Economic valuation of the marine and coastal biodiversity for Tyre Coast Nature Reserve in Lebanon

An overview of the study

The content of this brochure was developed by ECODIT Liban SARL as part of the project “Market policy and legislative development for mainstreaming sustainable management of marine and coastal ecosystems in Lebanon”. The project is executed by the International Union for Conservation of Nature – Regional Office for West Asia (IUCN-ROWA) in partnership with the Lebanese Ministry of Environment and funded by the Global Environment Facility (GEF) through the United Nations Environment Programme (UNEP).

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Project Background and Objectives

The International Union for Conservation of Nature – Regional Office for West Asia (IUCN–ROWA) in collaboration with the Lebanese Ministry of Environment (MoE) is executing the project “Market Policy and Legislative Development for Mainstreaming Sustainable Management of Marine and Coastal Ecosystems in Lebanon”. The project, which is funded by the Global Environment Facility (GEF) and implemented by the United Nations Environment Programme (UNEP), aims at creating an enabling integrated framework for sustainable management and conservation of coastal and marine biodiversity and, at mainstreaming the priorities of this biodiversity into national plans and, coastal zone management plans, with particular focus on the impact of climate change on marine and coastal biodiversity.

Conservation zone of TCNR
© Lebanon in a picture - Jad Massabni

ECODIT Liban SARL was assigned by IUCN-ROWA to deliver a comprehensive Ecosystem Services Valuation Study for Tyre Coast Nature Reserve (TCNR).

Objectives

This study is an economic valuation intended to translate the benefits provided by the marine and coastal ecosystem services of Tyre Coast Nature Reserve (TCNR) into monetary terms.

It will stress on the socio-economic importance of this Marine Protected Area (MPA) and provide decision-makers with the necessary tools to efficiently monitor and protect the marine and coastal ecosystems; leading to an optimal balance between ecosystem services use and conservation.

The ultimate purpose is to enhance management practices, leading to more resilient ecosystems, effective conservation of marine biodiversity, and improved climate change adaptation and mitigation mechanisms, as well as to strengthen local livelihoods and provide food security.

Marine Protected Areas and Ecosystem Services

Marine protected areas (MPAs) are described by the International Union for Conservation of Nature (IUCN) as: "clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."

MPAs were established to efficiently manage and protect vital marine and coastal ecosystems, processes, habitats and species; which can contribute to the restoration and replenishment of resources for social, economic and cultural enrichment.

MPAs have numerous benefits, including:

- Increasing fish stocks
- Adjusting to climate change impacts and carbon storage
- Conserving cultural heritage
- Enhancing ecosystem resilience
- Protecting species and restoring ecosystem diversity
- Creating sustainable tourism
- Supporting improved governance

Ecological benefits

Biodiversity conservation (e.g. fish stock, species habitats etc.); preservation of ecosystems regulatory services (e.g. climate regulation, coastal protection etc.).

Economic benefits

Improve business opportunities which generate revenues, turnovers and profits (e.g. eco-touristic activities) and increase employment rate.

Social benefits

Positively impact local communities by creating jobs (e.g. boat operators, guided tours etc.). They also provide cultural, educational and research opportunities.

Agricultural zone of TCNR

About Tyre Coast Nature Reserve

Tyre Coast Nature Reserve (TCNR) is a marine protected area located in southern Lebanon, near the city of Tyre. It is the largest sandy beach in Lebanon with a terrestrial area of about 1.82 km² and a marine surface area (territorial waters) of about 37.06 km². It is divided into two segments by the Rashidiyeh Palestinian Refugee camp that lies alongside the principal road and extends to the sandy beach. The northern part of the reserve is open during summer season for recreation and it encloses the public sandy beach, while the remaining part of the reserve is a restricted area covering the conservation zone located in the northern part of the reserve, and the agricultural land and Ras Al Ain artesian freshwater wells located in the southern part.

Touristic zone of TCNR

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Declaration

Under the mandate of MoE

November 12, 1998

Law no.708

International designation

Ramsar Wetland of Special International Importance - 2001

Specially Protected Area of Mediterranean Importance (SPAMI) - 2012

Zones

Touristic zone

Conservation zone

Agricultural zone

Ecosystems

Sand dunes

Sandy beaches

Agricultural land

Grassland

Coastal freshwater

Marine seawater

Special species

Loggerhead sea turtles

Green sea turtles

Migratory birds

Special culinary and medicinal flora

Cultural heritage

Artesian wells dating back to the Roman times including aqueducts

Submerged archaeological sites of the old city of Tyre in the area of Al Jamal

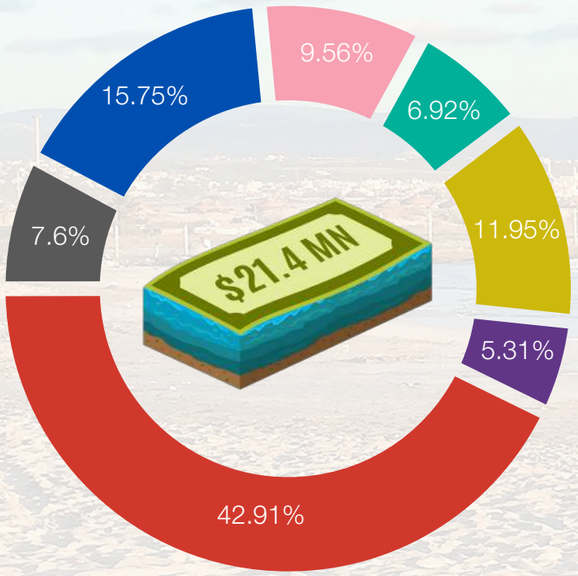
Estimated Economic Values of TCNR Ecosystem Services

Ecosystems Benefits and Results

The total economic valuation figures provide an estimated overview of the total social welfare and ecological benefits derived from the MPAs. It is important to note that ecosystems function in a dynamic way and their provision of services may vary across time. Placing a monetary value on ecosystem services does not mean that these services can be traded or marketed.

Total yearly estimated economic benefits of TCNR marine and coastal ecosystems:

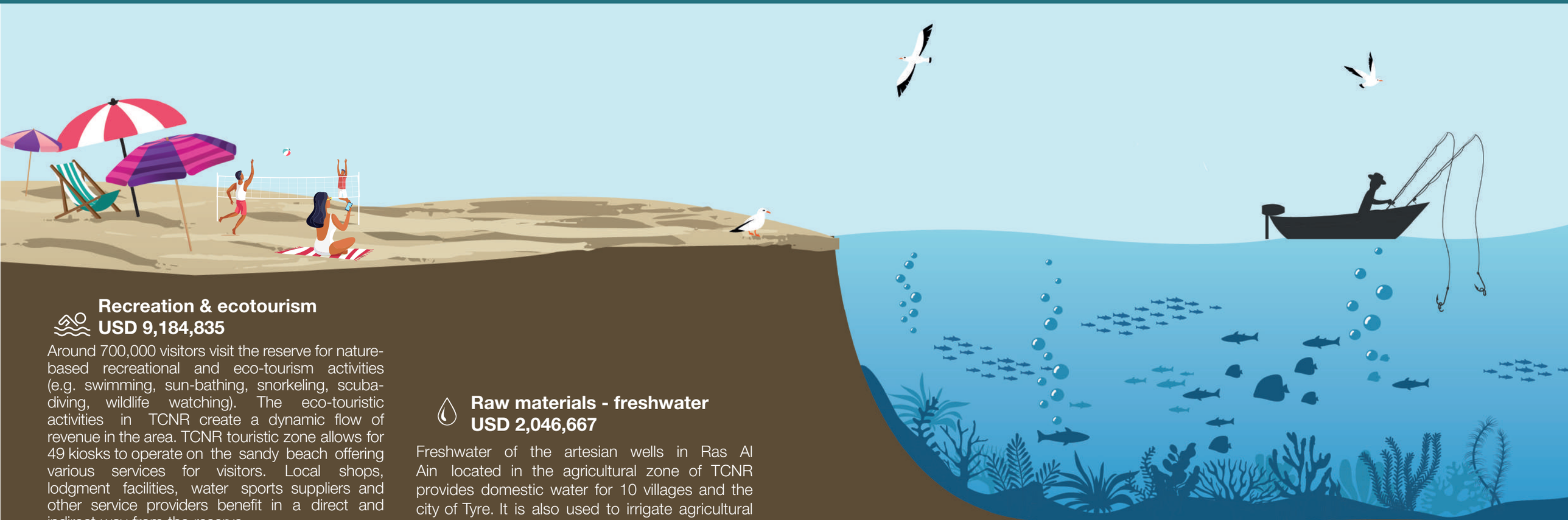
USD 21.4 Million



Touristic zone in TCNR

© Pinterest

Estimated Economic Values of TCNR Ecosystem Services



Recreation & ecotourism
USD 9,184,835

Around 700,000 visitors visit the reserve for nature-based recreational and eco-tourism activities (e.g. swimming, sun-bathing, snorkeling, scuba-diving, wildlife watching). The eco-touristic activities in TCNR create a dynamic flow of revenue in the area. TCNR touristic zone allows for 49 kiosks to operate on the sandy beach offering various services for visitors. Local shops, lodgment facilities, water sports suppliers and other service providers benefit in a direct and indirect way from the reserve.

Bequest value
USD 3,372,073

This value measures the desire of people to conserve TCNR ecosystems and their services for the future. It takes into account the importance of these ecosystems in terms of well-being and sustainability. This value is estimated using the results of the survey conducted for TCNR.

Biodiversity & biological support
USD 2,557,907

The different habitats in TCNR present favourable habitats, refuge and breeding grounds for endangered marine and coastal species (e.g. Loggerhead and Green sea turtles), as well as resting sites for migratory birds.

Agricultural products
1,481,184 USD

The fertile agriculture lands of Ras Al Ain in TCNR are considered a source of livelihood for many families and a source of food security for the local community.

Raw materials - freshwater
USD 2,046,667

Freshwater of the artesian wells in Ras Al Ain located in the agricultural zone of TCNR provides domestic water for 10 villages and the city of Tyre. It is also used to irrigate agricultural lands.

Coastal protection & hazard mitigation
USD 1,459,228

Shoreline stabilization & erosion control is a natural regulating ecosystem service that is indirectly provided by the sandy beach and the coastal wetland of TCNR. Storm protection & wave attenuation provided by the sand dunes and sandy beach of TCNR are considered natural barriers against severe weather conditions and storm waves that can cause damage to the coastline and loss of habitats.

Fisheries
USD 1,137,473

Marine ecosystems of TCNR provide a habitat for various number of fish species and crustaceans. Preventing illegal and blast fishing within TCNR has a positive impact on adjacent fisheries and, thus it increases the fish resources captured.

Carbon sequestration & climate regulation
USD 95,027

The wetland of TCNR acts as natural reservoir, storing water in the soil or in surface water, reducing runoff and releasing water gradually. It protects from flooding, drought and storm surges. The sand-dunes in TCNR are recognized for their importance in providing a sediment bank acting as a shield against erosion and helping replenish the beach after severe storms or natural events.

Medicinal, culinary & ornamental products
USD 41,048

The wetland area in TCNR is a rich ground for important flora species of medicinal and ornamental significance.

Waste assimilation
USD 22,695

The marshes, ponds, springs and the small estuary in the agricultural zone have the capacity to filter water by absorbing excess nutrients that would lower oxygen levels in the sea and harm wildlife.

Cultural & archaeological heritage
USD 3,680

The Birak or the “ponds” of Ras Al Ain located in the agricultural zone of TCNR are cultural heritage sites reflecting the long history of use, culture and values in the region.

Education & research
USD 3,000

TCNR conservation zone attracts students from different universities and schools, mainly interested in bird and sea turtle watching.

Main Recommendations – Way Forward

1 Conservation and protection of the marine and coastal ecosystems in the MPA is fundamental to ensure sustainable flow of goods and services that are important for the society's welfare.

2 Abiding by the rules and regulations imposed by the MPA limits the degradation of ecosystems and biodiversity in the reserve.

3 Understanding the link between the MPA's ecosystems function and the flow of benefits generated in both direct and indirect way is a vital first step to conservation.

4 Having healthy ecosystems will allow for more climate change resilience.

5 Protecting marine and coastal ecosystems will guarantee sustainability by allowing future generations to benefit from these natural services.

6 Polluters must be aware that legal and financial sanctions are imposed in case of any actions that would harm the environment and species.

7 Local community and the society must share the responsibility of managing and protecting the reserve as they are considered one of the first beneficiaries. For example, stopping illegal fishing and blast fishing within the reserve will result in the conservation of fishery stock and marine species in adjacent areas.

8 Shedding lights on the importance of a MPA ultimately allows for surrounding businesses to thrive as the number of visitors would surge as an effect of national recognition.

9 The protection of a MPA secures a higher priority ranking in terms of national and international funds that will be reflected back in the economy and wellbeing of the region.

Way forward

Local community and the society must share the responsibility of managing and protecting the reserve, which will ensure sustainable flow of goods and services and protection of biodiversity.

Keeping MPAs protected and clean constitutes a passive financial income for the surrounding areas and municipal institutions as well as an aesthetically pleasant environment for local community and tourists.

Biodiversity in TCNR

Key Messages

1 Nature, in specific marine and coastal habitats are amongst the most productive and vital ecosystems. They provide various ecological and socio-economic benefits; yet they are under many environmental and anthropogenic threats leading to their deterioration.

The benefits offered by the marine and coastal ecosystems are categorized by the Millennium Ecosystem Assessment in 2005 as provisioning (e.g. food and materials), regulating (e.g. carbon sequestration, erosion control etc.), cultural (e.g. recreation, eco-tourism, educational) and supporting (eg. nutrient cycling and primary production).

Increasing population and human needs coupled by the impacts of climate change are increasing the pressure on these ecosystems leading to their degradation.

2 The ecosystems of the Mediterranean Sea have been degrading rapidly, jeopardising the local economies and livelihoods of the society depending on the sea.

Ocean-related activities in the Mediterranean Sea generate an annual economic value of USD 450 billion making it the fifth largest economy in the region.

3 UN Convention on Biological Diversity (CBD) aims to preserve at least 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystems services.

Initiative to alleviate the marine and coastal degradation and to protect these ecosystems in order to maintain the flow of goods and services they produce.

4 MPAs are established to efficiently manage and protect vital marine and coastal ecosystems, processes, habitats and species.

This contributes to the restoration and replenishment of resources for social, economic and cultural enrichment.

5 Social engagement and local consensus must not be neglected when conserving the nature.

Social, cultural and economic impacts have to be well established and explained to the local communities and society in order to avoid any hostile behaviour or opposition.

6 Majority of the MPAs ecosystem services are under-estimated or overlooked due to their indirect long-term benefits to the society

Some of the benefits provided by the regulating services of ecosystems are not explicitly captured by society (e.g. the carbon sequestration whose effect is trans-boundary, the spill-over effect of fisheries and marine species to adjacent areas, etc.)

Ras Al Ain artesian well

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7 As established by The Economics of Ecosystems and Biodiversity program (TEEB) and Millennium Ecosystem Assessment (MA): “MPAs benefits calculated are significantly higher than estimated costs”.

The costs of MPAs are directly related to establishment, maintenance and compliance actions. Yet, each investment in conservation yields higher benefits from ecosystem services.

8 Fisheries and eco-tourism sectors are the main contributors to the Mediterranean Economy, and they are considered key ecosystem services of marine protected areas.

The fishery sector has a total worth of USD 3 billion based on the General Fisheries Commission for the Mediterranean (GFCM) in 2016. As for the recreational and subsistence fishing it generated around USD 200 million. However, overfishing activities have put 80% of the fish stock under threat.

As for the eco-tourism sector, it is generating more than USD 420 billion yearly to the regional economy. Yet, when not well managed and controlled, this sector is resulting in the degradation of many marine and coastal ecosystems.

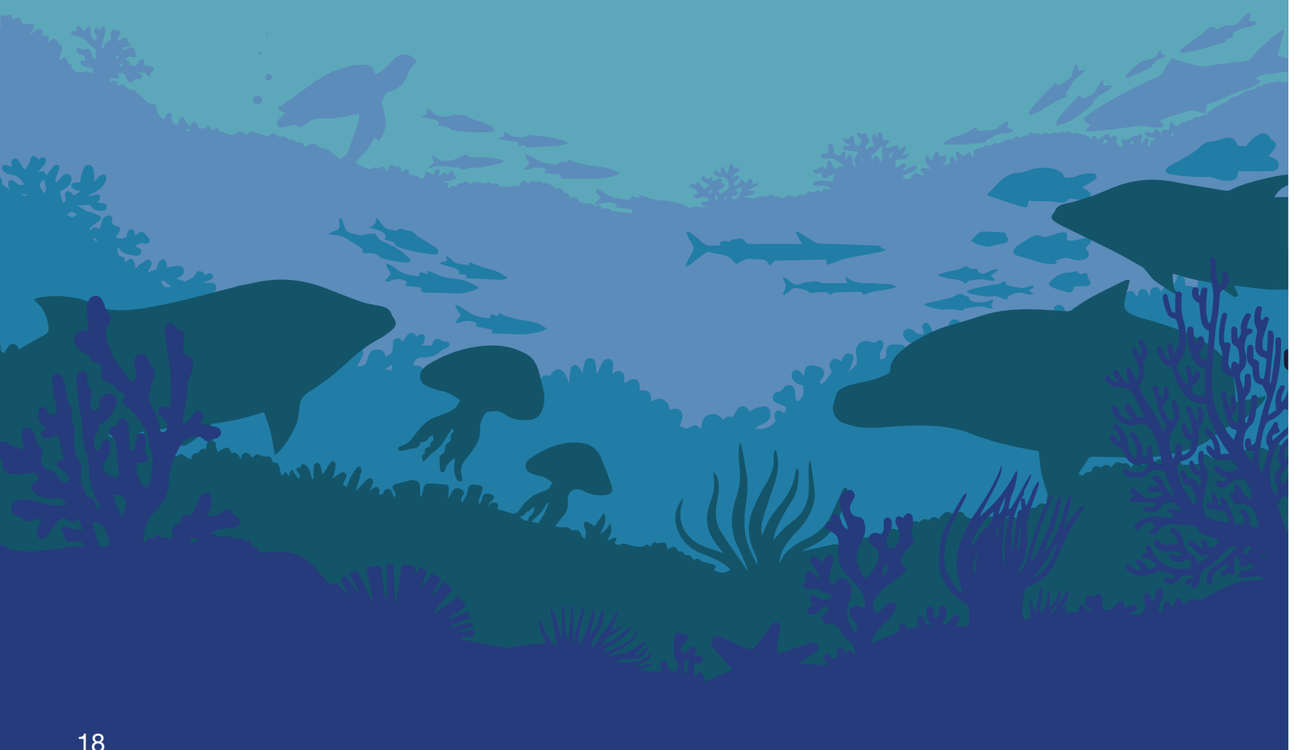
Glossary

Ecosystems: defined as the interaction between living and non-living organisms that live and function together in a particular habitat to provide a flow of ecosystem services (Willis, 1997).

Ecosystem Services: pioneered by the Millennium Ecosystem Assessment (MA) (Alcamo, et al., 2003) and The Economics of Ecosystems and Biodiversity (TEEB) program (Wittmer, et al., 2013), it highlights the importance of human dependency on ecosystem services and underlines the functioning of ecosystems with the role of biodiversity and ecological processes on human well-being.

Carbon Sequestration: Carbon sequestration is a biochemical process by which atmospheric carbon is absorbed by living organisms, including trees, soil microorganisms, and crops, and involving the storage of carbon in soils, with the potential to reduce atmospheric carbon dioxide levels.

Wetlands: Transitional areas between terrestrial and aquatic systems in which the water table is usually at or near the surface or the land is covered by shallow water.



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