established at commercial scale. Such activities, with the advent of established and emerging fields such as tourism and recreation, aquaculture, blue bioeconomy, offshore energy, will be competing more intensively for space within the next few years.

The need to manage adequately the installation and operation of uses and activities to protect effectively the sensitive marine ecosystems of the GCC region, and to provide socially equitable livelihoods to coastal populations, will require proper spatial planning so that activities can be regulated and monitored regarding their effects.

Saudi Arabia has been elected in the Executive Board of UNESCO and strongly supports the IOC, thereby providing a good launch platform for the implementation of MSP policies in the region, and the development of MSP for all GCC countries in collaboration with the EU, offering them benefits from the latter's leading role globally.

Sea Basin Strategies

To meet the specific economic, social and environmental characteristics of its maritime waters, the EU has prepared Integrated Maritime Policy (IMP) sea basin strategies for all seas and oceans of the Union. A sea basin strategy is a region-tailored approach based on cooperation among countries within the same sea basin to address common challenges and opportunities towards the development of the maritime economy and marine environment protection.

IMPs include the *Baltic Sea Region*, the *Black Sea*, the *Atlantic*, the *Adriatic and Ionian Region*, the *Arctic*, the *EU's outermost regions*, the *western Mediterranean*, and the *Integrated Maritime Policy for better governance in the Mediterranean*. Through these regional strategies, the EU also establishes

[10] Managing the growing impacts of development on fragile coastal and marine ecosystems: Lessons from the Gulf, United Nations University 2012
Climate Change Threats, Opportunities, and the GCC Countries, Middle East Institute, 2008

closer cooperation with non-EU countries within shared sea basins, giving the IMP an international dimension.

As the GCC region has access to *Gulf of Oman*, the *Gulf of Suez*, the *Gulf of Aqaba*, the *Strait of Hormuz*, the *Red Sea*, and the *Arabian Sea*, within which all activities of the Blue Economy are carried out and will be intensified and multiplied in the near future, the need emerges for the region to establish, sooner rather than later, the process for developing, with the participation of concerned GCC members, Integrated Sea Basin Strategies. This, in conjunction with the development of Maritime Spatial Plans will make the institutional backbone and development platform for the establishment of a fully-fledged Blue Economy in the region, making it attractive for foreign investment and private sector business establishment.

Such a development will not only allow the appropriate planning and regulation of Blue Economy activities within a country's waters, but will have the additional benefits of:

a) reinforcing regional cooperation for the addressing of transboundary challenges,
b) allowing for economically, socially and environmentally optimization of use of shared resources for the development of economic activities, and
c) setting the basis for improved governance in the Blue Economy sector in the region.

From Blue Growth to sustainable blue economy

Blue growth is the long-term strategy adopted by the EU in 2012 to unlock the potential of the Blue Economy and support the development of sustainable marine and maritime economic activities. Lack of access to finance and a shortage of suitably skilled workers have been identified as blocking growth. In the blue economy, Member States are tackling this by developing maritime clusters, i.e., groupings of larger industries, smaller suppliers and educational establishments that can establish synergies by complementing each other's capacities and field of expertise, as parts of a broader value chain.

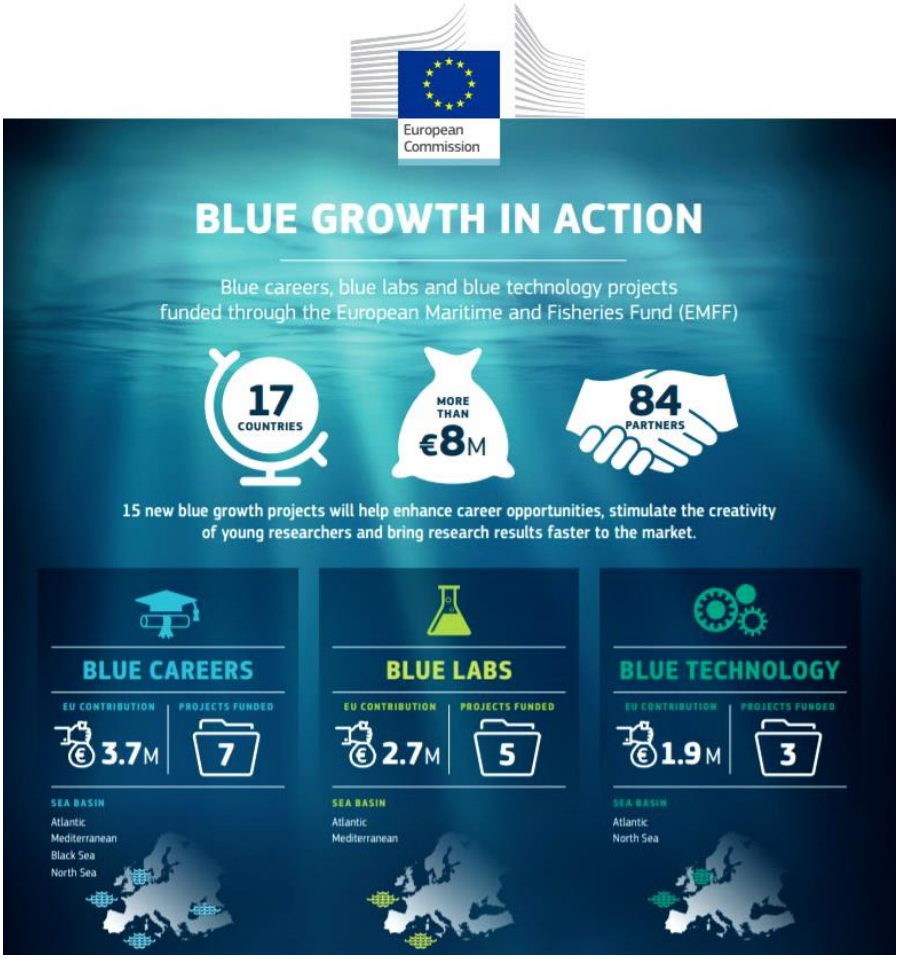
An analysis of the job-creation potential, as well as the potential for research and development to deliver technology improvements and innovation and the need for action at EU level, has suggested that five value chains could deliver sustainable growth and jobs in the EU blue economy:

- Blue energy
- Aquaculture
- Maritime, coastal and cruise tourism
- Marine mineral resources
- Blue biotechnology

In the context of the Blue Growth strategy, the annual call for proposals of the European Maritime and Fisheries Fund (EMFF) supports the sustainable development of the blue economy SMEs across the European Union. The aim of the call of proposals is to:

- Bring to market new products, services, processes, and business models in blue economy value chains and help advance their market-readiness;
- Develop sustainable and innovative blue economy in Europe's sea basins;
- Facilitate their access to other financing schemes for the next stages of their activities.

An EU funded project mana Service for Foreign Policy Instruments (FPI) Implemented by GFA CONSULTING GROUP DMI CEPS



The European Commission is preparing a new communication on Sustainable Blue Economy to contribute to the European Green Deal objectives and transform the blue economy value chains to make them more sustainable. It will scale up previous initiatives to further support sustainable finance, research and innovation and skills.

With the objective of the GCC countries to shift to a dynamic and private sector focused Blue Economy that will allow the diversification of their economies and build attractive sectors for qualified young professional and mobilise private investment from local and international sources, the model of the EU sustainable Blue economy of the EU along with a mechanism that supports the development of entrepreneurship and business in the Blue Economy is a key part of the development of the sector in the region.

As currently the process for the development of Blue Economy sectors is mostly government-driven, and the establishment of an innovation and entrepreneurship ecosystem is unlikely to result from this process, drawing on the very successful example of the EMFF and establishing relevant structures at regional and national level in the GCC can provide a very strong boost to the Blue Economy sector in the region.

Investment - Blue Economy Finance Principles (BEFP)

The Sustainable Blue Economy Finance Principles are the EU's standard proposition to invest in a sustainable Blue Economy. Launched in 2018, they are the world's first global guiding framework for banks, insurers, and investors to finance a sustainable blue economy. They promote the implementation of SDG 14 (Life Below Water), and set out ocean-specific standards, allowing the financial industry to mainstream sustainability of ocean-based sectors.

The Principles point the way to what 'sustainable investment' looks like in an ocean context. The goal is to ensure that Blue Economy investment delivers long-term value without having a negative impact on marine ecosystems, on efforts to reduce carbon emissions, or on ocean-based businesses of all sizes and the livelihoods of people who depend on them. The Principles are also intended to support the development of financial instruments and development models that prove most effective in the context of ocean investment, notably in emerging fields such as marine renewable energy and blue bioeconomy, where the stakes are even higher.

Arab bankers and representatives of central banks pledged at a forum convened in July 2018 in Egypt, to work together to develop a regulatory framework to encourage the Arab financial sector to actively contribute to financing sustainable development projects. The meeting discussed the issue of financing Sustainable Development in Arab Countries, and held consultations on its findings, which were reflected in the recommendations.

As GCC regulators are preparing to engage significantly in the development of Sustainable Development finance and investment, it is an opportunity to adopt good practices. In this context, and complementary to the development of the sector, working with EU to develop policies for finance and investment along the lines of the BEFPs can provide a significant boost to the attractiveness of the GCC region in terms of investment for Blue Economy activities, and assuring the long-term viability of such endeavours.

An interesting case for the GCC region and collaboration with the EU know-how is the possibility to develop blue finance approaches and products in agreement with the Sharia principles. Sharia principles are generally aligned with sustainable resource management. Most local banks have Sharia advisory boards or councils to provide direction and advice. The modernization of the finance and capital markets that has been undertaken in most GCC countries sets a good basis for the development of such a targeted capital market, with the Islamic economy being one of the fastest-growing tranches of the global economy.

Climate Change

In December 2019, the European Council endorsed the objective of achieving a climate-neutral EU by 2050, on the basis of the Intergovernmental Panel on Climate Change (IPCC) Special Report on 1.5°C. As part of the European Green Deal, the Commission intends to propose an increase to the EU's 2030 target to at least -50% and towards -55% compared to 1990 levels, in a responsible way.

The EU has already been on a path towards climate neutrality through economic transformation and modernization. Between 1990 and the end of 2018, greenhouse gas emissions in the EU dropped by 23%, while the economy grew by 61%. Even if the reduction of greenhouse gas emissions in Blue Economy sectors has often been less drastic, it demonstrates that economic output has been decoupled from greenhouse gas emissions.

In the EU's water transport sector (inland water and coastal water transport), between 2009 and 2017 turnover for the sector has increased by 17.3 % (from €97.6 billion to €114.3 billion) while greenhouse gas emissions (CO2e) per unit of turnover decreased by 16.4% again underlining the decoupling of the sector's output from greenhouse gas emissions. Similarly, for the EU's capture fisheries and aquaculture sector the GVA of the two combined increased by 41.5% (from €4.7 billion to €6.6 billion) while greenhouse gas emissions in terms of CO2e increased by just 0.5%, representing a decrease of 29 % of CO2e per unit of GVA.

In February 2021, the European Commission adopted the new EU Strategy on Adaptation to Climate Change, with the vision that in 2050, the EU will be a climate-resilient society, fully adapted to the unavoidable impacts of climate change. It will do so by making adaptation smarter, more systemic, swifter, and by stepping up international action. The strategy contains many actions to achieve this, among others in the field of providing data, supporting the improvement of adaptation strategies and plans of Member States, climate proofing of new and existing infrastructure and coordination with civil protection and disaster risk prevention. Also cooperation with the financial sector, stimulating cross-border cooperation and international cooperation are important elements of the new strategy.

Regarding Climate Change impacts, The CERES project (*Climate Change and European Aquatic Resources*) provides a cause-and-effect understanding and management responses on how climate change will influence European fish and shellfish resources and the economic activities that depend on them. Other projections show that EU coastal zones will be severely exposed to the effects of climate change, such as sea level rise, increase in frequency and severity of storms, marine heat waves, and acidification. Sea levels in Europe are expected to rise between 0,4 and 0,8 m by the end of this century and will very likely continue to rise in the future.

The projections and results from this analysis call for the development of coastal regions to be planned taking into account climate adaptation, to prepare for the present and expected climate change impacts, such as rising sea levels, storms and the stress on marine and coastal ecosystems. In this context, *Maritime Spatial Planning* can offer a coherent framework to combine both hard defense and nature-based solutions integrated alongside a continuous, iterative, and dynamic planning process that is based on the best available evidence (including environmental impact and risk assessments, scientific data, sectorial information, and local knowledge).

In the GCC region all countries start to become significantly engaged, with national *Vision* documents discussing in different ways the need to address the challenges of climate change (both mitigation and adaptation), and some - notably Saudi Arabia and Qatar - proposing regional collaboration to this end, and other countries engaging in specific actions and sectors for the same purpose - for example, UAE with ports, shipping and renewable energy. In this context, sharing the know-how of the EU, the global leader in Climate Change mitigation and adaptation policy and planning, may be very timely and efficient in terms of results, cost and technology development and application.

Issues such as carbon sequestration value per tonne of CO_2 in economic production and in quantifying the value of ecosystems, mitigation measures including flood control from both extreme rainfall and sea level rise, coastal erosion, and the development of nature-based solutions (mangroves, sea grass, natural & artificial coastal wetlands), acting on shipping emissions as well as all other sectors of the economy[11], and a regionally adapted Emissions Trading System (ETS), are some fields in which the experience and expertise of EU in policy development as well as solutions on the ground may be of interest for both sides.

Farm to Fork Strategy

The capital-rich GCC countries, with little or no foreign exchange restrictions for food imports were thought to be less vulnerable to price risk than other food importers. Bridging shortfalls in domestic food

[11] As per Directive (EU) 2018/410

production by imports was a commonplace strategy. As late as 2018, the GCC countries were considered among the most food secure in the Arab world and in the world.

Food security in the region first became a pragmatic concern following the 2007-2008 global food crisis. As it exposed the high dependence of GCC countries on imports, the need to increase the local production and to limit food imports became apparent. Yet, in the GCC region agriculture is limited by natural resources, including limited water and unproductive soils, while fisheries and aquaculture are not yet developed to productivity levels sufficient to ensure food security.

Even more critical to GCC food security is the availability risk, in the sense that import-dependent countries may not be able to import food even when funds to purchase it are not an issue. The Covid-19 crisis, with impacts of food production and exports in the region, and reduction of available funding reserves and deficits in relation to the oil exports-dependent economies of GCC countries being strongly affected by the low oil prices globally, has further exacerbated the need of the GCC region to secure sufficient food sources, but also the need for sustainable ways of doing so.

The EU *Farm to Fork (F2F) Strategy* addresses the challenges of sustainable food systems and recognizes the links between healthy people, healthy societies, and a healthy planet. The strategy is also central to the EU agenda to achieve the United Nations' Sustainable Development Goals, especially SDG2 ("End hunger, achieve food security and improved nutrition and promote sustainable agriculture"). All citizens and operators across value chains, in the EU and elsewhere, should benefit from a just transition, especially in the aftermath of the COVID-19 pandemic and the economic downturn. A shift to a sustainable food system can bring environmental, health and social benefits, offer economic gains and ensure that the recovery from the crisis puts the EU and its food value chain in a sustainable path. Ensuring a sustainable livelihood for primary producers, who still lag in terms of income, is essential for the success of the recovery and the transition.

Putting the food systems on a sustainable path also brings new opportunities for operators in the food value chain. New technologies and scientific discoveries, combined with increasing public awareness and demand for sustainable food, are expected to benefit all involved. Some key aspects of the F2F strategy include:

- a neutral or positive environmental impact;
- mitigating climate change and adapting to its impacts;
- reversing the loss of biodiversity;
- ensuring food security, nutrition and public health, making sure that everyone has access to sufficient, safe, nutritious, sustainable food;
- preserving affordability of food while generating fairer economic returns, fostering competitiveness of the EU supply sector, and promoting fair trade.

Therefore, as the GCC region is currently aiming to develop its food security by making a significant turn into increased productivity of its food sector, modernization of agriculture, farming, fisheries, and aquaculture, and establishing a modern and efficient food value chain, working closely with the EU in terms of the overall F2F Strategy with relevant policies and introduction of the most efficient technologies, adapted to the GCC region specific conditions, is a field of extreme importance.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

5 - GCC Blue Economy policy context and contribution that EU and the International Ocean Governance can make

Having already examined in the previous chapter the gaps, differences, and opportunities that exist in terms of key policies regarding the Blue Economy in the EU and how those have been developed, or not, in the GCC region, this chapter focuses into the specifics: with an aim to make an assessment of the policy context for Blue Economy in the GCC region, and to be able to analyze and discuss the contributions that can be made from the part of the EU and the International Ocean Governance, this chapter is divided in two sub-sections:

The first section looks at a *Regional* level as regards the Blue Economy in the GCC region, by examining all the activity sectors that constitute the current *established* pillars of the Blue Economy, by complementing those with the ones that appear to be the key *emerging* ones, as they may also develop into significant socio-economic sectors in the near future. Through this analysis, the first section allows the identification of EU practices and policies that may be activated in each case and supported by International approaches.

The second section looks into the *Country* level of this analysis, presenting and discussing the specificities of each of the six GCC States in terms of the key sectors opportunities and needs, complementing the regional approach. This is expected to give a more on-the-ground insight to the reader as regards the specific opportunities and needs for the involvement of the EU in the development of the Blue Economy sector in the region with optimal benefits for the policymaking and the economies of all GCC States.

5.1 - Regional level

Established sectors

Marine living resources

All six GCC countries look into the need to ensure and reinforce their strategies for food security. Due to the restrictions imposed by climatic conditions and the lack of plentiful water resources and the limited productivity of soil in large parts of the region, these countries have been looking into ways to secure a steady and efficient stream of locally grown produce, including to modernize and develop the production from marine food resources, from either capture fisheries or aquaculture, or both. Other fields, including the development of innovative food sources, such as biotechnology and algae production, amongst others, are also considered in some cases, as described below in the *emerging* sectors.

Fisheries

In the field of fisheries, challenges include the development of national programmes for the optimum and sustainable exploitation of fisheries in view of the limited fishing areas and the depletion of fisheries and stocks. The FAO estimates that globally approximately 52 percent of fish stocks are fully exploited and another 17 percent are over-exploited, depleted and in some cases recovering, with numbers presenting a more acute situation in the Western Indian Ocean at 57 percent and 30 percent respectively [12]. Fish stocks are further exploited by illegal, unreported, and unregulated fishing (IUU), responsible for roughly 11 to 26 million tons of fish catches annually, or US$10-22 billion in unlawful or undocumented revenue.

Commercial fisheries that contribute to the domestic fish production have not been fully developed in the region, and in many cases are underdeveloped and using old technologies, and in general lacking modernization. Coupled with limited availability of some of the necessary equipment and services for fishing vessels, including Vessel Monitoring Systems (VMS) and catch reporting tools, this leads to sub-

[12] Review of the state of world marine fisheries resources, United Nations Food and Agriculture Organization (FAO), 2012

optimal use of fishing effort and fish stock resources, including bycatch, and loss of value due to missing of basic infrastructure, such as cold storage onboard, which is sometimes rooted to cultural bias.

Landing locations and fishing ports need modernized equipment and essential services, including registration of fish landings, cold storage and an efficient value chain, including processing, fish manufacturing, and packaging close to the landing areas, thereby securing freshness and quality, leading to higher values of fish catches and their export potential. Logistical support for efficient transportation with specialised cold storage units and rapid delivery to local and export markets is also needed.

Traceability, especially with the use of modern technologies and IoT solutions, including tagging and blockchain registration, could provide a particularly important boost to the industry and creation of value and contribution to the GDP.

An overall combination of catch recordings and produce traceability, in connection to sustainable fisheries management with modern tools including VMS/satellite location and activity monitoring and registration, data analytics for recording fishing effort and stock assessment, are fields that need to be addressed at the national level through the reinforcement of national research and monitoring facilities in combination with the review of fishery legislation and enforcement of effective sustainable management laws and practices. Regional collaboration, especially for pelagic stocks such as tuna, needs to be upscaled and promoted.

Aquaculture

Aquaculture is a relatively new and still under-developed field in the region under examination, coupled with the fact that each country has its own constraints and priority issues for developing aquaculture. Thus, differences are significant in the rate of its development in the region, although aquaculture remains a potentially important field of the Blue Economy activity in some states (Saudi Arabia, Oman) and a field with strong development potential in others (UAE, Bahrain). With a view to promoting this industry in Oman, UAE and KSA, the respective governments have been investing on improving some aspects, such as developing technologies and providing fingerlings of local species, creating and establishing a legal framework for aquaculture, relaxing institutional and investment constraints, and mapping out suitable sites for aquaculture production.

However, limitations to this endeavour include restricted availability of appropriate sites, insufficient tidal amplitude for land-based culture and restrictions in the availability of suitable marine sites. Added to these, are the high ambient temperatures that pose limitations to the feasibility and productivity of land-based Recirculating Aquaculture Systems (RAS).

To date, it is no surprise that the local banks seem to be reluctant in regards to investing in aquaculture, especially at the hatchery stage where the production can be uncertain and pose an investment risk. Government support and incentives are therefore necessary as they can provide a significant boost to the industry, and this certainly provides a definite field for the development of sustainable investment.

Additionally, developing the support industries for aquaculture, that is machinery, equipment, spare parts, and very importantly fish feed, which constitutes one of the greatest parts of expenditure in aquaculture, is needed and may constitute a very important business sector for the Blue Economy in the region. It is worth noting that currently, Saudi Arabia is the only country that produces fish feeds in the region.

Environmental control, regarding the protection of fish produce from adverse or unstable environmental conditions, is also needed. For example, fluctuating air temperature and increased water evaporation rates can induce water temperature and salinity, and thus algae blooms - in 2008 to 2009 the coasts of Oman and UAE was affected by red tide algae bloom that devastated the marine life. Pollution control and protection from accidental release of alien species to the marine environment are also needed for furthering the development of the sector.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

Some other key challenges and opportunities facing aquaculture in the region include: more research towards improving production efficiency of the currently cultured species, and development for new species with high market potential, better adapted to local conditions, sustainable practices based on global standards certification, labelling and traceability, marketing to increase public awareness as well as the issues of fish and fish products processing, and logistics and transportation. Further analysis at a country level is provided in section 5.2 regarding aquaculture.

Climate Change and Renewable Energy

Challenges related to climate change, including both long-term changes such as sea level rise, and acute and present challenges, such as intense and frequent weather events, are considered important in the region[13], especially as changes specific to the region, including in sea temperature, acidity, and major oceanic currents among others, threaten marine life and habitats, also related to the development of fisheries and aquaculture. In response to the need for mitigating climate change and in order to limit the effects in the GCC countries, it is important to focus, among other things on the development of renewable energy sources.

As it was already mentioned, in spite of the abundance of oil and gas resources and decades of high economic dependence on their export revenues, the hydrocarbon-rich GCC states have recently started looking at the need for transition towards into a climate-resilient green economy in order to achieve the necessary diversification from oil, and a better quality of life, as evidenced in their Vision programs, and this includes plans for renewable energy development.

Since the 2014 drop in oil prices, Gulf countries have begun to develop renewable energy commercially; between 2014 and 2018, the total renewable electricity installed capacity in the Gulf Arab states has almost tripled.

Country	Installed renewable energy capacity as of the end of 2014 (megawatts)	Installed renewable energy capacity as of the end of 2018 (megawatts)	Share of renewable energy within total energy mix	Renewable energy target by year (megawatts)	Percentage of target achieved
Bahrain	6	6	0.1%	196.05 (2025)	3%
Kuwait	0	79	0.4%	11,000 (2020)	0.88%
Oman	1	8	0.1%	2,600 (2024)	0.3%
Qatar	42	43	0.4%	1,800 (2030)	2.4%
Saudi Arabia	24	142	0.2%	9500 (2022)	1.5%
United Arab Emirates	137	589	2%	11,880 (2050)	5%

Source: IRENA

Additionally, domestic consumption of oil in the GCC has commenced posing problems as consumption of oil products reduces the amount of oil available for export, creating a significant opportunity cost for oil exporting countries. This is of particular importance in the case of desalination, with estimates indicating that by 2030 desalination could absorb close to 50% of local oil and gas production to secure freshwater resources[14]. Addressing these needs has been viewed with an additional urgency since 2014, when oil prices plunged by more than 56 percent from a peak of $155 a barrel, resulting in reduced oil export revenues and state budget deficits. The increase in domestic demand for oil and gas,

[13] Climate Change Threats, Opportunities, and the GCC Countries, The Middle East Institute Policy Brief, 2008

[14] See section 5.3 on Saudi Arabia

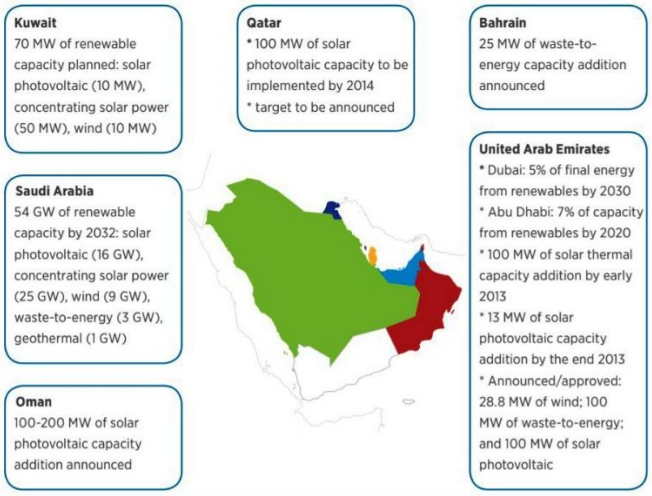
especially for electricity and water desalination, has seriously challenged the pursuit of ambitious economic diversification plans, such as downstream oil industries and the production of petrochemicals, also requiring oil and gas resources for their operations.

All GCC countries, with the exception of Qatar, are now faced with a shortage of low cost natural gas, due to the rapid growth in demand for power, high usage of gas reserves for enhanced oil recovery, heavy consumption of natural gas in the steel, aluminum and petrochemical industries, the technically challenging development of non-associated natural gas fields, and long-term natural gas export commitments in countries, such as the UAE and Oman.

According to both the International Monetary Fund (IMF) and the International Energy Agency (IEA), GCC energy subsides for oil, natural gas, and electricity in 2011 alone exceeded USD $100 billion with electricity subsidies alone reaching almost USD $30 billion in the same year[15]. However, the fiscal burden associated with such energy subsidies became unsustainable in GCC countries, resulting in a wave of reform measures since 2015 forming the key policy for distributed renewables in the GCC.

Due to the above-mentioned need and the significant decline in the cost of renewable energy technologies, the Gulf states have developed both small and large-scale renewable energy projects, thus breaking global records in terms of the cost of energy produced from renewable energy projects[16].

Although the technologically mature offshore renewable energy solutions (mostly offshore wind and floating PV) are practically not yet introduced on the GCC region, there is significant potential due to the littoral (shallow waters) and the wind and solar irradiance conditions. Capacity targets currently relate primarily to land-based solar and wind energy technologies given the excellent regional potential for these resources. However, sovereign funds from the GCC region have invested significantly in offshore wind projects elsewhere[17].



Source: IRENA - Renewable Energy in the Gulf: Facts and Figures

While it is clear that GCC countries have ambitions for adoption of renewable energy in their power sectors, a more structured approach is needed for supporting policy development. Across the GCC, the lack of a structured and documented approach to policy formation is a key hindrance to the wider

[15] Renewable energy policy trends and recommendations for GCC countries, S. Griffiths, 2017
[16] The LCOE (Levelized Cost of Energy) for Saudi Arabia's first solar project, Sakaka, was 2.34 U.S. cents per kilowatt hour, one of the lowest costs in the world
[17] Masdar's offshore projects include the London Array and the Dudgeon Offshore Wind Farm in the United Kingdom. Masdar is also a partner in the world's first floating offshore wind farm, Hywind Scotland, which became operational in October 2017.

adoption of renewable energy support policies. Renewable energy policy design continues to evolve and adapt to the rapidly falling costs of renewable energy technologies and lessons learned from government support mechanisms already implemented[18]. Governments are no longer focused primarily on bridging a cost gap between renewables and fossil-based energy production. Interestingly, the major trend in renewable energy policy design is supporting the sustainable integration of cost-effective renewables into energy systems at a minimal burden to government finances. This trend is most relevant to the power sector where renewable energy technologies, such as solar and wind, are becoming economically viable in multiple geographies at a rapid pace.

As mentioned, the Gulf Arab states' progress in renewable energy development over the past few years has been strictly linked to oil price fluctuations, and the need to free up oil and gas for export and to fuel the growing petrochemical industries. However, a future of total reliance on renewables or other non-fossil fuel resources (nuclear, for example) is hard to imagine for the Gulf Arab states because profits generated from renewables are most unlikely to outweigh those gained from oil and gas exports in the near future.

Nonetheless, it is advantageous for Gulf Arab states to maintain momentum in pursuing renewable energy projects and advancing strategies and policy frameworks that support their development. This strategy has a two-fold impact: promoting renewables in the Gulf would not only ease economic vulnerability from fluctuating oil prices and enhance energy security, but also put Gulf states in line with the Paris Climate Agreement goals to cut greenhouse gas emissions and prepare the region to compete in a fossil-fuel constrained future.

Maritime Transport and Port infrastructure, Shipbuilding and Repair

Port authorities in the GCC are keen to engage in changes and development as customers demand more efficiency, while an increasing number of players in the region and beyond pose competitive risks. To this end, new technologies in the operational systems of GCC ports are of major importance, as well as regional and transboundary collaboration.

One way forward is through transport infrastructure investment which is projected to increase by about five per cent annually by 2025 at a global scale[19] according to PwC. The expenditure on seaport infrastructure will double as per its 2014 numbers. For instance, in the UAE only, approximately €53 billion (Dh238.7 billion) was invested in the country's maritime sector in 2017[20]. This is coupled with the transport sector in the region looking to engage into delivering more speed, transparency, efficiency, and effectiveness. And with the region playing a significant role in the industry, and its vital contribution to the Belt and Road Initiative[21], growth of the sector is expected.

Focused on economic diversification, the GCC's post-oil dependent economic strategy aims to boost foreign direct investment (FDI) by attracting funds and international partners for infrastructure projects. Saudi Arabia and the UAE pursue a more active geopolitical role that has to be supported by increased maritime power and seafaring expertise. As the GCC is trying to pivot to the East with a focus on the Western Indian Ocean (including the Suez Canal, the Red Sea, the Gulf of Aden, the Gulf of Oman, the Arabian Sea, the Arabian Gulf), a new era dawns in terms of energy exports, trade, and new market routes. GCC's maritime competition in the Western Indian Ocean dictates new alliances with Eastern African and Asian players, adding to the traditional map of rivalries in the Indian Ocean (China vs India, India vs Pakistan). And this competition can be traced along three routes of geostrategic influence,

[18] The GCC countries RE-readiness: Strengths and gaps for development of renewable energy technologies, Mondal et al, Renewable and Sustainable Energy Reviews, 2016

[19] Assessing the global transport infrastructure market: Outlook to 2025, PwC, 2015

[20] UAE Ministry of Energy and Infrastructure

[21] The Belt and Road Initiative, reminiscent of the Silk Road, is a massive infrastructure project that would stretch from East Asia to Europe.

namely through commercial ports, military agreements and bases, and blockage or choke points (e.g., Hormuz Straight, Bab-el-Mandeb, Suez Canal.)

A first step towards investment in infrastructure is capacity expansion. As GCC economies are aiming to diversify economic activity away from oil and hydrocarbons, larger berths and container terminals enable more vessels to dock at ports and greater quantities of cargo to be processed. To this end, in 2018, Khalifa Port (Abu Dhabi) engaged into an investment agreement with COSCO (China) to grow its handling capacity to 9.1 million TEU[22] over the next five years. Dubai's Jebel Ali already handles 19.3 million TEU and was expected to add another 3.1 million TEU by the end of 2019. Saudi Arabia and Kuwait are also seeking to grow capacity, while in Oman work is progressing on the Sohar South development, a 250-hectare expansion. The port authorities are now looking towards bringing in new customers from outside the region.

Smart infrastructure is expected to be at the core of the transformation in the ports and shipping industry in the GCC region with technology infrastructure accounting for a market size of $5.3 billion by 2024, from an estimated $1.7 billion in 2019[23]. As more and more port authorities aim at developing smart ports using by introducing disruptive technologies and developments including big data, artificial intelligence (AI), the internet of things (IoT), and blockchain, technological solutions regarding container termination automation and drone patrols offer a way of addressing long-term maritime trade-processing issues and improving operational efficiency and security. Ports including King Abdul Aziz Port in Dammam, Khorfakkan Container Terminal (KCT), Dubai's Jebel Ali and Oman's Salalah Port have all adopted port information and management software systems to provide real-time, holistic operational overviews.

GCC's focus on maritime infrastructure also goes hand in hand with large urban development projects, that combine commercial ports with new planned cities and mega projects. This includes city transforming investments such as the newly constructed King Abdullah Economic City (KAEC), NEOM in Saudi Arabia, and Duqm in Oman. In this context, innovative infrastructures, such as global container ports and free zones, have become the drivers and the enablers of the post-oil economic diversification and growth.

These developments have led to the emergence of cross-national partnerships and cross-border collaboration in the region: ports across the Arabian Gulf are teaming up for mutual benefit, working together to enhance all areas of the maritime sector, promoting an innovative strategy that brings about benefits, funding, and equality to all associated organisations. This emerging strategy, integral to the maritime industry moving forward, will significantly impact on creating strategic initiatives and boosting smart transformation across ports, thus tackling the pressing regional economic issues.

Additionally, addressing the environmental issues of shipping industry is becoming central for the GCC region ports. By improving and understanding the environmental aspects of the shipping industry, ports, operators and shipbuilding have to deal with speed reduction, fuel consumption, and new energy technology for environmental and economic benefits. Certainly, the environmental management system (EMS) is recognized by businesses as a key factor in gaining a competitive advantage over competitors. Moreover, technical, market-based instruments, and operational measurements (OM) are considered for mitigating harmful effects by shipping emissions. More efficient ship hulls, energy-saving engines and more efficient propulsion, emission trading systems and carbon levy schemes, as well as speed optimization or reducing ship speed, optimization of ship routing, logistics-based measures and use of low sulfur fuels are some of the practices considered.

Shipbuilding and Repair operations in the region are also starting to adapt to the new industry standards and clients' needs; for instance, international Maritime Industries (IMI) in Saudi Arabia aims to become one of the largest full-service maritime facilities, capable of competing against the world's biggest shipyards. This €4.2 billion mega-shipyard facility located at Ras Al Khair in the Kingdom is set to

[22] Twenty-foot equivalent unit

[23] The Smart Ports Market, Markets and Markets, 2019

become fully operational in 2022, and intends to align itself with the new regulations, creating high-utilization eco-efficient vessels, as the shipping industry is moving rapidly towards the IMO2020 regulation for reduced emissions. IMI is expected to generate 80,000 direct and indirect jobs by 2030 and is likely to make a $17bn economic impact. The nearly 12 million square-meter facility can manufacture four offshore oil and gas rigs and over 40 vessels annually including three very large crude carriers (VLCCs). It can also service over 260 maritime products. It is the largest combined drydock area in MENA with a combined lift capability of 2,150 tons.

Coastal tourism

Over the last decade, massive projects in tourism infrastructure development have been undertaken in many GCC countries in line with the fact that all GCC countries have begun to establish national tourism development strategies and have tremendously expanded tourism through the adoption of positioning / re-positioning strategies for tourist destinations and niche tourism initiatives[24]. Sport, leisure, event, hospitality infrastructures, and large-scale urban development have become a priority in such large-scale tourism initiatives. Ferrari Land, Formula One, Atlantis Dubai, Sharjah Biennale, the Asian Games, and the forthcoming Football World Cup are well-known examples of these GCC tourism mega-projects. These coupled with more than 12 sites in GCC countries listed on the UNESCO list of world cultural heritage make the region a hub for tourism and certainly in recent years, GCC countries have collectively seen an influx of millions of tourists, with increasing number of visitors in most destinations. The number of international tourists increased from about 8.6 million in 1995 to almost 32 million in 2012[25].

Indeed, tourism development provides opportunities for GCC countries to diversify away from single resource economies. It also offers ways to help solve their socio-economic problems, such as unemployment. However, there are differences in how the GCC countries see tourism. For Kuwait, Saudi Arabia, Qatar, and the United Arab Emirates, and to some extent for Bahrain, tourism growth is economy-driven, in the sense that oil-related economic growth is the main way to invest in tourism and sustain tourist inflows, while the case of Oman differs by being a more self-developing industry[26].The direct contribution of the tourism industry to the GDP of the GCC countries is relatively small compared to oil, ranging from 1.5 per cent for Kuwait to about 4.1 per cent for UAE in 2015[27].

In the GCC, the effects of the COVID-19 pandemic were felt very significantly on tourism. PwC had estimated in April 2020 [28] that tourism revenue may decline by $14 billion to $17 billion (excluding airlines) assuming the pandemic would last for two quarters, which represented a drop of over 30%. In addition, up to 400,000 tourism-related jobs in the GCC region could be lost, at a time when unemployment levels are already high. These numbers, along with the significant delays in regional mega-events such as the Dubai 2020 Expo, will be significantly aggravated with the prolongation of the pandemic effects into 2021.

Despite the efforts of GCC countries to diversify their economies by focusing on sectors such as financial investments, Sovereign Wealth Funds (SWF), aviation, logistic zones, transport, and knowledge-based sectors, the tourism industry has emerged as an easy, straightforward, and resilient economic diversification tool among most of the GCC countries. However, the industry faces various challenges because of the distinctiveness of the political and socioeconomic structures of the GCC

[24] International Tourism Development in the GCC: Opportunities and Challenges; Gulf Research Center: Cambridge, UK, 2013

[25] International Monetary Fund. World Economic Outlook Database, IMF Data and Statistics; International Monetary Fund: Washington, DC, USA, 2015

[26] Is Tourism Development a Sustainable Economic Growth Strategy in the Long Run? Evidence from GCC Countries, Abdulkarim K. Alhowaish, Department of Urban and Regional Planning, University of Dammam, 2016

[27] The World Travel and Tourism Council–WTTC. Yearbook of Tourism Statistics; WTTC Database: Madrid, Spain, 2015.

[28] How the GCC's travel and tourism industry can get ready for the post-COVID-19 recovery, Strategy&, PWC

countries in terms of the *rentierism* system[29]. Indeed, because the hydrocarbon industry is characterized as a heavily capital-technology-intensive business, as opposed to labour-intensive ones, there were high expectations for the tourism industry to create jobs for nationals and avoid the influx of large numbers of foreign workers into the GCC countries, especially as most of the GCC countries lack agricultural development due to their climates and the desert landscapes in the region. This expectation has been mitigated by limited success because of massive hidden unemployment rates in the public sector where most nationals are employed, and the implication of the mechanism of the dual labour market in the context of the GCC countries. The dual market problem is identified as: one labour market for nationals, who are employed almost exclusively by the public sector and enjoy high salaries and improved work conditions, and another labour market for the private sector, which employs almost exclusively foreign labour at lower salaries.

One factor that enhances the GCC region's appeal as a tourist destination, and indeed in relation to coastal and marine tourism is the climate that is moderate during the winter season. The sun, sand, and sea, the factors that make up the *Triple-S* Tourism, are abundant in the region, which is surrounded by the Arabian Gulf from the east, the Indian Ocean from the south, and the Red Sea from the west. In addition, the region's geographical proximity to Europe can attract more tourists. This enhances the GCC region tourism potential and competitiveness, especially with regard to Mediterranean destinations such as Turkey, Greece, Cyprus, Spain, and Israel. A supporting factor towards recreation and the coastal and marine tourism, is that GCC countries also developed MICE Tourism (Meetings, Incentives, Conferences, and Exhibitions) initiatives by hosting regional and international events such as the World Cup in Qatar, and Expo 2020 in Dubai (which was rescheduled due to the Covid-19 pandemic). Likewise, the aviation industry is considered an integral part of tourism in the GCC countries. Bahrain and then Dubai were the first destinations in the region to focus on the (stopover) market and develop different activities within the tourism industry.

In line with the emergence of cross-national partnerships and cross-border collaboration in the region for ports, an initiative was launched during the GCC tourism officials meeting in Doha on May 13, 2015 for the development of intra-GCC tourism action plans. The focus of the meeting was on exploring mechanisms to enhance intra-GCC tourism, while building on the success of the Cruise Arabia Alliance, a regional collaboration that strengthens the Gulf's position as a cruise destination. The meeting also encouraged GCC officials to accelerate a joint GCC action to ensure that all member states benefit from mega events taking place in the region over the next decade, such as the Dubai Expo 2020 and the FIFA World Cup 2022.

Interestingly, the GCC national authorities are aware of the potential risk involved in creating a high level of intraregional competition in the tourism arena. To address this, they have recently decided to adopt a win-win approach to this problem by calling for cooperation and coordination in tourism development and marketing, as they believe that only through intraregional cooperation will they be able to secure an overall increase in the number of international cruise arrivals. This cooperation is being pursued in various projects, such as the joint Oman–UAE tourist visa. Given the fact that GCC countries have similar climate and natural resources, attracting international tourists may require some degree of specialization to offer unique services and activities. For the intra-GCC tourism policy to succeed, policymakers should formulate their tourism policy based on country-specific comparative advantages, rather than competitive advantages.

A competitive advantage to all these strategies and policies underway as regards marine-based tourism would be a GCC tourism framework that has yet to be designed based on the notion of sustainable tourism and managed following the three principles of sustainability. If the economic, social, and cultural benefits of sustainable tourism are the focus of the sustainable development of the sector, the tourism economy will be more sustainable and thriving. Thus, GCC governments should play a major role in boosting and maintaining the path of sustainable tourism and hospitality industry within their regional destinations.

[29] Distribution of the revenues of the hydrocarbon to citizens in the form of direct (schooling, health, etc.) and indirect (energy subsidies). For more discussion see chapter 6.

Given the importance to GCC economies of developing the tourism industry and the effects of the COVID-19 pandemic, governments need to intervene by looking into strategic ways that could turn the crisis into an opportunity, including:

- adjusting national policies to facilitate travel, for example by digitizing and enhancing the processes to issue travel visas, and to introduce new health and quality standards for tourism providers,
- building marketing and promotional campaigns related to sustainable tourism objectives and principles that can be launched at the crisis ending, and
- reassessing upcoming business and leisure events considering different scenarios for the end of the crisis.

Since EU treaties exclude any harmonisation of tourism laws and regulations between the Member States to create more uniform conditions in the tourism sectors and allow the EU only to support, coordinate or supplement the actions of the Member States, EU tourism policy is rather limited, consisting mainly of providing financial support or legislating through other EU policies affecting tourism and its sustainable development30. The EU has therefore taken a wide range of measures in the field of tourism, which also take its sustainable development into account. Following the entry into force of the Lisbon Treaty, the European Commission prepared an EU tourism strategy with the stated aim of retaining Europe's position as the world's number one tourism destination. In the framework of this strategy, the Commission has launched various projects and initiatives to provide support (mostly financial) for tourism in the EU. Such EU projects and initiatives could constitute an excellent basis for exchanges and sharing of experience and good practices between the GCC region and the EU in the sector of tourism.

Sustainable Finance and Investment

The shift of GCC countries towards a reorientation of the economic model, away from dependency of their economies from oil production and exports and diversification towards greener activities, creates the space for a viable market for green finance. Initially led by the UAE, the GCC over the past few years has been investing in renewables, particularly solar power, and already hosts an active and growing renewables market. However, the green bond market in the GCC is still in its infancy and lacks cross-border financing and the presence of institutional investors such as pension funds as seen in other developed capital markets. The first green bond in the region was issued in March 2017 by the National Bank of Abu Dhabi, for a total of $587 million. In green loans, Masdar in Abu Dhabi has received a green $75 million revolving credit facility (RCF) in September 2018 to fund its sustainability projects. In June 2020, First Abu Dhabi Bank issued the Gulf region's first Hong Kong dollar–denominated HK$750 million green bond.

The Blue Economy has already become involved with sustainable finance in the GCC region: DP World, Dubai's seaports operator, took out one of the region's first corporate green loans in 2018. The interest rate on the $2 billion borrowing was linked to the company's environmental impact through carbon emissions. However, specialized products targeting the Blue Economy sector, and indeed impact investment efforts related to specifically maritime and coastal activities, such as shipping, aquaculture, and offshore renewables are still not present in the region.

The GCC governments have laid groundwork for a green finance sector to support their sustainability targets. In October 2018, new legislation came into force in the UAE, providing a framework for sovereign bond and sukuk issuance (sukuk are financial instruments similar to bonds and shares that are compliant with Islamic law)[31] to facilitate development of its primary and secondary green financial markets. Another promising effort towards sustainable finance is the commitment of the Dubai government to take a lead and become a hub for the green finance in the region. The Dubai Green Fund, established by the Dubai Electricity and Water Authority (DEWA), is keen to play a key role in

[30] Tourism and the European Union, Recent trends and policy developments. Maria Juul, European Parliament 2015

[31] An Introduction to Islamic Securities (Sukuk), Pegah Zolfaghari, Uppsala Faculty of Law, 2017

financing green projects and provide concessionary loans for investors, aiming for $27.2 billion in green assets under management.

The global effort to mitigate climate change has drawn growing attention from Islamic and conventional investors to new forms of green finance and has triggered development of the green sukuk market. The Islamic finance industry counts assets of $2.1 trillion globally, and S&P Global Ratings believes it will grow at a 5 per cent rate for the next two years. Historically, GCC issuers have been an important driver of growth for the global sukuk market, and the first green sukuk in the region seem to be just a matter of time[32].

Green sukuk, as new financial products, have the potential to further broaden the Islamic financial market and close the gap between the conventional and Islamic financial worlds. This could allow GCC issuers to access a wider pool of capital, which is necessary for the green sukuk market to develop. Green sukuk could attract conventional investors by providing a high degree of certainty about the allocation of the proceeds and by filling the fixed-income supply gap for green investors. Sharia-compliant financing of environmental projects could also diversify the investor base in the green financial market. [33]

The emerging momentum in the UAE towards sustainable finance provides a unique opportunity to integrate the Sustainable Blue Economy principles in the UAE endeavours, as the results from the Emirates Nature-WWF study show that 80 per cent of the finance sector interviewees confirmed that they will require corporate customers to have plans to mitigate their marine environmental impacts in the next five years[34].

Green sukuk could be used to finance a much wider range of projects, beyond renewable energy and green real estate[35]. These projects could include, on the Blue Economy front:

- Aquaculture,
- Emission reductions in shipping,
- Sustainable ports operation,
- Offshore energy,
- Blue biotechnology,
- Sustainable desalination,
- Pollution prevention and control,

while more generally sectors to be involved are:

- waste management
- resilient infrastructure and the built environment
- greater efficiency in transportation and clean transportation
- energy-efficient building construction and energy efficiency projects
- reforestation and avoidance of deforestation
- protection against extreme events
- agriculture and sustainable land use
- forests and ecological resources
- biodiversity conservation

There is an opportunity for the GCC region finance sector, following the leading role of the UAE to engage with various industries and regulators to create green/blue financial products and drive positive action. There is also an important role for wealth management organizations or funds to work closely with customers and banks to create such products. Working closely with credit rating agencies to integrate the risks and opportunities of a Sustainable Blue Economy can help advance current sustainable ocean financing.

[32] Green Finance Takes Hold in the GCC, S&P Global Ratings, 18 Feb, 2019

[33] Global Finance: The Gulf Goes Green, July 2020

[34] Emirates Nature-WWF: How UAE Businesses Can Shape a Sustainable Blue Economy, 2019

[35] Green sukuk growth could follow the trajectory of green bonds, Blake Goud, RFI Foundation, October 2020

Environmental Protection in marine and coastal areas

Substantial changes have taken place in marine habitats and resources of the Gulf over the past decade and these habitats are especially interesting because of the naturally high levels of temperature and salinity stress they experience, which are important in a changing world climate. However, the extent of all-natural habitats is changing and their condition deteriorating because of the rapid development of the region and, in some cases from severe, irregular warming episodes. Major impacts come from numerous industrial, infrastructure-based, and residential and tourism development activities, which together combine, synergistically in some cases, to cause the observed deterioration in most benthic habitats. Substantial sea bottom dredging for material and its deposition in shallow water to extend land or to form a basis for huge developments, directly removes large areas of shallow, productive habitat, though in some cases the most important effect is the accompanying sedimentation or changes to water flows and conditions. The large scale of the activities compared to the relatively shallow and small size of the water body is a particularly important issue.

The major causes of coastal pollution in the GCC countries are resulting mostly from ship-based pollution, offshore oil leaks and spills as a result of offshore operations, fishermen dumping, industrial discharge, including desalination and cooling water discharges, excess nutrients from untreated municipal wastewater and sewerage, agricultural run-off and marine debris such as plastics. Coastal erosion also damages infrastructure and livelihoods and is expected to become more acute due to climate change and extreme weather.

The marine environment in the GCC countries is important as a source of food security, energy, water desalination, as well as for supporting industries such as pearl trade, travel and tourism, transport, and fishing. For example, the tourism and leisure industry, closely related to a number of other economic fields, including real estate development, relies to a large extent on clean bathing waters, and recreation opportunities in natural areas such as reefs and mangroves. Their activities can be affected by chemical and oil pollution that degrades ecosystems, water quality and the overall visitor experience. As mentioned in previous sections, fish species are in severe decline and continued biodiversity conservation can only be achieved through the application of an integrated fishery management approach.

Water desalination is a sector that has significant impacts on the coastal and marine environment in the GCC, as discharges of hyper-saline effluents alter marine life and the ecosystems. Desalination can greatly benefit from developing a platform focused on investment in research, development, and innovation to make better, lower impact technology available. The key area for innovation and advancement is in commercialising technology for low or zero-liquid discharge and brine from desalination plants. Water desalination plants also rely on good water quality; increased salinity or pollutants in the seawater requires additional treatment with cost implications for their operations.

Stability of the coastal geomorphology is another important environmental factor, connected with the sustainability of ports operations, as erosion and sedimentation patterns can affect shipping canals and port accessibility. Changes in patterns of sedimentation and currents - due to port construction or coastline alterations in proximity - not only affect the marine environment and geomorphology but can also result in higher maintenance costs for port operators. In this sense, issues related to coastline stability need to be addressed during site selection, and relevant Environmental impact assessment studies and Strategic Impact Assessments to be conducted prior to development of ports, artificial islands, and dredging activities.

Equally important from the perspective of controlling damaging effects is the limited cross-border collaboration and even intra-country collaboration among government agencies and large projects. Along with the cumulative nature of impacts that occur, even where each project receives environmental assessment or attention, each is treated individually, rarely in combination.

To protect the marine and coastal environment from environmental threats including oil spills, land-based sources of pollution and challenges emanating from climate change, national and regional Integrated Coastal Zone Management (ICZM) policy and studies are of utmost importance.

Furthermore, in order to avoid the cost and socially disruptive side effects of *ad hoc* development, leading to unplanned and unregulated interventions in the narrow coastal interface and near shore areas leading to significant externalities between sectors, suboptimal siting of infrastructure, overlapping uses of land and marine areas, marginalization of poor communities, and loss or degradation of critical habitats, it is important to engage in Marine Spatial Planning (MSP) at a national and ideally regional level. This will allow, among other benefits, coordination across sectors, at an early stage of development, supported by relevant regulatory and maritime planning authorities, and can play an important role in mainstreaming sustainability into key decision-making and promote efficient spatial use practices at sea.

Collaboration on environmental protection starts to emerge at a regional level. A unified environmental law for the GCC, incorporating various laws followed by the member countries taking into consideration the national laws of the member states, was recommended at the 21st meeting of the Ministers Responsible for Environmental Affairs at the GCC in October 2019, hosted by the Sultanate of Oman. The unified environmental law will establish see a common framework for the member countries which will be presented at the next meeting. As part of this collaboration, Bahrain will prepare a vision for the unification of chemical lists and the proposal on the integration of the GCC states in the treatment of wastes.

A partnership agreement was signed in August 2017 between the UN Environment Programme Executive Director and the Secretary General of the Gulf Cooperation Council (GCC) to address pressing environmental issues facing GCC countries. The agreement will support the implementation of four key priority projects agreed upon by the Ministers of Environment and endorsed by the GCC Ministerial Council. UN Environment, the GCC Secretariat and member countries will develop a unified system for the sound management of chemicals, guidelines to safeguard coastal ecosystems from dredging activities, standards for collection and analysis of air quality data and assessment of the state of the environment and outlook for the region.

Emerging Sectors

Innovative Ocean energy

The presence of innovative ocean energy applications in the GCC region, in the form of floating offshore wind, wave and tidal energy, floating solar photovoltaic energy, and hydrogen generation offshore is minimal or nonexistent. This is a result of the focus of the region towards the more developed and commercially deployable renewable energy sectors, namely solar-thermal, photovoltaic and wind, driven by the relative advantages that the region has in conditions for such forms of renewable energy, and the drive to invest in sectors that present a commercially viable Levelized Cost of Energy (LCOE) in a region where energy is heavily subsidized.

Although not directly linked to activity in the region, one case could eventually produce regional spillover: *OceanBased Perpetual Energy*, led by a Saudi entrepreneur, has signed a memorandum of understanding to assist in developing the world's largest commercial ocean current energy project. The deal has been signed with Florida Atlantic University's Southeast National Marine Renewable Energy Centre (SNMREC) to focus on an area off the southeast coast of Florida, with the aim of installing hundreds of megawatts of ocean current generating equipment. The initial phase of the project will focus on verifying compatibility between generation and subsea transmission equipment. Installation of up to 1MW of shore-connected capacity is expected to follow, reaching up to 20MW within as few as five years.

Blue bioeconomy and biotechnology

Algae biofuels is an attractive proposition to offset the environmental impact of the oil and gas industry. They have the potential to become a renewable, cost-effective alternative to fossil fuels with reduced impact on the environment, as algae hold tremendous potential to provide a non-food, high-yield, non-arable land use source of renewable fuels like biodiesel, bioethanol, and hydrogen, amongst others. Microalgae are considered as a potential oleo-feedstock, as they produce lipids through photosynthesis,

using only CO2, water, sunlight, phosphates, nitrates and other oligoelements that can be found in residual waters.

The region is highly suitable for mass production of algae because of the following reasons:

- Presence of large tracts of non-arable lands and extensive coastline.
- Presence of numerous oil refineries and power plants (as points of CO2 capture) and desalination plants (for salt reuse).
- Extremely favorable climatic conditions (highest annual solar irradiance).
- Presence of a large number of sewage and wastewater treatment plants.
- Existence of highly lipid productive microalgae species in coastal waters.

These factors make it very opportune for GCC countries to develop robust research, development, and market deployment for comprehensive microalgal biomass-based biorefinery approach for bio-product synthesis. An integrated and gradual appreciation of technical, economic, social, and environmental issues should be considered for a successful implementation of the microalgae-based oleo-feedstock (MBOFs) industry in the region.

In Saudi Arabia, for instance, the King Abdulaziz City for Science & Technology (KACST) is funding an innovative project called Saudi Arabia Biorefinery from Algae (SABA Project) to screen for lipid hyper-producer species in Saudi Arabia coastal waters. These species will be the basis for next-generation algal biofuel production. The goal of this project is to increase research and training in microalgae-based biofuel production as well algal biomass with an additional goal of using a biorefinery approach that could strongly enhance Saudi Arabia economy, society, and environment within the next 10 years.

The technology development is supported by a consortium of engineers and researchers in cooperation with industry players (to ensure technology transfer), international collaborators (to ensure knowledge transfer), and the Riyadh Techno Valley (to promote spin-off and commercialization of results). Since the research topic is innovative in the Kingdom's research circles, a strong partnership was promptly developed by the King Saud University / King Abdullah Institute for Nanotechnology with international distinguished research centers with proved successful experience in this technology development. The Centre of Marine Science (CCMAR) and the Institute of Biotechnology and Bioengineering (IBB) both from Portugal are a guarantee to the successful research-based technology development in the SABA project development and the effective capacity-building for Saudi young researchers and technicians.

In the UAE, a team of leading international scientists has developed a method for growing algae – used to produce biofuels and food – in extreme Middle Eastern climates. The synthetic biologists from New York University Abu Dhabi, worked with researchers from the UAE University, to pioneer a technique which allows rapid algal growth in previously prohibitive weather conditions. By genetically engineering diatoms, and developing an approach referred to as Intracellular Spectral Re-compositioning of light (ISR), common algae can more effectively absorb light for photosynthesis, and flourish in conditions that were previously prohibitive. This could pave the way for a buoyant bioeconomy in the region, as algae can be grown in photo-bioreactors at a higher density and a faster pace, reducing cost and speeding up production[36].

In Qatar, researchers at Qatar University's Sustainable Development Centre have revealed that the second phase of the Qatar Biofuel Project will research aviation biofuel from algae-based bio-crude following the first phase launched in 2012 that looked at biodiesel, bioethanol and bio-crude oil. The program will support Qatar Airways' efforts to diversify into aviation biofuel that will help the company and the country comply with goals set out during the United Nations Climate Change Conference (COP18) in 2012 in Doha.

Desalination

[36] Weiqi Fu, PhD, a Research Scientist at NYU Abu Dhabi

The GCC is leading the world in desalination with the UAE and Saudi Arabia being market leaders[37]. The GCC countries have the highest global water desalination capacity of 81 per cent, producing around 40 per cent of the total world water desalination. Saudi Arabia alone is responsible for about one-fifth of global production and leads the world in the volume of desalinated water it produces which makes up 50 per cent of its water consumed.

Research and development that will allow innovation to make desalination operate with reduced impact in terms of discharges and energy consumption are critical for a region that is inextricably linked to the technologies of producing freshwater from saline raw inputs. Reduced or zero-liquid discharge and management / reuse of the brine from desalination plants is the key priority.

Creating a circular desalination economy – where high-value discharge components, such as brine, metals and chemicals can be used in other industries – can generate unique economic opportunities for the GCC countries, while also reducing impacts on the marine environment. The cumulative impact of multiple desalination plants occurring in coastal areas would need to be addressed to minimize impacts on ecosystem processes, due to changes in water temperature and quality, as well as the cost effectiveness and sustainability of the desalination sector

In 2013, Masdar launched a renewable energy desalination pilot programme to research and develop energy-efficient, cost-competitive desalination technologies that may be powered by renewable energy. The project was officially inaugurated during UAE Innovation Week in November 2015. Through a competitive tender, commercial partners – Abengoa, Suez, Veolia and Trevi Systems – were selected and they each developed and operated a next-generation pilot seawater desalination plant in Ghantoot, Abu Dhabi. A fifth pilot was installed in October 2016 by Mascara Renewable Water, an off-grid solar powered solution without batteries suitable for remote locations. The Masdar Institute, now part of the Khalifa University of Science and Technology, conducted five research projects alongside the pilot programme. Three solar collector systems were also installed in 2017 to evaluate their suitability for providing low temperature process heat for desalination. The solar thermal collector systems were installed by Empereal, Emsol, and GREENoneTEC.

Maritime defence

The navies of the Gulf Cooperation Council (GCC) have traditionally been small and focused mainly on coastal defense. But some of them have begun to develop an expeditionary maritime capability, with implications in the region and beyond. They have been spurred on by a general sense of an increased maritime security threat around the region, including from Iran, and, in part, by the requirements of the conflict in Yemen.

[37] Data published for the second MENA Desalination Projects Conference in March 2020

GCC: blue-water surface combatant and expeditionary naval platforms

Country	Frigates	Landing ships (LS)*	Landing craft (LC)*	Fleet-replenishment ships
Bahrain	1 Sabha (ex-US Oliver Hazard Perry)	-	7 LCM	-
Kuwait	-	-	1 LCM	-
Oman	3 Al-Shamikh	1 LST (serviceability in doubt)	-	-
Qatar	-	-	-	-
Saudi-Arabia	3 Al Riyadh (La Fayette mod)	-	3 LCU	2 x Boraida (Durance mod)
	4 Madina (F-2000)		2 LCM (est.)	
United-Arab Emirates	1 Abu Dhabi	2 LST	10 LCT	-
			5 LCM	

* Landing ships have a hold; landing craft are open vessels. Landing ships tend to be much larger and are typically more capable of ocean-going operations.
LCT - landing ship tank; LCM - landing craft medium; LCT - landing craft tank; LCU - landing craft utility

A table showing the naval power of GCC countries. Credit: IISS

Of the six GCC nations, the **UAE** has the largest and most significant sealift capability. Since the beginning of the Saudi-led intervention in the Yemen conflict in 2015, the UAE has been supplying its own forces there by sea, as well as ferrying in those of other nations. Much of this sealift capability is based in the port of Assab in Eritrea, where the UAE Navy currently maintains a typical deployment of at least two corvettes and eight amphibious vessels.

A new Emirati naval base is being constructed 11 km to the northwest of Assab, next to the city's international airport, part of which is also used by the Emirati armed forces. The UAE's military footprint will be further expanded by the construction of a new naval base at Berbera in Somaliland, a breakaway region seeking independence from the central Somali government in Mogadishu. Whilst the UAE certainly has the funds to acquire relatively high-end equipment, the navy is constrained by its size. Numbering just a few thousand sailors, the UAE Navy would have difficulty finding crews for new frigates, fleet-replenishment vessels, and large amphibious platforms and to sustain operations beyond the Horn of Africa.

The **Qatari** Navy's largest vessels are Barzan-class missile craft, built by the British firm Vosper Thornycroft in the 1990s. The 2016 agreement with Italian shipyard Fincantieri for the acquisition of four corvettes, two offshore patrol vessels (OPVs) and a landing platform dock (LPD) is therefore significant. Details of the vessel designs released subsequently have revealed that the announcement actually understated the scale of Qatar's ambition. Upon closer inspection, the corvettes, OPVs and LPD have turned out to be frigates, corvettes, and a landing helicopter dock (LHD). Since 2013, Qatar has been investing significant resources to acquire high-end Western equipment on a significant scale. As with the UAE, is not clear where the small peninsula nation of two million people will find the crews to operate these vessels or the 96 new fighter aircraft over the next decade. If Qatar can find a way to do so, most likely by hiring foreign nationals, by 2025 will have the beginnings of a modest expeditionary capability centered on the new LHD and 12 NH90 naval helicopters also being acquired from Italy.

Saudi Arabia's potential blue-water fleet is the largest in the GCC, with seven frigates and a pair of replenishment vessels. However, four of those frigates and both supply ships were built in the early 1980s and are now nearing the end of their service lives. Two contracts signed in 2018 for US and

Spanish frigates will increase the overall size of the fleet, but these are not currently accompanied by orders for logistics ships that would allow them to operate further afield or for any new amphibious capability. Unlike the UAE, Saudi Arabia has no experience in naval shipbuilding and would struggle to fill this gap domestically without significant outside support.

GCC Procurement: Ongoing contracts for principal surface combatants and principal amphibious vessels

Country	Class	Type	Quantity	Value (US$)	Shipyard	Order Date
Qatar	Doha	FFGHM	4	5.59bn	Fincantieri (ITA)	2017
	OPV	FSGM	2			
	Kalaat Beni Abbes mod	LHD	1			
Saudi Arabia	Multi-Mission Surface Combatant (Freedom LCS mod)	FFGHM	4	6bn	Marinette Marine (US)	2018
	Avante 2200 mod	FFGHM	4	2.12bn	Navantia (ESP)	2018

FFGHM - frigate with hangar and anti-ship and air-defence capability; FSGM - corvette with anti-ship and air-defence capability; LHD - amphibious assault ship

A table showing GCC naval procurement contracts. Credit: IISS

A number of other countries have naval and air bases or facilities in or near the Horn of Africa. Djibouti is the most popular location, where the European Union, for example, has long had facilities to help run the Operation Atalanta counter-piracy mission that has been under way since 2008.

The increase in the size and capability of several of the GCC navies over the next decade could allow the GCC countries to take on a larger share of maritime-security responsibilities in the future, including participating in multinational missions and patrolling sea lines of communication. However, unless many more billions are spent on sustainment, training, operations and personnel, and the ships fitted into a wider strategy, the GCC will remain a largely littoral force with very expensive patrol ships.

Marine Research and Technology

GCC countries are looking at the issues related to research in the marine environment, with a focus on the development of science and innovation in relation to Blue Economy sectors, of which the most common are aquaculture and fisheries, pollution, ecosystems, and to some extent Coastal Zone Management.

In **Saudi Arabia**, research efforts are supported by a major increase in the capacity of institutions in marine science and technology, led by a number of high-performing institutions, as described below. Whereas no research vessel was available in Saudi Arabia in the past, marine research is now supported by research vessels, including Research Vessel sSultan (43.7 m, Royal Commission of Survey), Najil (43.2 m, KACST), Al Azzizi (43.1 m, KAU), and Thuwal (34.7 m, KAUST), covering both the Red Sea and Arabian Gulf. The Red Sea Research Center has been active since the opening in 2009 of the King Abdullah University of Science and Technology (KAUST), a leading institution in global marine and coral reef research. The Research Center undertakes a wide variety of research to formulate a comprehensive understanding of the Red Sea's rich ecology in order to ensure sustainable use and conservation of its natural resources.

The faculty of Marine Science at the King Abdulaziz University (KAU) was established to keep up the pace with the development in marine science and technology, particularly the active role played by the seas and oceans for food security and provision of safe drinking water. It is carrying the longest-lived program of research in the Red Sea through the Faculty of Marine Science, started initially in 1975 as Department of Marine Science in the Faculty of Science and changed 1978 to the Institute for Marine Sciences with four scientific departments (Marine Biology, Marine Geology, Marine Physics, Marine

Chemistry). Other research facilities include Prince Sultan bin Abdulaziz Center for Science and Technology (KACST), which contains centers contributing with remote sensing and biodiversity assessments with science and technology covering earth, space, seas and exploration, and King Fahd University of Petroleum and Minerals (KFUPM) with an outstanding record of applied research in the Arabian Gulf and the Red Sea, and through. Saudi Arabia also hosts a national Capacity Development (CD) of IOC/UNESCO, with activities undertaken within the framework of targeted capacity development for decision-making, policy, governance, and knowledge.

In the **UAE** the 2031 National Advanced Sciences Agenda aims to utilize advanced sciences in the development and creation of solutions to future challenges. Also, the Fourth Industrial Revolution UAE Strategy (4IR) aims to achieve future security of water and food supply by using bioengineering sciences and advanced renewable energy technologies. Additionally, the Sheikh Khalifa Marine Research Center has been established. It is dedicated to developing marine organisms in general, and studying marine environment pollutants, as well as releasing fish fingerlings to increase fish production. It has 14 specialized laboratories divided in five clusters, including a hatchery, a research centre, laboratories, the expansion of a hatchery for endangered species, and an education centre. The objective of the Marine Hatchery Complex is to produce 10 million juveniles per year of a variety of local and non-indigenous fish species to allow the indigenous sustainable development of aquaculture.

UAE also hosts a national office of IMarEST, the Institute of Marine Engineering, Science and Technology, the largest marine organization of its kind with a worldwide membership based in over 120 countries, which has the global aim to ensure that marine resources and activities are sustained, managed and developed for the benefit of humanity. The IMarEST Dubai branch is an active branch with members from a number of marine areas such as shipping, energy, manufacturing, ship repair, surveying, and classification. The branch organizes technical events by leading speakers on topical events.

In the **Qatar** University, Marine Science is the largest and oldest research group within the Environmental Science Center, supported by experienced staff and well-trained support team with research vessel, boats and divers equipped with the latest measurement and monitoring technologies. The Group generates published research, services, and multimedia materials about the different components of the marine ecosystem of the country. Work focuses mainly on documentation and biota analysis of the natural marine heritage of Qatar in the Arabian Gulf and Qatar Marine Zone (QMZ), and preservation of the collected components in accordance with international museums and herbaria and dentification is by use of standard taxonomic keys. In December 2020, Qatar University and UNESCO announced the establishment of the UNESCO Chair in marine sciences at the Environmental Science Center. The Science Plan covers natural and anthropogenic components related to Arabian Gulf including Arabian Gulf circulation, climate change, sea level rise, Shamal winds and swells, geomorphological changes due to coastal and offshore developments, marine pollution and its management, hypoxia formation & ocean acidification and anthropogenic impacts on the Gulf's ecosystems. Additionally, the ExxonMobil Research Qatar (EMRQ) operates inside the Qatar Science and Technology Park in 2009 with a research and development center that includes offices, laboratories, and training facilities. EMRQ conducts research in areas of common interest to the State of Qatar and ExxonMobil, including environmental management, water reuse, LNG safety and coastal geology.

In **Kuwait**, the impressive facility of Marine Science Center at Fintas is designed to support a renewed interest in Kuwait's maritime culture and further the understanding of regional, gulf-related environmental concerns. Composed of three distinct elements, a laboratory wing, an administrative and classroom wing that promotes interaction among faculty disciplines and creates a sense of community, and a connecting lobby space for student gatherings and exhibits, it is ambitiously supplemented by an extensive harbor facility for nine research vessels.

The Kuwait Institute for Scientific Research (KISR) was established to carry out applied scientific research in three fields: petroleum, desert agriculture, and marine biology. The objectives of the institute are to carry out applied scientific research that helps the advancement of national industry and undertake studies relating to the preservation of the environment, resources of natural wealth and their discovery, sources of water and energy, methods of agricultural exploitation, and the promotion of water wealth. KISR undertakes research and scientific and technological consultations for both governmental

and private institutions in Kuwait, the Gulf region, and the world. Its marine research work focuses on five key fields: Coastal Management, Aquaculture, Biotechnology, Environmental Pollution and Climate, and Ecosystem-based Management of Marine Resources.

In **Oman**, the Aquarium and Marine Science and Fisheries Centre at Sultan Qaboos University is the new name of the former department of Fisheries Science and Technology. Its aim is to increase knowledge by studying a wide range of marine species with particular emphasis on ecosystem conservation and preservation of endangered species. The aquarium hosts a wide range of unique marine life taken from the 3,165-kilometer coastline.

In **Bahrain**, marine science is carried out by the Department Biology of the University of Bahrain. Among the earliest departments in the University, the department houses marine biology and environment among its 12 teaching laboratories. Yet, in the aquaculture sector, the National Mariculture Centre of Bahrain is in charge of research. Applied research activities of NMC which include studies in the areas of nutrition, reproduction, hatchery techniques, nursery and grow out of the species indicated above, and the mass production of finfish juveniles. All research and production efforts are focused on the development and refinement of appropriate economically efficient technologies and the production of marine finfish juveniles for sale, for stock enhancement programmes as well as for the limited use in land-based grow-out tanks.

5.2 - Country-level key findings and opportunities

This section aims to provide more detailed information for each of the GCC countries, by specifically focusing on the sectors where the EU institutions and business may be able to identify opportunities for collaboration and development of synergies and business, in line with the key policies and best practices established by the EU in the context of the Blue Economy.

Specifically regarding Renewable Energy, and because most GCC countries have not yet developed a specific segment or focus for *marine* renewable energy, the current status of the overall sector is presented as it is considered important that the EU takes it into consideration, as European companies are already having close collaboration with GCC countries on land-based projects, and the coastal and offshore development of renewable energy is expected to start, and indeed show significant growth over the next 10-15 years.

5.2.1 - Bahrain

The Kingdom of Bahrain is an archipelago of 33 natural islands with additional 51 artificial ones with total area of 765 sq. kilometre in size. It is critical for Bahrain to diversify its economy from hydrocarbon to be less affected by energy price shocks, as the aim of the Kingdom's economic *Vision* for 2030 is to ensure that every Bahraini household has at least twice as much disposable income – in real terms – by 2030.

The following sectors are of interest in the diversification of Bahrain to a post-hydrocarbon economy, and may present opportunities for involvement of the EU in the Blue Economy sectors:

Marine Living Resources: Aquaculture

Bahrain has a good potential for fish farming because of the climate, location, coastal area, and market. Although Bahrain's aquaculture industry is still in its infancy and its current production is only marketed locally, the sector has good prospects for boosting the national economy of the country in the near future. By contrast, capture fisheries are not expected to present any significant growth: fish landing statistics in the country indicate a large and steady deficit in its supply of fish, while the demand and per capita consumption of fish products has continued to increase over the last two decades, due primarily to the increased public awareness about the health benefits of fish consumption. However, the fisheries resources in the waters surrounding the Kingdom cannot meet this increased demand. Therefore, in the long-term, it is felt that investment in the development of an aquaculture sector will contribute to the food security and self-sufficiency of Bahrain and its ability to earn foreign exchange through the export of aquatic products.

The white paper published recently[38] and mentioned in previous chapters highlights how the country could earn major revenue from investments in fish farms, mangroves, and coral reefs preservation. Recognizing the importance of aquaculture development, the Directorate of Fisheries has established the National Mariculture Centre to undertake applied research in this field and relevant legislation is revised and updated in conformity with international standards and requirements.

For many years, the National Mariculture Center has been supplying marine finfish seed to all GCC countries and other member countries of the Regional Commission for Fisheries (RECOFI) and thus the Kingdom of Bahrain has maintained its position as a leading marine finfish seed producer and exporter in the region. Due to scarcity of freshwater resources in Bahrain, all efforts have been diverted towards marine species, there are very limited land-based culture activities carried out in tanks.

The proposed sites, beside Ras Hayyan, are East Al Dor, East Ras Al Qurain and Ras Al Bar in the Southern Governorate. The Ministry of Municipalities and Urban Planning has allocated six investment pieces of land in the area of Ras Hayan, to support the private sector in the field of aquaculture and to achieve food security national plans. Each area has a surface of 6000 m2 to produce 250-300 tonnes of several types of fish using a closed recirculating system (RAS). Investment in aquaculture in these sites will be an important step in enhancing food security of the nation and contributing to narrowing the gap between demand and supply.

The National Mariculture Center has to be developed and equipped further to give the necessary technical support for the upcoming industry. More research in different fields of aquaculture is needed for improved future management of this growing sector. The main areas of research that could be the focus in future are:

- Identification of suitable local and exotic species for culture.
- Environment monitoring programmes.
- Fish health and disease control.
- Enhancement of the legal and administrative framework

Coastal Tourism

As an island state, an archipelago of 36 islands with a coastline of 510 km, Bahrain aims to develop its marine tourism which comes in line with recent worldwide demands and trends. Located in the middle of the Arabian Gulf, surrounded by shallow, warm, and clear water with coral reefs and oyster beds, it is only natural that *Dive Bahrain*, the world's largest underwater theme park spanning an area of 100,000m^2, complete with a sunken Boeing 747, opened in the fall of 2019. The site, in close proximity to Bahrain International Airport, has a 70m-long decommissioned Boeing 747 as its centrepiece, the largest aircraft ever to be intentionally submerged. The world-class project was developed in close cooperation between the Bahrain Tourism and Exhibitions Authority (BTEA) and the Supreme Council for Environment (SCE).

Bahrain is building the capacity to support its growing tourism industry and the tourism sector at large is viewed as a means for helping with diversification efforts away from the hydrocarbons, especially as the country can be a tourism hub due to its historical treasures. In addition, plans were underway to inaugurate a new, state of the art terminal at Bahrain International Airport in March 2020 ahead of the outbreak of COVID-19.

To this end, in 2018 Bahrain hosted 12.8 million visitors, a 6 per cent increase on 2017. The target is to grow the number of visitors to 15 million over the next four years, and before the Covid-19 outbreak Bahrain was confident that this growth target is achievable. Investment levels have been strong in recent years: there are 22 hotels in the pipeline expected to be ready by 2023, leading to double-digit growth year-on-year in terms of accommodation, and a number of mega-projects such as the new Bahrain International airport expansion, a $1bn-plus project with the potential to triple the amount of

[38] Shaikha Aya bint Hisham Al Khalifa: The Blue Economy: New Investment Potential in Bahrain, Boston University, 2019

travelers to Bahrain each year, or the new exhibition centre next to the Bahrain International Circuit in Sakhir.

Box 2 - Coral Reef Preservation and Ecotourism in Bahrain

With this development of capacity for receiving an increased number of visitors, Bahrain will be looking into mobilizing investment in coral reef preservation, encouraging growth of sea life and increase fish stocks, creating new eco-tourism opportunities. Already, Bahrain hosts the world's largest underwater dive park, and the Bahrain Pearling Trail (also called the Bahrain Pearling Pathway), a cultural heritage site inscribed on the UNESCO World Heritage List. It consists of three oyster beds in the northern waters of Bahrain, a segment of the coast and the seafront Bu Mahir fortress in the southern tip of Muharraq Island, and 17 buildings in historical section of Muharraq connected by a 3.5 km visitor pathway.

Environmental Protection

Bahrain suffers from pollution and the country being flat is threatened of being submerged by Arabian waters. Major polluters are the gigantic electricity generating stations fueled by hydrocarbon gas, which are in proximity of the urban areas, contributing to pollution and climate change. However, Bahrain has not adopted a detailed strategy to deal with the deteriorating environment and contribute towards addressing climate change. There are no major plantation projects for green zones, though there are barren and could be irrigated by treated sewage water.

Investing in developing and adopting a cross-cutting strategy to address Climate Change and mitigate its effects, along with investments in infrastructure and sectoral policies, including a shift to a metro public transportation system in view of limited geographical area of land and overpopulation, development of extensive public bus network with incentives to reduce private cars use, and shift to renewable energy are expected to become a significant need and opportunity in the near future.

Sustainable Finance and Investment

The transformation of Bahrain's FinTech ecosystem has been driven by regulatory reform, paving the way for emerging industries including crowdfunding, InsurTech, robo-advice and crypto-asset platforms. In this context, the development of new products and services within the realm of sustainable Blue Finance, including Blue Investment and Finance and Green sukuk connected to the Blue Economy may present an opportunity.

Regarding the general investment climate, advantages for foreign investors have been under development by the Kingdom's authorities, including zero taxation for private companies, few indirect taxes for private enterprises and individuals, and free movement of capital – one hundred percent foreign ownership of business assets and real estate in most of the sectors.

5.2.2 Kuwait

Kuwait's economic *Vision for 2035 (New Kuwait)* has as its main goal the transformation of Kuwait into a financial and trade hub, attractive to investors, where the private sector leads the economy, creating competition and promoting production efficiency.

Maritime Transport and Port Infrastructure

Kuwait is planning to construct a new urban centre, Madinat Al Hareer (Silk City), near the coast of Iraq, which it hopes will be a further boost to the country's regional and global connectivity. The 250-sq-km city will be served by an international airport, road and rail connections, and a major seaport and trans-shipment zone. The first phase of the plan was released in February 2019, with an estimated cost of $86bn.

Central to this mega-project is Mubarak Al Kabeer Port on Boubyan Island, which was initially launched in April 2011 with a four-stage construction plan. The site will include a container storage facility capable of handling 2.5m twenty-foot equivalent units per year when it reaches full capacity. According to the plan, the port will also contain a free trade zone, an industrial park and a number of deep-water berths,

and road and rail connections will be built to connect the island to the rest of the country. The new port, Mubarak Al Kabeer, aims to become a hub for the import and export of goods in MENA, as well as a link between Kuwait and China's global Belt and Road Initiative (BRI). Madinat Al Hareer, the new mega-city, will incorporate earlier plans for urban expansion in Kuwait's northern region. Once the port is effectively connected to the rest of Kuwait by road and rail, it will be able to act as a new and easily expandable entry point into the country, freeing up the existing three ports in the south and offering notable potential for redevelopment.

Environmental Protection: Pollution Study and Control

Environmental projects under way address the current situation of under-capacity in critical segments such as sanitation and waste management. Kuwait's resources and environment were heavily damaged by Iraq's invasion and environmental destruction during the 1990-91 Gulf War. Since the liberation of Kuwait in 1991, a number of survey and assessment projects have been conducted and a great deal of data has been collected characterizing the oil pollution in the air, water and soil. The marine environment was exposed to large quantities of petroleum hydrocarbons, with the volume of the spills estimated to between 1 and 1.7 million tons. Work undertaken aims to provide a substantial assessment of the evidence for and the extent of pollution, to provide an overview assessment of remediation options for the impacted aquifers, and to provide a somewhat detailed assessment and costing for a treatment option for the aquifers that would restore the aquifers to pre-invasion quality within a reasonable timeframe.

The coastal waters of Kuwait Bay have also been extensively used for the disposal of domestic wastewater, increasing the level of pollution. Recent studies indicate that the amount of waste discharged into Kuwait Bay is expected to grow further, from raw sewage, illegal disposal of partially treated sewage, and industrial waste. These sources play significant roles in heavy metal, hydrocarbon, and fecal coliform bacteria inputs to Kuwait's coastal waters, which impact the marine environment and lower water quality.

Marine Living Resources - Fisheries and Aquaculture

Fisheries are not comparatively significant from an economic point of view in Kuwait, although they were the most important revenue before oil was found. However, fisheries are still the second largest export industry after oil. Kuwaiti fisheries consist of two sectors: the industrial shrimp fishery and the artisanal multi-species, multi-gear fisheries exploiting pelagic and valuable demersal species. After the 1991 liberation of Kuwait from Iraqi occupation, industrial fishing capacity increased significantly (with illegal fishing also being common). Shrimp landings have fluctuated at around 1740 tonnes per year over the last decade.

Fisheries present an opportunity in terms of the need for modernization with new technologies for monitoring, stock management and processing. On the other hand, aquaculture production is negligible at a level around 300 tonnes in recent years, most of which was Nile tilapia produced by about 80 farms using water for irrigation. Marine fin fish culture is less than 10 tonnes.

Box 3 - Wastewater Treatment in Kuwait

In January 2020, the Government of Kuwait signed a contract for the building of the Umm Al-Hayman wastewater Public-Private partnership project, with a value of $1.6 billion. The project aims to develop the wastewater treatment project in Umm Al-Hayman in view of the urgent need to expand the capacity of wastewater treatment and the removal of the wastewater treatment plant currently located in the southern region of Kuwait. The project consists of the construction of a new sewage treatment plant within the boundaries of the current Umm Al-Hayman purification plant to treat wastewater.

5.2.3 - Oman

The biggest Middle Eastern oil producer outside the Organization of the Petroleum Exporting Countries (OPEC), Oman made the acceleration of economic and energy diversification a central part of its ninth five-year plan in 2016. In its 2040 Vision, Oman states its aim to replace oil as a source of growth, anticipating the emergence of natural gas production and downstream industry, along with a rapid and successful expansion in construction, real estate, trade, fisheries, and tourism.

Coastal Tourism

Marine tourism in Oman is increasingly popular due to its diverse forms and types. It has emerged as an important form of tourism in the country due to its geographic components and marine nature. The Sultanate's beaches spread across 3,169 square kilometres. Marine recreation activities include surface diving, dolphin watching, deep diving, and sunset watching. Many tourist operator companies specialise in cruises and organise several types of trips, including fishing trips, island tours, dolphin watching and sunset trips. Omani hotels offer recreational trips in the marine environment.

The Oman Ministry of Tourism (MoT) has announced plans to more than double its number of international visitors over two decades as part of its new national 2040 Tourism Strategy. Oman has been focusing on diversifying its economy and has been boosting tourism since it is seen as main source of income by the government of Oman. The government plans to develop its coast along the Arabian Sea and to develop infrastructure and sporting activities in inland waters.

Marine tourism has become the most significant component of growing tourism industry in Oman. Oman has a long coastline with soft sand beaches, which is conducive for several activities such as scuba diving, snorkeling, boating. Its long coastline with clean and unpolluted water has lot of coral, flora, and marine life. The average visibility of the waters around Oman is 20-30 meters (Omanet, 2002). The country has several species of turtles and dolphins and different species of whales along with 460 different bird species. All these wildlife species have made marine tourism very attractive, thus boosting it significantly.

In early 2016, Oman launched its National Tourism Strategy (NTS), with the primary aim to increase international arrivals to 11.7m visitors per year by 2040, up from 2.6m arrivals in 2015. The initiative also seeks to boost tourism's contribution to GDP to more than 6 per cent, from 2.6 per cent today. In addition to increasing hotel stock and employment, the government plans to develop and promote a series of destinations – or clusters – across the sultanate, offering visitors a broader variety of experiences, with the goal of encouraging extended visits and greater engagement with the country's culture and natural sites. While the government wants to maintain and grow its already strong domestic tourism market, the new strategy places a heavy emphasis on promoting Oman as a destination for international visitors, who in the past might have overlooked the country for other destinations in the region or further away.

The creation of unique tourism clusters that utilise the natural and cultural resources available to them will be key to the implementation of the NTS. The MoT has picked 14 such locations across the country, that will be promoted internationally and grow into key attractions for tourists. Some of these sites are already well known, while others have not yet developed an international reputation. Examples include the coastal areas of the Musandam Governorate and the Frankincense Trail in Dhofar, which will be developed over the next decade and a half, becoming destinations in their own right or potentially forming part of a broader itinerary of travel across the sultanate.

Beyond the headline visitor numbers and contribution to GDP figures, the new tourism strategy aims to add more than 500,000 direct jobs to the sector by 2040, with the target of filling 75 per cent of those positions with Omani nationals. In order to succeed, the Ministry of Tourism needs to work with existing tourism colleges and training institutes, as well as industry players already in the market, to build up the human resource capacity necessary to grow the sector.

The MoT is expecting to attract more than 88 per cent of the investment needed from the private sector. This push for greater private sector involvement in the strategic growth of the tourism sector – whether via public-private partnerships, strategic investments or 100 per cent private projects – will be an engine for job creation and innovation and could encourage a similar approach in other areas of the economy.

Marine Living Resources - Fisheries and Aquaculture

Fisheries and Aquaculture are considered important sectors in the 2040 Vision, with a goal to create a "profitable world class sector that is ecologically sustainable and a net contributor to Oman's economy".

In 2017, self-sufficiency from fisheries was 193 percent, therefore constituting a resource that can strongly support exports. Fishery and aquaculture are among the most ancient and important sectors to Oman, with deep cultural and social significance. Before oil was discovered there in the 1960s, 80 percent of the population lived from agriculture and fishing.

The volume of fish exports has been steadily increasing over the past ten years—ranging from 62.3 thousand mt in 2002 to 132.5 thousand mt in 2014, according to official statistics. In 2011, half of exports were to the United Arab Emirates, where the demand is strong. The ratio of fish exports to fish landings has also been steadily increasing and Oman has been lauded by environmental and fishery specialists for its ban on trawl fishing in 2011. The current growth is entirely from artisanal fishing, a sub-sector that has grown in importance since the ban. The growth, however, has been somewhat chaotic and uncontrolled, and has involved mostly foreign workers, recruited mainly from Bangladesh and India. The traditional involvement of women in the sector has started to decline.

Catch has expanded rapidly to exceed catch levels experienced before the trawl ban. The status of fisheries is now reaching critical levels in most of Oman's key fisheries where economic development potential is at its highest. Over half (56 per cent) of Oman's large pelagic fish and 68 per cent of Oman's important demersal species are known to be fully to over exploited. Further research is needed to fully understand the status of remaining fisheries.

The economic development in fisheries, especially if the target of quadrupling the sector's contribution to the GDP is to be achieved will need to focus on improving the use of current catch rather than through increasing production. Production increases in small pelagic fisheries are feasible, but economic development of these fisheries needs appropriate planning and modernization.

The same holds true for landing and processing infrastructure: despite a plethora of new ports, fishermen still prefer to land their catch on beaches in proximity to where they live and make their own arrangements for the sale of fish which limits opportunity for quality improvement and value addition. Ports are considered mismatched for potential demand; they are too dispersed for commercial boats, but also often lack a cluster of services including accurate recording of landings, cold storage chain and processing towards high value-added fish products. These would be important in order to attract the artisanal sector.

The Sultanate of Oman has also identified **aquaculture** as one of the key pillars to diversify its national economy. The overall vision of the Ministry of Agriculture & fisheries is to develop a sustainable, competitive and environment-friendly aquaculture sector that meets the needs of customers from the high-quality aqua products. The government-scripted legislation regarding aquaculture in 2004 and updated in 2012, and in collaboration with FAO, MAF has developed a national strategy for aquaculture development in 2007.

Since 1997, the Ministry of Fisheries Wealth has engaged in different research and development projects on fish and shellfish culture. These included the investigations on abalone hatchery, mussel and oyster culture, shrimp farming and pilot trials on cage and pond culture of finfish, suitable site selection for aquaculture, development of feed for cultured aquatic animal, hatchery development for finfish, sea cucumber aquaculture and development of freshwater integrated tilapia farms in Oman and using GIS in selecting suitable sites for aquaculture.

At present, there are several funded projects that include:

(i) abalone aquaculture which aims to develop novel hatchery technologies and to examine the potential of enhancing the natural fishery;
(ii) sustainable aquaculture development in Musandam Governorate;
(iii) a Geographic Information System (GIS) based approach, which concentrate on the use GIS as a tool for selecting the suitable sites for cage aquaculture in Musandam Governorate;
(iv) development of marine cage demonstration farm in Musandam, which focus on the development of small demonstration cage farms for local fishermen association in Musandam;
(v) development of feed ingredients for aquaculture sector; and
(vi) second phase of the project for development of integrated tilapia aquaculture.

Currently, there are two commercial aquaculture projects in Oman: an Indian white prawn (*Penaeus indicus*) culture project and a gilthead seabream (*Sparus aurata*) cage culture. In addition to this aquaculture facilities, there are many applications for establishing commercial aquaculture projects for shrimp, marine cages and Recirculating Aquaculture Systems (RAS).

Climate Change and Renewable Energy

Oman is slowly taking steps toward sustainability and diversification of its economy and energy sources. In March 2019, Oman Power and Water Procurement Company (OPWP), the country's main supplier of electricity and water, announced the kingdom's aggressive plan to cover 30 percent of its electricity needs with renewable energy sources by 2030, the sources to be developed being waste-to-energy and solar and wind power. Up to 21 percent of the targeted 30 percent is anticipated to come from solar. OPWP plans to reach 16 percent of its total power generation from renewables by 2025.

As solar power in the sultanate is expected to get cheaper, Oman aims to develop its nascent solar sector and cover a major portion of domestic electricity demand with energy from sun, while creating thousands of jobs by building local production of solar panels and aluminum frames. It is therefore actively trying to train its domestic work force for the renewable energy sector and increase technology transfers from experienced foreign companies. In 2018, OPWP began requesting bids from foreign investors to develop several major solar power and solar-diesel electricity storage projects in the country, its plans being to add 4 gigawatts of renewable energy capacity by 2030.

OPWP in March 2019 announced the launch of several renewable energy projects, including a new utility-scale solar project with a capacity between 500MW and 1000MW and a mega-wind energy project with an anticipated capacity of 300MW. It also announced the launch of Oman's first waste-to-energy independent power plant with an anticipated electricity generation capacity of 125MW to 160MW. OPWP also announced the awarding of 500MW Ibri II Solar Independent Power Project (IPP) to a consortium led by Saudi Arabia-based ACWA Power, the largest and first utility-scale solar project in the sultanate.

Maritime Transport and Port Infrastructure

The strategic location of Oman makes it an important connecting point on the sea trade routes and thus Oman hosts several marine-related industries and has attracted many investors over the years to capitalize in it. Oman's Sohar port and free zone has handled over 50 million tons of cargo in 2015, an increase of 12 per cent compared to 2014, representing an average of almost one million tons a week. Following the first full year of additional traffic from port Sultan Qaboos, container traffic at Sohar jumped by 62 per cent from 2014. Sohar port also saw an increase in break bulk cargo to over 1.9 million tons, a 46 per cent rise from 2014. RoRo figures saw one of the biggest increases and were up by over 90 per cent, with over 230,000 vehicles handled in 2015. Besides shipping, Omani ports witnessed a growth in the number of tourists to Sultan Qaboos Port reached 41 per cent in 2016. Gross volume of loaded goods at Sohar Port increased to 1.654 million tones.

5.2.4 - Qatar

Qatar's National Vision aims that by 2030 Qatar becomes an advanced society capable of sustaining its development and providing a high standard of living for its people. Qatar's National Vision defines the long-term goals for the country and provides a framework in which national strategies and implementation plans can be developed. The plan's development goals are divided into four central pillars: economic, social, human, and environmental development. The government seeks to meet development goals by establishing a strong policy framework and implementing strategies to address the challenges presented in human development reports. It is critical for Qatar to diversify the economy from hydrocarbon to be less affected by energy price shocks. Additionally, Qatar has to address local environmental issues, such as the impact of diminishing water and hydrocarbon resources, and the effects of pollution and environmental degradation, as well as international environmental issues such as the potential impact of global warming on water levels in Qatar and thereby on coastal urban development.

Environmental Protection

The Environmental Sustainability Strategy 2017-2022 (ESS) aims to strike a balance between economic and social development and to preserve the environment and natural heritage, especially since these activities are accompanied by increased economic and demographic growth, which has put the environment and biodiversity, and the immunity of ecosystems and natural resources under severe strain. This requires programmes, projects, and activities to help monitor and manage these pressures related to pollution and solid waste to reduce and recycle them in order to avoid their negative effects. This is in addition to observing climate change and minimizing its negative impacts on the environment and biodiversity through the conservation of ecosystems and biodiversity in a scientifically sound and effective manner, taking into account regional and international considerations.

The Marine environment hosts some rich and diverse marine resources, including coral reefs, seaweed, mangrove trees, breeding areas of fish and crustaceans, and breeding, nesting and feeding areas of sea turtles and dugongs. It is exposed to multiple sources of drainage, including hot cooling water flowing from industrial zones[39], brine from power and desalination plants which is almost twice the salinity of seawater, and drainage of groundwater/surface water and rainwater on the Doha Corniche[40]. This water carries huge quantities of organic and inorganic compounds to the marine environment, altering their characteristics and type and causing pelagic and demersal marine life to migrate. There are also backfilling and drilling operations for ports and residential and tourist islands, as well as various sea-based activities of hotels and resorts.

Marine pollution is the greatest threat to the marine environment, with many pollutants being poured into the sea through several activities, including power plants, desalination plants, ballast water discharged by ships, and petrochemical industries. In light of the rapid industrial and urban development of the country, the urgent need to maintain water quality requires a comprehensive marine environmental control plan aimed at determining the current situation, predicting future changes and making recommendations and mechanisms to preserve the marine environment and ensure sustainability of its resources.

Climate Change and Renewable Energy

Qatar forms one ecological system that is affected by the practices and activities of every country in the region. It will be necessary to engage and to encourage all Gulf States to protect and conserve the environment. Qatar is fully aware that rising sea level and increasing temperatures in coastal areas of the Arabian Gulf will eventually impact the country's urban landscape, infrastructure, and marine environment. Therefore, adapting to, and mitigating the impact of climate change have become imperative for, and central to the national sustainable development policy. Qatar's efforts in the field of climate change are not limited to the local environment. They extend to solidarity and joint action as a global responsibility, and support international efforts to mitigate the effects of climate change, including the signing and ratification of the Paris Protocol for the Climate Change (2016 and 2017 respectively), hosting the eighteenth Conference of UNFCCC in Doha and being a founding member in the International Institute for the Green Growth GGGI, which participates in assisting the developing countries to adopt development strategies on a sustainable basis.

Harnessing **solar power** has become an important objective for Qatar in recent years, and by 2030, Qatar has set the goal of attaining 20 per cent of its energy from solar power. The country is well-positioned to capitalize on photovoltaic systems, as it has a global horizontal irradiance value of approximately 2,140 kWh per square meter annually. Furthermore, the direct irradiance parameter is roughly 2,008 kWh per square meter annually, implying that it would be able to benefit from concentrated solar power as well.

To this end, Qatar Foundation has been active in helping Qatar achieve its solar power goals. It established Qatar Solar, which, together with Qatar Development Bank and German company

[39] which in some drains exceeds 1 million m^3/h

[40] four main drains and 13 rainwater sub-drains discharge nearly 75.5 million m^3/year

SolarWorld, embarked on a joint venture resulting in the creation of Qatar Solar Technologies (QSTec). In 2017, QSTec commissioned its polysilicon plant in Ras Laffan. This plant has a total capacity of 1.1 MW of solar power.

Qatar signed a deal with Total and Marubeni in January 2020 to build a solar power plant that could produce 800 megawatts of energy. The plant is being built in Al Kharsaah at a cost of $467 million and is expected to be completed by 2022. The 350MW first phase will be grid-connected by the first quarter of 2021 and the project is expected to be fully commissioned in April 2022. Total, Siraj Energy and Marubeni formed a special purpose company Siraj1 to build, operate and manage the project. Marubeni holds a 20.4 per cent stake in Siraj1, while Total and Siraj Energy own 19.6 per cent and 60 per cent interests respectively. Siraj Energy is a joint venture of Qatar Electricity & Water Company (60 per cent) and Qatar Petroleum (40 per cent).

Several large-scale developments are deploying rooftop solar installations as part of their energy infrastructure, including Mshereib Downtown Doha, a sustainable downtown regeneration project; Lusail City, a planned city on the coast north of Doha; and Energy City, an integrated energy hub being built between Lusail City and the capital. Five of the FIFA 2022 World Cup stadiums are also slated to use pioneering solar-powered cooling technology.

Marine Living Resources - Fisheries and Aquaculture

The second National Development Strategy (NDS-2) 2018-2022 shows that capture fishing increased by 25 per cent from 12,995 mt in 2012 to 16,213 mt in 2014. The average fish catch per vessel increased from 26 mt to 35 mt during the same period. Fish is an important source for food in Qatar and significantly supports its food security. Qatar has therefore taken measures to increase the fisheries stock and improve their management, enforce effective laws, and provide the possibility for local aquaculture to meet the population needs. In the field of fisheries, challenges include the development of a national programme for the optimum and sustainable exploitation of fisheries in view of the limited fishing areas, the depletion of fisheries and stock, the scarcity of commercial fisheries that contribute to the domestic fish production, the limited availability of some of the necessary equipment and services for fishing vessels in some fishing ports, and a lack of fish manufacturing that contributes to the diversification and expansion of fishery products.

Since fish contributes to food security, in order to achieve 65 per cent of the fishery self-sufficiency[41], it is essential to develop fisheries, promote the creation of advanced fish farms, diversify fish production, establish fishery industries, develop and equip fishing ports with essential services, establish a research center to improve fishery production, create a pilot plant for freshwater fish breeding, provide the sea with quantities of young groupers, review fishery legislation, and enforce effective conservation laws.

Aquaculture is gaining momentum in Qatar over the last few years. Since 1988, significant efforts to develop the sector have been made. There are a few fish ponds in the private sector using extensive and semi-intensive culture systems. The continuous increase in fish consumption and demand for fish in Qatar needs to be addressed through aquaculture production. The Department of Fisheries is planning new experimental projects for the growth of the aquaculture industries as a profitable venture. The natural resources for aquaculture are yet to be exploited and they require pioneering effort both from government and the private sector. Coastal land unfit for agriculture and commercial activities can be used for fish and shrimp culture and associated activities.

Coastal Tourism

Tourism has been identified by the country's leadership as one of five priority sectors integral to diversifying Qatar's economy and to increasing private sector participation. Qatar National Tourism Sector Strategy 2030 Diversified tourism offerings across six areas: coastal and desert tourism, cultural tourism, business events, sports tourism, urban and family entertainment, and cruise tourism. Qatar

[41] Qatar National Development Strategy 2022

hopes its expansion in marine tourism will help increase the total number of visitors as it tries to recover from a drop in tourists due to the boycott of four Arab countries since 2017.

In Qatar, Doha Port has achieved in 2019 a milestone in its success with 144,707 visitors and staff members on board of 44 cruise ships with a growth rate of more than 120 per cent over the previous season[42]. Qatar hopes its expansion in marine tourism will help increase the total number of visitors as it tries to recover from a drop in tourists due to the boycott of four Arab countries, including three Gulf countries, since 2017. Doha Port puts Qatar on the track to enhance its ability to receive tourist cruise ships, as well as the transition to a landing station. It is estimated that once all projects for the development of the marine tourism sector are completed, the sector will attract more than 500,000 visitors to Qatar and generate revenues of QR350 million (€ 78.2M) annually by 2026.

Maritime Transport and Port Infrastructure

The Maritime Transport Sector is committed to developing and modernizing the sector aiming to ensure a safe maritime navigation that meets all safety requirements and obligations, and keeping pace with international maritime developments through creative and effective application of international maritime instruments and observation of emerging trends and latest technologies. Ensuring the quality of maritime services and transportation comes at the top of the Sector's priorities. Qatar aims at developing maritime transport in line with international best practices and standards and developing an integral inspection system for vessels to ensure that all vessels are compliant with international safety requirements for maritime navigation.

Hamad Port, which became operational in 2016, is expected to transport six million containers a year upon the completion of its operation phases in 2020 through three container terminals. Its current annual capacity is less than two million containers. It has a general cargo terminal that can handle 1.7mn tonnes of general goods, 1mn tonnes of foodgrains and 500,000 vehicles. It will also have a livestock terminal, a multi-use terminal, an offshore supply base, a coast guard facility, and a port marine unit. The start of partial operations at Hamad Port, which is one of the largest multi-purpose ports in the region, was a major milestone for this mega project that will modernise the way Qatar handles ocean imports and exports and help facilitate the growth and diversification of the country's economy. As part of its partial operations, Hamad Port opened its general cargo and "roll-on roll-off" facilities and cleared its operations for the delivery of general goods, vehicle imports and construction equipment. The start of Hamad Port's partial operations also increased the container capacity at Doha Port. Along with regional transport development plans, Hamad Port will provide transshipment links by rail, sea, or road to GCC and other Arabian Gulf states making use of its advanced safety, security system, and dedicated customs inspection area with latest technologies to speed the clearance of goods. With the establishment of an economic zone adjacent to it, Hamad Port will facilitate manufacturing industries and help the nation to increase its non-oil and gas exports. Along with the new expressway interchanges, the port will facilitate cost-effective cargo handling and will position Qatar as the new regional shipping hub.

In addition to Hamad Port, the start of the first phase of the port of Ruwais began in January 2015. The port is located in Madinat Al Shimal, 120 km north of Doha. It will spread over an area of 261,224 sq.m and will include the development of the existing fishing port and the construction of new facilities to accommodate dhows (traditional sailing vessels), coastal trading vessels and passenger/car ferry traffic. In December 2018 the port authority, officially launched the second phase of the development project. As part of this phase, it will undergo a 156,000 m² expansion. After the completion of the first phase, Al Ruwais Port was capable of exchanging up to 20,000 containers per year, up from 1,000 containers per year prior to the phase's completion. It is expected that by 2020 the port will have 300 additional berths.

Doha Port puts Qatar on the track to enhance its ability to receive tourist cruise ships, as well as the transition to a landing station. It is estimated that once all projects for the development of the marine

[42] Hukoomi - Qatar e-Government Portal, September 2019

tourism sector are completed, the sector will attract more than 500,000 visitors to Qatar and generate revenues of QR350 million (€ 78.2M) annually by 2026.

Sustainable Finance and Investment

The government is actively promoting Qatar as a regional centre for fintech, which will act as a catalyst to drive innovation and growth forward, making it the perfect time and place to join the FinTech revolution. The country has introduced progressive laws that support its emphasis and focus on embracing payment innovations while adopting the latest Islamic financial services. The National Fintech Strategy aims to support the burgeoning sector in partnership with several key local stakeholders including the Qatar Financial Centre (QFC) and the Qatar Development Bank (QDB). Although Blue Economy and blue finance and investment are not recorded as specified sectors of Qatar's fintech development strategy, the sector is certain to constitute an upcoming field of opportunity in the near future, especially taking into account the know-how established regarding Islamic financial services modalities.

Desalination - Water Resources and Treatment

Qatar water resources are particularly important given the lack of freshwater bodies like rivers and lakes, and low rainfall. There are only three water resources: desalinated water, groundwater, and recycled water, all inefficient, though critical to water security. Desalinated water in 2015 totaled 533 million m^3 compared to 362 million m^3 in 2010. The production of desalinated water depends partially on oil and gas and causes multiple environmental impacts. Recycled, or Treated Sewage Effluents (TSE) volume in 2015 amounted to 194 million m^3 or around 98.2 per cent of total wastewater. Nearly 66 million m^3 were used in agriculture (feed), around 31 million m^3 in the irrigation of green landscapes and public parks, and about 57 million m^3 in deep injection into the non-freshwater aquifer. Further, 39 million m^3 were discharged into lagoons, which is a waste of a sustainable water resource and a financial waste due to the costs of such treatment.

5.2.5 - Saudi Arabia

Saudi Arabia's Vision 2030 identifies the sea and coastline as a fundamental component of the Kingdom's heritage that is to host a number of giga-projects. It is now emerging as a relevant ocean state, with a focus on its two seas, the Red Sea and the Arabian Gulf, stronger than ever before. A number of marine-based industries are set to develop strongly under Vision 2030, including sustainable desalination, coastal tourism and marine sports, aquaculture and marine energy.

Marine Living Resources - Fisheries and Aquaculture

Saudi Arabia aims to build safe and sufficient strategic food reserves to guard better against emergencies. The capture fisheries and aquaculture sectors contribute to the food security of the Saudi population. The Saudi Arabia Fisheries and Aquaculture Market is projected to register a CAGR of 4.1% during the forecast period (2020-2025)[43]. The demand for seafood is increasing in the country, owing to a shift toward protein-rich diets and increased demand for various aqua species, such as shrimp and oysters. The average per capita consumption of fish in the country was peaked at 11 kg during 2017-18, while the global average stood at 19 kg. To meet the domestic requirements, the country is now dependent on imports.

Capture fishery production of the Kingdom has been average of 68000 tonnes in 2015-16. Shrimps, mackerels, emperor fish and swimming crab are the main species caught. Artisanal fishing vessels form the large majority of the Saudi fishing fleet of close to 11200 in 2010, with mainly small boats operating in shallow coastal waters. The number of fishers was around 29000 in 2010, of which 68 percent was foreign fishing workers. The industry, particularly the artisanal fishery, receives significant Government subsidies in the form of soft loans, grants, and other assistance.

[43] Mordor Intelligence, 2019

Shrimp is sold locally heads-on without further processing. Exported shrimp is processed, packed and frozen and sold both heads-on and head-less. Most (98%) of the large by-catch of the shrimp fishery is discarded, but some desirable species are landed at local fish markets. Finfish are landed on ice and sold fresh in both wholesale and retail markets. Wholesale markets exist in most major coastal and inland cities.

The Saudi Fisheries Company was established in 1981 to lead development in the catch utilization sector and operates both a number of wholesale and a chain of retail fish outlets throughout the Kingdom. In addition, the Company is actively involved in the export of fresh and processed fish products. The Company has four processing plants strategically located in Dammam, Jizan, Jeddah and Riyadh. These plants have the capacity to process more than 100 tons of fish and shrimp daily. All plants are modern, well equipped and have additional lines for freezing, processing and packing fish products.

In comparison with the oil industry, the contribution of the fishing industry to Saudi Arabia's economy is very small. While Saudi citizens own and operate traditional and industrial vessels, the sector is heavily dependent on immigrant workers with more than 50% of these workers coming from Bangladesh or India. In addition to commercial food production, the fishery resource also supports a significant recreational fishery, particularly on the Red Sea coast. With demand increasing and production from wild capture fisheries stable or, for some species, falling, prices of most major local fish species are increasing significantly. As a result, profitability of individual fishing enterprises has remained adequate despite lower catch rates within the finfish sector. However, profitability is significantly distorted by direct, and increasing, subsidies by the Government which are in response to lower catches.

Most stocks are fully or over-exploited and, although some management is in place, over-capacity of the fleet remains a significant issue. The shrimp and the finfish resources off both the Arabian Gulf and Red Sea coasts are already intensely exploited. The present annual shrimp production could be increased by a reduction of the fishing effort, better controls on the taking of small shrimp in shallow water areas by artisanal vessels and prevention of illegal fishing on the main shrimp nursery areas.

Like other countries in the region, the catch of some major finfish species (such as grouper) on the Arabian Gulf coast of Saudi Arabia are in decline. Overexploitation may be a contributing factor in this decline as well as changing environmental conditions brought about by coastal development. Cooperative management among all Gulf and Red Sea countries for shared stocks is needed to address the overall management of these regional stocks.

The **Aquaculture** sector is expanding rapidly with recent expansion being in marine aquaculture. Aquaculture production now accounts for around 14% of total fish production in KSA. The Government has identified aquaculture production as a priority and has set a target production from this sector of 48000 tonnes in the medium term. As landings from capture fisheries are declining and stricter safety regulations are imposed on imports, aquaculture is expected to be the main source of seafood in Saudi Arabia. At the same time, its strategic geographic position presents an ideal opportunity for the country to become a major seafood exporter serving the GCC as well as European and Asian markets.

Current aquaculture total production was at 30000 tonnes in 2015, 26 per cent up from 2014. Shrimp is the dominant product of the Saudi aquaculture industry. The majority of farmed shrimp produced is exported, while the bulk of the farmed fish is consumed domestically. The production increase follows the switching of the target species from *P. indicus* (native species) to the more resistant non-endemic *P. vannamei* and the implementation of biosecurity guidelines at farm level and surveillance programme at national level.

Marine cage culture is a relatively new development with several large farms established along the coast of the Red Sea, farming mainly the exotic gilthead seabream and the Asian seabass (*Dicentrachus labrax*). The interest in finfish cage farming using other species, including grouper and amberjack, is increasing.

The national aquaculture sector in particular has grown rapidly over the past several years making the country the top regional producer and an exporter of seafood worldwide thanks to the highest production

safety and traceability standards, state-of-the art technology, and rigorous biosecurity[44]. The national plan for the aquaculture sector under Vision 2030 aims is to reach a total production of around half a million tonnes in 2030. Aquaculture thus seeks to create a strong pillar for the country's new economy, contribute to GDP, provide skilled employment, and help effectively address the issue of food security in the most environmentally sustainable manner.

Coastal Tourism

Saudi Arabia is the second biggest tourist destination in the Middle East with over 16 million visiting in 2017. Although most tourism in Saudi Arabia still largely involves religious pilgrimages, there is growth in the leisure tourism sector. Potential tourist areas include the Hijaz and Sarawat Mountains, Red Sea diving, and a number of ancient ruins.

Marine-based tourism has yet to be developed in Saudi Arabia despite its huge potential.[45] Saudi Arabia has the longest coastline in the Gulf region and the Red Sea coastline running from Jazan to Tabuk offers many tourism opportunities, especially in winter because of weather and beautiful scenery. For example, Yanbu and Rabigh have great potential for diving and can attract many who love this sport as they both have coral reefs. One of the steps that should be taken to promote marine-based tourism is to draft laws to regulate investment activities in the sector, given that the lack of such legislation is a great obstacle facing this type of tourism.

Nonetheless, the Red Sea Project (TRSP – see below) is a development that is aiming to change this: the development extends over 28,000 km2 along the shores of the Red Sea. It will become a sustainable luxury tourism destination on the west coast of the Kingdom of Saudi Arabia. The destination incorporates the Al Wajh lagoon, a pristine 2,081 km2 area that includes 92 islands with valuable habitats (coral reefs, seagrass, and mangroves) and species of global conservation importance. The Red Sea Development Company, responsible for the execution of TRSP, has committed to achieve a net-positive impact on biodiversity while developing the site for sustainable tourism. After careful optimization of the development plans to explore every opportunity to avoid impacts, Marine Spatial Planning was carried out in order to optimize the conservation of the Al Wajh lagoon in the presence of development. The results showed that careful design and planning could potentially allow coastal development to enhance, rather than jeopardize, conservation.

Saudi Arabia boasts of having 3,400 km long charming and serene coastlines along the Red Sea in the west and the Arabian Gulf in the east. The beaches in these coastlines are distinguished by their natural beauty that attracts thousands of tourists throughout the year. Since the launch of the Kingdom's Vision 2030, these coastlines have been accorded great attention with the authorities implementing massive environment and tourism development projects. Untamed stretches of coral-filled Red Sea Coast are going to witness several mega-projects, which are part of Vision 2030, and the most important among them are NEOM, Amaala, and the Red Sea projects.

The **Red Sea Project**, owned by the kingdom's Public Investment Fund, is described as the world's most ambitious and exciting hospitality project. Situated between the cities of Umluj and Al Wajh on the west coast of Saudi Arabia, the Red Sea Project will be a luxury tourism destination within a 28,000km^3 area encompassing more than 200km of coastline, around 90 islands, and including ancient archaeological sites and unspoilt nature. Red Sea Development Co. plans to close on a 14-billion riyal ($3.7 billion) loan from five domestic banks as it steps up construction on a luxury tourism project "about the size of Belgium", as described by its chief executive.

Serving this will be latest in a group of new airports along Saudi Arabia's Red Sea coast that will provide the entry points to several new resorts. The airport is expected to be operational within the next two

[44] The seafood sector in Saudi Arabia: Philippos Papageorgiou, National Fisheries Development Program, Ministry of Environment, Water and Agriculture of Saudi Arabia; and Ekaterina Tribilustova, EUROFISH International Organization in collaboration with Saudi Aquaculture Society and National Aquaculture Group, 2020

[45] Muhammad Al-Mejel, chairman of the national tourism committee at Riyadh Chamber of Commerce and Industry Ocean of opportunities awaits investors in marine tourism, Saudi Gazette, 24 September 2016

years. Seaplanes will provide an option for travelling to the outer islands of the archipelago of more than 90 islands. Construction of the airport has begun, and the company aims to open the first four hotels at the end of 2022 and 12 more the following year. That would complete the first phase of the project. When the entire development is completed in 2030, it will target 1 million visitors a year, split evenly between domestic and international.

Amaala is a luxury tourism project on Saudi Arabia's northwestern coast that is inspired by the Red Sea. Composed of three communities based on the pillars of Art & Culture; Wellness & Sports; and Sun, Sea & Lifestyle. Developed by PIF, the sovereign wealth fund of Saudi Arabia, this ultra-luxury destination is also part of the Saudi Vision 2030 programme, envisioning to feature the largest wellness retreats in the world. The giga-project, which is currently in Phase 1 of development, which covers 4,155km^2 of terrain across land and sea, targets the world's top 2.5 million ultra-high net worth travelers, the development will offer an immersive experience for travelers and residents that is underpinned by a strong focus on environmental preservation, conservation of marine life and sustainable practices. Once developed, it is expected to include 2,500 hotel rooms, and more than 800 residential villas, apartments, and estate homes, in addition to 200 fashion and retail brands.

As part of the deal, joint conservation initiatives will be explored to benefit the world's oceans through the effective management of coral reefs, protection of iconic species, enforcement of Marine Protected Areas (MPA), and preventing plastic pollution. Water production plans include a dedicated desalination plant that has zero impact on the coral reefs. All wastewater will be treated and reused in agriculture, while all organic waste will be used in agriculture. Biodegradable materials will be used within the resort, while energy requirements will be met by using renewable sources, with the entire development having a zero-carbon footprint.

Climate Change and Renewable Energy

Saudi Arabia expects to attract more than $20 billion in investments in renewables over the next decade, aiming to generate 30 GW from renewables by 2025 and 60 GW by 2030. It also expects to attract near record low prices for its renewable energy projects. To this end, the Ministry of Energy launched in January 2020 the third round of the National Renewable Energy Program (NREP). The round comprises four solar projects with a total combined capacity of 1.2 GW Renewable capacity. Through the NREP, the Ministry of Energy, has pre-developed and tendered 2.17 GW of renewable energy capacity, of which 700 MW was awarded in 2019 and a further 1.47 GW to be awarded in 2020. According to the Energy Minister, Saudi Arabia plans to produce 70% of its power from gas and 30% from renewable energy, while currently the country burns mostly oil to produce power. Saudi Arabia's local energy reforms will also reduce domestic consumption by 2 million b/d of oil equivalent by 2030.

Maritime Transport and Port Infrastructure

Saudi Arabia's maritime sector is working towards making the Kingdom a regional logistics hub and a pioneer in the transport sector, aiming to place KSA in the 25th position globally on the Logistic Performance Index[46]. Saudi Arabia is considered a key player in the field, keeping in mind its geographical location.

The King Abdullah Port Project has witnessed investments worth more than $10.7 billion and is contributing to increasing Saudi exports to more than $160 billion by 2030. The King Abdullah Port is the first port in the region fully-owned, developed and managed by the private sector. Classified as the fastest growing container port, it was listed as one of the world's largest ports, less than 4 years after its launch. Port development is moving ahead, with projects at Dammam and King Abdullah Economic City launched in the last five years to boost the kingdom's import, export, and transshipment potential. The inauguration of the King Abdullah Port, has led to a number of agreements, including the launch of petrochemicals exports from the facility. Expansion of container capacity at the facility to 7 million TEU is now expected, as is the commencement of drilling of the northern basin, paving the way for capacity of 10m TEU.

[46] In 2018 KSA was in the 55th position, lpi.worldbank.org/international/global

One of the largest projects recently undertaken in the sector is the King Salman International Complex for Maritime Industries and Services, a joint venture of Saudi Aramco, National Shipping Company of Saudi Arabia (Bahri), Hyundai Heavy Industries, and Lamprell. Completion of the complex is expected in 2022. According to Saudi Aramco, the entire project is designed to contribute around SAR64bn ($17bn) to the Kingdom's GDP, boost import substitution for maritime products and services by around SR45 billion, and create more than 80,000 direct and indirect jobs by 2030. The integrated maritime yard is expected to be the largest in the region, in terms of both production capacity and scale.

Saudi Arabia is also improving efficiency in the maritime sector with a priority being the improvement of land infrastructure, especially rail, in order to improve the logistics performance.

Environmental Protection

Human activities have affected the marine environment, causing many problems, such as changes in ocean circulation, ocean acidification, shifts in distribution of marine species with climate change, as well as marine habitat loss, coastal erosion, environmental impacts of aquaculture and overfishing. Hence, addressing the cumulative effects of these activities is required to conserve the marine environment. Social commitment and support for these actions depend, however, on awareness and requires, therefore, an understanding of citizens' awareness and perceptions on these issues.

A study[47] focusing on public perception for the marine environment degradation and needs, showed that marine litter, chemicals, and sewage pollution were identified as the top three marine issues. Economic punitive actions (e.g., fines) should be prioritized by Saudi government to address environmental issues, and greater oversight over commercial activities in the marine environment and enhanced scientific research efforts are required to address environmental marine impacts.

Results also point to the high level of support for government to implement solutions to marine environmental issues, including climate change impact, supported by the research of scientists working for universities and government and international organizations. Improving the attention to environment in the Saudi education curriculum emerged as an easily achievable strategy to promote awareness and positive citizen-based action in addressing marine environmental issues.

The elevation of environment to the Ministerial level by the establishment of the Ministry of Environment, Water and Agriculture (MEWA), has led to a number of progressive policies to protect the ocean. Saudi Arabia recently adopted a new national strategy for environment, which includes restructuring the environmental organization to strengthen further the environmental compliance and biodiversity conservation. A new environmental law has been framed and was planned to be approved in 2020, leading to adoption of more stringent environmental standards. MEWA is also rolling a number of new centers and new strategies to improve ocean stewardship and conservation, which should remove other pressures on coral reefs and improve their conservation.

These efforts are supported by a major increase in the capacity of institutions in marine science and technology, led by a number of high-performing institutions, such as KAUST, a leading institution in global marine and coral reef research, KFUPM with an outstanding record of applied research in the Arabian Gulf and the Red Sea, KAU carrying the longest-lived program of research in the Red Sea through its Faculty of Marine Science, and KACST through centers contributing with remote sensing and biodiversity assessments.

Saudi Arabia has launched a new trans-boundary body, the Council of Arab and African Littoral States of the Red Sea and the Gulf of Aden, to align policies to achieve a sustainable ocean economy, supported by a number of ongoing processed involving multiple stakeholders.

[47] Perceptions of Marine Environmental Issues by Saudi Citizens, 2020. https://doi.org/10.3389/fmars.2020.00600

The election of KSA to the executive board of UNESCO (2019-2023), provides strong support to UNESCO's Marine World Heritage Sites and UNESCO's International Oceanographic Commission, that just launched the U.N. Decade of Ocean Science (2021-2030).

Desalination – Water Resources and Treatment

In order to overcome water scarcity, substantial investments have been undertaken in seawater desalination, water distribution, and sewerage and wastewater treatment. Today about 50% of drinking water comes from desalination, 40% from the mining of non-renewable groundwater and only 10% from surface water in the mountainous southwest of the country.

Water is provided almost for free to residential users. Despite improvements, service quality remains poor, for example in terms of leaks and continuity of supply. Another challenge is weak institutional capacity and governance, reflecting general characteristics of the public sector. Among the achievements is a significant increase in desalination, and in access to water, the expansion of wastewater treatment, as well as the use of treated effluent for the irrigation of urban green spaces, and for agriculture. The Ministry of Environment, Water and Agriculture (MEWA) has increased its investment in sewerage with treated sewage effluent (TSE) becoming more widely available for use in non-potable applications.

The Saline Water Conversion Corporation (SWCC) established in 1974 as an independent government corporation is the Saudi Government entity responsible for the desalination of seawater and supplying various regions in the Kingdom with desalinated water. SWCC puts great efforts, through its Saline Water Desalination Research Institute in Jubail, to improve further the water desalination technologies and to discover new techniques and methods to reduce cost and to protect the environment.

In 2002, Saudi Arabia established the framework for private sector participation through build-own-operate and build-own-operate-transfer schemes, laying the groundwork for the development of independent water and power projects (IWPPs). The first IWPP, undertaken in 2007 just outside Jeddah, was the Shuaibah III power and desalination plant, while the 2700-MW-capacity Marafiq complex in Jubail, built in 2008, is now the world's largest IWPP. These IWPPs sell their water and power to the main buyer, the Water and Electricity Company (WEC), which then sells water on to the SWCC and electricity to Saudi Electricity Company (SEC).

The apparent paradox of very low water tariffs and water privatization is explained by government subsidies. The government buys desalinated water from private operators at high prices and resells the bulk water for free. Likewise, the government directly pays private operators that run the water distribution and sewer systems of large cities under management contracts. In January 2016 water and sewer tariffs were increased for the first time in more than a decade, which resulted in discontent and in the replacement of the Minister of Water and Energy. It is estimated by 2030, 50% of Saudi Arabia's local oil and gas will solely be used to meet the rapidly growing demand for water[48].

The first contract for a large solar-powered desalination plant in Saudi Arabia was awarded in January 2015 to a consortium consisting of Abengoa from Spain and Advanced Water Technology (AWT), the commercial arm of the King Abdulaziz City for Science and Technology (KACST). The $130 million reverse osmosis plant, co-located with a photovoltaic plant in Al Khafji near the Kuwaiti border, was planned to have a capacity of 60,000 m3/day. The plant would rely on grid power at night and its operator expected to sell electricity to the grid in the future. However, Abengoa filed for bankruptcy at the end of 2015, putting the future of the plant in jeopardy.

Floating desalination barges have operated since 2008 to meet high seasonal demand for potable water along the Red Sea coast of the Kingdom. In 2010, the largest floating desalination plant in the world, with a production capacity of 25,000 m3/day (9 million m3/year), was launched on a barge in Yanbu. It is sufficient to supply a city with more than 100,000 inhabitants with drinking water.

[48] Water, Energy, & Food Sustainability in the Middle East. Badran, Adnan, et al., Springer International Publishing, 2017

5.2.6 - United Arab Emirates (UAE)

The UAE Vision 2021 consists of four main elements: an ambitious and confident nation grounded in its heritage, a strong union bonded by a common destiny, a competitive economy driven by knowledgeable and innovative Emiratis, and a nurturing and sustainable environment for quality living. This vision will be reached, among others, through focusing on sustainable environment and infrastructure, innovation based on science and technology including the UAE Strategy for Artificial Intelligence, the UAE Strategy for the Fourth Industrial Revolution (4IR), the National Advanced Sciences Agenda 2031, and the National Climate Change Plan of the UAE 2017–2050.

UAE aims to achieve future security of water and food supply by using bioengineering sciences and advanced renewable energy technologies. The National Advanced Sciences Agenda 2031 Agenda aims to utilize advanced sciences in the development and creation of solutions to future challenges including: enhancing water security using advanced and clean technology, developing advanced scientific food security system, and building a system of logistical support based on scientific studies and data. The National Climate Change Plan of the UAE 2017–2050 focuses on the transition into a climate resilient green economy in order to achieve a better quality of life.

In the UAE, the sea is not only linked with recreation and the country's rich cultural heritage, but also provides a foundation for diverse economic activities such as fisheries, water provision, shipping, tourism, and recreation. Up to 40 per cent of global shipments go through the UAE waters. Up to 80 per cent of oil shipments and 30 per cent of fish are hunted in the oceans around this region. About 42 per cent of the UAE population somehow lives near the sea; 68 per cent of the UAE's jobs are related to services and functions of the seas; and 30 per cent of jobs in the country are related to areas close to the sea.

A Sustainable Blue Economy can support a prosperous and resilient future for the UAE by safeguarding precious natural resources and creating new opportunities for innovation, economic growth, and human well-being. To varying degrees, many key UAE economic sectors depend on the marine environment. Some examples include water desalination, shipping and port operations, tourism and recreation, real estate and development, as well as fisheries. The UAE's National 2030 Agenda for Sustainable Development presents a new cross-governmental framework linked to the UAE Vision 2021 and has categorized SDG 14 (Life Below Water) as a 'competitive knowledge economy'.

Marine Living Resources - Fisheries and Aquaculture

Though the fisheries sector constitutes a relatively small segment of the UAE economy, overfishing and habitat loss led to an 88 per cent decline in fish stocks between 1976 and 2011, according to the UAE State of Green Economy Report. The adult stock size of three of UAE's most important commercial species has declined by an estimated 90 per cent, including hamour, or orange-spotted grouper (*Epinephelus coioides*); shaari, or spangled emperor (*Lethrinus nebulosus*); and farsh, or painted sweetlips (*Diagramma pictum*).

With a 1318 km coastline that extends from Oman in the east to Saudi Arabia in the west, the majority of the UAE coastline is in the Gulf, with a smaller coastline in the Gulf of Oman; the Gulf is characterized by warm saline waters that are relatively poor in fish resources. Fisheries provide an important supply of fish to local communities and urban areas and are considered to have a heritage value. The fisheries of the UAE are almost entirely small-scale, with bottom trawl fishing has been banned since the 1990s. The employment in fisheries increased significantly during the 1990s, and in 2011, around 24800 persons were involved in fishing and the fishing fleet consisted of around 5570 boats in 2011.

The major development in **aquaculture** in UAE in recent years was the construction of a large scale in-door aquaculture farm equipped with recirculating aquaculture system (RAS) for sturgeon farming, with the target of up to 30 tonnes of caviar production annually in coming years. It is expected that an increasing number of entrepreneurs will start considering aquaculture as an interesting sector for investment, as new technologies such as RAS and land-based systems are being introduced in the UAE.

Maritime Transport and Port Infrastructure

The shipping and ports sector in the UAE is uniquely positioned to bring positive sustainable change that can be scaled at the global level. The global importance of the shipping industry for the UAE and the international economy, the rapid changes in the global shipping regulatory framework, the growth of awareness and interest in the shipping and finance sectors, as well as available technological advancements, are creating the enabling conditions for significant positive change towards sustainability.

The UAE is a Signatory State of the International Maritime Organization (IMO) since 1980 and in 2017 became a member of the IMO's Executive Council, owing to the country's important role in global and regional maritime trade. The sector can benefit from guidelines linked with improvements in ship design that can also help reduce environmental impacts. Changes in design can improve operational efficiencies and meet IMO requirements to reduce at least 50 per cent of total annual GHG emissions generated by the shipping sector.

At the national level, efforts are needed to help provide infrastructure facilities and support compliance, while also monitoring incidents and working closely with shipping companies to address any environmental concerns. These suggested actions will need to be complemented by international regulations and stronger global action in managing the high seas, where irresponsible practices often take place and can sometimes affect natural resources within the Exclusive Economic Zones of adjacent countries.

UAE supports the need for a unified approach in port standards and enforcement across the region, in line with international requirements. This is of particular importance, considering that the Gulf is a semi-enclosed basin and any activity occurring within its waters can affect other areas. The role of port authorities and operators in bringing systemic change is therefore key to following IMO standards when monitoring ships approaching into a port.

Coastal Tourism

The tourism and hospitality sector has long been, and continues to be, one of the main sectors contributing to economic diversification in the UAE. An increasingly important segment within the tourism industry in the UAE, many hospitality and tour operators offer a unique blend of sightseeing opportunities and nature-based experiences. These include nature-based trips to the desert, mountains, and coastal areas, as well as water-based activities such as diving and snorkeling. Luxury, low-impact eco-tourism developments are also increasingly being initiated.

Linking the effective management of Marine Protected Areas with recreational opportunities and following best practices can create new economic opportunities in the UAE, in line with existing marine conservation strategies and goals. The need to integrate marine ecosystem management into corporate sustainability strategies in addition to reducing energy consumption, water use and waste, which are typically the areas of corporate focus. In the UAE, tourism and environmental authorities across various Emirates have started including sustainability in their visions, announcing green initiatives, and actively promoting recreation in protected areas.

The increasing number of cruise lines docking at UAE ports supports the maritime sector's function as a significant global maritime player. The UAE prioritizes all aspects of the maritime sector, especially maritime tourism which is playing a greater role in the development of the local maritime cluster, driving economic growth, as well as promoting tourism and economic diversification[49]. The country's tourism infrastructure is being rapidly expanded to welcome the surge in cruise tourists, while ambitious projects are being implemented to upgrade port infrastructure.

The Emirate of Abu Dhabi has emerged as a major destination for maritime tourism. Port Zayed hosts the Abu Dhabi Cruise Terminal, a state-of-the-art terminal for passengers traveling by sea to Abu Dhabi.

[49] UAE Minister of Infrastructure Development and Chairman of the Board of Directors of the Federal Authority for Land and Maritime Transport, H.E. Dr. Abdullah bin Mohammed Balheif Al Nuaimi

The emirate is also home to various leading cruise operators. Abu Dhabi has launched a series of initiatives to develop its maritime tourism sector which forms one of the pillars of its economic diversification strategy. At the end of last year, Sir Bani Yas Island in the Western Region was opened to cruise ships, becoming the only beach stop in the Gulf region. And more efforts are being undertaken for further development, expansion and modernization of local marine tourism facilities.

Maritime tourists and cruises in Dubai increased significantly by 15 and 18 per cent respectively, from 2016 to 2017[50].The emirate is home to the Middle East's largest and most modern cruise facility which covers 36,500 sqm and extends at a distance of 2,200 m. Mina Rashid currently welcomes around 650,000 passengers and was expected to attract a million tourists by 2020. The inauguration of two new cruise lines, 'Norwegian Cruise Line' and 'Thomson Cruises,' will support an 18 per cent increase in the number of cruises in Dubai. The emirate presently hosts more than 23 leading international cruise lines, six of which are based in Dubai, reinforcing its position as a global destination of choice for cruise tourism.

A segment of significant growth potential is also the leisure sector, with officials targeting the development of yachting services, construction, maintenance, and berthing facilities. Dubai Maritime City Authority (DMCA) has recently unveiled the features of 'Sea Dubai' initiative, an instrumental project for the development of the maritime leisure sector in Dubai. The 'Sea Dubai' initiative aims to facilitate recreational maritime activities with a focus on creating high quality tourism services and new jobs within the maritime leisure sector. More such projects are underway. For example, in January 2018, Meraas Holding announced plans to construct a new 1,400 berth marina at Dubai Harbour, a nearly 50 per cent increase on Dubai's existing 3,000 berthing slots. The marina will have the capacity to accommodate some of the world's largest private yachts, including vessels up to 85 metres in length. In addition, Dubai Properties launched another marina in March this year, with the 157 slip[51] facility to be located on the Dubai Canal, close to the centre of the city and part of a larger mixed purpose waterfront development.

It is worth noting that UAE's beaches are currently the only ones in the GCC region that are certified as 'blue beaches', meaning the beaches are environmentally sustainable. Dubai focuses on renovating its beaches with the development of new facilities and activities for visitors, and Oman similarly concentrates on the development of its beaches, although it focuses more on cultural festivals, natural environment, and local heritage, focusing on visitors who are attracted to its diverse and natural environment and ecotourism, culture, heritage, history, and archaeology.

Environmental Protection

Environmental protection is considered the main objective of the UAE's developmental policies aimed at increasing green areas, developing water resources, improving marine environment, and protecting it from pollution, preserving fisheries and livestock, developing strategies to protect biodiversity. The UAE has set a body of legislations to ensure sustainable environment for life. It has introduced many federal laws and ministerial decrees to preserve the environment. These are some of the ways through which the UAE aims to achieve the sustainable management and efficient use of natural resources.

For instance, the UAE has enacted laws banning waste and oil sludge dumping in the sea by the hundreds of tankers operating in the region. Any intentional disposal of pollutants or wastes from ships, aircraft or any other means into the marine environment, and deliberate dumping from ships or industrial installations or other means into the marine environment is prohibited.

Additionally, the Environment Agency – Abu Dhabi (EAD) announced a policy to reduce the amount of single use plastic material in Abu Dhabi and mitigate its harmful effects. The policy aims to keep plastics out of the environment and eliminate the use of avoidable single-use plastic materials by 2021 through fostering a culture of recycling and re-use and encouraging more sustainable practices in the

[50] Growth of maritime tourism gives major boost to UAE's global competitiveness, Travel Daily News, 26 September 2017

[51] A specific dock (or slip) to store a boat

community. Through the new policy, the EAD will make Abu Dhabi free of single-use plastic bags by 2021.

The UAE is committed to protecting and managing the rich biodiversity of the state and prevent the extinction of threatened species. The creation of natural reserves intends to improve the environment and protect the wildlife in the country, in addition to the promotion of eco-tourism. By 2020 there were 49 nature reserves in the UAE. Reserves that have been listed as wetlands of international importance within the framework of Ramsar Convention increased from 2 nature reserves in 2010 into ten in 2019.

The hospitality sector relies on clean bathing waters and recreation opportunities in natural areas such as reefs and mangroves. Their activities can be affected by chemical and oil pollution that degrades ecosystems, water quality and the overall visitor experience. Water desalination plants also rely on good water quality; increased salinity or pollutants in the seawater requires additional treatment with cost implications for their operations.

For ports, channel stabilization and erosion control are important operational considerations that can be affected by coastal modifications, storms and sea level rise due to climate change, as erosion and sedimentation patterns can affect shipping canals and port accessibility. These issues need to be addressed during site selection and Environmental Impact Assessment and Strategic Environmental Assessment to be conducted prior to port development. Additional coordination across other sectors, at an early stage of ports development, supported by relevant regulatory and maritime planning authorities, can play an important role in mainstreaming sustainability into key decision-making and promote efficient spatial use practices at sea.

However, environmental considerations need to be embedded in the corporate policies and strategies of hotel and tourism developers and investors, in addition to government environmental regulations requiring Environmental Impact Assessments (EIAs).

Climate Change and Renewable Energy

The UAE launched its national Energy Strategy 2050 in January 2017 and allocated over $163 billion to meet its goal to increase the contribution of clean energy sources in the total capacity mix to 50 per cent (44 per cent renewable, 38 per cent gas, 12 per cent clean coal and 6 per cent nuclear) by 2050. This goes hand in hand with the UAE's Vision 2021 strategic plan to generate 27% of its energy requirements from clean sources.

In Dubai, the Supreme Council of Energy announced an implementation plan for the Dubai Clean Energy Strategy 2050 to enhance the sustainable development of Dubai, a year after the launch of the national strategy. In May 2020, Dubai Electricity and Water Authority (DEWA) announced that the share of clean energy in Dubai's energy mix had increased to around 9%. This exceeds the target set in the Dubai Clean Energy Strategy 2050, which aimed to provide 7% of Dubai's total power output from clean energy sources by 2020 and 75% by 2050. DEWA's total installed capacity is 11,700MW of electricity, and includes 1,013 MW from photovoltaic (PV) solar panels at the Mohammed bin Rashid Al Maktoum (MBR) Solar Park, the largest solar park in the world, launched in January 2012 and managed by DEWA. The fifth phase totaling 900 MW was allocated in November 2019, with a world record price of $0.01693 per kWh.

The UAE has established itself as a key solar market over the past several years and will continue to add MW to the grid in coming years, in particular with the construction of:

- MBR Solar Park in Dubai with a total capacity of 5 GW by 2030 and investments worth over $10 billion.
- Sweihan solar power plant in Abu Dhabi.
- Abu Dhabi's Shams-1 opened in March 2013 as the world's largest Concentrated Solar Power (CSP) facility. No official decision has been announced regarding the proposed construction of Shams 2 or Shams 3.

The rooftop solar initiative kicked off in the UAE in 2017 with approximately 4 MW connected at the start of the year, with a total of 20 MW peak installed by December 2017, according to the Middle East Solar Industry Association Solar Outlook Report 2018. Under the Shams Initiative launched in 2014,

Dubai achieved 125 MW of installed capacity in residential, commercial, and industrial buildings in 2019. Under the net metering program, residents and businesses can add solar panels to their rooftops to generate electricity and excess electricity can be fed back into the grid for a credit on the power bill. Abu Dhabi is looking to expand solar rooftop installations in commercial and residential areas. At the end of 2017, the emirate established a net metering regulation which will allow businesses and government buildings to add solar panels on building rooftops, which could reduce electricity bills by 25%.

The Dubai Autonomous Transportation Strategy intends to transform 25% of all transportation to autonomous means by 2030. Also, the Dubai Supreme Council of Energy launched a number of initiatives to support electric vehicle owners, including free charging, parking and registration fees. In February 2017, U.S. electric car maker Tesla opened a showroom in Dubai. As of 2019, there are 103 Tesla destination charging stations and 3 supercharger stations available in UAE with plans to bring hundreds more online at Abu Dhabi National Oil Company (ADNOC) and Emirates National Oil Company (ENOC) service stations over the next several years.

In terms of **marine renewable energy**, Dubai seeks to establish floating solar power plants on the Arabian Gulf. DEWA and Dubai Municipality are studying the installation of a floating solar PV system on deep-water drainage lakes. In September 2019, DEWA issued a request for proposal for appointing consultants to study, develop, and construct floating solar PV plants in the Arabian Gulf.

Desalination and Water Treatment

This is a critical sector for the UAE linked to water security. In 2018, the UAE accounted for the largest desalination activity on the Gulf coast, with a desalination capacity of over 7 million m^3 per day. A variety of desalination techniques have been applied, in parallel with improvements in energy efficiency, recovery efficiency and the development of desalination technologies. An estimated 83 per cent of the plants in the UAE consist of thermal plants, with a smaller amount of reverse osmosis (RO) technologies currently in use. However, RO technology is projected to meet the majority of future demand. The cost effectiveness of desalination technology fundamentally depends on the quality of the intake water, in addition to the cost of the technology and the fuel that is used to power it.

Water desalination is a sector that can greatly benefit from developing a platform focused on investment in research, development, and innovation to make better, lower impact technology available. The key area for innovation and advancement is in commercialising technology for zero-liquid discharge and brine from desalination plants. Creating a circular economy – where high-value discharge components, such as brine, metals and chemicals can be used in other industries – can generate unique economic opportunities for the UAE, while also reducing impacts on the marine environment

The cumulative impact of multiple desalination plants occurring in coastal areas would need to be addressed to minimize impacts on ecosystem processes due to changes in water temperature and quality. Masdar's clean desalination pilot project has been testing the application of solar power to produce desalinated water and trialing the application of zero-liquid discharge technologies.

Sustainable Finance and Investment

The Emirate of Abu Dhabi is aiming to become a green bond pioneer in the region. In Sept 2018, Masdar (also known as Abu Dhabi Future Energy Co.), a renewable energy company, signed the first green revolving credit facility (RCF) in the Middle East, totaling $75 million, with four local and international banks. The RCF is consistent with the Loan Market Associations' Green Loan Principles and aims to provide funding for new and ongoing investments for Masdar's global technology and sustainable real estate projects. The Abu Dhabi Security Exchange also announced it joined the UN's Sustainable Stock Exchanges initiative to encourage sustainable investment.

Financial and insurance activities in the UAE are the third highest contributors to the economy, estimated to account for 8.7 per cent of GDP in 2017. In line with global trends, the finance sector in the UAE is in a unique position to drive action towards a Sustainable Blue Economy and engage various sectors within the local economy. The emerging momentum in the UAE towards sustainable finance

provides a unique opportunity to integrate Sustainable Blue Economy principles, as investors require corporate customers to have plans to mitigate their marine environmental impacts.

There is an opportunity for the UAE's finance sector to engage with various industries and regulators to create green/blue financial products and drive positive action, with finance sector representatives having supported the idea of supplying more 'blue' and 'green' finance products, as long as there was sufficient demand from clients [52]. Additionally, the hospitality, ports and shipping sectors are favourable towards obtaining such products if advantageous financial terms (e.g., lower interest rates) were included. Emirates Blockchain Strategy 2021 to transform 50 per cent of government transactions into the blockchain platform by 2021 can be an additional lever for the development of Blue Finance and Investment.

6 - Enhancing GCC's approach to an effective blue economy: policy, fiscal and administrative recommendations and proposed reforms

The development of the Blue Economy in the GCC region depends on establishing the appropriate policies and practices at a regional level in a timely and effective way. Following the sectoral policies and strategies that need to be put in place or further developed at a regional and country level, as presented in Sections 5.1 and 5.2, and the overall policy gaps presented in Section 4 by comparison to the EU policies, some institutional, knowledge and market pillars are described in the present section, as they are considered important towards creating the conditions for the establishment of a Blue Economy. From a knowledge-based development to proper governance structures and market-based tools, setting the foundations of a GCC strategy, including sectoral strategies, that will also be reflected at a country level at this early stage for Blue Economy in the GCC region is of crucial importance.

This chapter looks at the key policies that need to be addressed in relation to the above and introduces a number of recommendations for each.

6.1 - Data and Information Technology

The use of science, data and technology is critical to underpin governance reforms and shape management decisions. Credible information on the state of resources and environmental parameters and the forecasting possibilities provided by data are necessary in order to design effective policies and management measures. Environmental impacts need to be monitored and measured, and data need to be used to allow the effectiveness of management decisions. Digital mapping of the maritime and coastal space and natural assets can form the basis for cross-sector analysis and planning in order to prevent conflicts and avoid externalities.

Sustained ocean observations provide essential input to ocean scientific research. They also support a wide range of societal and economic benefits related to safety, operational efficiency, and as explained, regulation of activities within the coastal and marine space. The ultimate beneficiaries of ocean observations are end-users whose activities or businesses benefit from ocean data and information in terms of better scientific understanding of the ocean, improved safety, economic efficiency gains or more effective regulation of ocean use, and the protection of the ocean environment.

End-users of ocean data and information fall into four main types:

- Science end-users and research activities that rely in whole or in part on sustained measurement and observation of the ocean.
- Operational end-users who make use of ocean data and information to support operational needs related to safety, economic efficiency, and protection of the environment.
- Policy end-users who require sustained ocean data and information to support policy formulation, monitoring of policy compliance, and assessment of policy effectiveness.

[52] Emirates Nature-WWF: How UAE Businesses Can Shape a Sustainable Blue Economy, 2019

- Public end-users who have a general interest in the ocean or make use of ocean data and information in support of their leisure activities or recreational pursuits.

Providers of observing system infrastructure include manufacturers of sensors, instruments, and platforms; those building, launching, and operating satellite systems; providers of the cyber infrastructure that interconnects observing system components; and organizations that develop and maintain the data management systems, software tools, and models that are used to help turn data into useful information.

Ocean observation is conducted by a variety of national, regional, and international institutions and initiatives on different spatial scales. Many countries have installed marine research infrastructure and ocean observatories. Regions often prefer to combine efforts to observe different parts of the ocean collectively and to share and combine collected data. Business end-users of ocean observations increasingly engage in direct data collection to support operational needs where existing observation systems cannot address their needs operational ocean data and information. In these instances, end-users generally place contracts with specialist ocean measurement businesses who undertake such work on their behalf. In some cases, public organizations also contract to private companies in similar ways.

Delivery of end-user services is often not a simple linear end-to-end operation. More often, benefits are delivered by multiple organizations merging and mashing different sources of data and information to derive a product useful for a particular purpose. In that sense, growth in the ocean economy can be the driver for the development of a significant service industry meeting the specialist information needs of different sectors.

For the development of the Blue Economy sector, necessary policy developments on Data and IT include:

- **The development of marine observation and data collection policies, at national and regional levels.**
- **The establishment of rules and regulations in line with existing global and regional standards, for the collection, processing, and use of such observation information.**
- **Security and data ownership and safety considerations, including encryption and rights of access.**
- **Regional cooperation for the establishment of cost efficient and distributed efforts in the field of observation and data collection.**
- **Collaboration with established and world-class infrastructure, including the European Union Space Policy and tools.**

6.2 - Governance and Decision Making

Investing in improved governance can create a pipeline of investable opportunities to grow the blue economy in a manner that benefits national economies and local communities, while protecting resources for future growth. Effective governance is an essential condition to promote sustainable management of aquatic resources and environment, and ensuring biodiversity and ecosystem resilience, which in turn contribute to building community resilience against various shocks, including climate change. Effective governance can also help create an enabling environment for responsible private sector investments throughout the value chain by reducing risks and providing incentives for innovation. It is also a key pathway towards enhancing the development and sustainable operation of fisheries and aquaculture with the involvement of local communities and economic actors from the start.

Good governance setup needs to include provisions for the inclusion and empowerment of local communities. When local communities and operators have early involvement in setting policies and management approaches and rules, these rules are much more likely to be followed and create lasting change. Empowering local communities also means clarifying tenure and resource access privileges; in order to be effective, these must be accompanied with the capacity and resources to take advantage of these clear rights.

Policy developments in relation to governance for the development of the Blue Economy in the GCC need to address:

- **National and regional reforms to ensure the early involvement of local communities, economic actors, and the private sector in policymaking, implementation, and monitoring processes.**
- **Building the public sector knowledge and capacity to support such participatory governance practices.**
- **Align economic objectives with long-term sustainability, including not only environmental, but crucially social and economic targets embodying the SDGs.**
- **Establish and promote conditions that encourage business growth and a healthy private sector, with transparency, accountability, and operation in a fair and equitable environment without market distortions.**
- **Public-private dialogue, and strategic partnerships with investors, the finance sector, and international donors.**
- **Establishing governance and decision making on facts, data, and proven knowledge and expertise.**

6.3 - Innovation and New Technologies

The Blue Economy is rapidly becoming an innovation-intensive sector of the economy. Aiming to establish economically efficient and environmentally sustainable operations in the coastal and marine environment, most Blue Economy activities are building their foundations on critical technological developments, new approaches and innovations that allows harnessing the resources and processes of the oceans in the optimal ways. Realizing the full potential of seas and oceans in the GCC demands responsible, sustainable approaches to their economic development, based on solid science and knowledge.

Unless the innovation and technology development sectors in the region are provided with the appropriate conditions to flourish and generate solutions that can be turned into business and operational practices, development of the Blue Economy will be lagging and hampered with inefficiencies, environmental and operational deficiencies and externalities that ultimately will render it not viable.

It is therefore of crucial importance to support and focus the development of innovation and technology on a number of aspects in relation the Blue Economy in the GCC. Being a broad and emerging field, the needs are equally broad and vary between economic sectors, however some common policy guidelines are as follows:

- Encouraging innovation that produces win-win outcomes for ocean business and the ocean environment, allows innovation and technology to respond effectively to the growing challenges associated with the development of economic activity in the ocean.
- Increased attention needs to be paid to the possibilities for greater interaction and stronger synergies between ocean-related science on the one hand and ocean business on the other.
- Support new pioneering initiatives to improve measurement of the ocean economy, since policies need to be evidence-based, so that they can become instrumental in matters of stewardship, regulation and management of seas and oceans.

GCC governments need to take the following steps to succeed with the establishment of a dynamic innovation and technology ecosystem that supports the Blue Economy in the region:

- **Build high-quality infrastructure that supports innovation and technology, particularly in growth areas such as renewable energy and digital infrastructure, and promote competition in the delivery of services to businesses and consumers.**
- **Avoid the impulse of simply importing technology, and instead embed these capabilities in their countries through sustained initiatives over time.**
- **Reduce regulatory barriers to the adoption of foundational technology, such as drones, artificial intelligence, and advanced analytics.**
- **Establishing strong data-protection regulations can provide companies with a stable baseline, and ensure that consumers adopt new technologies and keep their data safe.**
- **Attract the right talent by changing the region's value proposition for global experts, by streamlining immigration policies and reducing the cost of living.**

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

- **Improve the quality of local education, with a particular focus on science, technology, engineering, and math, along with soft skills such as communication, creativity, and problem-solving.**
- **Encourage the participation of the private sector by creating an ecosystem of innovation.**
- **Change banking regulations, revisit existing incentives, and attract new investors such as Private Equity firms to increase funding for promising new ideas and start-up businesses.**
- **Encourage companies to launch corporate research functions.**
- **Establish Incubator and Acceleration platforms for Blue Economy Innovation, and Clustering schemes forging alliances between companies and universities.**
- **Support Mergers and Acquisitions in the innovation sector M&A, allowing companies to make faster progress and adopt public investment and exit processes.**

6.4 - Education and Training for Blue Economy

A strong, innovative, and productive Blue Economy that delivers economic results and safeguards the environment and the coastal and marine resources needs qualified and skilled professionals. Blue economy sectors around the globe have difficulties in finding the right people, as the field is in many ways new, and focused education and training fields are still lacking.

Some of the key underlying issues regarding the lack of proper training and education on Blue Economy knowledge, skills and jobs can be attributed to the lack of awareness of career opportunities in the blue economy, limited communication between the education sector and economic actors, absence of general ocean literacy. Examples of EU policies and practice, including the European Maritime and Fisheries Fund (EMFF) through its blue careers strand, which aim at establishing platforms for cooperation between business and education at local/regional or transnational level, and the BlueInvest initiative, can serve as a model.

Understanding how activities influence the ocean and how the ocean influences human societies is at the core of Ocean Literacy. An ocean-literate person understands the essential principles and fundamental concepts, is capable of communicating about the ocean in a meaningful way and is able to make informed and responsible decisions regarding the ocean and its resources. Developing Ocean Literacy in the region needs to follow the seven principles that reflect efforts to date:

1: The Earth has one big ocean with many features.
2: The ocean and life in the ocean shape the features of Earth.
3: The ocean is a major influence on weather and climate.
4: The ocean made the Earth habitable.
5: The ocean supports a great diversity of life and ecosystems.
6: The ocean and humans are inextricably interconnected.
7: The ocean is largely unexplored.

To advance towards establishing the necessary policies and practices for the development of a society and workforce that will be able to support the development of a strong and efficient Blue Economy, GCC countries need to:

- **Adopt national and regional policies making education and training on Blue Economy a priority.**
- **Launch national and regional programmes on Ocean Literacy.**
- **Support the development of university and technical training in academia and schools for a number of fields including:**
  - **Blue policies, planning and security, such as coordination of economic sectors, valuation of non-market values (e.g., ecological services), spatial planning and integrated coastal zone management, maritime security.**
  - **Blue energy, technologies and transport, such as marine renewable energy, logistics, shipping, port management, spill prevention, offshore technologies.**
  - **Biodiversity, blue carbon, and climate change, with fields such as marine and coastal ecosystems, carbon sequestration and storage, ecosystem resilience, marine debris litter and plastics.**

- **Aquatic resources management including fisheries management, aquaculture development, marine protected areas, habitat restoration.**
- **Provide incentives such as recognition of study titles and certificates, providing value for engagement in the labour market.**
- **Engage in cooperation with recognized global and national academic and training institutions to develop educational and training curricula in the GCC region.**

6.5 - Market-based approach for a Blue Economy

Development of the Blue Economy aiming at the diversification of the GCC national economies will require realigning incentives for businesses and workers. At present, the distribution of oil revenues within the economy crowds out non-oil tradables (products and services that may be part of imports and exports). Producing *non*-tradables is less risky and more profitable for firms because they can benefit from the rapid growth in government spending, while the easy availability of low-skilled, low-wage foreign labor has helped extract larger rents. The continued availability of public sector jobs discourages nationals from pursuing entrepreneurship and private sector employment in the fields of non-oil tradables, a case within which most Blue Economy would fit. Similarly, non-oil economic activity is heavily influenced by domestic government expenditure, which itself is dependent on oil revenue.

For the GCC countries to transform their economies, governments would need to cut welfare subsidies, reduce public sector employment opportunities and dismantle the social contract that has enabled society and the private sector to be disengaged from the development process, a state of an economy that is often described as *Rentierism*. Governments would also have to address the longstanding issue of wage disparity between private and public sectors.

The shift towards privatization in many cases in the GCC, most prominently known through the privatization by Aramco by Saudi Arabia, is not in itself sufficient to improve performance and create the conditions for the development of a dynamic Blue Economy. Other conditions are required, including increased competition, improved governance that leads management and the workforce to be responsive, flexible, and inventive, conditions that allow attracting qualified professionals from all over the world, reduced government interference to allow management to maximize shareholder value, and effective and efficient capital markets to impose the necessary discipline on managers. If privatization simply delivers a set of windfalls for the state while reinforcing market efficiency and removing distortions, this is unlikely to become a driver for private sector development in the context of the Blue Economy[53].

The socio-political conditions that characterize GCC countries, where property rights are in many cases unclear and the rule of law not understandable to exterior parties, and where the prospects for independent regulation of the market for private enterprises are uncertain, are not conducive to enabling the necessary conditions for the development of a Blue Economy that relies on the private sector, innovation, and entrepreneurship.

Globalization of non-oil sectors, including the Blue Economy, would facilitate private capital flows and create new financing options. There can be short-term costs associated with the resulting resource reallocation, but these trends also offer significant potential for welfare gains if proper conditions are in place. Within this framework, a large and adaptable trade sector and a sufficiently diversified economic base would be required.

At first glance, the GCC countries with their open and liberal trade regimes and a large external trade sector appear to be in a good position. However, although in the GCC countries the share of total external trade to GDP is among the highest in the world and per capita exports reach the levels of industrial countries, these statistics are heavily influenced by oil trade.

[53] Economic Reform in the GCC: Privatization as a Panacea for Declining Oil Wealth? Chatham House, 2016

Despite liberal exchange policies, the links between markets in the GCC countries and the international markets have not been strong because there are restrictions on direct foreign participation in domestic equity markets and entrepreneurship. In addition, private equity markets have been dominated by a few large, and mostly closed and family-owned private sector companies. At the same time, except for joint ventures in the oil and gas sectors, direct foreign investment in the GCC countries has been insignificant because of the small domestic market and public sector control on major operations.

As such, domestic markets need to become more diversified and open in order to allow the benefits of the development of a Blue Economy to allow GCC countries to diversify their economies.

Reducing interventionism and rentierism in labour and goods and services of their economies and improving market infrastructure and access can create more sustainable outcomes that benefit private business. This brings together public and commercial finance, capital, and private equity to invest jointly in projects that create jobs, grow the Blue Economy, and generate positive social impacts to scale up sustainable solutions.

At the same time, growing the blue economy requires assessing the true value of marine resources. Understanding the relative direct and indirect values of coastal and marine resources and assets (e.g., fish stocks for fisheries, or pristine ecosystems for tourism) allows governments to adopt the right policies and defend the case for innovative and sustainable resource use in the context of the Blue Economy.

Some of these changes will be accelerated as a result of the twin shock of the low oil prices and the Covid-19 pandemic. As for the first time over decades, there have been restrictions in the public spending to invest in Blue Economy related projects, GCC countries will have to rely upon the private sector to drive diversification. This may lead to an acceleration of reforms to attract investment, including further dismantling of foreign investment restrictions, privatization, closer ties with other regions, including the EU and China.

One very significant reform would be the relaxation of the requirement in some GCC countries for firms to ensure employment of their nationals, leading to increased costs and limitations on efficiency causing a significant blockage on foreign investment in private business development, also in the sectors of the Blue Economy.

The pricing of some key resources and utilities, including water and electricity, needs to be revised. As such, electricity tariff design is a key policy domain in the GCC because of its direct impact on the economic viability of distributed renewables. The current electricity pricing policy in GCC countries is unsustainable. It is characterized by significant subsidies to end users and growing demand. The region needs reform to achieve its ambitious industrialization agenda and have an economically viable electricity sector, and at the same time to give any market-base prospect to the development of renewable energy, including any potential interest for the development of marine renewables, and provide a healthier energy sector, with the additional benefits of increased research and development of new technologies, and a much higher rate of employment per MWh produced.

6.6 - Marine and Coastal Planning – ICZM and MSP

Integrated Coastal Zone Management (ICZM) can enhance the protection of coastal and near shore resources while increasing the efficiency of their uses, while *Marine Spatial Planning (MSP)* is the most appropriate approach for addressing conflicting spatial demands.

Coastal zones are among the most productive areas in the world, offering a wide variety of valuable habitats and ecosystems services that have always attracted humans and human activities. Coastal zones – including the coastal land part and the coastal part of the sea - are also among the areas most vulnerable to climate change and natural hazards. Risks include flooding, erosion, sea level rise as well as extreme weather events. These impacts are far reaching and are already changing the lives and livelihoods of coastal communities. Unlike sectoral approaches that can lead to disconnected decisions, inefficient resource use and missed opportunities, integrated coastal zone management (ICZM) seeks to coordinate the application of different policies affecting the coastal zone and maritime activities. ICZM is an iterative process which includes a variety of approaches, from mapping, delineation and

demarcation of the hazard lines and coastal sediment cells, to building the capacity of agencies, institutions, and communities to make informed decisions about growing the blue economy within the carrying capacity of its living natural resource base.

Given the right conditions, all or most of the sectors of the Blue Economy are forecasted to grow, placing increasing pressure on marine space. At the same time, sectors use marine space differently. “Hard” sectors are those requiring fixed infrastructure in the sea. They tend to be in place for a long time, expensive to install and difficult to move. “Soft” sectors tend to be more mobile and fleeting. Spatial conflict prevention is particularly important in the case of “hard” uses as changing a situation after the fact is usually difficult, while their deployment may hamper the development of “soft” sectors.

While all sectors look for ideal locations for their activities, some are more constrained in their choices than others. Sectors also differ with respect to their political and socio-economic importance, with nearshore conflicts often involving local communities, and a different set of stakeholders from those involved with offshore conflicts. Early knowledge of locational needs and constraints, as well as the stakeholders involved, can point to limits of spatial adaptability and potential restrictions on workable solutions (i.e., it may not be possible to spatially separate two activities, so co-location solutions need to be found).

Suitable means must then be found to successfully address each conflicting issue. These will also depend on the spatial scale of the conflict (national vs. transnational). Other than deciding not to go ahead with an activity, no single management measure can tackle every conflicting issue. While some conflicting issues can be addressed by spatial management measures, others – in particular those affecting the environment – may require additional non-spatial solutions. Marine Spatial Planning is therefore the best tool for dealing with the spatial dimension of such challenges, while ICZM may be able to provide policy, regulation, and technical approaches to address a given problem.

To establish appropriate policies for ICZM and MSP, GCC countries need to:

- **Establish legislation and practices that allow geographic integration of coastal systems, allowing the inclusion of interconnections between land and sea environments, which can extend over more or less vast distances.**
- **Allow integration across time scales, allowing to account for cumulative impacts of many individual decisions.**
- **Allow integration across sectors, leading to a horizontal integration of sectors traditionally seen as separate, together with the associated governmental agencies that influence the planning and management of coastal systems and resources.**
- **Allow political and institutional integration: the boundaries of coastal ecosystems go beyond local, provincial, and often national areas of authority. Vertical integration between spheres of government, from the local to international level, and to integration between institutions in government, civil society, and the private sector which influence the planning and management of coastal ecosystems and resources.**
- **Allow Integration across disciplines: it is difficult, if not impossible, to determine cause and effect relationships, as coastal systems are multifaceted, dynamic, and complex. Integrating knowledge and understanding from the natural and social sciences, the humanities, and the design professions, will allow to account for all these parameters.**

Further, for the Marine Spatial Planning (MSP) to be possible and effective, the following pre-conditions should be ensured by GCC countries:

- **EEZ and/or derivative zones where possible could prove to be beneficial for MSP.**
- **Define a common geographic scope for MSP implementation.**
- **Establish the MSP process within existing and upcoming regional strategies, as this provides an enabling environment and avoids the need to deal with problems that have already been addressed at different levels (e.g., foreign policy, environmental agreements.)**
- **Capacity building, training, and transfer of knowledge and good practices are other essential components for the development of common approach to MSP.**

- **Ensure proper and efficient stakeholder involvement and commitment, in particular in the visioning and strategic phases of the MSP.**
- **Ensure accurate, transparent, and as complete as possible information and the collection of reliable data: information and data availability are a key enabling element for a knowledge-based and transparent process for MSP - and ICZM.**
- **Ensure that the adaptive approach towards MSP is accepted form the outset: monitoring, evaluation using performance and result indicators, and revision steps need to be considered from the beginning of the process.**

6.7 - Regional and Cross-Border Collaboration

Limits in cross-border collaboration and even intra-country collaboration among government agencies and also large projects are an important impediment towards establishing a sustainable Blue Economy in the GCC region.

Given that, unlike regional collaboration frameworks such as the European Union, a common set of rules, directives, and regulations for the management of marine and coastal resources, environmental protection, and economic processes is not fully developed in the GCC region, the importance of Regional and Cross Border collaboration at the outset of the establishment of the Blue Economy in the region, becomes imperative.

An example is a unified approach in port standards and enforcement across the region, in line with international requirements. This is of particular importance, considering that the Gulf is a semi-enclosed basin and any activity occurring within its waters can affect other areas. The role of port authorities and operators in bringing systemic change is therefore key to following IMO standards when monitoring ships approaching into a port.

The same holds true for a number of other challenges related to the Blue Economy, such as, indicatively, addressing common concerns over effects of climate change for the mitigation of extreme weather events, flooding and erosion, as well adopting coordinated measures for the reduction of Green House Gases (GHG) emissions.

Managing fish stocks, especially regarding pelagic species such as tuna, and protecting endangered species including dolphins and sea turtles from bycatch and other risks, as well as addressing marine pollution within the closed seas surrounding the GCC region, is much more effectively addressed through transnational and regional collaboration.

Towards this direction, some efforts have already been made:

- the GCC Supreme Council, during its sixth session held in Muscat in 1985, adopted the “Policies and general principles for the protection of the environment.” This is considered the strategic framework for joint environmental action among the GCC countries and the basis for future environmental work.

In the context of this agreement the GCC has subsequently also adopted (among others):

- The common system for Environmental Impacts Assessment (EIA) for projects in the GCC countries (1995).
- Standards for the environmental specifications of quality of air, water and noise control (2004)
- Saudi Arabia has launched a new trans-boundary body, The Council of Arab and African Littoral States of the Red Sea and the Gulf of Aden, to align policies to achieve a sustainable ocean economy.

Other efforts include the establishment of a GCC environmental media and awareness committee as well as numerous GCC environmental conferences and the holding of region-wide environmental weeks. Such events included the Meeting of the working group of Environment Statistics (Kuwait 2017), the Gulf Environmental and Sustainable Development Forum (launched in 2010 and held six times since in Jeddah), and the World Future Energy Summit (held annually in Abu Dhabi since 2008) and the Qatar Sustainability Week (held in Doha since 2015).

An EU funded project mana Service for Foreign Policy Instruments (FPI) Implemented by GFA CONSULTING GROUP DMI CEPS

Despite these various initiatives, the current environmental cooperation and integration is far from what is needed. Many of the required rules and common systems continue to remain at the theoretical level and have not been applied as there is no clear enforcement mechanism in the member countries. Stronger cooperation is therefore needed, both among the GCC countries in terms of developing commonly accepted and enforced rules and regulation for the protection of the marine and coastal environment, and the transposition of such regulations to specific sectors of the Blue Economy, thereby setting a level playing field for all countries to engage.

To implement effective environmental integration, there is a need to categorize the process into one of the following four stages depending upon how countries proceed with environmental integration:

1. **Basic coordination for common environmental problems, projects, and multilateral negotiations.**
2. **Guidance rules on environmental standards and institutional coordination.**
3. **Common environmental policies and regulation, for example regarding multilateral negotiations, such as the UN environmental Conventions on Climate, Biodiversity, Ozone Layer, Desertification.**
4. **Full environmental integration (i.e., one position, one policy, central institutional set up, regulation).**

6.8 The Role of the GCC SG

The GCC Charter states that its basic objectives are, among others, to effect co-ordination, integration, and inter-connection between member states in all fields, to deepen and strengthen relations, links and areas of cooperation in various fields, and to establish joint ventures and encourage cooperation by the private sector for the good of their peoples.

In this sense the GCC SG is in a privileged position to inform and catalyse the shift of the region towards the full-scale development of a Blue Economy, while at the same time supporting the unanimous will of all its member states to diversify their economies and limit the dependence on oil and gas production and experts.

Some of the key sectors that the GCC SG could play a key role are the following:

- In the sector of **Fisheries**, and in collaboration with the UN Food and Agriculture Organization, and other prominent and relevant global institutions, promote and ensure the establishment under its aegis of a *Regional Fisheries Management Organization* (RFMO – an international body made up of countries that share a practical and/or financial interest in managing and conserving fish stocks in a particular region), which could coordinate research and management policies and practices, and thereby ensure sustainable fishing and optimization of catch efforts.
- Similarly, in the sector of **aquaculture**, the GCC SG could play a significant role, again working with the EU DG MARE and the UN Food and Agriculture Organization and expert institutions to streamline the significant work and investment undertaken at a national level in the region, in order to develop a regional brand and identity for aquaculture products, while also ensuring that quality and environmental, social, and governance (ESG) sustainability standards become a common practice, thereby making the sector attractive to global *impact* investors.
- In the sector of **tourism**, supporting the countries in developing a regional approach to tourism development, by establishing a regional brand while at the same time promoting the development of initiative based on complementary (rather than competitive) advantages, could be key in the rebounding of the sector post COVID-19.
- In **shipping and ports management**, coordinating the region's role in effectively becoming a leader in technology development and practices with the new IOC regulations in line with UNFCCC policies to curb emissions, can boost economic development and establish the region as an innovation hub for maritime transport.
- Building on existing initiatives for promoting **environmental protection** especially for marine and coastal ecosystems, species, and processes, the GCC SG needs to work with the relevant UN entities, while also benefiting from increased exchange with the EU, especially building on

the MSFD Directive[54] approach, as well as Marine Spatial Planning (MSP) and other tools, to become the reference point in the GCC region for the sustainability of the emerging Blue Economy,

7 - Types of projects for a blue economy investable pipeline for EU businesses and local communities in GCC

Following the analysis of policies and practices in the GCC region regarding the development of Blue Economy, and the discrepancies and gaps that exist by comparison to the European Union, where the sector is much more advanced and is currently in a phase of dynamic growth, the present chapter looks into the opportunities that EU public and private entities may have in developing projects in the field of the Blue Economy in the GCC region, in collaboration with local actors and governments.

In order to follow a logical order, the categorization of chapter 5 of the present study, in which the Blue Economy sectors were presented in the sub-categories of Established and Emerging ones, is followed in the present chapter. For each of the activity fields under each sub-category, indicative types of projects are briefly presented.

Furthermore, a *Matrix* presenting the key EU programmes that may provide support for the development of policies, sectors, and business activities in relation to the Blue Economy is presented at the end of the present section, as a tool that may allow the interaction of GCC based institutions and actors with EU counterparts.

Marine Living Resources

For all GCC countries, food security is an overarching priority, and the provision of high-quality protein from fisheries and aquaculture is therefore a target activity within the Blue Economy. Not both sectors are at unequal level of priority for all countries, and in addition in some the industries and value chains are more developed than in others. The projects proposed below for each are indicative and need to be adapted to the national needs based on the prevailing conditions, described in previous sections of this report.

Fisheries

Modernization of the fishing tools and monitoring of fisheries

Both fishing tools as well as fishing monitoring facilities are outdated in many cases. Promoting the appropriate tools that allow the modernization of both is necessary to reach a more efficient and better managed fishery in the region. The following could be opportunities for modernization and monitoring:

- Establishment of operations for the provision of modern fishing tools, including fishing equipment and GPS/tracking technology that allow more targeted fishing effort, in order to increase efficiency and avoid bycatch.
- Introduction of Vessel Monitoring Systems (Satellite or GMS operated) for coastal and middle scale fisheries, allowing to monitor fishing activity, and collect data for fishing effort that will allow appropriate fishery management decisions to be made on fishing seasons, quotas, closed areas etc.

For both categories, the total market in the GCC region is large enough to justify the establishment of localized production/assembly of materials, as well as the establishment of data management facilities, either at national or regional level.

Establishment of fish handling facilities aiming to increase quality and value added

[54] The EU Marine Strategy Framework Directive (MSFD) was put in place to protect the marine ecosystem and biodiversity upon which the health and marine-related economic and social activities depend

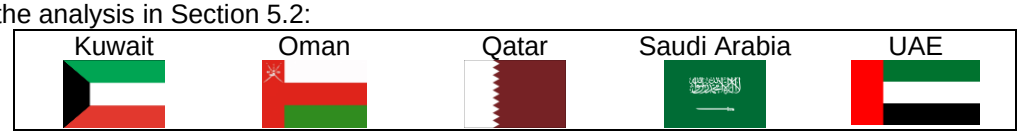
From the cold storage of fish on the vessels to handling the catches after delivery in the landing ports, there is a need in many parts of the region or considerable modernization and automation. In that sense the following may be opportunities for improving the entire value chain:

- Establishment of uninterrupted cold storage across the value chain (vessels, landing ports, storage and processing facilities, and specialized transport and logistics infrastructure for fish).
- Fish processing technologies that allow automation for sorting, packaging, preparation of processed products and by-products.
- Traceability of fish and fish products through labelling and tagging schemes, including blockchain technologies.

Fisheries policy and management

Cooperation with the EU and national entities and specialized expert consultants for the establishment of national and regional fisheries policies and management practices could secure the sustainability of fisheries in the region, and increase the efficiency and economic output of the sector, while maintain the important social aspects.

Countries in the GCC region presenting interest and opportunities for projects in the fisheries sector as per the analysis in Section 5.2:



Aquaculture

Modern technologies and materials for sustainable aquaculture

- Collaboration with EU companies and research institutions for the introduction of advanced technologies for hatcheries and fingerlings, production facilities, and equipment, including machinery and spare parts.
- Introduction of innovative technologies for safer and more environmentally friendly production technologies, including feed and automation systems.

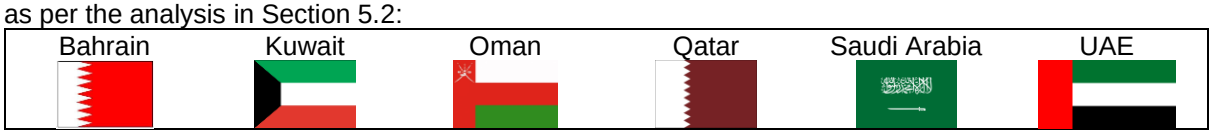
Sustainability guidelines and certification

- Collaboration with EU and national entities, as well as specialized expert consultants from the EU to develop a regional methodology for ensuring that the key parameters of sustainability (e.g., environmental, social, labour, health, animal ethics.) are taken into account and secured in the development of aquaculture in the region.
- Development of national and/or regional sustainability assessment and monitoring methodologies, and certification.

Specialized investment and finance for aquaculture

- Collaboration with expert public and private financial institutions and private equity funds from the EU to develop specialized products in support of ensuring that sufficient finance and investment becomes available for the substantial needs for the development of sustainable aquaculture in the region.
- Development of the M&A sector in the field of aquaculture allowing consolidation and maturing of the sector.

Countries in the GCC region presenting interest and opportunities for projects in the aquaculture sector as per the analysis in Section 5.2:



Climate Change

Although addressing climate change, regarding both the mitigation and adaptation challenges presented in the GCC region, is a priority expressed in the national vison documents of most countries, practical steps for the implementation of those policy orientations are still in need of development.

Considerations regarding especially the interaction of Climate Change and the marine/coastal environment, are not developed.

Climate policy development

- Work with EU Institutions, national entities, expert academic institutions, and specialized experts from the private sector to support the development of national policies and a regional approach towards addressing the challenges of Climate Chance.
- Work with business and expert advisors from the EU for the incorporation of integrated Climate Change policies in the business sector (public and private) of the GCC region, including company policies, benchmarking, monitoring, and certification schemes, with special attention towards the interaction with the marine environment.
- Work with specialized companies and innovators from the EU for the introduction of advanced technologies leading to the reduction of emissions.

Countries in the GCC region presenting interest and opportunities for projects in the climate change sector as per the analysis in Section 5.2:

Maritime Transport and Port Infrastructure, Shipbuilding and Repair

Shipping and port management are very significant activities in the GCC, making this one of the most advanced sectors in the region's Blue Economy development. There is significant know-how and expertise in the companies that operate in this sector from the GCC, however the need for faster and more efficient adaptation to the new IMO regulations will also be significant.

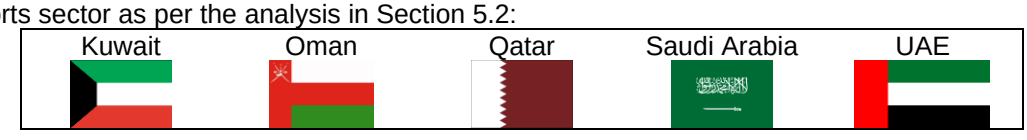
Collaboration to adapt to Climate Change regulation of IMO

- Work with specialized companies and experts from the EU to introduce innovative technologies and methodologies for shipping, shipbuilding, and port operation in line with the new IMO regulations for reduced emissions.
- Establish ongoing exchange between ports in the EU and GCC regions for the exchange of know-how and best practices for sustainable shipping and port management.
- Establish joint training centres for the development of workforce capacities and skills in this sector.
- Collaboration with expert public and private financial institutions and private equity funds from the EU to develop specialized products in support of ensuring finance and investment for the shift of the shipping sector towards reduced emissions, including performance-based bonds and sukuk products.

Environmental protection in port management

- Work with existing expertise in the EU Institutions, national authorities, and port managers at a national level to introduce methodologies and technologies to address the key environmental impacts of ports and shipping, including waste management, pollution and spills, and antifouling, amongst others.
- Establish joint training centres for the development of workforce capacity and skills in the field of environmental protection, and develop joint innovation efforts.

Countries in the GCC region presenting interest and opportunities for projects in the maritime transport and ports sector as per the analysis in Section 5.2:



Coastal tourism

The GCC countries are looking towards developing significantly coastal tourism as a key means for the diversification of their economies. In doing so, some of them (especially Saudi Arabia) have plans for

developing mega-projects in the coastal area that already include significant expertise in terms of sustainable development, in which the EU may provide additional expertise. In terms of the needs for the development of the sector some gaps exist, for which the EU may become a dependable partner to the GCC region.

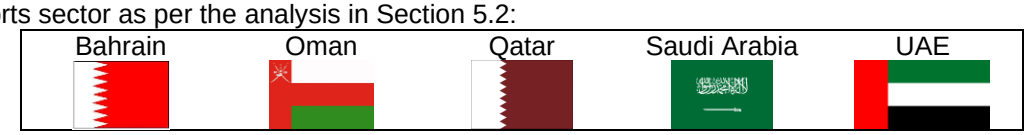
Addressing the lack of human resources capacity

- In collaboration with EU academic and vocational training entities, establish training and education institutions aiming to provide knowledge and skill dot the GCC workforce so that they can become involved in the coastal tourism sector as qualified personnel.
- Working with national and EU institutions, as well as private operators, establish training and certification methodologies for the ongoing development of human capacities in the field of sustainable coastal tourism.

Expertise for sustainable coastal tourism policy and practice

- Work with EU entities, and national authorities and private operators, develop certification methodologies and schemes adapted to regional conditions, for the environmental status and sustainable operation of coastal tourism operations in the GCC.
- Transfer good practices for the sustainable operation of coastal tourism facilities, including hotel management, sustainable mobility, and the valuation of marine protected areas for the development of the sector.
- Develop specialized ESG criteria and methodologies for coastal tourism in the region to incorporate environmental and social aspects.
- Work with established expertise in the EU to combine coastal tourism with the development of public awareness and education in terms of Ocean Literacy and the need to protect the sea and coasts.

Countries in the GCC region presenting interest and opportunities for projects in the coastal tourism and ports sector as per the analysis in Section 5.2:



Sustainable Finance and Investment

Blue Finance and Investment in the GCC region presents a number of opportunities. Although not yet developed, and with the green bond market in the GCC in its infancy, the region has significant expertise in working with the financial markets and a number of countries have set the aim of developing fintech hubs.

Lay the foundation for establishing Blue Finance and Investment in the region

- Work with EU Institutions, private sector entities, and civil society to develop the basic principles for the launch of sustainable Blue Finance and Investment in the region.
- Develop joint activities between EU-based financial institutions and private equity, offering innovative finance and investment product for the Blue Economy, including specialized products compatible with Islamic law, such as sukuk.
- Develop specialized Blue Economy ESG assessment and certification methodologies aligned with the SDGs and taking into account the socio-economic specificities of the GCC region.

Make Blue Finance and Investment the driver for Blue Economy in the region

- Work with EU, national entities and European finance and investment actors to launch a programme following the model of the *European Maritime and Fisheries Fund (EMFF)* in connection with the regional and national entities -sovereign funds, banks and private equity- in support of innovation and entrepreneurship in the field of the Blue Economy.
- In collaboration with EU institutions and programmes, establish targeted, sector specific (shipping, aquaculture, energy) programmes of financial and investment support to promote the transfer of know-how and joint development of regionally applied solutions for sustainable Blue Economy in the region.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by

Countries in the GCC region presenting interest and opportunities for projects in the blue finance sector as per the analysis in Section 5.2:

Environmental Protection

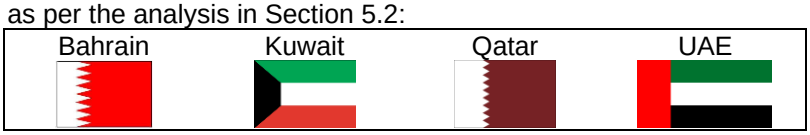
Policy development and know-how transfer

- Work with the EU institutions to adapt the model of European policies for the marine environment (for example the Marine Strategy Framework Directive) to the specificities and conditions of the GCC region and produce the relevant policies at national and regional level.
- Establish collaboration programmes between the EU and national institutions, and involve expertise from EU academic and research institutions and specialized experts for the development of integrated programmes for the protection of the marine environment and all its aspects (e.g., ecosystems, pollution control, endangered species.)

Transfer and sharing of environmental protection technologies

- Collaboration between European private entities and technology developers with local/regional actors in order to adapt existing cutting-edge technologies, for example in the fields of pollution control and de-pollution, monitoring of environmental parameters, and others, to the needs and conditions of the GCC seas.

Countries in the GCC region presenting interest and opportunities for projects in the environmental protection sector as per the analysis in Section 5.2:



Emerging Sectors

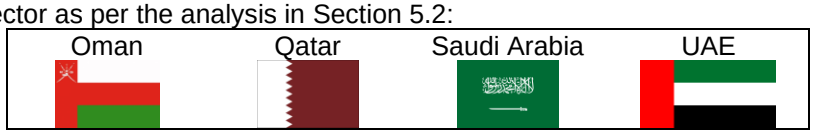
Innovative Ocean energy

In the renewable energy sector, although some countries have made significant progress with the development of land-based solar (concentrated and PV) energy, marine renewables are almost nonexistent, also due to the market distortions resulting from the heavy government subsidies to oil and gas produced energy.

Development of Marine Renewable energy

- Collaboration with established national institutions (energy companies, research and development institutions such as Masdar and KAUST) for the introduction of innovative marine renewable energy technologies, that can be specifically adapted to the region's comparative advantages in terms of environmental and geographical conditions.

Countries in the GCC region presenting interest and opportunities for projects in the renewable and ocean energy sector as per the analysis in Section 5.2:



Blue Bioeconomy and Biotechnology

Blue bioeconomy is one of the most important target sectors for the development of emerging Blue Economy sectors in the EU. At the same time, many GCC countries have engaged in the field of blue biotechnology especially in the field of developing algae for specific uses for example in energy, and food production.

Make joint advances in the development of marine biotechnology

- Establish joint programmes between existing efforts for the joint development of Blue biotechnology between the EU and the GCC research and technology institutions and programmes. This will allow to utilize the comparative advantages of each side (e.g., technology development status, environmental conditions) in order to advance in the most efficient way.
- Launch joint programmes providing initiatives for the collaboration in the field of blue biotechnology.

Connect the business sector of EU and GCC with the development of innovation

- Establish a framework of contact between blue innovation funds in the EU and the development of blue biotechnology in the GCC and vice versa, with the aim of promoting synergies, business acceleration, and market access to such innovation.

Countries in the GCC region presenting interest and opportunities for projects in the maritima transport and ports sector as per the analysis in Section 5.2:

Note: Bioeconomy and biotechnology are not mentioned as such in national programmes, however ongoing research in most countries present an interesting opening for development.

Desalination

Desalination for the GCC region and countries is a key technology and a significant economic activity in terms of energy used and provision of vital eater resources. Yet, the side effects to and impact on the environment, both in the sense of GHG emissions and discharges in the marine environment are substantial, and GCC countries are already investing effort and resources to reduce them.

Reducing impacts of desalination in the marine environment

- Collaborate with EU technology companies and technology development institutions to develop new approaches towards the reduction and eventually elimination of negative environmental effects of desalination.
- In the context of the EMFF programme of the EU, and in collaboration with blue economy accelerator programmes, establish joint platforms with the GCC region for the development of innovative ideas and technologies on desalination.

Water resources management

- Intensify collaboration between EU companies and specialized experts in order to make significant advances in the sector of water management, including distribution, recovery from treated water, and reduction of quantities used in water intensive sectors, such as food production and coastal tourism, thereby reducing the demand for desalinated water.

Countries in the GCC region presenting interest and opportunities for projects in the desalination sector as per the analysis in Section 5.2:

Marine Research and Technology

Development of the Blue Economy in the GCC region will depend, as is the case all over the world, and indeed in the EU, on knowledge, information and data for the marine and coastal environment, and the production of innovative ideas and technologies.

The EU hold a leading position globally in both research and technology development, making it a very good and dependable partner for the GCC region.

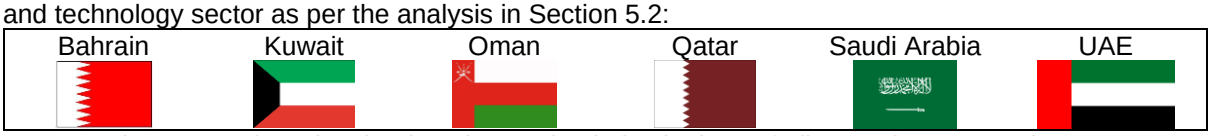
Collaboration on marine science and research

- Develop joint programmes between EU and GCC national or regional institutions for the launching and implementation of joint programmes on marine science, aiming to gain better knowledge of the marine environment, collect data and information, and apply analytical models that already exist in the EU.
- Develop sector-specific marine research programmes (e.g., in fisheries, aquaculture, shipping) in collaboration.

Knowledge transfer and joint innovation development

- Connect the European Innovation Hubs with the relevant actors in the GCC (universities and institutes) and link them to support programmes for acceleration in both regions.
- Establish a connection platform between public and private equity European Blue Innovation funds, and launch joint programmes for participation of GCC entities in calls and other activities.

Countries in the GCC region presenting interest and opportunities for projects in the marine research and technology sector as per the analysis in Section 5.2:



Note: Marine research and technology is ongoing in institutions of all countries, presenting an interesting opening for development.

Matrix – European Programmes on Blue Economy

Programme Name	Programme Description
1. Enterprise Europe Network	The 'Enterprise Europe Network' is a European Union initiative aimed at providing business and innovation support to small and medium sized enterprises (SMEs) in Europe and important international growth markets. It is the world's largest support network for SMEs with international ambitions, currently consisting of 600 partner organizations located in 54 countries. More than 4500 internationalization experts and technology transfer practitioners offer a wide range of business and innovation support services to enterprises. The partners of the Enterprise Europe Network are chambers of commerce, regional development organizations, SME organizations, research institutes, universities, technology centres and innovation centres. Their specialized knowledge of the local and regional business environment ensures that their services offer real added value to their clients, mainly SMEs.
2. European Investment Projects Portal	The EIPP is a central EU project promoting platform which aims to create a bridge between EU project promoters and investors worldwide. Launched in June 2016, the Portal's goal is to help the financing of EU investment projects and create jobs across the EU through boosting the visibility of existing EU investment opportunities. Investment projects covering 25 high economic-value sectors are displayed in a user-friendly format, searchable by customizable criteria. It currently has over 900 projects listed on the portal.
3. Innovation Radar	The Innovation Radar is a data-driven initiative of the European Commission focused on the identification of high potential innovations and the key innovators behind them in Horizon 2020 projects. It supports innovators by suggesting a range of targeted actions to assist them in fulfilling their potential in the market. It is an initiative that involves: • Assessing the maturity of innovations developed within the H2020 projects and identifying high potential innovators and innovations • Providing guidance during the project duration in terms of the most appropriate steps to reach the market • Supporting innovators through EU (and non-EU) funded entrepreneurship initiatives to cover specific needs concerning networking, access to finance, Intellectual Property Rights, etc.

4. BlueInvest	European Commission's BlueInvest aims to boost innovation and investment in sustainable technologies for the blue economy, by supporting readiness and access to finance for early-stage businesses, SMEs and scale-ups. It is enabled by the European Maritime and Fisheries Fund. This platform is broken down in smaller initiatives that include the BlueInvest Readiness Assistance, an exclusive coaching programme for high potential start-ups and SMEs with innovative and sustainable products and solutions for the Blue Economy, the BlueInvest Academy, that offers capacity-building courses, training events and exclusive webinars to accelerate businesses for investment, market access and international expansion, the BlueInvest Fund (the European Investment Fund, backed by the European Strategic Investment Fund, has earmarked finance for enterprises with innovative products and services that can help the blue economy deliver the EU's Green Deal priorities. From late January 2020, the new fund will be able to provide finance to funds that are wholly or partly targeting the blue economy or to individual enterprises backed by more general funds), and the BlueInvest Grants.
5. European Maritime and Fisheries Fund	The European Maritime and Fisheries Fund (EMFF) is one of the five European Structural and Investment Funds which complement each other to deliver more jobs and growth in the EU. It has an overall budget of €6400 million for the period 2014-2020. The European Commission has delegated to EASME the implementation of part of the EMFF actions under direct management, representing a budget of €340 million for the programme period. Through the EMFF, the Commission also funds an additional €40 million grant scheme, to help blue economy SMEs with developing and bringing to market new innovative and sustainable products, technologies and services.
6. European Cluster Collaboration Platform	The European Cluster Collaboration Platform is a service facility aiming to provide cluster organisations with modern tools These tools allow to: • make efficient use of networking instruments (search/find potential partners and opportunities) • develop collaboration trans-nationally (within Europe) and internationally (beyond Europe) • support the emergence of new value chains through cross-sectorial cooperation • access the latest quality information on cluster development • improve their performance and increase their – as well as their members' - competitiveness.
7. Fast Track to innovation (FTI)	Fast Track to innovation (FTI) is a fully-bottom-up measure in Horizon 2020 promoting close-to-the-market innovation activities that is open to all types of participants. FTI aims to reduce the time from idea to market and to increase the participation in Horizon 2020 of industry, SMEs and first-time industry applicants. FTI also aims to nurture trans-disciplinary and cross-sector approaches. All kinds of innovation actors can work together to develop sustainable innovations addressing societal needs or areas under 'Leadership in enabling and industrial technologies' and, at the same time, create viable business opportunities. This is why FTI projects must be business-driven and clearly demonstrate a realistic potential for quick deployment and market take-up of innovations.

8 - Supporting responsible private sector investments, reducing risks and providing incentives for innovation: recommendations on the enabling environment

A thriving private sector is crucial for the development of the Blue Economy, based on innovation and entrepreneurship, yet certain business-friendly conditions must be in place to unleash private sector dynamism. Markets work reasonably well without government intervention if property rights and competition are guaranteed, as intervention is in most cases considered less efficient than market-based solutions, and thus government interventions in fact often obstruct private sector development. Market distortions are pervasive and governments have a more active role to play in correcting such market failures.

Besides the overarching issue of the role of the public sector, a number of other key points are considered necessary to ensure private sector development and investment throughout the Blue Economy value chain, and reduce while providing incentives for creating innovation and fostering business development:

- The **regulatory business environment** in the form of regulations that immediately affect businesses through the costs of compliance, given that those are made up by direct costs such as license fees, and indirect costs such as delays in obtaining a licence, or increasing costs from government regulations that make contract enforcement or the hiring and firing of workers unnecessarily complicated and cost increasing.

- The **investment climate**, which besides the regulatory environment also includes a number of specific conditions analysed in more detail in the following paragraphs, and which can be summarized in the quality of infrastructure, the health system, the overall level of education, rule of law, political stability and security, functioning financial markets, and trade liberalization. In order to improve the investment climate, measures could include reorienting public spending, strengthening the role of private sector competition, developing backward and forward linkages across sectors with a comparative advantage, and implementing labour market reforms to incentivize private sector employment and improvements in productivity.

In more detail, some of the enabling conditions are the following:

Reforms to ease business registration and the acquisition of licences are necessary to stimulate the establishment and formalization of businesses, including business ownership obstacles on the basis of nationality. Besides providing incentives for an increased registration of businesses, this reform can be expected to enhance competitive pressure and crowd out inefficient firms, thereby accelerating the diffusion of new business practices and raising productivity.

Ensuring **Intellectual Property** rights is critical, so that security of ownership and rights of use and commercialization provided by formal titles, will stimulate investment and entrepreneurship. By supporting innovative entrepreneurship, the development of an ecosystem of medium and small-medium companies can have a secondary multiplier effect of the upstream and downstream business environment, with additional employment opportunities and development of further innovation and business ideas.

Simplification of labour regulations, both as regards procedures for hiring and terminating employment agreements, and removing quotas and obligations for hiring local personnel irrespective of qualifications, allows businesses to operate in a more efficient way, and, in combination with a properly developed education and training system, this provides incentives for the local workforce to become trained in the field of the Blue Economy.

Good governance is an overarching issue. By improving the performance of the public sector and developing the appropriate policies that set the standards and codes for transparency and business activity, provide licensing and zoning rules, set clear and transparent procedures for permitting and impact assessments, regulate investor relations and stakeholder management, set the rules for the management and provision of data and information to all parties concerned, a level playing field that reassures investors may be established.

In this, the **rule of law** is of critical importance. Business operation is dependent on the consistent and systematic applications of legal rules. The lack of universal protection for property and contractual rights constitutes a substantive constraint on economic freedom by inhibiting or disincentivizing investment and trade.

Adequate infrastructure is also one of the major enablers for investment in private business. Dependable telecommunication, electricity and water supply services, up to date information and communication (ICT) technologies, efficient transport, and health services are key towards attracting investment in the establishment of business, and highly qualified human capital.

The **education system** needs to be in a position to support and multiply the effect of the initial establishment of a Blue Economy private sector. By providing university education in fields related to the Blue Economy fields of activity, and through vocational training for professional skills also supported through recurring training seminars and courses, the local workforce can become the main source of human capital for the development of these sectors.

In order to build a lasting and competitive Blue Economy, **concerted public-private efforts** are needed. Governments have an important role in creating incentives to invest in new technical and entrepreneurial skills, facilitating collective action, developing and ensuring quality standards, motivating investors to surmount technological lags, or avoiding too strong trade shocks that might wipe out entire industries. Improving state-business relations also contributes to better understanding the private sector needs by the government and thus to a more efficient allocation of resources in the economy.

Strengthening **inter-firm specialization and linkages** reinforces learning opportunities and productivity growth. Creating supplier relations and fostering knowledge flows between companies and small-medium enterprises is important to bridge productivity gaps. Large buyers are important drivers of technological learning in value chains.

Promoting exports & Foreign Direct Investment. Linking the Blue Economy to global trade will not only open new markets but also lead to increased productivity because of learning effects and competition. Foreign trade in the GCC has been expanding robustly, though with limited non-oil exports. Greater openness to trade and foreign investment can lead to faster and stronger development of the Blue Economy by creating jobs, enhancing productivity with new technologies, promoting knowledge, and creating a more competitive business environment, while investing in human capital, and improving the business and investment climate.

Developing financial services for the Blue Economy. Access to, and the cost of finance can be a serious impediment for the development of the Blue Economy sector. Especially as this is based on innovation and operation with increased uncertainty, incentives are needed to provide the de-risking conditions. Such incentives may include government incentives, and a level playing field with no distortions for resources and inputs. Financial systems in the GCC have developed significantly over the last few decades, but there is further room for progress, especially towards supporting the development of targeted tools and products for the Blue Economy, while also making financial services more widely available to everyone, and in particular regarding access to finance for small and medium enterprises (SMEs), women, and youth.

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

Annex

References

Climate change: The game changer in the Gulf Cooperation Council Region, Hilal M.S. Al-Maamary, Hussein A.Kazem, Miqdam T.Chaichanc, 2017

Promoting GCC Regional Integration: An Environmental Perspective, Mohamed Abdelraouf, Gulf Research Center, 2014

Blue Economy Abu Dhabi Declaration, 2014

Managing the growing impacts of development on fragile coastal and marine ecosystems: Lessons from the Gulf, United Nations University 2012

Climate Change Threats, Opportunities, and the GCC Countries, Middle East Institute, 2008

Directive (EU) 2018/410 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814

Review of the state of world marine fisheries resources, United Nations Food and Agriculture Organization (FAO), 2012

World Economic Outlook, April 2020: The Great Lockdown, IMF, 2020

Climate Change Threats, Opportunities, and the GCC Countries, The Middle East Institute Policy Brief, 2008

Renewable energy policy trends and recommendations for GCC countries, S. Griffiths, 2017

The GCC countries RE-readiness: Strengths and gaps for development of renewable energy technologies, Mondal et al, Renewable and Sustainable Energy Reviews, 2016

Assessing the global transport infrastructure market: Outlook to 2025, PwC, 2015

The Smart Ports Market, Markets and Markets, 2019

International Tourism Development in the GCC: Opportunities and Challenges; Gulf Research Center: Cambridge, UK, 2013

International Monetary Fund. World Economic Outlook Database, IMF Data and Statistics; International Monetary Fund: Washington, DC, USA, 2015

Middle East Set For Sharp Economic Fall Due To Covid-19 “Great Lockdown” Says IMF, Forbes, April 2020

Is Tourism Development a Sustainable Economic Growth Strategy in the Long Run? Evidence from

GCC Countries, Abdulkarim K. Alhowaish, Department of Urban and Regional Planning, University of Dammam, 2016

The World Travel and Tourism Council–WTTC. Yearbook of Tourism Statistics; WTTC Database: Madrid, Spain, 2015.

How the GCC’s travel and tourism industry can get ready for the post-COVID-19 recovery, Strategy&, PwC

Growth of maritime tourism gives major boost to UAE’s global competitiveness, Travel Daily News, 26 September 2017

Hukoomi - Qatar e-Government Portal, September 2019

An Introduction to Islamic Securities (Sukuk), Pegah Zolfaghari, Uppsala Faculty of Law, 2017

Green Finance Takes Hold in the GCC, S&P Global Ratings, 18 Feb, 2019

Global Finance: The Gulf Goes Green, July 2020

Emirates Nature-WWF: How UAE Businesses Can Shape a Sustainable Blue Economy, 2019

Green sukuk growth could follow the trajectory of green bonds, Blake Goud, RFI Foundation, October 2020

Shaikha Aya bint Hisham Al Khalifa: The Blue Economy: New Investment Potential in Bahrain, Boston University, 2019

The seafood sector in Saudi Arabia: Philippos Papageorgiou, National Fisheries Development Program, Ministry of Environment, Water and Agriculture of Saudi Arabia; and Ekaterina Tribilustova, EUROFISH International Organization in collaboration with Saudi Aquaculture Society and National Aquaculture Group, 2020

Tourism and the European Union, Recent trends and policy developments. Maria Juul, European Parliament 2015

Perceptions of Marine Environmental Issues by Saudi Citizens, 2020

Water, Energy, & Food Sustainability in the Middle East. Badran, Adnan, et al., Springer International Publishing, 2017

Emirates Nature-WWF: How UAE Businesses Can Shape a Sustainable Blue Economy, 2019

Economic Reform in the GCC: Privatization as a Panacea for Declining Oil Wealth? Chatham House, 2016

Additional bibliography by region/country

European Union

Addressing conflicting spatial demands in MSP, Considerations for MSP planners, Final Technical Study, European Commission, 2018

Annex 2 of the Commission Implementing Decision on the 2020 Annual Action programme for the Partnership Instrument, Action Document for a Global Action to support EU Space Programmes, European Commission, 2020

Blue Economy Development Framework, World Bank Group, 2016

Declaration of the Sustainable Blue Economy Finance Principles, European Commission, EIB, International Sustainability Unit, WWF International, 2018

The EU Blue Economy Report 2020, European Commission, 2020

The EU Blue Economy Report 2019, European Commission, 2019

The EU Blue Economy Report 2018, European Commission, 2018

Farm to Fork Strategy - For a fair, healthy and environmentally-friendly food system, European Commission, 2020

Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change, European Commission, 2021.

Our Oceans, Seas and Coasts: Achieve Good Environmental Status. MSFD Summary Factsheet, European Commission, 2020

COMMISSION DECISION (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU

Communicating MSP - An inspiring era of cooperation between institutions, European Commission, 2020

Study on the Economic Impact of Maritime Spatial Planning, Final Report, European Commission, 2020

COPERNICUS Market report, European Commission, 2019

The Way to a Regional Framework for ICZM In the Mediterranean 2017-2021, UNEP/MAP 2016

GCC Regional

The Gulf: A young sea in decline, Charles Sheppard et al., Marine Pollution Bulletin, 2010

An EU funded project mana
Service for Foreign Policy
Instruments (FPI)
Implemented by
GFA CONSULTING GROUP
DMI
CEPS

Abu Dhabi Blue Economy Declaration, 2014

Financing sustainable development in Arab countries, Najib Saab and Abdul-Karim Sadik, Arab Forum for Environment and Development, 2018

Covid 19 - the game changer for the Blue Economy in the Middle East, Leila Ben Hassen, Marasi News, 2019

Ocean Observing and the Blue Economy, Ralph Rayner et al., Frontiers, 2019

GCC maritime strategy enters a new era, Emirates NBD Research, 2018

The new investment wave into aquaculture in Middle East countries: Opportunities and challenges, Gemsheer Mon Chalil, Globefish, 2020

Renewable energy policy trends and recommendations for GCC countries, Steven Griffiths, Energy Transit, 2017

How can GCC countries turn economic diversification into a reality, Raed Kombargi et al., Gulf Business, 2020

Economic Diversification in the GCC: Past, Present, and Future, Tim Callen et al., IMF Staff Discussion Note, 2014

How should GCC countries diversify their economies and promote inclusive growth?, IMF, 2018

Ocean Energy, Technology Readiness, Patents, Deployment Status and Outlook, International Renewable Energy Agency – IRENA, 2014

Renewable Energy in the Gulf: Facts and Figures, International Renewable Energy Agency – IRENA, 2011

Is Tourism Development a Sustainable Economic Growth Strategy in the Long Run? Evidence from GCC Countries, Abdulkarim Alhowaish, Sustainability Journal, 2016

The tourism industry as an alternative for the GCC oil-based rentier economies, Yoel Mansfeld, Tourism Economics, 2007

Tourism in the Gulf Cooperation Council Countries as a Priority for Economic Prospects and Diversification, Nazar Hilal, Gulf Studies Program, Qatar University, 2020

Understanding the 'Sustainable Blue Economy', Laila Mostafa Abdullatif, Gulf Business, 2019

Why the Gulf States' growing Naval Power may not be all it seems, World Economic Forum, 2018

Economic Diversification for a Sustainable and Resilient GCC, World Bank Group, 2019

Promoting Sustainable Finance and Climate Finance in the Arab Region, UNEP Finance Initiative, 2021

Creating an enabling environment for private sector development in sub-Saharan Africa, United Nations Industrial Development Organization, 2008

Why Thirst Arab Region Need Sustainable Desalination Tech, Jumana Khamis, Arab News, 2021

Bahrain

Bahrain to ramp up aquaculture production, The Fish Site, 2020

National Aquaculture Sector Overview, Bahrain, United Nations Food and Agriculture Organization (FAO), 2011

The Blueprint for a Brave New Bahrain, Gulf Daily News, 2008

Implementation of the 2030 Agenda of Sustainable Development and Sustainable Development Goals, Bahrain Transparency Association, Bahrain Transparency Society (BTS), Social Watch, 2020

Bahrain moves to next phase of tourism plan, Colin Forman, Middle East Business Intelligence, 2019

From Regional Pioneer to Global Contender: The Economic Vision 2030 for Bahrain.

Kuwait

Fishery and Aquaculture Country Profiles, The State of Kuwait, United Nations Food and Agriculture Organization (FAO), 2017

New Kuwait 2035, Kuwait National Development Plan, Khaled A. Mahdi, Secretary-General of The Supreme Council for Planning and Development

Kuwait Vision 2035: From Ideas to Reality

Building the New Kuwait, Vision 2035 And the Challenge of Diversification, Sophie Olver-Ellis, LSE Middle East Centre Paper Series, 2020

A Draft Strategic Vision for the State of Kuwait 2010-2035, An Executive Summary, Secretariat of Supreme Council for Planning and Development, 2015

Trade Policy Review, Report by the State of Kuwait, World Trade Organization, 2012

Oman

Sustainable Management of the Fisheries Sector in Oman, A Vision for Shared Prosperity, World Bank Advisory Assignment, World Bank and Ministry of Agriculture and Fisheries Wealth, Sultanate of Oman, 2015

National Aquaculture Sector Overview, Oman, United Nations Food and Agriculture Organization (FAO), 2015

Oman's new economic reality calls for Vision 2040 strategy rethink, Castlereagh Associates, 2020

OCEC holds the first ever Oman Maritime Confex focusing on the blue economy, Zawya Mena Edition, 2020

Oman accords top priority to 'blue economy', Oman Observer, 2019

Oman launches 2040 tourism strategy, Travel & Tourism News, 2016

Moving Forward with Confidence, 2040 Oman Vision

Qatar

National Aquaculture Sector Overview, Qatar, United Nations Food and Agriculture Organization (FAO), 2015

Qatar National Vision 2030, General Secretariat for Development Planning, 2008

Qatar Second National Development Strategy 2018-2022

Qatar gets serious about solar, Oxford Business Group 2017

The State of Qatar Second Voluntary National Review, Submitted to the High-Level Political Forum on Sustainable Development, 2018

Saudi Arabia

Fishery and Aquaculture Country Profiles, The Kingdom of Saudi Arabia, United Nations Food and Agriculture Organization (FAO), 2017

KSA Celebrates World Ocean Day stepping up to lead efforts toward a Sustainable Ocean Economy, King Abdullah University, Features, 2020

Perceptions of Marine Environmental Issues by Saudi Citizens, Hanan Almahasheer, Frontiers, 2020

Meeting the Vision in Saudi Arabia, Port Strategy, MercatorMedia 2020

Vision 2030, Kingdom of Saudi Arabia

The seafood sector in Saudi Arabia, Eurofish Magazine 2020

United Arab Emirates

Fishery and Aquaculture Country Profiles, The United Arab Emirates, United Nations Food and Agriculture Organization (FAO), 2016

UAE can lead way in boosting blue economy, Ashwani Kumar, Khaleej Times Abu Dhabi, 2019

UAE Fisheries and Aquaculture Sector 2020-2025: Production, Consumption and Trade of Pelagic Fish, Demersal Fish, Freshwater Fish, Scallop, Shrimp, Lobsters, Caviar, Salmon, and Others, BusinessWire, 2020

United Arab Emirates and the 2030 Agenda for Sustainable Development: Excellence in Implementation. Executive Summary, Voluntary National Review, UN High-Level Political Forum. National Committee on Sustainable Development Goals, 2018

How UAE Businesses Can Shape a Sustainable Blue Economy: Engaging the Private Sector Towards a Sustainable Blue Economy for the United Arab Emirates, Emirates Nature-WWF, 2019

Useful contacts

Bahrain
Bahrain Tourism and Exhibitions Authority - http://www.btea.bh/about-us
Bahrain Fisheries - Agriculture and Marine Resources in the Ministry of Works, Municipalities Affairs and Urban Planning, Agriculture and Marine Resources, https://www.mun.gov.bh/agri/pages/AusEn.jsp
Bahrain Economic Development Board - https://bahrainedb.com
Bahrain Chamber of Commerce and Industry - https://www.bcci.bh/en
Kuwait
Kuwait Institute for Scientific Research - https://www.kisr.edu.kw/en/discover-kisr/about-us
Kuwait Chamber of Commerce & Industry - https://www.kuwaitchamber.org.kw
Oman
Oman Fisheries Co SAOG, the largest fishing company in the Sultanate of Oman - https://omanfisheries.com
OADC - Oman Aquaculture Development Company LLC - http://alamah.om/oadc
Oman Tourism - https://www.omantourism.gov.om/wps/portal/mot/tourism/oman/home
Oman Shipping Company SAOC (OSC) - https://www.omanship.co.om
Oman Chamber of Commerce & Industry - www.chamberoman.om
ITHRAA - The Public Authority for Investment Promotion and Export Development of Oman - https://ithraa.om
Riyada - The Public Authority for Small and Medium Enterprises Development of Oman - https://riyada.om
Qatar
Ministry of Commerce and Industry of Qatar - https://www.moci.gov.qa/en
Qatar Chamber of Commerce & Industry - https://qatarchamber.com
Qatar Fisheries - Ministry of Municipality and Environment - http://www.mme.gov.qa/cui/view.dox?id=1461&contentID=3844&siteID=2
Qatar Shipping - Ministry of Transport and Communications - https://www.motc.gov.qa/en
Qatar Tourism – Visit Qatar - https://www.visitqatar.qa/en/home
Qatar aquaculture - Al Qamra Holding - https://www.al-qamra.com/aboutus.php
Investment Promotion Agency of Qatar - https://www.invest.qa
Saudi Arabia
Saudi Tourism - https://www.visitsaudi.com/en
BAHRI (formerly known as the National Shipping Company of Saudi Arabia) - https://www.bahri.sa
Saudi Aquaculture Society - http://www.sas.org.sa/en#

SAMAQ - Saudi National Aquaculture Product Certification and Labeling Program - http://samaq-sa.com Saudi Fish Company - http://www.saudi-fisheries.com/en/about-us-en/index.html Invest Saudi - https://investsaudi.sa MONSHAAT - Saudi Arabia General Authority for Small and Medium Enterprises - https://www.monshaat.gov.sa Riyadh Chamber of Commerce - https://www.chamber.sa
UAE
ADIO - Abu Dhabi Investment Office - https://www.investinabudhabi.ae Abu Dhabi Department of Economic Development - https://added.gov.ae UAE Shipping - Ministry of Energy & Infrastructure - https://fta.gov.ae/en/home.aspx UAE Department of Culture and Tourism - https://tcaabudhabi.ae/en/default.aspx Dubai's Department of Tourism and Commerce Marketing - https://www.dubaitourism.gov.ae/en UAE Ministry of Agriculture and Fisheries - http://www.uae.gov.ae/maf Masdar Clean Energy, UAE - A leading developer and operator of utility-scale renewable energy projects, community grid projects, and energy services consultancy - https://masdar.ae