undp3**United Nations Development Programme**

**Country: Jordan**

**PROJECT DOCUMENT**

|  |  |
| --- | --- |
| **Project Title:** | Mainstreaming marine biodiversity conservation into coastal zone management in the Aqaba Special Economic |
| **UNDAF Outcome(s):** | Sustainable management of natural resources and the environment. |
| **UNDP Strategic Plan Environment and Sustainable Development Primary Outcome:**  **UNDP Strategic Plan Secondary Outcome:** | | |
| **Expected CP Outcome(s):** *Sustainable Management of Natural Resources and the environment / Environmental policies aligned to global conventions and national implementation capacities enhanced* | | |
| **Expected CPAP Output (s)** The protection and sustainable use of agriculture resources and biological diversity included in relevant national and sectoral plans particularly for major hotspots | | |
| **Executing Entity/Implementing Partner:** UNDP/Aqaba Special Economic Zone Authority | | |

Total resources required 950,000 US$

Total allocated resources: 8,250,000 US$

* Regular \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Other:
  + GEF 950,000 US$
  + UNDP 50,000 US$
  + GoJ In-kind 7,250,000 US$
  + Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Programme Period: 2008-2012

Atlas Award ID: 00061764

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PIMS # 4002

Start date: June 2011

End Date June 2014

Management Arrangements NEX

PAC Meeting Date Oct 2010

**Brief Description**

The coral reef ecosystems of the Gulf of Aqaba are the most significant feature of the marine environment in Jordan. These coral reefs are unique in that they are the northern-most tropical reef systems worldwide, have a high diversity of marine taxa, and provide habitat for endemic and rare marine species; thus presenting a readily-available enterprise for Jordan’s tourism industry. They also have the potential to be largely isolated from the effects of climate change as a result of their seclusion within the Gulf. The Jordanian coastline is, however, subject to considerable resource pressure, particularly as this coast supports Jordan’s only seaport facilities. The high level and conflicting nature of pressure on the natural resources of Jordan’s coast poses significant challenges to effective management and conservation of this unique environment.

The marine environment of the Gulf of Aqaba is of global significance in having some of the northern-most reef systems in the Western Indo-Pacific and is designated, along with the Red Sea, as a World Wildlife Fund (WWF) global 200 ecoregion on account of its marine biodiversity value. Home to both endemic and globally threatened species, the Jordanian reefs are an important reservoir or refugium for tropical reef species. In particular, the endangered Indo-Pacific humphead wrasse, *Cheilinus undulates* has been found in the vicinity of these reefs, as well as threatened species of marine turtles. Furthermore, owing to their isolated location, these reef habitats may be largely protected from the effects of global warming and, to date, have been unaffected by bleaching and other detrimental climatic effects. This ecosystem therefore provides a natural laboratory for the study of climate change impacts on coral communities.

As the Jordanian coastline is limited to 27 km in length, the area is strategically important and the vast majority of all consumer goods and foodstuffs for the country are shipped through the Aqaba Special Economic Zone (ASEZ). There is also a small artisanal fishery in the Gulf of Aqaba. Furthermore, the current population for Aqaba City is projected to increase by more than 50% from approximately 100,000 to over 160,000 people by 2020, creating significant additional resource pressure. An initiative aimed at moving and expanding Jordan’s port facilities has recently become a higher priority, which has added urgency to this project for mainstreaming marine biodiversity conservation in the coastal management systems for the ASEZ. The development of port facilities is proposed for areas of high conservation value near the southern Jordanian border. Jordan’s coastline has become the focus of a burgeoning tourism industry. Several extensive tourist resort developments are already underway and others are proposed in the near future, adding to pressure on environmental resources.

The goal of this project is to mainstream biodiversity conservation in order to promote more effective and integrated management of the coastal zone in the Aqaba Special Economic Zone. The strategy to achieve this goal has four primary components: development and improvement of knowledge-management systems for coastal and marine biodiversity, promotion of biodiversity friendly investment and development, improving institutional capacity for integrated coastal zone management and biodiversity conservation and coral reef protection.

Effective stewardship is premised on having a good understanding of the nature and interactions between the living (human and non-human) and non-living components of the environment. The use of this information must be managed effectively for good stewardship. Where this information indicates that anthropogenic activities negatively impinge on environmental sustainability, appropriate guidance should be provided. The roles and responsibilities of environmental managers must therefore be transparent and grounded in the principles of long term environmental sustainability.

Agreed by (Government):

Date/Month/Year

Agreed by (Executing Entity/Implementing Partner):

Date/Month/Year

Agreed by (UNDP):

Date/Month/Year

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## Acronyms

**ACT** Aqaba Container Terminal

**ADA** Aqaba Dive Association

**ADC** Aqaba Development Corporation

**ARA** Aqaba Regional Authority

**ASEZ** Aqaba Special Economic Zone

**ASEZA** Aqaba Special Economic Zone Authority

**ASEZA-EC** Aqaba Special Economic Zone Environment Commissioner

**ASEZA-ED** Aqaba Special Economic Zone Environment Directorate

**ASEZA-IC** Aqaba Special Economic Zone Investment Commissioner

**ATASP** Aqaba Technical Assistance Support Program (USAID)

**CBD** Convention on Biological Diversity

**CZM** Coastal Zone Management

**EIA** Environmental Impact Assessment

**ETF** Environmental Trust Fund

**GAEAP** Gulf of Aqaba Environmental Action Plan

**GEF** Global Environment Facility

**GIS** Geographic Information System

**GPA** The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities

**ICZM** Integrated Coastal Zone Management

**IMO** International Maritime Organisation

**IOC** International Oceans Committee

**IS-ASEZA** Institutional Support- ASEZA (EU funded programme)

**IUCN** The World Conservation Union

**JREDS** Royal Marine Conservation Society of Jordan

**MBDC** Marine BioDiversity Conservation

**MIS** Management Information Systems

**MoEnv** Ministry of Environment

**MoPIC** Ministry of Planning and International Cooperation

**MPA** Marine Protected Area

**MSP** Medium Sized Project

**MSS** Marine Science Centre –Universities of Jordan and Yarmauk

**NGO** Non-governmental organization

**NPA** National Programme of Action for the Protection of the Marine Environment from Land-Based Activities

**OPRC** International Convention on Oil Pollution Preparedness, Response and Co-operation

**OWP** Operational Work Plan

**PERSGA** Regional Organisation for the Conservation of the Environment of the Red Sea and Gulf of Aden

**PIF** Project Information Form

**PMT** Project Management Team

**PPG** Project Preparatory Grant

**PSU** Practical Salinity Unit

**TEU** Twenty-foot Equivalent Unit, a standardized shipping container size based on overall length

**TOR** Terms of Reference

**UNDAF** United Nations Development Assistance Framework

**UNDP** United Nations Development Programme

**UNESCO** United Nations Educational, Scientific and Cultural Organisation

**UNFCCC** United Nations Framework Convention on Climate Change

**USAID** United States Agency for International Development

**WWF** World Wide Fund for Nature

## 

## SITUATION ANALYSIS

## The Physical Environment:

1. The Gulf of Aqaba is located at the northern reach of the Red Sea, which is an inlet (438,000 km2) of the Indian Ocean. The northern extremity of the Red Sea is bifurcated by the Sinai Peninsula, separating the Gulf of Suez to the west and the Gulf Of Aqaba to the east. The Gulf of Aqaba is connected to the Red Sea via the narrow entrance (6 km wide) at the Strait of Tiran (Figure 1), thus isolated from major ocean currents. Overall, the Gulf is 180 km in length and covers approximately 2,800 km2 in total area. The average depth of the Gulf is 800 m, but extends to a maximum depth of 1,828 m. The Gulf is situated within the Jordan Rift Valley, which is part of the Syro-African Depression stretching from East Africa to Turkey.
2. The climate in Aqaba is arid, with an average rainfall of 25 to 30 mm. Mean daily air temperature ranges from 14°C in January to more than 35°C in August. Temperatures on rocky shorelines may exceed 50°C during the summer. Prevailing winds are from the north and occasional winter storms blow from the south. Relative humidity ranges from 30 to 50 percent and the evaporation rate is high, up to 4 m per year (on average).
3. Sea surface temperatures in the Gulf of Aqaba range from winter lows of 20.5°C (February) to highs in late summer (September) of over 27°C. During the summer the Gulf is thermally stratified; a strong thermocline exists, with seawater temperatures below a depth of approximately 200 m remaining a constant 21.5°C. As sea surface temperatures fall in the winter the thermocline collapses and mixing between the upper and lower layers of seawater occurs.

Figure 1: Project location and relevant geographic features.

1. Salinity of the Gulf ranges from 40.3 to 41.6 psu (practical salinity units). The tidal regime is semidiurnal (two high and two low tides per day), with a tidal range of 0.3 to 1 m (data from the Marine Science Station, 2004).
2. The coastline (Figure 2) located at and to the north of the main port is primarily comprised of soft sandy substrates, with sea grass clumps and corals occurring as small patches but not as reef formations. Between the main cargo port and the Aqaba Container Terminal (ACT) there is a relatively high percent coverage of the corals with well-developed reefs present.
3. The southern half of the Jordanian coastline consists of a series of arcuate bays created by valleys between mountain outcrops. The bays are largely occupied by sandy substrates or seagrasses, while the extremities of the bays have well-developed coral reefs. The cover of hard corals is <50% across the entire Jordanian coast, but can reach >90% at some locations (National Monitoring Programme, Al-Horani 2007a, b). The results of the national monitoring program indicate that the percent cover of hard corals is greater at depths of 15 m than in shallower areas.
4. Aqaba Governorate is located at the most south-western part of Jordan, approximately 340 km from Amman. The governorate, encompassing just over 6900 km2 comprises approximately 8 % of Jordan's land area and its 27 km coastline accounts for approximately 7 % of the total for the Gulf of Aqaba. The Aqaba Governorate hosts Jordan's only sea port (consisting of discrete container, ferry, fuel and phosphate terminals and a bulk goods port) and occupies a strategic location close at the cross roads of Europe, Asia and Africa.

**Figure 2: The Jordanian coast of the Gulf of Aqaba showing the major coastal locations (inset: regional location)**

## Biodiversity Context and values

1. The most significant feature of Jordan’s marine environment is the coral reef ecosystems. These ecosystems cover a small area, estimated at 4 km2 in total (including vertical and horizontal faces) and occur along about half of the country’s short (27 km) coastline (Figure 2), but have remarkably high diversity. The Jordanian reefs lie within the Red Sea which is designated as a WWF global 200 ecoregion (no 231) on account of its unique marine biodiversity. The Gulf of Aqaba is a separate biogeographic zone within the Red Sea, and is of global significance in having the northern-most latitude reefs in the Western Indo-Pacific.
2. Marine endemism is relatively high in the Red Sea; for instance, there are an estimated 25 species of fish that occur only in the Red Sea, which are found in the vicinity of the Jordanian reefs. The Indo-Pacific humphead wrasse *Cheilinus* *undulates*, listed as Endangered by IUCN, is found on these reefs, as well as globally-threatened marine turtles.
3. Equally important is the high resilience demonstrated by these reefs, which, to date, have been unaffected by bleaching and other effects of global warming. The Jordanian reefs are thus a vitally important potential reservoir of reef species and a natural laboratory for the study of climate change impacts on coral communities.
4. More specifically, this coastline supports small but important coral reef communities comprised of a discontinuous belt of fringing coral reefs with two different morphological reef units; the coral reef flat and the outer reef slope (Bouchon et al. 1981). This coral habitat is one of the most diverse high-latitude reef systems in the world (Mergner et al. 1992).
5. Studies regarding the number and distribution of coral reefs along the Jordanian coast are limited, with the exception of coral mapping activities carried out in two areas including the proposed location of new port developments in the south and the middle port area (Al-Horani et al., 2007 a & b). These investigations assessed the percentage cover of 14 benthic components and detailed maps were produced (Al-Horani et al., 2007 a & b). In addition, monitoring surveys for ASEZA have been regularly conducted, including eight locations distributed along the coast at three depths (Al-Horani et al., 2005).
6. The most conspicuous shallow water marine habitat in the Red Sea is formed by the extensive coral reefs that fringe much of the coastline and extend offshore for many kilometers (UNEP 1985 in Fouda & Gerges 1994). The biodiversity of Jordan’s coral reefs has been better studied in recent times with coral mapping surveys undertaken in relation to proposed developments along the Aqaba coastline (Al-Horani 2007a, b). While coral communities are known only across approximately 50% of the coastline, these habitats are known to sustain a large number of taxa. Jordanian coral reefs are in good condition, with up to 90% coral cover in some localized areas (Kotb et al. 2008).
7. The complexity of these ecosystems is illustrated by high biodiversity, with approximately 250 species of stony corals and 180 species of soft corals found on reefs in the Red Sea (Sheppard et al. 1992 in Fouda & Gerges 1994). More specifically, the reefs in the Gulf of Aqaba are reported to support high coral diversity with varying records that range from approximately 129 species of hermatypic corals (Scheer & Pillao 1983) and in the order of 120 species of soft corals (Benayahu 1985) to more recent records of 158 coral species from 51 genera (Al-Moghrabi 2000, PERSGA/GEF 2003). Coral habitats of the Gulf therefore contain a relatively significant proportion of the total Red Sea coral diversity. The diversity index (H') compares well amongst the best globally with values of H' = 3.23 and 3.42 (based on Cnidaria cover), where 112 species of Cnidaria including 88 Scleractinia (hard corals) were found in a single square meter on a fringing reef near the Marine Science Center MSS (Schumacher et al 1995).
8. The Red Sea coral reefs also support a wide range of associated taxa including echinoderms (sea stars, brittle stars, sea urchins), sponges and molluscs (Fouda & Gerges 1994 and references therein). In addition to the sedentary taxa, there are a number of mobile species that utilise the reefs as places of shelter, for food and other biological resources. Khalaf (2005) reported a total of 507 fish species belonging to 109 families are found along the Jordanian coast. These fish taxa include 18 Chondrichthyes and 489 Ostichthyes; and the major families include the Labridae (51 spp.), Pomacentridae (29 spp.), Serranidae (25 spp.), Apogonidae (24 spp.), Blenniidae (24 spp.), Gobiidae (21 spp.), Carangidae (17 spp.) and Syngnathidae (16 spp.). Collectively these fish families comprise over 40% of the total fish fauna of the coastline. The great majority (>80%) of these species inhabit benthic environments, while others are pelagic fish. More specifically, a recent habitat mapping survey of the Aqaba reefs reported 170 species of reef fish from 39 families (Al-Horani 2007b).
9. This area is incorporated into the World Wildlife Fund (WWF) Global 200 Ecoregion (no. 231). This is attributed to the fact that it is the warmest and most saline of the world’s seas, with no permanent coastal rivers or streams, and partial isolation from the ocean ([http://www.worldwildlife.org](http://www.worldwildlife.org/wildworld/profiles/g200/g231.html)).
10. Coral species that are most probably found in Dirreh Bay (south port relocation site) are listed in Annex 1. This list was compiled [by Dr. F. Al-Horani] by visual identification without any further examination. Of these, 29 species are endemic to the Red Sea and Gulf of Aden (Annex 2, Veron). There are no studies aimed specifically at identifying species that are found only in the Dirreh Bay. There are also 25 fish species that are endemic to the Red Sea and Gulf of Aden. Furthermore, there is one endangered fish (humphead wrasse) and two sea turtles that are found in the Dirreh Bay specific and in the Jordanian coast in general.
11. With regard to the general distribution of corals along the coast, there is a trend of increasing hard coral cover from north to south towards the Saudi Arabian border (F. Al-Horani, pers. obs.). The northern coastal region located in front of the hotel area is mainly sandy substrate, with sea grass clumps and corals occurring as small patches but not as reef formations. To the south, coral cover increases significantly in front of the region where public coffee shops were located before removing them during November 2009, with small coral atolls found in this area. The shore in the vicinity of the main cargo port is largely sandy substrate as a result of the ports facilities. Between the main cargo port and the ACT container terminal there is a relatively high percent coverage of the corals with well-developed reefs occurring in this region.
12. The northern limit of the Marine Park is located to the south of the ACT container terminal and current passenger ferry facilities, in the vicinity of the Marine Science Station, and extends for approximately 7 km to the south (Fig. 2). This region contains coral coverage up to 90% in some areas and, consequently, has some of the greatest coral coverage of the Jordanian coastline. Similarly, high coverage of coral habitat continues between the southern limit of the Marine Park and the Saudi Arabian boarder.

## Management Context

## Policy and Legislative Context

1. In the year 2000 and under the direction of His Majesty King Abdullah II, the Aqaba taskforce was created and equipped with a mandate to transform Aqaba into a world class Red Sea business hub and leisure destination. In addition, it aimed at enhancing the quality of life and prosperity of the Aqaba community through sustainable development. Central to this mandate was to see Aqaba emerge as a competitive international investment location and the driving force for the economic growth of Jordan. The area was named Aqaba Special Economic Zone (ASEZ) with an empowered Authority known as (ASEZA) with regulatory, administrative, fiscal and economic responsibilities.
2. The empowering legislation is the Aqaba Special Economic Zone Law for the Year 2000 (No. 32) and its amendments. The legislation consists of 58 articles with content as follows in Table 1.

Table 1 Content of the legislation governing the Aqaba Special Economic Zone

|  |  |
| --- | --- |
| **Articles** | **Content Description** |
| 1-2 | Name And Definition |
| 3-11 | Establishment Of The Zone And Its Boundaries |
| 12-18 | The Authority Administration |
| 19-21 | The Authority’s Financial Affairs |
| 22-29 | Economic Activities In The Zone |
| 30-42 | Taxes And Duties |
| 43-47 | Lands And Buildings Zoning And Administering Coastal Areas |
| 48 | Entry And Residency In The Zone |
| 49-51 | Currencies, Banking And Insurance Activities |
| 52 | Environment Protection |
| 53-58 | General Provisions |

1. The natural environment of the ASEZ is important and significant, particularly in terms of marine flora and fauna, some terrestrial habitats and species and the landscape. Therefore, it is necessary that all developments remain environmentally sustainable in the long term, since the environmental resources of the area are themselves an integral part of its attraction to investment. This can only be achieved by maintaining a healthy environment and preventing the deterioration and pollution of the unique environment in Aqaba through giving the priority to the environment. Therefore, a directorate under the supervision of Environmental Commissioner was established with the right to permit or reject the projects according to their environmental impacts.
2. Environmental protection was further strengthened with the ASEZ Environmental Protection Regulation No. 21 for the year 2001. This regulation requires that all existing and potential investors within the zone satisfy the Authority with regard to environmental effects and their capacity to comply with all the relevant environmental requirements, rules and instructions within the zone.
3. This regulation provides the overall basis for the environmental policies in ASEZ and lists a number of prohibited acts regarding waste management, use of sea water, and emission of harmful substances to the environment. The regulation addresses the legal framework for environmental management and monitoring in the zone including environmental clearance and post-clearance phases of the economic activities in the Zone. The regulation also details appropriate measures to prevent environmental pollution and protect the marine resources, and sets out a legal framework for the imposition of penalties for pollution incidents.

***ASEZA Environmental Policies***

1. ASEZA has adopted a number of policies associated with the control, management and protection of the natural environment. The environmental policy requires preservation and protection of the environment and the sustained development of the Zone's natural resources.
2. The water policy requires the protection and management of groundwater resources to bring down annual abstractions from the various renewable aquifers to a sustainable rate, as well as the development of wastewater management and reuse schemes.
3. Water conservation is to be enhanced by managing both supply and demand and efficiency of use through the utilization of improved water-saving technologies and management practices, and the modification of current practices through public awareness programs.
4. The energy conservation policy promotes the provision of adequate energy to consumers at the least possible cost, while attempting to achieve sustainable development of the energy sector and to meeting the needs of socioeconomic development in the Zone.
5. ASEZA has adopted a stringent discharge policy of "Zero Discharge" to the sea in order to preserve the marine environment through the complete elimination of marine pollution. The Gulf of Aqaba is defined as a 'special area' according to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) signifying that discharges of oil are prohibited from vessels (<http://www.aqabazone.com/index.php?q=node/242>).
6. Because of the zero discharge policy, and the prohibition of almost all anthropogenic land-based inputs, most of the contaminant inputs are accidental and irregular leakages and spillages. Very little quantitative data is available on these inputs. The main sources of contamination come from the industrial zone and ports, and include both air emissions and spillages of bulk material. The most significant ongoing alterations and degradation are linked to tourism uses of the coastline (e.g., for diving and boating).
7. Since the environmental resources of Jordan are among its most important assets, the ASEZ Master Plan addressed the need for strong environmental protection. Since 2001, ASEZA has built up a strong regime of environmental protection, including a risk-based environmental clearance mechanism for new industries as well as monitoring and enforcement of standards on the existing activities. One important aspect of ASEZA's regime is the prohibition of any discharges to the marine environment. This 'zero-discharge policy' was designed to ensure that only cooling water, which is of the same quality of the Gulf itself, brine from desalination works, and stormwater, are discharged to the Gulf. No wastewater treatment discharges, or other industrial discharges are permitted. The Aqaba Marine Park was also established as a specially protected marine reserve. Activities are strictly controlled along this 7 km stretch of coastline.

## Institutional Context

1. Implementation of a programme of integrated coastal zone management depends upon a thorough understanding of the institutional, and policy settings as well as the various sector groups that play a role within the target environment. The potential for effective integrated management within the ASEZ is relatively high, given the administrative organisation in place.
2. Promulgated in law in 2000 (Law No. 32), the ASEZA has full responsibility for the entire Jordanian marine coastline. Within this legislative framework, ASEZA is governed by a Board of Commissioners, comprised of six permanent commissioners and led by the Chief and Vice-Chief Commissioners. Each Commissioner has specific strategic and operational responsibilities and duties within a specific management and administrative sector, as outlined below and in Figure 3.

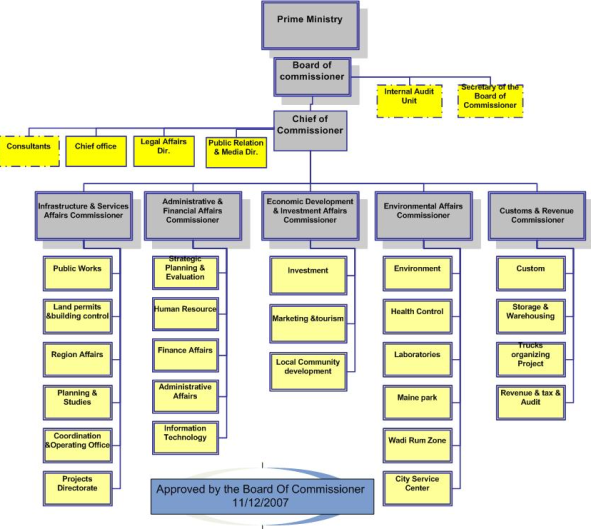


Figure 2. ASEZA Organizational Structure.

1. The Commissions (alphabetically) are:

* Administrative and Finance
* Customs and Revenue
* Environment and Health Control
* Investment and Economic Development
* Land, Infrastructure and Services

1. In addition, there are a number of other bodies and constructs (ranging from integrated, quasi-autonomous and fully independent of ASEZA) that have either jurisdiction within or direct relevance to the coastline (Table 2). Each of these is discussed in the following section.

Table 2 Key constructs within ICZM in the ASEZ

|  |  |  |
| --- | --- | --- |
| Aqaba Container Terminal | Aqaba Marine Park | Marine Science Station |
| Aqaba Cooperative Maritime Society for Glass Boat | Aqaba Ports Corporation | Prince Hamza Oil Spill Combating Centre |
| Aqaba Development Corporation | ASEZA Departments & Directorates (City Services, Community Development, Environment, GIS, MIS,Tourism) | Royal Marine Conservation Society of Jordan |
| Aqaba Dive Association | Environmental Trust Fund | Royal Jordanian Navy |

1. The participatory process revealed a high level of awareness of the importance of the marine environment among some sectors. This awareness is acute across all sectors, particularly during this period of rapid and extensive urbanization and industrial development. The consequence of this awareness is a moderately high potential for conflict over resource allocation and decision-making. A key requirement for the success of this project is therefore to promote balance (both among and within sector groups) between the economic and strategic needs of the area and biodiversity conservation. Noteworthy is that, while there is a high level of awareness about potential impacts on the natural capital of the area and its importance, there is little understanding of possible solutions, be they policy, technical or financial mechanisms which would enable stakeholders in Aqaba to concurrently pursue economic development goals in harmony with biodiversity conservation objectives.

## Socio- economic context

1. Aqaba's Gross Regional Product (GRP) was estimated at JD 408 million in 2005; and it is projected to reach JD 814 million by the end of 2010. As such, Aqaba's share in Jordan's Gross Domestic Product (GDP) in 2006, amounted to 6.3 percent; and it is expected to rise to 10 percent by 2010. In 2006, the total population of the Aqaba governorate was 118,300, with a growth rate of 3.19 percent over the1994-2006 period. Aqaba city had about 100,000 residents in 2006. Because of the net increase in immigration to Aqaba, estimated at 16.7 percent of the population in 2004, population growth is expected to increase by 5.0 percent annually till 2010. Currently, the population in Aqaba constitutes 2 percent of the Kingdom's total population.
2. Aqaba's unemployment rate was 15 percent in 2005, down to 14 percent in 2006, and is expected to decline to 11 percent by the end of 2010. This reduction is based on the projection of an additional 50,000 jobs by the end of 2010; 30,000 of which are permanent. The remainder would be in the construction sector and is expected to end when the building boom ends. Despite the natural population increase and the constant in-migration over the past six years, the ASEZ has succeeded in reducing the unemployment rate. It has also attracted substantial local and foreign direct investments, increased GRP at fixed prices, and raised its contribution to the country's GDP.

***ASEZA Financial Statement***

1. ASEZA was set up to operate as an independent Government agency, with substantial fiscal freedom. Its finances are governed by Article 19 of the ASEZ Law, which allows it to operate its own independent budget. Its activities are funded mainly by fees, taxes and returns from economic activity in the Zone. These include customs duties, sales and income tax and land and buildings tax. ASEZA also receives fees collected in return for services, and penalty fines for various violations.
2. ASEZA is also authorized to raise loans, and to accept aid, grants and donations, as well as to raise proceeds from the disposition of its assets. ASEZA can also receive transfers from Jordan's General Budget if necessary. ASEZA's total annual budget is around USD 50 million. Table 3 provides the total actual revenues and expenditure budget for AZESA during the period (2004-2007). The annual expenses in 2007 reach about JD 48 million, whereas the total revenue from different sources shown in Table 3 below reaches about JD 37.7 million. The budget deficit is in the order of JD 10.4 million for the year 2007.

Table 3 Total Actual Revenues and Expenditure Budget of ASEZA 2004-2007 (USAID 2008)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Operating Revenues** | **2004** | **2005** | **2006** | **2007** |
| Fees & Licenses | 3,810,505 | 8,716,392 | 12,714,902 | 12,939,215 |
| Sales & excise tax | 4,067,068 | 5,106,585 | 8,645,438 | 9,804,215 |
| Customs Fees | 4,897,972 | 1,123,064 | 1,234,872 | 1,233,566 |
| Income tax | 994,458 | 2,425,947 | 2,538,803 | 3,008,893 |
| Land & Building Tax | 661,061 | 514,907 | 1,113,337 | 1,012,684 |
| Lease Income | 1,369,968 | 674,000 | 1,530,562 | 1,759,763 |
| Others Revenues | 1,341,432 | 2,138,236 | 1,985,374 | 7,935,668 |
| **Total Revenue** | **17,142,464** | **20,699,131** | **29,763,888** | **37,694,004** |
| **Expenditure** |  |  |  |  |
| Total salaries, leases and allowance | 6,013,917 | 6,591,532 | 7,697,753 | 10,376,729 |
| Total Operating expenditure | 3,661,015 | 4,592,946 | 7,886,822 | 6,968,233 |
| Total transformation expenditure | 1,664,792 | 1,682,945 | 2,520,398 | 3,064,588 |
| Others expenditures | [235,246](mailto:+C49-@sum(C45:C47)) | [285,867](mailto:+C49-@sum(C45:C47)) | [391,059](mailto:+C49-@sum(C45:C47)) | [433](mailto:+C49-@sum(C45:C47)) |
| Total Operating Expenditure | 11,574,970 | 13,153,290 | 18,496,032 | 20,409,983 |
| Total Capital Expenditure | 13,808,459 | 25,041,196 | 25,177,913 | 27,695,704 |
| **Total Expenditure** | **25,383,429** | **38,194,486** | **43,673,945** | **48,105,687** |
| **Total Expected Deficit** | **-8,240,965** | **-17,495,355** | **-13,910,057** | **-10,411,683** |

1. Table 4 shows the forecasted budget for AZESA for the coming period and forecasted for the years (2008-2013) by the USAID financial enhancement report. The total revenues from different sources will reach around JD 50 million in 2010, whereas the total expenses would be JD 61.4 million with a budget deficit of about JD 11.3 million in 2010.

Table 4 Total Projected Revenues and Expenditure 2008-2013

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Operating Revenues** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| Fees & Licenses | 14,233,137 | 15,656,450 | 17,222,095 | 20,613,688 | 24,929,675 | 30,475,118 |
| Sales & excise tax | 10,784,637 | 11,863,100 | 13,049,410 | 16,214,817 | 20,185,703 | 25,173,203 |
| Customs Fees | 1,356,923 | 1,492,615 | 1,641,876 | 1,772,733 | 1,914,020 | 2,066,567 |
| Income tax | 3,309,782 | 3,640,761 | 4,004,837 | 4,430,697 | 4,901,842 | 5,423,086 |
| Land & Building Tax | 1,113,952 | 1,225,348 | 1,347,882 | 1,606,387 | 1,914,469 | 2,281,636 |
| Lease Income | 1,935,739 | 2,129,313 | 2,342,245 | 2,815,610 | 3,384,643 | 4,068,677 |
| Others Revenues | 8,723,235 | 9,602,158 | 10,562,374 | 11,450,326 | 12,415,765 | 13,463,617 |
| **Total Revenue** | 41,463,404 | 45,609,745 | 50,170,719 | 58,904,859 | 69,464,116 | 82,951,903 |
| **Expenditure** |  |  |  |  |  |  |
| Total salaries, leases and allowance | 10,943,531 | 11,808,654 | 13,225,692 | 14,812,776 | 16,590,309 | 18,851,146 |
| Total Operating expenditure | 7,393,536 | 7,807,522 | 10,277,854 | 13,398,489 | 17,552,020 | 22,993,146 |
| Total transformation expenditure | 3,359,010 | 3,144,010 | 3,678,492 | 4,303,835 | 5,035,487 | 5,891,520 |
| Others expenditures | [246,000](mailto:+C49-@sum(C45:C47)) | [181,500](mailto:+C49-@sum(C45:C47)) | [171,430](mailto:+C49-@sum(C45:C47)) | [270,144](mailto:+C49-@sum(C45:C47)) | [329,576](mailto:+C49-@sum(C45:C47)) | [132,083](mailto:+C49-@sum(C45:C47)) |
| Total Operating Expenditure | 21,942,077 | 22,941,686 | 27,353,468 | 32,785,244 | 39,507,392 | 47,867,895 |
| Total Capital Expenditure | 29,076,550 | 31,850,670 | 34,098,461 | 36,868,032 | 39,755,687 | 42,933,754 |
| **Total Expenditure** | 51,018,627 | 54,522,356 | 61,451,929 | 69,653,276 | 79,283,079 | 90,801,649 |
| **Total Expected Deficit** | -9,555,223 | -8,912,611 | -11,281,210 | -10,748,417 | -9,818,963 | -7,849,746 |

1. Figure 4 illustrates the total operational expenses and total capital expenditure as well as the total revenues for the years (2004-2013). The percentage of capital expenditure reaches about 55% of the total expenses annually.



Figure 3: Total actual and forecasted budget of AZESA (2004-2013).

1. At present, all ASEZA's regulatory activities are funded from its own budget, that is, from funds received from economic activity in the Zone. This includes the operation of the Marine Park. However, ASEZA operates a polluter-pays policy, which requires those responsible for damage to the environment - including both accidental damages, and ongoing routine impacts, even if within legal limits -to contribute to its environmental management costs.
2. ASEZA has plans to set up an Environmental Trust Fund (ETF) which will provide support for management and awareness raising activities from monies collected from fines and compensation damages. In this way, ASEZA can leverage private sector support for the protection of the coastline, and there is private sector interest from local tourism and industrial actors in assisting ASEZA in this role. ASEZA has also received some significant donor support from international partners and donor agencies, including UNDP, GEF, USAID, and the EU. Some examples of specific grant-aided projects, which have assisted ASEZA in developing its capacity for environmental regulation include:

* The EU-funded program, entitled “The Institutional Support to the Aqaba Special Economic Zone Authority Programme” has provided technical assistance, infrastructure, equipment and training to ASEZA in the areas of tourism, environment and trade. Under the environment component, fully operational laboratories for the analysis of food, air and water have been established, as well as an environmental monitoring network. The environmental laboratory will enable ASEZA to identify, evaluate and control the potential environmental impact of industrial development in the area.
* The USAID funded program “Aqaba Technical Support Program” (ATASP) provided institutional and technical support to ASEZA. This included the establishment of the ASEZA’s Environmental Planning Department, the development of its regulations and procedures, and training and capacity building for the staff.
* ATASP also provided strategic planning assistance to ASEZA, and provided a review of the legislative and regulatory framework, including recommendations for development of additional legal tools.

1. The Finance Directorate is responsible for the accounting of all revenues collected. However, if revenues for special (excise) taxes and income tax are increased in favour of the Government of Jordan as planned after Fiscal year 2008 from 50% to 75%, (meaning that ASEZA will "retain" only 25% of shared revenues) the consequence is that ASEZA may not have the fiscal flexibility to satisfy future service levels or meet capital investment demand, ASEZA's own source revenue as a percentage of total operating revenue will increase as a result of its expected reductions in "retained" shared revenue. Any reduction of retained shared revenue plus any increases in operating and capital costs means that ASEZA will need to raise additional funds.

***Annual Revenue from Marine Eco-tourism***

1. ASEZA has a diverse operating revenue base that for the purposes of this report is summarized into the following categories: Fees and Licenses, Sales and Special Taxes, Custom Fees, Income Tax, Land and Building Tax, Lease Income and Others. Each commissioner is responsible for administering the collection of the tax or fee that falls within its jurisdiction. These revenues may be further defined as:
   1. Own Source Revenue - locally derived revenue exclusive to, and collected by, ASEZA including fees and licenses, lease income, custom fees, and other; and
   2. Shared Revenue - revenue shared between ASEZA and the Government of Jordan including sales and special taxes, income tax, and land and building tax. ASEZA has had the authority to raise own source revenue since it became operational in 2001.
2. The main environmental revenues (Table 5) for ASEZA are the environmental levies from violations to coral and oil spill and Marine Park activities such as camping fees, scuba diving license fees. The total annual environmental revenues amount to about JD 40,000 which represents only about 1% of the total operating revenues of ASEZA. Since in 2008, there was a lack of demographic, socio-economic and environmental data making it difficult to prepare scenarios based on more sophisticated econometric projections. This lack warrants the preparation of sensitivity analysis of ASEZA revenues and expenditures to help justify future revenue policy changes. Indicatively, as forecasted by ASEZA the revenue from environmental violations are expected to increase from JD 18,000 in 2007 to JD 32,000 in the year 2013 as a result of improved enforcement on one hand and increasing fines associated with the expansion of economic activities. On the longer run, with enhanced awareness and compliance, this source of revenue will be expected to decrease and only occasional and accidental environmental violations would generate revenue. As reported in the ASEZA strategic plan for the year (2007-2010) ASEZA will try to improve its revenue collection and reduce expenditures, thereby increasing its revenue allocation and that of the treasury, keeping the authority financially sustainable and helping to reduce the national budget deficit. Table 5 provides the actual (2007) and forecasted (2007-2013) revenue of Aqaba Marine Park, which is largely insufficient to meet management costs, resulting in a systemic deficit.

**Table 5 Actual & Forecasted Environmental Revenue from ASEZA budget Statement** *Source USAID (2008)*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Actual** | **Projected** | **Projected** | **Projected** | **Projected** | **Projected** | **Projected** |
| **Years** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| Environmental violation | 18,050 | 19,855 | 21,841 | 24,025 | 26,427 | 29,070 | 31,977 |
| Aqaba marine park revenue | 16,999 | 18,699 | 20,569 | 22,626 | 24,888 | 27,377 | 30,115 |
| Total Environmental Revenue | 35,049 | 38,554 | 42,410 | 46,651 | 51,315 | 56,447 | 62,092 |
| Total Operating Revenue | 37,634,004 | 41,463,404 | 45,609,745 | 50,170,719 | 58,304,859 | 69,464,116 | 82,951,903 |
| Percent Env. R/TR | 0.09% | 0.09% | 0.09% | 0.09% | 0.09% | 0.08% | 0.07% |

Table 6 Forecasted Revenue of Aqaba Marine Park

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Own-Current Revenues | 2009 | 2010 | 2011 | 2012 |
| Rental income properties | 3,000 | 3,000 | 3,000 | 3,000 |
| Revenue Marine Park Visitons Center Restaurant | 35,000 | 35,000 | 38,500 | 42,400 |
| Activities marine park revenues | 16,325 | 14,700 | 17,100 | 17,500 |
| **Total revenue and grants** | **54,325** | **52,700** | **58,600** | **62,900** |

1. A trend analysis prepared by USAID (2008) updated revenue and expenditure forecast; USAID indicates that the lack of demographic, socio-economic and environmental data make it impossible to prepare more sophisticated econometric projections. This finding warrants the preparation of sensitivity analysis of ASEZA revenues and expenditures to help justify future revenue policy changes.

***Annual Expenditure on Environment and Coral Reef Protection***

1. The cost recovery ratio is the amount of revenue compared to the cost of providing a service. A service is said to be self-financing if revenues equal or exceed the costs. If a service is not self-financing, then ASEZA must make up the difference, that is, provide a subsidy. If the full cost of a good or service is not recovered, then an explanation of ASEZA's rationale for this deviation should be provided.
2. Table 7 shows the annual expenditures by the Environment Commissioner and Aqaba Marine Park. The total expenditure by the Environment Commissioner is about JD 5.0 million. About 25% of the expenditures is related to salaries and labour allowances. More than 50% of the expenditures are operational current expenditures. However, about 32% of Total capital expenditure is financed from grants and assistance.

Table 7 Annual Expenditures on Environments and Aqaba Marine Park

|  |  |  |
| --- | --- | --- |
| **Annual Expenditures on Environment** | **Environmental Commission** | **Aqaba**  **Marine Park** |
| **Expenditures Items** | **2007** | **2008** |
| Total Salaries, Wages & Allowances | 1,313,370 | 280,465 |
| Operational Expenditures (Goods & Services) |  |  |
| Total Operational Expenditures | 1,016,123 | 332,161 |
| Social Security | 107,048 | 21,422 |
| Scientific missions and training courses | 9,018 | 1,379 |
| Subsidies | 43,862 | 120 |
| Rewards for non-staff | 18,461 | 100 |
| Retirement and compensation and (Provident Fund) | 3,771 |  |
| Total Transformation Expenditures | 182,159 | 23,021 |
| Other Expenditures | 141,523 | 33,188 |
| Total current expenditure | 2,653,176 | 668,835 |
| Total studies, research and consultancy | 105,280 | 0 |
| Total equipment, machinery and equipment | 31,060 | 821 |
| Total vehicles and machinery | 125,620 | 0 |
| Total Public Works and Construction | 225,626 | 31,499 |
| Total loans and contributions | 57,930 | 0 |
| Total processing and furniture | 20,961 | 1,490 |
| Total self-financed capital expenditure | 578,813 | 34,981 |
| Total studies, research and consultancy | 1,115,067 | 0 |
| Total Equipment and machinery | 711,631 | 0 |
| Total Public Works and Construction | 2,544 | 0 |
| Total capital expenditure via grants & assistance | 1,829,241 | 0 |
| **Total Expenditures** | **5,061,230** | **703,816** |

1. The total annual expenses of Aqaba Marine Park are estimated at about JD 704 thousand in 2008. More than 40% of AMP expenses are directed to administration cost, salaries and labour allowances. The total current expenditure reaches about JD 668,835. Table 8 shows the forecasted expenditure of Aqaba Marine Park. Total current expenditures are expected to reach JD 810,055 in 2011 whereas the total expenditure including the investment expenditure is forecast at JD 831,075.
2. Table 9 shows the annual financial gap of Aqaba Marine Park. The budget deficit is expected to decline in the future. However, the expected deficit is expected to reach JD 900,839 in 2009. This deficit is covered directly by ASEZA budget. The full cost of providing a service should be agreed as an objective in order to provide a basis for setting future fees. Full cost incorporates direct and indirect costs, including operations and maintenance, overhead, and charges for the use of capital facilities. The review of all current fee supported activities, training staff on cost finding techniques, costing out the service, determining the cost of service and determining if full cost pricing is consistent with ASEZA’s revenue raising policies is a priority.

Table 8 Forecasted Expenditures of Aqaba Marine Park (2009-2011)

|  |  |  |  |
| --- | --- | --- | --- |
| **Current Expenditure** | **2009** | **2010** | **2011** |
| Total salaries and wages and allowances | **296,895** | **318,809** | **336,391** |
| Total operating expenses | **294,056** | **351,576** | **368,742** |
| Total Transformative expenses | **31,252** | **32,872** | **33,936** |
| Other current expenditures | **61,461** | **66,034** | **70,986** |
| **Total current expenditures** | **683,663** | **769,291** | **810,055** |
| Total Supplies | **15,000** | **5,000** | **5,000** |
| Total Expenditures on studies & consultancy | **13,000** | **-** | **-** |
| Total equipment, machinery | **1,000** | **-** | **-** |
| Total vehicles and machinery | **35,000** | **-** | **-** |
| Total land & land purchases | **-** | **-** | **-** |
| Total Public Works and Construction | **195,000** | **-** | **-** |
| Total loans and contributions | **-** | **-** | **-** |
| Total processing and furniture | **500** | **1,500** | **1,500** |
| others expenses | **12,000** | **13,200** | **14,520** |
| **Total self-financed capital expenditure** | **271,500** | **19,700** | **21,020** |
| Total capital expenditure financed from grants & assistance | **-** | **-** | **-** |
| Loans and government contributions | - | - | - |
| **Total expenditures** | **955,163** | **788,991** | **831,075** |

1. As reported in the ASEZA strategic plan for the year (2007-2010). ASEZA will continue its procedures for auditing expenditures, revenues and accounting. Each directorate’s process will also be audited. Actual revenues and expenditures will be compared to estimated budget expenditures and directorates will be asked to explain deviations. This strategy depends on the submission and analysis of expenditure reports and documented work procedures for every financial process in ASEZA.
2. Despite the above, there is no available data related to direct expenses on coral reef protection. The administration cost and labor salaries, wages and allowance could be partially considered as direct expenses to protect the coral reefs.

Table 9 Forecasted Annual financing gap of Aqaba Marine Park (2009-2011)

|  |  |  |  |
| --- | --- | --- | --- |
| **Budget Deficit** | **2009** | **2010** | **2011** |
| Total revenue & grants | 54,325 | 52,700 | 58,600 |
| Total expenditures | 955,163 | 788,991 | 831,075 |
| Total revenue and grants | (900,838) | (736,291) | (772,475) |

## Production Sectors

1. The following section describes briefly the two main production sectors in Aqaba, tourism and fisheries:

***Production Sector - Tourism***

1. Tourism is of vital importance to the economy of Jordan. “It is the Kingdom’s largest export sector, its second largest private sector employer, and its second highest producer of foreign exchange. Tourism contributes more than USD 800 million to Jordan’s economy and accounts for approximately 10 percent of the country’s gross domestic product (GDP)” (National Tourism Strategy 2004-2010).
2. In order to support tourism growth, Jordan has invested heavily in infrastructure, especially roads and water supply, and this has led to the rapid and largely unplanned development of hotels and other facilities in some areas, with significant environmental impacts. It also threatens the sustainability of the industry as a whole, since the natural environment is the fundamental resource underpinning Jordan’s tourism.
3. Despite a decline in Arab and Gulf visitors, 2007 marked a year of steady growth for the tourism sector. Revenues jumped 13% to nearly JD 1.5 billion during the first 11 months, up from JD1.1 billion for the same period in 2006. The sector is overseen by the government's National Tourism Strategy (NTS), which was established in 2004 to take the industry through 2010.
4. The NTS aimed to double tourism revenues during the period and to increase tourism-related jobs to 91,719. The first goal has already been met but the second one might be more of a challenge: between 2004 and 2007 the total number of people employed in the sector rose from 23,544 to 35,484. This is impressive growth, but less than half the 90,000-or-more goal.
5. The NTS hopes to place Jordan as a boutique destination for high-end tourists. The strategy identifies seven priorities or niche markets:

* cultural heritage (archaeology);
* religious;
* ecotourism;
* health and wellness;
* adventure;
* meetings, incentives, conventions and exhibitions (MICE); and,
* cruises.

1. The Jordan Tourism Board's (JTB) marketing budget has increased in the past year from JD 6 million to JD11.5 million. These are positive times for tourism in Jordan, with steady growth and major projects in the pipeline. The sector has to make improvements in infrastructure and marketing, but overall the industry has been on an upward trend for the past several years.
2. Aqaba, bordering part of the Red Sea, is a primary tourist destination for attracting local and foreign tourists. Its potential has yet to be fulfilled. The major asset of Aqaba is its diverse tourist potential due to its unique location - at the border of desert and sea, and at the crossroads of two continents; interesting topography - mountains and deserts; world-renowned coral reefs; favourable climate - suitable for year-round outdoor activities; sandy beaches; a warm arid climate; and placid temperate waters. The lush coral reefs along the coast still unspoiled and close to the shore, are recognized as one of the prime diving locations in the world.
3. Most of the tourists in Aqaba hotels come from Western Europe, Americas, Arab countries; the main nationalities are Italy, U.S.A, Sweden, Germany, Belgium, France, Austria, Netherlands, U.K, Russia, Spain, Saudi Arabia in addition to Jordanian. The occupancy rate of 5, 4, 3 stars hotels is about (44%) with an average length of stay is 2.01 nights. The capacities of the hotels in Aqaba are shown in Table 10. Most of the visitors who came to Aqaba through the borders were from Poland, Germany, Italy, Belgium, France, USA, and U.K, Israel. The number of visitors to Aqaba is shown in Table 11.

Table 10 Capacity in Aqaba hotels (no. rooms, no. beds) in 2009

|  |  |  |  |
| --- | --- | --- | --- |
| **Aqaba** | **No. of Hotel** | **Rooms** | **Beds** |
| Five stars | 4 | 1193 | 2243 |
| Four Stars | 2 | 460 | 905 |
| Three Stars | 7 | 530 | 1063 |
| Two Stars | 11 | 665 | 1408 |
| One Stars | 8 | 180 | 426 |
| Under Classification | 9 | 919 | 1020 |
| Unclassified | 15 | 261 | 463 |
| **Grand Total** | **56** | **4208** | **7528** |

Table 11 Number of visitors to Aqaba

|  |  |  |
| --- | --- | --- |
| **Month** | **Number of Visitors 2008** | **Number of Visitors 2009** |
| Jan | 9217 | 14225 |
| Feb | 7584 | 14172 |
| March | 14844 | 17930 |
| April | 15690 | 19327 |
| May | 12763 | 18048 |
| Jun | 8145 | 12562 |
| Jul | 8517 | 8974 |
| **Total** | **76760** | **105238** |

1. Tourism investment is a major component of the ASEZ Master Plan, with an increase in tourism of 200% envisaged between 2006 and 2010. This will directly increase the pressure on the coastline, particularly the beaches, the Marine Park and the dive sites. Tourism facilities such as the Saraya and Ayla Tourism developments will require breakwater construction and some navigation dredging. These impacts will be discussed in more detail in the following sections.
2. Tourism projections for Aqaba are predicted to rise substantially in the medium term future. Table 12 below illustrates projections taken from Aqaba Tourism Marketing Strategy 2005-2010, illustrating a projected increase in tourism activity of 200% between 2006 and 2010. This would give rise to an additional load on local services and utilities, as well a corresponding increase on the load of the dive sites and beaches along the south coast.

Table 12 Tourism Targets to 2010 ('000 hotel nights per year).

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **2006** | **2008** | **2010** |
| Corporate | 100 | 168 | 260 |
| Wholesale (groups) | 320 | 490 | 720 |
| Individual Leisure | 60 | 182 | 420 |
| Domestic | 520 | 560 | 600 |
| **Total** | **1,000** | **1,400** | **2,000** |

1. Aqaba is now facing resurgence in its popularity as a destination for cruise liners. Arrivals to Aqaba on cruise ships witnessed a dramatic increase in 2007. The Aqaba port receives 106000 tourists from different nationalities; most of them arrive annually from European countries (mainly UK and Germany), with a larger incoming flow during the months of spring, particularly in the months of March and April, as well as in winter, mostly during November and December.
2. Aqaba has become one of the most desired destinations for this kind of tourism. Most of these ships dock for 2 days, during which passengers visit Aqaba. It has witnessed a great increase in tourist numbers, in comparison to previous years; 105 cruise ships, which made around 107 visits to the port of Aqaba, compared to 88000 visitors from 63 cruise ships during the year 2006, thus registering a 25% increase in the number of passengers. Economically, cruise liners have a great impact on Jordanian tourism sector, with an estimated income exceeding JD 6 million

***Laws and Regulations/Environmental Standards related to Tourism Sector***

1. At the level of the regulatory framework, the laws, regulations and bylaws that currently frame the licensing process of any project, demonstrate ASEZA’s focus on protecting and conserving the environment through EIA preparation and monitoring process.
2. From a voluntary compliance perspective, co-design/labelling standards and criteria concerning water, energy and waste management for tourism projects in particular are not available. Even though EIAs, through their environmental management plans are considering these options, there are limitations and restrictions related to monitoring of compliance during the operation phase.
3. New tourism eco-labelling and certification initiatives are initiated by the Royal Marine Conservation Society of Jordan (JRDES), which is currently working on two voluntary eco-labelling programmes through a steering committee comprising ASEZA and other stakeholders:

* Green Key is an eco-label for tourism facilities that aims to contribute to prevention of climate change and sustainable tourism by awarding and promoting good initiatives. The Green Key aims to change the practices and behaviours of tourism actors including enterprises, authorities, guests, local communities, and to involve them in increasing their responsibility towards their own environment. The Green Key programme started in 1994 in Denmark and was adopted in 2002 by the Foundation for Environmental Education (FEE) to become the fifth international programme. It has since spread to 12 countries and continues to grow.
* Blue Flag is a voluntary and exclusive eco-label awarded in 2008 to more than 3200 beaches and marinas in 38 countries worldwide. The Blue Flag works towards sustainable development at beaches and marinas through publicly awarding sites that meet strict criteria dealing with water quality, environmental education and information, environmental management, and safety and other services. A few of the issues covered in the criteria include cleanliness, provisions for waste management and recycling, zoning of activities, and environmental education activities for a variety of people. The Programme has also recently started a voluntary scheme for private boat owners called the Individual Blue Flag, which boaters can fly if they have signed and agreed to follow an environmental code of conduct. Since 1987 the number of beaches and marinas participating in the Programme has increased, despite toughening criteria. The criteria are updated as needed to keep abreast of new scientific findings, legislation, and generally to keep the campaign participants striving for ever better environmental quality.

***Tourism Market Strategy***

1. As reported in the ASEZA strategic plan for the year (2007-2010), ASEZA will seek to market tourism in the Zone through domestic and international marketing conferences, electronic publishing and twinning of Aqaba with foreign cities. To encourage tourists to extend their stay and return to Aqaba, ASEZA will improve infrastructure in the tourism sector and draw attention to the environmentally friendly aspects of tourism developments. ASEZA will analyze tourism indicators to develop additional strategies to achieve this goal and will encourage national organizations to focus on extending tourists’ stay in the Zone.
2. The Tourism Marketing Strategy for Aqaba (2005-2010) has three overall objectives:
3. To progressively re-position Aqaba as an international holiday destination as more quality, high yield product comes on stream
4. To broaden the awareness of Aqaba as a holiday base; as a quality diving centre; as a soft adventure destination; as a cruise liner port and a potential gateway to Jordan and the region
5. To increase the length of stay of visitors in Aqaba
6. This marketing strategy was built around four product clusters:
7. Rest, relaxation, beaches and boats
8. Diving
9. Soft adventure and touring
10. Aqaba as a Cruise liner destination
11. The brand identity for Aqaba, according to this strategy, is combining a relaxing Red Sea holiday with superb desert experience at Wadi Rum, and proximity to the magnificent Petra, aiming to increase bed-nights in Aqaba from 880,000 in 2003 to two million by 2010. This will support a doubling of hotel room supply with strong hotel occupancy and increased employment and visitor’s expenditure in the local economy.
12. The situation analysis of this strategy shows that in September 2004, Aqaba had 2125 classified hotel rooms, (4219 beds) spread over a range of accommodation, mostly in the mid to lower grades. Occupancy averaged 37 percent between 1999 and 2002, but increased significantly by 2003. Market research examining the image of Aqaba in overseas markets does not exist. There was probably little awareness of new resort product emerging.

***Number of Visitors and Growth Rates (Tourism Marketing Strategy 2005-2010)***

1. The following table (Table 13) shows the current numbers of tourists in Aqaba during 2008-2009 compared to 2004 figures; these numbers demonstrate a very confidant increase, which suggests that further tourism investments and developments are likely to take place in Aqaba during the coming years as previous investments prove economically viable and fruitful. However, this would need to be contrasted with the status of the corals and the general environment, and attribution of tourism improvement to these natural assets is yet to be confirmed. There is therefore a dire need to ensure that investment in tourism is guided by environmental considerations, contributes to the conservation or enhancement of these assets or at the least does not affect Aqaba’s resource base negatively.

Table 13 Hotel room categories and visitor numbers

|  |  |  |
| --- | --- | --- |
| **Category** | **2004** | **2008-2009** |
| Classified/Under Classification Hotel Rooms | 2,125 | 3,947 |
| Classified/Under Classification Hotel Beds | 4,219 | 7,065 |
| Occupancy Rate (3,4,5 star hotels) | 37% | 44% |
| Occupancy Rate (2 star hotels) | | 31% |
| Occupancy Rate (3,4,5 under classification hotels) | | 57% |
| Total number of visitors through charter flights (Jan-July)\* | | 56,934 |
| Total number of visitors through cruise ships (Jan-July)\* | | 52,345 |
| Total number of visitors to Wadi Rum Protected Area (Jan-July)\* | | 260,548 |
| Total number of visitors through diving centers (Jan-July)\* | | 18,140 |
| Total number of visitors who came through the boarders (Jan-July)\* | | 181,998 |

\*Main Nationalities are: Jordan, Italy, U.S.A, Sweden, Germany, Belgium, France, Austria, Netherlands, U.K, Russia, Spain, and Saudi Arabia.

1. The existing statistics are not enough to have a clear idea on the existing volume of tourism in Aqaba, especially the local Jordanian visitors’ numbers and activities. Indeed, the only site that is admitting visitors’ fees, which is the Marine Science Station (MSS), does not have a record for the visitor’s numbers and information.

***Aqaba Development Projects***

1. Aqaba is currently witnessing a number of mega projects that include the re-location of the main port area into the Dirreh Boarder area with Saudi Arabia, the expansion of the containers terminal, new resorts, hotels, lagoons, housing areas, towers, ferry boat terminals creation and re-location and other major development projects. Given that these mega projects have a considerable sensitivity to environment conservation issues and local community development, they were all subjected to detailed environment impact assessments and involved in the “Local Social Responsibility” initiative that is supporting schools, scholarships and other community-based developments. The major tourism and real estate projects currently underway in Aqaba are provided in Table 14.

Table 14 Major tourism developments (underway and completed) in Aqaba

|  |  |  |
| --- | --- | --- |
| [Raya Sea Side Residence](http://www.aqabazone.com/index.php?q=node/499) | [Flamingo Hotel](http://www.aqabazone.com/index.php?q=node/349) | [Golf Courses Hotel (Tala Bay)](http://www.aqabazone.com/index.php?q=node/340) |
| [Yemeniya Heights Residential Development](http://www.aqabazone.com/index.php?q=node/343) | [Domina Inn Hotel](http://www.aqabazone.com/index.php?q=node/348) | [Movenpick Hotel Tala Bay](http://www.aqabazone.com/index.php?q=node/339) |
| [Aqaba Oasis](http://www.aqabazone.com/index.php?q=node/495) | [Tala Hills (Al Hidab)](http://www.aqabazone.com/index.php?q=node/347) | [Marina Plaza Hotel (Tala Bay)](http://www.aqabazone.com/index.php?q=node/338) |
| [Al Maabar Jordan Real Estate Development Company "Marsa Zayed"](http://www.aqabazone.com/index.php?q=node/491) | Mansion Hills | [Radisson Blu Hotel (Tala Bay)](http://www.aqabazone.com/index.php?q=node/336) |
| [Palm Hills Hotel & Residence](http://www.aqabazone.com/index.php?q=node/346) | [Red Sea Resort](http://www.aqabazone.com/index.php?q=node/345) | [Ayla](http://www.aqabazone.com/index.php?q=node/117) |
| [Yemeniya Heights Beach Club](http://www.aqabazone.com/index.php?q=node/344) | [Tala Bay](http://www.aqabazone.com/index.php?q=node/438) | [Kempinski Hotel](http://www.aqabazone.com/index.php?q=node/115) |
| [Tala Bay Marina (Tala Bay)](http://www.aqabazone.com/index.php?q=node/342) |  | [Saraya Aqaba](http://www.aqabazone.com/index.php?q=node/113) |
| [Marriot Hotel (Royal Yacht Club)](http://www.aqabazone.com/index.php?q=node/351) | [Coral Bay](http://www.aqabazone.com/index.php?q=node/352) | [Hilton Hotel (Tala Bay)](http://www.aqabazone.com/index.php?q=node/337) |
| [Intercontinental H](http://www.aqabazone.com/index.php?q=node/350)otel | [La Alcazaba](http://www.aqabazone.com/index.php?q=node/353) |  |

***Tourism Activities***

1. When it comes to attraction and activities, diving is one of the main tourism activities in Aqaba and its main attraction is coral reef viewing; there currently are 10 dive centres with 21 diving locations (Figure 5). It is agreed that one of the important dive locations is at the same location of the new port area at Dirra borders between Jordan and Saudi Arabia. Another challenge to the diving activity is the development of new resorts and mega tourism projects with private beaches, which has restricted the direct accessibility of some of the diving locations through the shore and would force dive centres to use boats to be able to reach these sites.
2. Glass Boat tours have been one of Aqaba’s main tourist attractions for a long time, privileged by both local and international tourism. This activity is now practiced by a large number of boat owners who are fully or partially dependant on this profession, which is in its own terms dependant on clean beaches and healthy coral reefs. Even though the glass boaters association has received funding projects for the last 10 years to develop the boats and qualify the workers and owners, this activity is facing organizational and operational challenges for many reasons, one of them are the mega tourism projects that is either prohibiting them from practicing their work on their beaches or by decreasing the locations available for them to park their boats.
3. Regarding local tourism and as Aqaba is the only sea front of Jordan and declared as a special economic zone, the city became a major tourism destination for Jordanians coming for vacation and shopping. This can be clearly seen during the public and national holidays, where thousands of Jordanians visit the city and use its public facilities including its beaches and gardens, causing pressure mostly on waste management systems and littering beaches.
4. A new nature-based tourism activity is emerging through the Aqaba Birds Observatory (ABO); this initiative is connecting the private sector to governmental plans for tourism and development as well as involvement of local communities in the development aspects. This project is managed through the Jordan Society for Sustainable Development (JSSD).
5. The ABO is situated in the relatively dense vegetation and open ponds at the waste water treatment plant, which attracts hundreds of thousands (possibly millions) of more than 350 different species of migratory birds every spring and autumn. ABO aims at maintaining and preserving a critical stop-over for migratory birds, in addition to expanding ecotourism, increasing overall public awareness on environmental issues, scientific monitoring and research to create database for birds and their migration and to open the doors for future similar endeavors.
6. The ABO is the first specialized observatory for birds in Jordan and it attracts so far some specialized bird watching groups over specified seasons of the year, but still, it is not promoted enough to the public, since it is situated close to the border area and a special permit is required to access the site.

Figure 4: Dive sites in the Aqaba Marine Park (from www.aseza.jo).



***Aqaba Marine Park***

1. In 2001, a 7 km length of shoreline was designated as a protected marine reserve (Figure 5). The Aqaba Marine Park was established to conserve and manage the natural near-shore marine environment of Aqaba's South Coast with its rich biodiversity, while allowing for certain tourist uses at sustainable levels. Visitors benefiting from the Aqaba Marine Park include beach goers, swimmers, snorkelers and scuba divers.
2. Within the Aqaba Marine Park, there are zones encompassing the various permitted activities;

* A strict reserve zone to preserve marine communities in their natural state.
* Beach recreation and swimming zones allowing for safe beach recreation, where sunshades but no other permanent structures are permitted.
* Boat access corridors providing for safe boating passages
* Diving and snorkelling zones permitting safe observation of marine life.
* Bait fishing zone limited to the shore, and conditional upon possession of permit.

1. Fishing and harvesting of any form of living or dead marine flora and/or fauna in any form, commercial or recreational is not permitted within the Marine Park. This includes the collection of seashells, coral, bivalves and echinoderms as well as all forms of fishing (i.e., by nets, hooks, spear-guns or fish traps). The only fish collection activities permitted within the Park are bait fishing (by permit only) and scientific collection.
2. The Aqaba Marine Park Regulation No. 22 issued in 2001 sets out the perimeters of the Marine Park and its aims. It describes the formation and structure of the committee responsible for establishing the Park's policies, preparing annual administration plans, defining financial allocations necessary for the Park, issuing administrative, financial and technical instructions, and any other functions required. It also stipulates a number of prohibited actions and activities, which may result in the destruction, damage or deterioration of the natural environment of its wild life or affect the aesthetics of the area.
3. In addition to the reserve area, there is also a visitor's centre which can facilitate education and outreach programs. Activities include displays, lectures, and slide shows in addition to focused marine activities. The visitor centre includes an auditorium, 4 exhibition halls, gift shop, reception area, rest room facilities and a restaurant. Also in the Park are four facilities offering services, including the Marine Science Station, camp sites, the Royal Diving Club - catering for a maximum of 60 divers per day, and also offering snorkelling access, and Club Murjan - a club affiliated with the Al-Cazar Hotel. The Aqaba Marine Park is home to 10 of the 13 dive sites in Aqaba. Periodic clean ups of the coastline in the Marine Park are also performed.
4. Aqaba Marine Park is managed according to a management plan that was issued on 2002. Currently the Park is playing a set of roles including monitoring of any law violations on the beach and seas side area within the boundaries of the park, enforcement of related regulations, tourism activities and services, awareness raising of visitors and local community. Nevertheless the Park and other parts of the southern public beach are facing growing pressure stemming from the unregulated number of visitors, while the park is not financially sustainable, as the planned entrance fees system is not enforced. Most notably, the Park lacks a business plan which would enable it determine entrance fee levels that would contribute to its management and is rather dependent on ad hoc financial subsidies from the ASEZA rendering the Park itself a burden rather than an asset.

***Tourism impact on biodiversity***

1. As the planned mega projects and other future developments on the overall coastline are completed, they are expected to reduce the area of available beaches and focus the visitors more on the beach managed by the Marine Park. As a consequence, visitor pressure on the coastline in particular is expected to increase in concentration areas, requiring additional management, enforcement and resources for public areas, and proactive engagement through voluntary incentives with the private sector managing privatized beaches.
2. This growing tourism movement and development will demand and consume water and energy while producing all sorts of waste. While ASEZA is applying the response hierarchy to environmental impact assessments, there are a number of constraints and limits to its application: (i) EIA studies are considering water and energy consumption, however, it is unclear how these will be monitored; (ii) in cases where offsets are considered, the offset value is not necessarily derived from an in-depth economic and financial assessment, but rather determined by the law set in 2001; (iii) enforcement of environmental management programs remains voluntary and there are limited resources available for monitoring and enforcement post-construction and operation.
3. Waste management is supervised by the city services centre and operated by private sector companies. Whether current waste management sites such as the treatment plant and the landfill areas would be enough to handle waste generation from the foreseen investments in still unclear. Similarly, the idea of reuse and recycling was assessed by ASEZA and deemed not feasible so far, since the quantity of wastes is not large enough for such investment from the private sector point of view, even though it is accepted to have a positive impact to the environmental image of Aqaba. Physical and chemical pollution generated from solid waste, wastewater and chemical decomposition of waste poses a serious threat both to biodiversity at hand and to the achievement of tourism ambitions in Aqaba. This is one of the areas that requires investment and resources for planning, enforcement, implementation and monitoring as part of a broader environmentally friendly shift of practices within the sector.
4. Tourism impacts on biodiversity are equally expected to rise, specifically with impacts on turtle nesting on sandy beaches to be constrained through infrastructure and resort development on the beach, direct impact on species from pollutants produced by solid and wastewater, impacts on corals from dredging, changes in water circulation patterns and mooring.
5. Additional impacts such as potential introduction of invasive species from increased transport are also likely to occur, however this aspect is dealt with through Jordan’s participation in the GEF International Waters project – Globallast where Jordan is one of the actively participating countries.

## Production Sectors - Fisheries

1. With a limited coastline, marine fisheries in Jordan are necessarily relatively limited in overall scope. Total reported capture production of marine fish (predominantly consisting of tunas and mackerels) from 1950 to 2006 is just 5311 t. Over the nine year period from 1998 to 2006 (when records appear most accurate), average annual capture production of marine fish was 149.6 metric tons (FAO databases). Figure 7 illustrates annual capture production for the 40 year period from 1967 to 2006.

**Figure 5: Annual capture production from 1967 to 2006 (FAO Fisheries database).**

1. This production is harvested by approximately 80 professional fishers operating from small, outboard equipped vessels. A variety of fishing methods are employed, including gill nets (4 boats; see Figure 7), traps (15 boats), line (13 boats), among others (20 boats) and operations are limited to daylight hours (Cross 2006). With no processing facilities in Jordan, the fish are landed fresh, gutted and sold locally.



Figure 6: Fishers setting nets, Aqaba September 2009 (also illustrating cargo ships at anchor in the upper Gulf and tourist boats on the shoreline).

1. Cross (2006) reports that there are also approximately 200 other fishers that work over the winter months (December to March) to supplement their income from other sources. This catch goes unrecorded, but as their activities occur during the most productive time of the year (Cross 2006) the catch may be significant in the overall context of Jordanian sea fisheries.
2. The viability and activity of this sector is closely tied to that of the tourism sector, due to a strong demand for fresh fish and seafood. The projected increase in tourism and visitation rates will most likely translate into an increase in fish catch and seafood collection to satisfy the requirements of high end tourism. The sustenance of natural coastal areas and coral reefs therefore becomes critical as they provide the required spawning grounds for edible species. While immediate term impacts from changes in fishing practices – currently only artisanal - are not expected, developing the capacity of ASEZA to address potential changes in fishing practices on the long-term and engaging with fishermen in the immediate term will be necessary from a preventative perspective.
3. In order to meet its development and economic objectives on the long run, ASEZA recognizes that investments in the key natural asset of the Gulf are absolutely necessary. This is the basis for requesting technical assistance that would support ASEZA in providing a model for Special Economic Zones in Jordan and worldwide, where critical ecosystems are preserved and the hierarchy of impact assessment implemented and monitored to sustain economic activities underpinned by ecosystem function and keystone species.

## Threats and root causes

1. The Jordanian coast is relatively small and represents the only marine access of this country. Thus, coastal activities are concentrated in a limited area subjecting the coast to considerable and conflicting resource pressure. Such activity includes tourist facilities (hotels, resorts, ecotourism activities), a variety of port developments, an industrial complex, a marine park and a marine science station. This situation puts the coral reefs under continuous direct and indirect pressure throughout the year because of the even water temperature. The development of new port facilities and the expansion of existing ports are expected to extensively damage the coral reefs in the vicinity. In addition, accidents and illegal activities produce damages to this sensitive environment and with the planned expansion of development, tourism and economic ventures, such damages are bound to increase.
2. As Jordan’s sole seaport, the vast majority of all consumer goods and foodstuffs for the country are shipped through the area and it is thus a vital trade route. The thrust and attention given to Aqaba as one of the engines of economic growth in the country has almost led to a doubling of the population with demographic pressure projected to steadily increase in the coming few years. The current total population of approximately 100,000 persons in Aqaba city alone is projected to increase by more than 50% to an estimated 160,000 in 2020.It is inevitable that this increased demographic pressure will translate into biodiversity impacts, unless well managed and such impacts are curbed as and when possible. These impacts are most likely to translate into reduced open areas and sandy beaches as they are transformed for construction purposes. With increased residential and commercial areas, both solid and liquid waste disposal, unless appropriately managed, will result in higher pressure on the coastal and marine resources.
3. Fishing pressures, particularly from sport fishers using harpoons, have not yet had major negative impacts on populations of fish, it should however be monitored particularly for fish that favour these reefs. The fact that some species tend to spawn in large aggregations, returning regularly to the same locations, makes them particularly vulnerable to fishing impacts. There is also an artisanal Jordanian fishery in the Gulf of Aqaba which to date has not yet been proven to have significant negative impacts on marine ecosystems of the Gulf.
4. Concerns revolve around the drainage of excessive levels of nutrient load into the confined system leading to oxygen depletion (anoxia) and subsequently resulting in indiscriminate mortality of all forms of aquatic fauna. While agriculture along the coast is still minimal, there is limited understanding of the groundwater dynamics in this area, and means through which non-point source pollution may end up in the marine system. Currently, the gulf is already affected by discharges of sewage from settlements, beach houses and tourism complexes, with similar impacts such as anoxia and corresponding mortality of aquatic fauna. The implications of these diverse forms of water contamination vary in severity, depending on the volume involved and the amount of water circulation that occurs: for this reason, they tend to be particularly significant in water bodies with limited currents and water circulation, such as the Gulf of Aqaba.
5. The home to some of the most northern, diverse and readily accessible coral reef in the world, the area is also the focus of a burgeoning eco-tourism industry. Several large scale tourism developments already underway and projected to occur in the near future in the area (an estimated 50% of future investments in the Aqaba Special Economic Zone [ASEZ] will come from tourism) will also add to resource pressure. The elevated sediment loads issuing from the various rivers that empty into the area, due to land management practices upstream that cause erosion, result in choking of corals, together with increased water turbidity that reduces rates of photosynthesis. As with mangroves, estuaries and coastal lagoons, high nutrient loads in these water courses lead to anoxia in these coastal waters, resulting again in mortality of coral and associated fauna. Coral reefs are also subject to physical damage: dredging carried with the intention of establishing marinas; fishers and other boats anchoring on the reefs breaking off pieces of coral colonies; and extraction of corals for sales to tourists, as souvenirs and other artefacts.
6. Add to this the propensity for marine areas the world over to be used as disposal sites (both inadvertently and intentionally) by a variety of users and the potential for resource conflict is high. A proposal to expand and move port facilities to areas of particularly high conservation value near the international border with Saudi Arabia has added urgency to the project.
7. As a result, reefs in Jordan are among the most threatened in the Red Sea because they are shallow, easily accessible, and adjacent to a major population and industrial centre. They are suffering from a combination of factors common to reefs worldwide, that includes sedimentation caused by construction, algal overgrowth due to nutrient enrichment from sewage, physical damage from divers, boats and other recreational activities, and pollution from toxic industrial waste. Corals cover an estimate 4Km2, with average coral cover of 50% or less, and soft corals represent 2-5% of the total reefs depending on the seasons and locations. Soft coral (often a sign of stress) are more abundant on reefs adjacent to industrial areas than on those in less impacted areas, although as yet there is relatively little coral mortality[[1]](#footnote-1). The reefs fronting the industrial complex also have 50% fewer coral reef fish, a greater proportion of herbivorous and detritivorous fishes, decreased total abundance of invertebrate- and fish-feeders, and increased relative abundance of planktivores compared with undisturbed reefs. Corals under such stresses are vulnerable to disease, which is being recorded more frequently, particularly on these disturbed reefs3.
8. When the rate of coral damage exceeds natural recovery rates, the potential net result is a decline in total coral cover and decreased health condition of the coral communities. It is therefore becoming important to carefully manage coastal activities in order to maintain the coral reefs in the Gulf of Aqaba. The major processes and ensuring threats are summarized in Table 15 below and include the following:
9. The rapid rate at which the development of Aqaba’s coastal areas is occurring, and, in some cases, the lack of comprehensive marine ecological studies conducted to assess and monitoring the potential negative impacts of these developments. Furthermore, while an environmental impact assessment (EIA) is produced for many new development projects, the regulator (ASEZA) appears to lack the capability to monitor the effects and mitigation efforts of the development. Alternatively, some development projects appear to have only to pay a compensation cost to the regulator, rather than actively carrying out mitigation activities to maintain or repair the damaged environment.
10. The need by the regulator (ASEZA) to attract investments that may exceed the capacity of the coastal area. In addition, it may not be possible for the marine environment to recover from or be protected against these effects (i.e., reclamation, dredging activities).
11. The lack or limitation in public awareness towards the ecological significant of the coral reefs and the marine environment of Aqaba. There appears to be limited awareness of marine environmental issues amongst several groups including tourists (local and international), people involved in coastal development projects, and among many of the decision makers within the regulating body in Aqaba (ASEZA).
12. Some sections of the Jordanian coastline are inaccessible for conducting baseline or monitoring environmental studies, or for restoration or conservation programs. As a consequence, conservation opportunities may be lost or gone unrecorded in these areas.
13. The lack of funding to carry out major rehabilitation or conservation programs, or for clean-up campaigns in areas that face continuous accumulation of solid waste.
14. The limited implementation of laws, bylaws and regulations for coastal development projects, and the lack of transparency concerning the identification of impacts and mitigation measures for large developments.

Table 15 Practices with negative implications for biodiversity

|  |  |
| --- | --- |
| Practice | Biodiversity implications |
| Anchoring | Physical destruction of corals (soft and hard) |
| Dredging for construction | Physical destruction of corals and choking of fish |
| Infrastructure development on sandy beaches | Loss of nesting ground for marine turtles and other marine species |

1. Despite the above, many of the required components to effect good coastal management are in place in the administrative area, the Aqaba Special Economic Zone (ASEZ), including:

* A Master Plan for Development;
* A Land Use Plan;
* A strong regulatory basis for pollution control and environmental impact assessment;
* The 2001 Environmental Protection Regulations;
* A policy of zero discharges to sea;
* A coastal management regulatory body in the form of the Aqaba Special Economic Zone Authority (ASEZA);
* A marine park comprising three protected reserves and multi-use zones, and,
* Monitoring programmes for water quality and coral reef health.

1. Similarly, several voluntary initiatives to sanction and reward the ecological performance of the hotel and tourism industry have been started, although with little success or uptake so far. Noteworthy is also the fact that the marine park, which lacks resources for effective management, is currently the only mechanism that directly addresses biodiversity conservation.

## Long term solution

1. The long term solution to the threats facing the biodiversity values of the coastal and marine zone of Aqaba would be for the tourism sector to internalize biodiversity as an asset and value, and for economic and infrastructure development to take into account the sensitivity of the ecosystems while meeting national objectives and remaining economically viable. This shift in investment and decision making would be supported and governed by a combination of regulatory compliance and incentive-based voluntary mechanisms tailored to the specificities of the site, sectors and socio-economic profiles of the Gulf. Feedback loops from a robust information management and monitoring system would enable the adjustment of policies and mechanisms in such a way that the balance between ecosystem resilience and socio-economic development is maintained.

## Barrier Analysis

1. As exemplified above, the ASEZA has set out to invest significantly in its economic development. Yet, this development is planned to take place in Jordan’s unique marine outlet, which sustains biodiversity of significant national and global importance. The purpose of this project is therefore to mainstream the integration of biodiversity considerations into the deployment and implementation of the ASEZ economic development plans, therefore securing the conservation and sustainable use of this biodiversity.
2. Despite a generally robust policy, legal and institutional framework, environmental concerns are still overrun by development prerogatives, in particular as these are driven by the private sector which is generally well resourced and quick. The section below outlines the barriers that may inhibit the achievement of the desired long term situation and effective mainstreaming of marine biodiversity conservation in the ASEZ.

## Institutional Barriers

1. The potential for effective, integrated coastal zone management that incorporates the principles of marine biodiversity conservation in the ASEZ is relatively high. With a single point of environmental management in the ASEZA, there are relatively well developed structures in place for biodiversity conservation generally. While enthusiasm for the programme appears to be high within the personnel of the ASEZA, few technical staff remain within the institution following the changes that occurred in 2010. There is therefore a need to (i) bring in expertise during the lifetime of the project as a stop-gap measure; (ii) develop individual and institutional capacities for the long-term institutionalization of knowledge.
2. The ASEZA administers an Environmental Trust Fund (ETF) which can be used to finance environmental projects such as this project, biodiversity offsets or other needs. The ETF is mainly capitalized through collected penalties and offsets ensuing impact assessments. It should be noted that the hierarchy of impact mitigation is applied by ASEZA, following the avoid, reduce, mitigate and offset approach. While this holds true in the review and approval of permits, the situation is slightly different when it comes to enforcement and monitoring once operations start. The ETF is a relatively new construct and the terms of reference (TOR) for this fund are currently under development. A key institutional/policy gap is therefore the development of an appropriate TOR for the use of this fund, an objective basis for determining levels of offsets and fines, as well as a mechanism for the deployment of funds and tracking their impacts.
3. Limitations on internal communications within ASEZA are a potential barrier to the success of this project. A critical requirement for success is therefore establishment of a working group or committee within ASEZA which is empowered and is publicly mandated to drive the project forward from an official level. During the preparatory phase steps have already been made to establish this committee which will be completed by the start of implementation of the project.

## Policy Barriers

1. The policy and planning environment governing ASEZA is relatively strong overall. There is an overall Master Plan, Land Use Plan, Zero Discharge Policy and Environmental Protection Bylaws which both constrain and promote development in the area. The EIA permitting process is also a key component of the policy framework. Key points for action to overcome potential barriers to success include:

* The Master Plan is the guiding document for development in the area, but may be out of date- updating this plan to incorporate coordinated marine biodiversity protection is critical for success.
* The plan for managing the Aqaba Marine Park (administered by ASEZA) is likewise several years out of date and requires updating to cope with burgeoning visitor numbers; a business plan to guide investments, management effectiveness and fee setting policy was never developed and would be needed to enhance financial management and returns from the park.
* A policy of improving public participation in the EIA is required. There are currently opportunities for public input at the scoping and review stages of large projects, but the means by which the public are notified of development applications, and therefore the level of public participation at these meetings is unclear and could be enhanced for further transparency.
* The multi-use zoning policy that has been implemented in the Aqaba Marine Park has permitted some development to occur within the park boundaries (e.g., Tala Bay Resort, the temporary Ferry Terminal). Policy clarity is required in terms of permissible developments and boundaries of the park.
* Policies aimed at environmentally friendly development (e.g., eco-tourism) are lacking; similarly incentive and performance systems could be upgraded to include environmental parameters and ecosystem health as overarching performance indicators for ASEZ.

## Legal and Regulatory Barriers

1. The EIA process is the key regulatory instrument for approving/constraining development. The process is well constructed and administered by the ASEZA Environment Directorate (ASEZA-ED). The process consists of a number of steps, dependent upon the scale of the development. Small scale developments which are deemed to have low impact and meet existing environmental standards may receive an Environmental Permit readily. Larger developments may require some additional consideration from the proponents before they are permitted, possibly with conditions attached. Finally, very large scale developments will require a full EIA, conducted by approved consultants, which is subject to an extensive period of scoping and review before approval may be granted (with or without conditions).
2. Environmental permits can impose conditions on development. Once the permit is obtained and a development is completed it is apparently possible, however, for the operator to unilaterally amend operational conditions as long as environmental laws and bylaws are not broken (e.g., levels of water use, building heights or other operations potentially affecting the environment may be greatly and readily altered with no official re-permitting required). Thus the regulatory process must be strengthened to provide for ongoing verification of large developments and assessment of operations.
3. A more rigorous application of existing environmental regulations pertaining to the environmental assessment process is required. The regulatory environment is itself theoretically robust. Additional emphasis may, however, be required on the implementation of regulations (e.g., notification of the public, incorporating stakeholder submissions) and improving monitoring of required measures.
4. Aside from regulations relating to the Zero Discharge policy, environmental guidelines for development in the coastal zone are lacking. Guidelines covering allowable or restricted activities such as breakwater construction, coastal armoring, dredging, habitat removal, use of seawater and similar intrusive activities would assist in the effective planning and regulation of coastal developments.

## Technical Implementation Barriers

1. The key technical barriers stem from the lack of expertise and experienced personnel for implementing the coral transplantation programme (Coral Reef Protection project component). The scope and workload associated with this component is high and available time for implementation is limited. While expertise is present among Jordanian nationals, the limited timeframe may require additional expertise to be sourced internationally to assist with implementation.
2. A critical factor of success relates to the management and interpretation of geospatial data associated with the Coral Reef Protection project component. Currently technical capability and capacity in this regard is limited, so extensive upskilling and technical investment is required. Related to this is a need for detailed habitat maps, illustrating biological community composition of the coral reefs.
3. Some specific technical barriers particularly at the individual level include the following:

* Lack of appropriately trained personnel at the Marine Park with capacity in marine spatial planning and spatial information management
* Need for an appropriate MIS for marine geospatial information
* Pollution control equipment and analytical capacity to correlate the status of coral with pollution sources and types are not readily available, nor is individual expertise to analyze it
* Enforcement of Environmental Impact Assessment and monitoring permit conditions
* Information gap which impedes integrated management of the coastline.

## Sector and Market Barriers

1. Currently the tourism policy is aimed at promoting the experience of the ‘Golden Triangle’ destinations of Aqaba, Petra and Wadi Rum. As discussed above, the ASEZA tourism market strategy does list as one of it aims to broaden the awareness of Aqaba as a quality diving centre. There is recognition among some stakeholders that ecotourism initiatives, including a focus on environmental awareness and so-called ‘eco-labelling’ of facilities and locations, could be of economic as well as biodiversity benefit. It is not clear, however, that this recognition extends across the tourism sector. There are a few private sector entities willing to champion such eco-friendly facilities, and the strategy would aim at starting with these champions to subsequently expand reach.
2. An identified critical success pathway would therefore include updating the tourism policy to facilitate promotion of activities and destinations with positive (or less damaging) effects upon the natural environment. Activities would need not focus solely upon the seashore itself, but also include nearby areas and features (e.g., bird watching, mountain hiking, camping) which would serve to alleviate tourist pressure on the marine environment, as well as create new economic opportunities.
3. Given the determinant role of private operators in this sector, a mix of command and control combined with incentive and voluntary measures is critical to achieve a certain level of success. This is one of the key thrusts to be brought by the project and the GEF funding, in particular through the transfer of successful experiences globally and transposing them to the Jordanian context.
4. In order to render environmentally friendly investment the mainstream choice, appropriate knowledge constitutes a necessary pre-requisite. While generally acknowledged as an option, the value of environmentally friendly developments and services needs to be clarified in order to help make a ‘business case’ for such developments. Such a business case is based on the premise that investing in sustainability strategies or ‘attractions’ can, when implemented effectively, improve the financial bottom line of a company while simultaneously contributing to enhancing environmental performance and notably biodiversity conservation. Such a business case is reliant upon the environment that the business operates in, the nature of the consumers and government legislation/regulation. Furthermore, at a macro level, a similar business case is required to inform ASEZA of the short versus long-term benefits and trade-offs of different development pathways, which would fully incorportate opportunity costs and value of corals and the ecosystems they sustain.

1. Barriers to making environmentally friendly investments therefore include:

* Knowledge of the economic value of the resource;
* Estimates of the ‘carrying capacity’ of the local environment to provide tourism and other economic services;
* An appropriate regulatory framework which promotes environmentally friendly investment;
* Acceptable means by which environmentally friendly developments or ventures can be financed –either by regulatory agencies, developers, other users, tax incentives; and,
* An obviously coordinated approach to tourism/ecotourism in the ASEZ.

## Awareness and information barriers

1. A key feature in the process of obtaining an Environmental Permit under the current legislation is in conducting an appropriate scoping exercise early in the process. Stakeholder representation on the scoping committees is currently by invitation only. Wider public notification of developments is required in order to create a robust participatory process which would enable early alert and feedback into the permitting process. There is likewise limited or inconsistent communication by ASEZA with NGOs regarding submissions made on EIA reports and work plans. Communications between the commercial subsidiaries of ASEZA (e.g. ACT, ADC) and external bodies also necessitates additional systems and streamlining.

## Baseline Analysis

## Policy Setting

1. ASEZ was envisaged as a private sector-driven development initiative that maximizes private sector participation in duty free, tax-advantaged and flexible regulatory operations providing a model approach to environmentally sustainable development and governance, a unique tourist destination on the Red Sea with a high quality of life (ASEZA, 2006). ASEZA is the financially and administratively autonomous institution responsible for the management, and regulation of the ASEZ which is governed by six ministerial-level Commissioners each responsible for a major area of regulatory or operational activity. Generally speaking the regulatory baseline with regards to environmental management is strong from a command and control perspective, however lacks the incentive systems and structures, enforcement mechanisms and information basis to supplement and guide policy making.

## Baseline institutional capacity in information management

1. Institutional capacity for managing complex geospatial/seascape data is limited within ASEZA. The GIS unit is currently focused upon providing geospatial data relating to the provision of municipal infrastructure (e.g., water, wastewater and electrical utilities, roading, parks). Some capability for incorporating relevant management layers (e.g., marine park zoning) is available but currently is under-utilized. System software (e.g., ArcGIS, MapInfo, GRASS or similar) relating to managing geospatial environmental data needs upgrading with associated staff upskilling in order to both populate the GIS databases and utilize the information for effective coastal management.
2. An effective global information management system (Microsoft Sharepoint) for use within ASEZA (an intranet) is currently being implemented. This system will permit wide-scale sharing of the available information, which will facilitate effective management decisions. A proposal to convert this intranet to permit internet (outside ASEZA) access is currently under consideration. Physical capacity for storing the additional information which arises from this project is not (apparently) unduly limited. A more detailed IM capacity analysis will be required at the outset of the project in order to accurately assess the baseline condition.
3. Cooperation and coordination from an institutional standpoint is on-going, triggered particularly by ASEZA’s open and participatory approach. Collaboration is underway with many of the stakeholders identified in the stakeholder analysis, however in an ad hoc manner. In order to increase effectiveness and transparency, more structured and systematic approaches to public consultation and stakeholder engagement are required, as well as enhanced communication within and outside the Authority to enable efficiencies and balance conflicting views and perspectives.

## Baseline environmental setting- the Gulf of Aqaba

1. The Red Sea is one of the most saline seas that has direct links to the ocean. As a result of high evaporation and low volumes of freshwater input, salinity ranges, on average, from 36 ppt near the Indian Ocean to more than 40 ppt in the north (Fouda 1998). The Red Sea reaches significant depths and has an efficient water circulation pattern. These factors coupled with the fact that the Red Sea water mass exchanges its water with the Arabian Sea and Indian Ocean via the Gulf of Aden, reduce the effect of high salinity caused by evaporation and cold water in the north and relatively hot water in the south. Furthermore, the Red Sea is unique amongst deep water basins for having a stable warm temperature (of about 21.5°C) throughout its deeper waters. The mechanism that maintains this situation appears to be driven not only by winds but also through density gradient (Fouda & Gerges 1994).
2. The marine environmental conditions within the Gulf of Aqaba and the wider Red Sea area will likely moderate the potential effects of climate change on coral species. The Gulf is at the northern-most distribution range for tropical corals where sea temperatures do not typically exceed 27°C in the summer (Rosenberg & Loya 2004). Therefore, the timeframe in which increasing sea temperatures will reach the tolerance limits for corals is greater at Aqaba in comparison to other tropical seas.
3. The potential for sea level rise will likely be reduced by the semi-enclosed nature of the Gulf from the Red Sea, which is itself semi-enclosed from the Indian Ocean. In this instance, the tides of the Indian Ocean do not propagate into the Red Sea, hence there is no progressive tidal wave that raises and lowers the water level within the Red Sea basin (Fouda & Gerges 1994). Increases in salinity, ocean acidity and decreases in light penetration could, however, have an effect upon the Aqaba coral communities if climatic conditions continue to change. It is expected however, that changes in these parameters may be moderated by the long residence times (2-3 years) as a result of the limited water circulation in the Gulf (PERSGA/GEF 2003).
4. The resilience of the coral communities in the Gulf has been demonstrated by their recovery from a mass mortality event in which the shallow water corals were exposed to the air as a result of extremely low tides in the northern part of the Gulf in September 1970 (Rosenberg & Loya 2004). In addition, there have been no records of bleaching events in more recent times (PERSGA/GEF 2003).
5. Furthermore, there is a benefit in that the Red Sea is an ideal study area for climate change effects as it has a very simple water cycle, with no major rivers running to it and only a narrow connection to the Indian Ocean. Therefore, as the link between temperatures and sea level has been clear in the past, differences in temperature can be used to predict future sea-level changes (Rohling et al. 2009).
6. While the Aqaba coral reefs may be vulnerable to the effects of climate change, as are reefs worldwide, they can persist for longer under such stresses if their resilience is maintained. Thus, activities that may affect the water quality, fishing, and development activities that have the potential to result in habitat destruction should be effectively managed to minimize the local anthropogenic impacts on these coral communities.
7. Marine endemism is high in the Red Sea, for instance 70% of fish species in the family Pseudochromidae (dottybacks) are endemic, and 90% in the family Tripterygiidae (triple fins). Recent coral mapping exercises on Jordanian reefs recorded 25 fish species that are endemic to the Red Sea (Al-Horani 2007 a & b). The Indo-Pacific humphead wrasse *Cheilinus undulates*, is also known to frequent this coastline and is listed as Endangered by International Union for Conservation of Nature (IUCN) (Al-Horani 2007 a & b).
8. Coral reefs of the Middle East vary considerably, ranging from the well-developed, highly diverse and near-pristine reefs of the Red Sea, to the shallow fringing reefs in high sediment areas of the Arabian Gulf (Fouda 1998). Thus, the Gulf of Aqaba contains a relatively pristine and valuable coral resource that may not be found in other regions of the Middle East or globally.
9. Overall, the Gulf of Aqaba is a separate biogeographic zone within the Red Sea, and is of global significance in having the northernmost latitude reefs in the Western Indo-Pacific. Equally important is the high resilience demonstrated by these reefs which to date have been unaffected by bleaching and other effects of global warming, due to their northerly location and the fact that water temperatures do not exceed 27ºC in summer. The Jordanian reefs are thus a vitally important potential reservoir of reef species and a natural laboratory for the study of the impacts of climate change on coral communities, and home to both endemic and globally threatened species.
10. The coral reefs in the Gulf of Aqaba represent the northernmost distribution of reefs on earth. The Red Sea is a semi-closed sea linked to the Indian Ocean and the Gulf of Aqaba is a semi-closed basin in the northern region of the Red Sea. This geographical isolation has resulted in the evolution of many marine species that are endemic to the Gulf or Red Sea. The isolated nature of the Gulf also acts to mitigate against the effects of climate change threats such as coral bleaching resulting from increases in sea surface temperature. Thus, the Aqaba coral reefs are naturally protected and represent a reservoir for unique coral species.
11. The proposed coastal development activities (i.e., relocation of Aqaba port facilities to the southern shore, expansion of existing ACT container port facilities, and relocation of the passenger ferry terminal) will likely impact on marine areas that are characterized by very high coral cover and biodiversity in relation to other areas of the neighbouring coastline. Moreover, many of the coral colonies are thought to be in the order of 100 years old or more (F. Al-Horani pers. comm.). Thus, the transplantation of coral communities from impacted areas will aid in the survival of important habitats and the project itself will provide expert advice and technical assistance to seek alternative solutions and/or maximize the success of the transplantation.

## Economic Valuation of Coral Reefs

1. Coral reefs rival any other natural resource as being among the most important and biologically productive ecosystems on Earth. Their immense beauty not only attracts millions of visitors worldwide but also provides mankind with an array of resources on which to survive. The Gulf of Aqaba is well known for its diverse coral reef communities. Moreover, the coral growth rate in Aqaba is considered the highest at the latitudes of 30°N and 30°S (General Corporation for the Environment Protection (GCEP), 1998) where the coral reef communities occur.
2. Coral reefs attract many tourists to dive and snorkel in Aqaba; they also play an important role in protecting the coast form wave action. Despite this, the coral reefs in Aqaba are threatened and their quality is declining due to a variety of anthropogenic practices which threaten reef health (Pilcher and Al-Moghrabi, 2000) and as a result reduce the benefits generated from these reefs.
3. In standard economics, the market is used to obtain or derive these values. However, environmental goods are not traded in the market and hence, no market prices exist in general. Therefore, over the last decade the environmental economics literature has developed alternative methods of measuring environmental goods and services. The Total Economic Value (TEV) is derived from the value of the sum of all the goods and services provided by the coral reef ecosystems (e.g. Sarokin and Schulkin, 1993). The TEV can be broken up to obtain the value for different components of reef use, i.e. tourism areas, fishery areas, preservation areas etc. The main advantage of calculating the TEV is to obtain a figure of the value of the reef ecosystem, which will highlight to stakeholders and policy makers the importance of the conservation of the reef ecosystem to different user and interest groups. Often, many people are not aware of just how much economic value a coral reef can derive as natural resources are often taken for granted. According to Seenprachawong (2003), Cesar et al. (2002), the total economic value of coral reefs (TEV) can be divided to use and non-use values (as shown in Figure 9).
4. Based upon estimates made by quantifying the Recreational Value of coral reefs (using the Travel Cost Method [TCM] and Contingent valuation Method [CVM]), the economic value of ecotourism as a service of the Aqaba coral reef ecosystem ranges from about 17 million JD annually (24.6 million US$) to 34.4 million JD (49.2 million US$). In 2008 alone, the total recreational benefits of the Jordanian coral reefs were estimated as JD 19.5 million. The total value added to the national economy was approximately JD 3 million as shown in Table 16. This result is a rough estimate and only provides indicative figures. For the purpose of determining offset values, engaging with decision makers, developing a business case and undertaking advocacy for coral conservation, it is necessary to conduct in depth study on the coral reef values in Jordan using the standard methodology to quantify the total economical values of coral reefs. While this first assessment was undertaken during the preparatory phase to provide for a baseline value and provide a starting point for interventions related to the development of a business case for biodiversity conservation, more in depth assessments will be undertaken during the lifetime of the project as tourism related information is better documented and collection of data becomes more rigorous.



Figure 7: Total economic value and attributes of economic values for coral reefs

Table 16 Average expenditures by tourists on tickets, dives and on daily expenditure

|  |  |  |  |
| --- | --- | --- | --- |
| **Expenses** | **Unit** | **Expenditure** | **Value added** |
| Ticket | JD | 500 | 25 |
| Direct daily Expenditure on Diving | JD | 50 | 12.5 |
| Other indirect daily expenditure | JD | 50 | 12.5 |
| Staying Days | days | 5 | 5 |
| Total Expenses per Divers | JD | 1000 | 150 |
| No. of Divers | person | 19497 | 19497 |
| Total Economic Value | JD million | 19.497 | 2.92455 |

1. The annual net benefits over time given above can be recalculated in net present values (NPV) terms. This gives an aggregate of the discounted net benefits over time. Table 17 presents the results of this exercise for different levels of discount rates. At a zero discount rate, i.e. the situation where undiscounted aggregation takes place, the overall asset value of coral reefs in Jordan is JD 87.7 million for the whole of coral reef. At a 2 percent discount rate, this value drops to JD 65.5 million and further to JD 50.6 million at a 4% discount rate. The result shows the importance of coral reefs in Aqaba.

Table 17 Net present value for coral reefs for various discount rates (million JD)

|  |  |
| --- | --- |
| **Discount rate** | **Net Present Value of Coral Reef in Jordan** |
| 0% | 87.74 |
| 2% | 65.50 |
| 4% | 50.57 |
| 6% | 40.26 |

## Stakeholder analysis

## Overview

1. Stakeholders for this project include governmental, non-governmental (NGO) and private sector organisations with specific interests in the Aqaba coastal zone. In general there is regard and concern expressed for the existing and future marine biodiversity (species, communities, habitats) of the Gulf of Aqaba among most sector players. However, the primary exceptions to this observation are the general public. There is little obvious consideration shown by the beach users with regards to the disposal of litter when at the seaside. Solid waste management is noted as a significant issue for the Marine Park, and the Diver NGOs consulted indicated that they regularly organize and participate in frequent underwater clean-ups to respond to the problem.
2. Despite the widespread (but not complete) regard for marine biodiversity, differences arise between parties regarding how to balance development needs and national strategic interests with biodiversity conservation and environmental management.
3. A list of stakeholders and an accompanying stakeholder involvement plan is provided in Annex 4. A broad stakeholder consultation was conducted during the preparatory phase in Aqaba through a series of presentations, interviews, and workshops. A national workshop to discuss the project’s components was conducted in Aqaba for two days in November 2009, a list of stakeholders attended the workshop is provided in Annex 4.

## Governmental Organisations

**ASEZA Environment Directorate-EIA unit**

1. The law which established the ASEZA, the Environmental Protection Law (2003) and Environmental Protection Bylaw (2008) are all very clear in that environmental protection is a priority in the economic development of the area. Adoption of the 2008 bylaw passed the responsibility for Environmental Protection for the entire Aqaba Governorate to the Environment Directorate. The result of this additional responsibility is that the Directorate is now working beyond its available capacity. As such, the Directorate will be a key beneficiary of the Institutional Capacity for ICZM and Biodiversity Conservation project component. The unit will specifically benefit from and be engaged in interventions related to strengthened EIA compliance, enhanced assessments for prevention, mitigation and offsetting, as well as the preparation of economic valuation assessments. Guidelines for environmentally friendly facilities and practices will be reviewed and vetted by the unit who is in charge of ensuring adoption, deployment and compliance.

**ASEZA-Environment and Investment Commissions**

1. Aside from being the main authority in charge of the development of Aqaba, ASEZA is one of the main partnering agencies in Jordan for this programme and accordingly is the key coordinating unit for its development and implementation. ASEZA administers the Environmental Trust Fund (ETF) which is capitalized from penalties and donations made by developers to fund environmental offsets. The Terms of Reference for the governance and management of the ETF are as yet undefined. ASEZA will be the implementing party for the Coral Reef Protection project component and will benefit from the Institutional Capacity for ICZM and Biodiversity Conservation project component. The Investment Commission will also benefit and be a partner in the project specifically when it comes to eco-friendly investments and implementation of guidelines. As the overarching Authority in charge of development in Aqaba, the ETF will benefit from the transfer of global expertise for the design of incentive systems and penalties conducive to the adoption and deployment of eco-friendly practices.

**ASEZA Community Development Unit**

1. The CDU works to support local communities through scholarships, income generation support and training. The CDU conducts market analyses to determine local skill gaps and targets support towards filling identified areas. The CDU will be involved in project elements relating to the eco-tourism value chain and development of capacities within Aqaba’s communities to be able to benefit from and provide new types of services and skill sets which will be in demand with the implementation of biodiversity-friendly business opportunities and investments.

**ASEZA GIS Unit**

1. Currently the GIS unit within ASEZA focuses on infrastructure and services within the ASEZ. It does not consider of landscape/thematic features within its operating mandate. As such, the unit does not have the capabilities nor capacity for incorporating and using geospatial information on marine biodiversity to inform decision-makers and managers. The GIS Unit will be a key beneficiary of the Knowledge Management Systems for Coastal and Marine Biodiversity project component. The ultimate aim of this component is to ensure the technical, human and procedural bases for well-informed decision making are instituted within the GIS unit. Given the principles of financial sustainability on which ASEZA operates, this component will also look into the possibility of setting up certain operations of the GIS unit on a cost-recovery basis so as to ensure permanence of data, infrastructure and skill upgrades after the completion of the project.

**ASEZA MIS Unit**

1. The Management Information Systems unit is the information technology section of ASEZA. The unit is currently working towards implementing a Sharepoint-based intranet to facilitate sharing of information within ASEZA; the intent is to convert much of this information to an internet-based system over time. The unit recognizes that as additional information related to marine biodiversity becomes available there will be a requirement for additional intellectual/technical capability to manage this information and provide relevant knowledge to managers. The unit will thus be involved in the Knowledge Management Systems for Coastal and Marine Biodiversity project component, in particular in terms of translating scientific data into information for use by decision-makers and the incorporation of such information on the long term.

**ASEZA Tourism Directorate**

1. The primary strategy for tourism development in the ASEZ is focused on the Aqaba-Petra-Wadi Rum ‘Golden Triangle’ and the increase in offering cruise-type tourism. The Tourism Directorate will thus be a key beneficiary from the development of capacity and an integrated ecotourism programme aimed at the area which will result from the Promotion of Biodiversity Friendly Investment and Development project component.

**Aqaba City Services**

1. The City Services unit is related administratively to the Aqaba Governorate and the Ministry of Interior. Formerly a part of the Aqaba municipality, this unit has been part of the ASEZA for two years and is in the process of extending services to areas outside the Aqaba municipality. The unit is responsible for providing basic infrastructures services such as waste disposal, health control and licensing of small enterprises; some of these services are outsourced to private contractors under commercial arrangements. Given the rapid expansion in the area of responsibility since it has become tied to ASEZA, the City Services Unit will likely benefit from the Institutional Capacity for ICZM and Biodiversity Conservation project component.

**Aqaba Marine Park**

1. The Aqaba Marine Park was established in 2001 as a result of an apparent need to protect the marine environment from unconstrained exploitation. The AMP consists of a 7 km long stretch of beach running in the north from the Marine Science Station (MSS) south of the oil terminal. The park is zoned for multiple uses ranging from strict conservation to regulated use and has a multi-use Visitor Centre which includes a conference/meeting room, library and other facilities. The staff of 75 full and part-time staff is administered by a management team which is appointed and funded by ASEZA. Covering over 25% of Jordan’s coastline, the Park is one of the key focal points for visitors to the Aqaba area whilst also a biodiversity hotspot. Key environmental issues identified by park staff include coral breakage, solid waste (litter), destructive fishing practices, unauthorized anchoring and unorganized diving.
2. The Marine Park will be a major beneficiary of more integrated management of the coastline through better information management (the Knowledge Management Systems for Coastal and Marine Biodiversity project component), strengthened institutional capacity (Institutional Capacity for ICZM and Biodiversity Conservation project component) and better educated/aware visitors to the area (the Promotion of Biodiversity Friendly Investment and Development project component). Since the Park has already received GEF financing towards its establishment and management under the GEF/IBRD Gulf of Aqaba Environmental Action Plan, the present project will build from there and more specifically provide technical assistance to the park in developing a business plan and enhancing its financial viability as part of the broader coastal zone management.

**Prince Hamza Oil Spill Combating Centre (PHOSCC)**

1. Charged with responding to medium-sized oil spills in Jordanian waters, the PHOSCC can clean up accidental spills arising from vessels during fuelling operations or from the strategic oil reserve held in the M/V Jerash. The PHOSCC has capacity to clean up heavy oil spills of 5 to 200 m3 in volume. The PHOSCC cannot respond to any spills of lighter petroleum grades, including diesel or gasoline. For slightly larger spills the PHOSCC has international agreements with other PERSGA countries for assistance if required. The primary response will come from the spill response team based in Jeddah, Saudi Arabia. Under a weather-specific spill response plan, the PHOSCC has designated certain locations of the shoreline as ‘sacrificial areas’, wherein spilled oil can be directed for cleanup and disposal. Given this somewhat limited national response capacity, the PHOSCC might benefit from improved capacity which may arise out of the Knowledge Management Systems for Coastal and Marine Biodiversity project component, specifically in avoiding critical coral and biodiversity areas.

**Royal Jordanian Navy**

1. The Royal Jordanian Naval base is located within the boundaries of the Aqaba Marine Park. The RJN plays an active role in Jordan’s coastal waters and maintains vessels on patrol and on standby at all times. The RJN is not anticipated to be a direct beneficiary of this programme, though improved knowledge management practices and geospatial information may be broadly of benefit for its operations and the internal management of its environment.

## Quasi-Non Governmental Organisations

**Aqaba Container Terminal**

1. The Aqaba Container Terminal is the primary gateway for goods into and out of Jordan. Owned by the Jordanian Government and the Aqaba Development Corporation (ADC), ACT is operated in the manner of a private company, the management of which is contracted to APM Terminals under a joint venture agreement. The ACT is about to embark on a major facilities expansion, which will increase the berthage space by 450 m for the port as well as cargo capacity from the current 750,000 TEUs. This will result in direct loss of 8147 m2 of hard corals, for which ACT has already made a contribution to the ETF.  The compensation package is US $ 1.86 million or approximately 228$/m2; when compared with the results of the rapid economic valuation undertaken during the preparatory phase, the opportunity cost of such a loss is put in perspective as are the longer term economic benefits. These figures and differences speak to the need for (i) better valuation and understanding of the economic value, opportunity cost and commensurate offset value; (ii) technical assistance for the identification of avoidance and mitigation measures that may curb impacts rather than resorting directly to the loss and offset option. As such, the Aqaba Container Terminal will benefit from the project’s assistance in that regard.

**Aqaba Development Corporation/Aqaba Ports Corporation**

1. The Aqaba Development Corporation (ADC) is designated a private sector organisation that is owned jointly by the Jordanian Government and the ASEZA. Acting as the central development body within the ASEZ, ADC ‘owns’ Aqaba’s ports (both sea and air), strategic land, key infrastructure and utilities and development rights for these assets. The ADC is charged with implementing the Master Plan (2001-2020) for Aqaba with a goal of making Aqaba the leading business, leisure and transport centre within the wider Red Sea region. ADC will be a primary beneficiary of the project’s knowledge management component, and linkages with ADC in terms of decision-making and allocation of land and marine uses will be critical for the project’s success.
2. In cooperation with ASEZA, ADC has officially recognized the importance of environmental protection within the law and is required to prepare Environmental Protocols for both Land and Ports which detail response actions in the event of specific environmental problems (e.g., oil spill, solid waste disposal, pollution control). The ADC is the responsible agency through the APC, for managing the relocation of the port to the southern industrial area and is thus a key stakeholder of the project. As the development arm of ASEZA, ADC is committed to working in partnership with the project team towards completion of the work. Close coordination between ADC, the Environment Commission and the project team is a critical success item for the programme.

**Ben Hayyan Aqaba International Laboratories**

1. The Ben Hayyan Laboratories operate within ASEZA and was set up with funds from the EU under an Institutional Support programme (IS-ASEZA) and is wholly owned by ASEZA with a view to achieving complete financial independence by 2011. The laboratory provides analytical and monitoring services to governmental and commercial clients in areas of: water quality, microbiology, organic/inorganic analysis, air and noise monitoring. Currently 80% of the analytical work is done for the Jordanian Food and Drug Administration. Linkages with the laboratory, in particular in terms of providing water quality analysis baselines and trends will be established under the knowledge management component of the project in a strive to identify linkages between water quality parameters and health status of coral reefs.

## Non-Governmental Organisations

**Aqaba Dive Association**

1. The Aqaba Dive Association (ADA), registered as a NGO, is an industry body concerned with providing dive site access to its member organisations and both local and international tourists. The ADA is comprised (as at 1 September 2009) of 9 of the 11 professional diving centres located in the ASEZ. ADA members have considerable dive-industry experience and institutional knowledge of the coral habitat in the area and as such are a potential source of experienced, knowledgeable personnel and information feeds for the monitoring and evaluation system of the project.
2. This NGO is concerned with marine biodiversity conservation as its members are dependent upon the presence of high quality coral reef habitat for their economic livelihood. While the group has been opposed to the relocation of the main port in the past they recognize that the decision has been made for the national interest. ADA is potentially able to mobilize large numbers of highly experience divers in support of the coral transplantation plan and is willing to assist in conserving this resource in whatever way is possible.
3. Furthermore, this NGO will be involved in the deployment of industry-level standards and practices that reduce the impact on dive sites as well as verification for certification purposes such as the Blue Flag.

**Aqaba Cooperative Maritime Society for Glass Boats**

1. This NGO represents the operators of glass-bottom tourist boats (Figure 8) in the Aqaba area. They are supported by the ASEZA and also through financial assistance from international agencies such as the World Bank and USAID. The quality of the marine environment is of critical importance to the Society, as its members derive their livelihood from the coral reefs of the area. Currently the quality standards of the member operations are variable. The Society could thus benefit from a coordinated approach to operations and product marketing and thus be a beneficiary of the promotion of biodiversity friendly investment and development project component.



Figure 8: Glass boat operating in Aqaba.

**Marine Science Station**

1. The MSS is a joint construct of the University of Jordan and Yarmouk University. The MSS is the primary repository of expertise and information pertaining to the Coral Reef Protection project component. MSS personnel are technically/scientifically highly qualified and experienced and will play a key role in the implementation of this project component.

**Royal Marine Conservation Society of Jordan**

1. As a quasi-independent NGO, JREDS is interested in the long term sustainability of the marine environment for the benefit of future generations of Jordanians. Involved in the concept leading to the development of this project, JREDS is committed to its implementation and will contribute to Coral Reef Protection project component where feasible. JREDS is likewise involved in promoting activities which lead towards ecologically sustainable tourism through the ’Green Key’ and ‘Blue Flag’ internationally recognized eco-labeling initiatives. JREDS is the country-contact for these programmes and will likely benefit from a coordinated ecotourism plan (Promotion of Biodiversity Friendly Investment and Development project component).

## Private companies

1. The key private organisations with interests in the coastal environment that are not represented by one of the NGOs listed above are the hotel and resort companies (see Table 14 above). Representatives of these organisations were unfortunately not available during the primary consultation period in early September. However, preliminary discussions with resort companies by staff of the MSS (Al-Horani, pers. comm.) indicate a high level of recognition (at least by larger companies) of the importance of the local marine biodiversity for their operations.

## STRATEGY

## Project rationale and policy conformity

1. The project will deliver significant improvements to the conservation status of globally important BD in the coastal and marine areas of the country, by developing an enabling environment and creating capacities at institutional and individual levels for the mainstreaming of BD considerations into the tourism sector primarily, into development plans of the ASEZ and into the fisheries sector as a sector with a potential bearing on marine biodiversity. These sectors represent the principal sources of threats to BD, and at the same time provide the principal opportunities for sustainable management of BD and for community participation in conservation.
2. In the absence of the GEF project, the main economic sector in Aqaba (tourism) will continue to operate without policies, guidelines or models for integrating biodiversity conservation and sustainable use into its production activities. The GEF alternative will provide a systematic mechanism for mainstreaming biodiversity into tourism policies, programs and activities, which will contribute to stall the current rate of loss of biodiversity and curb future losses.
3. This project aims to conserve the unique marine biodiversity in Jordan and ensure the long-term survival of the coral reefs of the Gulf of Aqaba as well as promote equitable sharing of the benefits of the ecosystem services they provide. This will be achieved by developing mechanisms to ensure that biodiversity protection is addressed within the development framework of the ASEZ, and in particular in sectors of economy that strongly impact it, notably tourism.
4. The strategy to achieve these goals has four components, three to be co-funded by the UNDP and GEF, and one to be entirely financed through the ASEZ Fund. The project components aim at lifting the critical barriers indentified earlier and its components are articulated as follows:

* Knowledge-management systems for coastal and marine biodiversity
* Promotion of biodiversity friendly investment and development
* Institutional capacity for ICZM and biodiversity conservation
* Coral reef protection

1. The project components have been widely discussed during the participatory process implemented during the PPG. The results of these consultations with stakeholders, interest groups and project partners are provided in Annex 3. The project is aligned with a number of national and international initiatives already in place, including the Gulf of Aqaba Environmental Action Plan, National Programme of Action for the Protection of the Marine Environment from Land-Based Activities, the Convention on Biological Diversity and the International Convention on Oil Pollution Preparedness, Response and Co-operation. These are discussed in greater detail below.
2. From a GEF perspective, the project aligns with SO2 given that it will promote BD conservation through the modification of practices in specific production sectors (tourism) and production landscapes/seascapes. The ASEZ is a mosaic of landscapes and seascapes that are essential for a range of economic activities and that contain globally important biodiversity in the form of the northernmost reefs of the western hemisphere, for which sustainable integrated management is essential for their survival. While 25% of the targeted landscape/seascape is included within the AMP, the bulk of the area of the ASEZ is principally used for production. Specifically, this project will contribute to SP4 (Strengthening the policy and regulatory framework for mainstreaming biodiversity), by building capacity for effective ICZM and promoting activities to ensure that the needs of coral reefs are taken into account in land use planning and development. Through its actions in creating an enabling environment for BD mainstreaming it will generate institutional capacities at the level of public, private and non-governmental organizations. The project also aligns with SP5 (Fostering markets for BD goods and services) as it will assist the insertion of BD-friendly forms of production into premium markets and also develop markets for environmental services in the form of its involvement with the tourism sector and establishment of economic valuation of biodiversity as a basis for business development and certification.

## Country ownership: country eligibility and country drivenness

1. Interest in the programme is very high. The large majority of the consulted parties have stated a strong preference to see improved management practices, improved access to information and protection of the unique coral habitats in the ASEZ. There is a high level of recognition that the coral reefs in the area are one of a number of strong draw cards for the international tourist trade, that they are at threat and that the most adequate approach for their conservation is through valuation and broad endorsement by different user groups as opposed to conservation through protection.
2. In recognition of this high level of interest and also the important ecosystem role played by coral reefs, the ASEZA and Ministry of Planning and International Cooperation have played key roles in the development of the project.
3. On this basis there is a high level of ‘ownership’ with respect to the project goals and outcomes. The project is also consistent with a number of other international initiatives to which Jordan is a party. Jordan is a signatory with a number of international conventions and treaties that are of relevance to marine biodiversity conservation. These are outlined in the Table 18 that follows. While all are relevant to Marine BioDiversity Conservation (MBDC), a subset of these are directly relevant to this project and will be discussed in the following paragraphs.

Table 18 Conventions/Agreements Relevant to MBDC in the region.

|  |  |
| --- | --- |
| **Name** | **Abbreviated Name**  **(where applicable)** |
| International Convention on Civil Liability for Oil Pollution Damage 1969 |  |
| Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter | London Convention 1972 |
| Convention for the Prevention of Pollution from Ships. | MARPOL 1973, 78, Annexes I, II, III, IV, V |
| International Convention for the Safety of Life at Sea | SOLAS 1974 |
| Convention on International Trade in Endangered Species of Wild Fauna and Flora | CITES 1979 |
| Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment. | PERSGA, 1982  PERSGA Protocol 1982 |
| The Consolidated Jeddah Convention | Jeddah Convention 1982 |
| International Convention on Oil Pollution Preparedness, response and Coordination | OPRC 1990 |
| Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal | Basel Convention 1992 |
| UN Convention on Biological Diversity | CBD 1994 |
| Agreement between Jordan and Israel on Cooperation in Environmental Protection and Nature Conservation 1995 |  |
| Gulf of Aqaba Environmental Action Plan | GAEAP 1996 |
| Upper Gulf of Aqaba Sub-Regional Contingency Plan 1999 |  |

1. The project builds on the Gulf of Aqaba Environmental Action Plan (GAEAP) 1996-2002, prepared with the support of GEF/UNDP/IBRD, which recommends updating the national CZM plan with a focus on conservation of the waterfront and the carrying capacity of competing uses. The project also sends a strong signal in responding to the recommendations in the Jordan Report on ICZM Experiences (PERSGA 2004), namely, the:

* Development of a plan for marine waters;
* Assessment of carrying capacity for the entire coastal zone;
* Strengthening of public awareness and education programmes; and,
* Formal implementation of an ICZM process.

1. This project will build upon the activities initiated under the GEF/UNDP/UNEP/World Bank supported PERSGA Strategic Action Programme. These include the use of IOC-UNESCO indicators for measuring progress in ICZM and improved management of the AMP through PERSGA-supported MPA training.
2. The project is consistent with the National Programme of Action (NPA) for the Protection of the Marine Environment from Land-Based Activities (NPA 2008), developed under the Global Program of Action for the Protection of the Marine Environment from Land-Based Activities, which recommends the:

* Creation and maintenance of a database to harmonize available data on the marine environment;
* Development of guidelines on shoreline alteration, breakwater development, dredge and fill, beach maintenance, seawater use; and,
* Strengthening of management and protection of coastal areas (including dive sites and beaches) through education and awareness raising, signage, staff-training, and enforcement.

1. The project responds to the obligations of Jordan as a party to the Convention on Biological Diversity (CBD), in terms of the target of creating a representative system of effectively managed MPAs by 2010, and ensuring that at least 10% of all biomes are protected, or more in the case of vulnerable habitats such as coral reefs. Given that the AMP will benefit from the project, this will help conserve and effectively manage 25% or the Jordanian coastline and its associated diversity. In addition, the project also supports Jordan in complying with the CBD’s orientation related to the mainstreaming of biodiversity conservation in productive sectors, notably tourism, and national development plans, notably landscape level planning and use to secure ecosystem integrity and functions.
2. Jordan is also a party to the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC). Through the Prince Hamza Oil Spill Response Centre, Jordan has well developed capacity to respond to smaller (< 200 m3) spills of heavy oil, but no internal capability to respond to small (< 5m3) or larger (> 200m3) spills, or indeed any spills of light-weight grades of petroleum (e.g., diesel). Liaison with regional partners in the Gulf of Aqaba (e.g., Saudi Arabia, Israel) also provides some additional capability. In the event of a very large spill, cooperative agreements with PERSGA nations can be implemented.
3. This project helps respond to Jordan’s obligations under OPRC by improving institutional capacity in information management, in particular with respect to the location of sensitive areas requiring additional protection from oil spills and which cannot be used for the disposal of spill material. This in turn will contribute to the longer term protection of marine biodiversity in coastal areas of the ASEZ.

## Design principles and strategic considerations

1. The design logic of the project is summarized in the results and resources framework**Error! Reference source not found.**. The main overall principle guiding project design is the need for an integrated approach that combines regulations with incentives, in order to modify the actions of producers in the tourism sector with potential implications for biodiversity status.
2. Project design and appraisal has been guided by (i) desired results and relevance for the Jordanian context; (ii) alignment with GEF priorities; (iii) efficiency and effectiveness. These three considerations have guided the selection of interventions and their prioritization, the identification of partners and the management and operational arrangements retained. In its design and retained strategy, the project recognizes the high priority given by the government of Jordan for developing the ASEZ as a hub of economic development. As a consequence the adopted strategy recognizes the higher efficiency of engagement and mainstreaming versus conservation strategies that would constitute or be perceived as a constraint to development. The proposed interventions therefore have focused on win-win options which deliver dual dividends in terms of economic development and biodiversity conservation to meet the principles of sustainable development.
3. Overall the project is designed on the basis of a barrier removal approach, with the main assumption being that if barriers to reaching the long-term solution are lifted one by one and systematically, then tangible impacts on the ground will accrue. In view of this approach, a de facto assumption is that the project will primarily deliver process-oriented results which in turn will generate tangible impacts on biodiversity. These tangible impacts are summarized in the list of indicators below, for which baseline and end of project targets have been provided. In aligning the GEF project with national processes and priorities, the retained indicators serve both ASEZA’s environmental performance as well as the GEF project. It is therefore foreseen that long term monitoring capability of these indicators will be developed through the project, but also that some of these indicators may be adjusted as their applicability, relevance, technical and financial requirements are better assessed during implementation.
4. The Government of Jordan and UNDP Jordan are committed to the Paris Declaration on aid effectiveness which promotes the five principles of: (a) Ownership; (b) Alignment; (c) Harmonization; (d) Results; and (e) Mutual Accountability.

***Paris Principle 1: Ownership***

1. In practical terms, this translates into supporting Institutions to implement their mandates. Within this context, the interventions identified in this project have been derived from strategic priorities of the ASEZ and government of Jordan as outlines in key policy documents, from national demand and from national consultations. They aim at addressing specific needs and lifting barriers identified together with ASEZA and the government of Jordan and put together in such a way that they constitute a coherent whole which enables the delivery of long term impacts.

***Paris Principle 2: Alignment with ASEZA Systems and Procedures***

1. UNDP will make every effort to use the systems of ASEZA as this will promote building capacity to manage development resources and creating a more sustainable development programme. Since ASEZA proved to be a moderate risk implementing partner during the 2010 Harmonized Approach to Cash Transfers (HACT) assessment, UNDP will proceed with cash transfers and align, as possible in view of meeting the GEF fiduciary requirements and effective, to the processes of ASEZA. UNDP will make every effort to align its processes and endeavour to utilize the administrative, HR, public financial management, recruitment and procurement processes at ASEZA. To achieve this ASEZA will commit the relevant staff who are normally responsible for the administrative, HR, finance and procurement, functions to also carry out these functions for the GEF and UNDP funding of support to ASEZA. As a GEF implementing agency holding overall fiduciary and technical accountability, UNDP will provide technical advice on these systems as needed and provide its own systems as necessary. Should the above approach prove to have significant limitations to the delivery of project results on time, on scope and on budget, ASEZA and UNDP Jordan will jointly determine the most suitable alternative modality.

***Paris Principle 3: Harmonization***

1. UNDP endeavours to promote the Paris Principles and the Accra Agenda for Action, and is an active member of the Donor/Lender sub-groups on Water and Environment which was established to facilitate a sustained dialogue on environmental issue between development partner community and the Government of Jordan. These meetings provide an opportunity for the donor community to share information about their support to this sector so as to prevent overlap and improve coordination to ensure one voice in support of the GOJ. Given the interest of several donors in the ASEZ, both from a trade and from an environment perspective, ASEZA may be asked to provide regular briefings or updates certain thematic areas to the donor lender groups so as to leverage additional resources and/or foster synergies in the different interventions.

***Paris Principle 4: Results***

1. The Paris Declaration urges UNDP and GoJ to **Monitor, evaluate and document** progress of the Paris Declaration and this was reiterated in the Accra Agenda for Action (AAA). These commitments ensure that countries focus on achieving the targets of the Paris Declaration and also on understanding the **wider impact** **of aid effectiveness** on development.
2. To this end there will be a quarterly progress report and a six months board meeting to discuss results and issues arising. Project Board meetings agenda shall include an agenda item on compliance with the Paris declaration and reporting will be undertaken against outcomes, impacts and results based on the indicators identified in the results framework. Delivery figures and processes will be reported against and serve as proxy indicators for performance against planned levels of achievement. They will serve as early warning systems to review risks, strategy and operational modality; as a result the project board may recommend adjustments or modifications should the modality retained here not be deemed effective for the delivery of the desired results.
3. ***Paris Principle 5: Mutual Accountability***
4. The Government of Jordan and development partners are mutually accountable for development results. ASEZA and UNDP are mutually accountable for the overall development results for this project; respective responsibilities are outlined in the draft MOU to be signed upon project initiation. Project updates to the Ministry of Planning and International Cooperation shall be submitted jointly by ASEZA and UNDP and to the extent possible will align with national reporting systems and calendars to minimize bureaucratic burden on ASEZA and enable a focus on implementation. However, in view of the specific requirements of the GEF and its council, reporting per the GEF requirements and templates will also be required and aligned, to the extent possible, with the ASEZA normal reporting systems.

## Project objective, outcomes and outputs/activities

1. The project goal is to incorporate or mainstream the principles of marine biodiversity conservation into the effective decision making and management of the ASEZ. This will be effected through improved knowledge management, promotion of ecotourism (biodiversity-friendly investment) and community awareness, institutional capacity building and a direct intervention for saving portions of coral reef from destruction by removal and transplantation to an unaffected site.
2. The project includes four components that are designed to lift the barriers identified earlier and currently preventing the required balance between biodiversity conservation and development decisions. These outcomes are the following:
3. ***Project Component 1: Knowledge management systems for planning and investment.*** This component involves the development of a marine and coastal biodiversity database with GIS support (covering ecosystems, species, physical factors and human uses) that will permit the development of a marine spatial plan to complement the existing Land Use Plan, and provide long-term support for biodiversity-based ICZM. This component will also review national progress in ICZM, update the 2004 PERSGA national report on ICZM, produce a ‘State of the Coast’ report that covers biodiversity conservation issues, and integrate the National Coral Reef Action Plan into other ICZM planning initiatives. The methodology and indicators developed by IOC-UNESCO to assess management effectiveness and the impact of ICZM, and promoted by PERSGA, will be introduced. This component has two outcomes.

**Outcome 1.1: Spatial planning and sharing of benefits from marine resources informed by sound knowledge**

1. A high level of understanding of the local environment is prerequisite for effective spatial planning leading to good environmental management. In the context of this project, such an understanding is necessarily based on actual data on the state of the Jordanian coastal environment. Currently this data is not readily available, nor in a standardized format for easy interpretation. A geospatially relevant database is required as a basis for ICZM. This outcome will provide guidance in the form of spatial planning for the improved management of Aqaba’s coastal resources and encourage the equitable sharing of benefits from these resources between the local population and the tourist industry, particularly in light of the rapid increase in tourist and port developments along this section of coastline.
2. ***Output 1.1.1:*** *A coastal* and *marine database, with associated GIS, established and information available to all stakeh*o*lders.*
3. Activities***:***

1.1.1.1 Develop and implement a new policy on the availability and use of marine spatial data which supports open and transparent access;

1.1.1.2 Collect data regularly and information available on natural features (e.g., physical features, habitats, and biological communities), existing spatial planning/zoning, resources, and uses of the coastal area; and analyze in order to identify trends in natural features, resources and patterns of utilization;

1.1.1.3 Collect data on tourist statistics, including the total number of visitors, origin (national, international), activities, and behaviour on the public beaches, Aqaba Marine Park and Marine Science Station;

1.1.1.4 Prepare and validate all metadata using the relevant standard format (ISO 19115);

1.1.1.5 Prepare a metadata catalog to allow users to interrogate the database for specific information; and use the Metadata to prepare a GIS database;

1.1.1.6 Prepare spatially accurate marine habitat maps for public use;

1.1.1.7 Prepare a readily accessible GIS or web-based database of marine natural features, resources and uses;

1.1.1.8 Prepare a ‘State of the Aqaba Coast’ Report for public use, which includes discussion of the current biological communities and habitats, short and long term threats to viability; and,

1.1.1.9 Formulate Marine Spatial Plan, using the GIS, to be formally endorsed and made publicly available.

**Outcome 1.2: Trends in status of marine biodiversity documented and causes of changes identified**

1. This outcome aims to review the progress of marine biodiversity reporting and dissemination of environmental information, and to improve the capacity and ability of regulatory and institutional bodies to monitor, assess, report on and present marine information to relevant stakeholders and the general public.
2. Output 1.2.1***:*** *Monitoring of marine biodiversity strengthened and expanded.*
3. Activities*:*

1.2.1.1 Design and implement guidance notes, manuals and brochures for monitoring programmes;

1.2.1.2 Implement a Professional monitoring programme of marine biodiversity (workplans prepared and implemented, data logged) on a regular basis;

1.2.1.3 Monitor activities associated with and arising from the granting of Environmental Permits for major developments;

1.2.1.4 Develop a special programme to monitor the direct effects of tourist activities on the coastal environment;

1.2.1.5 Monitor the Effects of other commercial activities (e.g., movement of cruise and other ships as vectors for non-indigenous species, damage caused by fishing or other vessels to coral habitat);

1.2.1.6 Provide all monitoring metadata in the appropriate format for incorporation in the coastal GIS; and,

1.2.1.7 Prepare of an updated PERSGA national report on ICZM.

1. ***Project Component 2: Promotion of biodiversity friendly investment and development*.** This includes an economic evaluation of Jordan’s marine biodiversity using information gathered in the previously named component, building on previous relevant studies, and demonstrating how this value can be fully realized on a sustainable basis. This component will be undertaken in collaboration with the private sector, particularly the tourism industry, and will identify mechanisms for introducing incentive measures (such as eco-certification), offsets and other schemes by which relevant industries, particularly tourism, might finance management actions aimed at maintaining healthy coral reefs. This component has three outcomes.

**Outcome 2.1: Marine biodiversity and ecosystem services accounted for within the ASEZ decision-making**

1. This outcome aims to better integrate the consideration for marine environmental resources into the decision-making framework of ASEZA, including the identification of existing information and evaluation of their economic benefit. The outcome is expected to include the provision of a business case reasoning for including and promoting marine biodiversity into decision-making processes.
2. ***Output 2.1.1:*** *Ecosystem services identified, their economic value and carrying capacity estimated, and a ‘business case’ for marine biodiversity conservation prepared.*
3. ***Activities:***

2.1.1.1 Prepare an economic valuation of coral habitat and other marine ecosystems in terms of eco-tourism potential, fisheries resources, education and scientific research and other potential uses of the resource;

2.1.1.2 Develop and adopt a business case for marine biodiversity conservation based on, but not limited to, carrying capacity of ecosystems, potential revenue from local initiatives in eco-tourism (i.e., to glass boat operators, dive operators, marine park facility, hotel investments), fisheries, and scientific research;

2.1.1.3 Implement incentive measures and financial schemes within the ASEZA regulatory system.

1. ***Output 2.1.2:*** *Guidelines for environmentally sound investments.*
2. ***Activities:***

2.1.2.1 Identify critical success factors for making environmentally and economically sound investments in the context of the Jordan’s coastal zone.

2.1.2.2 Develop guidance notes, making reference to the business case prepared by the project, for promoting and making environmentally sound investments;

1. ***Output 2.1.3:*** *Marine biodiversity and ecosystem services in ecologically sensitive areas identified and managed effectively.*
2. ***Activities:***

2.1.3.1 Use a risk-based approach to identify the varying levels of protection to be afforded to different environmental features;

2.1.3.2 Inform decision makers in ASEZA and private organisations on the nature of biodiversity-friendly investments in the zone and,

2.1.3.3 Establish a ‘sustainable business coordination group’, consisting of developers, ASEZA and relevant NGOs to promote effective and coordinated management of ecologically sensitive areas.

**Outcome 2.2: Tourism sector contributes to marine biodiversity conservation**

1. This outcome seeks to include the burgeoning tourism sector of Aqaba (and potentially the wider *Jordanian* tourism industry) in the promotion and maintenance of marine biodiversity in the ASEZ. This may include development and enforcement of regulatory policy requiring eco-labelling or other incentives as well as the promotion of the ‘business case’ for marine biodiversity as a significant eco-tourism resource.
2. ***Output 2.2.1:*** *Mechanisms to promote marine-biodiversity friendly tourism identified and implemented.*
3. *Activities****:***

2.2.1.1 Prepare “Aqaba Ecotourism Development Plan”, including:

Create and activate new off-shore tourism activities,

Review Aqaba marketing strategy (currently under revision) to focus on Ecotourism options and the environmental image of Aqaba, and to promote and target ecotourism and marine ecotourism niche markets;

Identify alternative eco-tourism activities (e.g., related to the mountain range of Aqaba, hiking/trekking tours, bird watching, and camping/eco-lodging) that take pressure off the coastline ;

2.2.1.2 Conduct a capacity needs assessment for ASEZA tourism department and Marine Park staff in the fields of ecotourism/sustainable tourism development and certification;

2.2.1.3 Implement the capacity development strategy;

2.2.1.4 Inclusion of incentive measures and/or financial mechanisms into regulatory policy and monitoring of compliance; and

2.2.1.5 Review and update the Interpretation Plans and fee collection system of the Marine Park, to enhance visitor experience and appreciation of the natural environment.

1. ***Output 2.2.2:*** *Identify and implement eco-labelling/certification schemes to promote marine-biodiversity friendly tourism.*
2. *Activities****:***

2.2.2.1 Develop Aqaba’s independent, environmentally sound, auditable eco-labelling/certification Criteria for improving environmental outcomes arising from tourism;

2.2.2.2 Identify relevant incentive measures such as eco-certification similar to ‘Blue Flag’ beaches or ‘Green Key’ hotels;

2.2.2.4 Support uptake of eco-labelling/certification systems by large investors and small business (e.g., glass boat, diving operations, hotels, travel agents) through advice and financial incentives (if necessary).

2.2.2.5 In partnership with the private sector, implement standards and certification schemes leading to enhanced management and conservation of marine biodiversity in their operations.

2.2.2.6 Building on international best practice, and in consultation with key stakeholders, identify and implement incentive measures (tax rebates, levies and other) leading to the integration of biodiversity considerations into the operations of private sector tourism operators.

**Outcome 2.3: Public understanding pressures political commitment for strengthened marine biodiversity conservation**

1. This outcome seeks in develop the awareness in the public opinion of the significance of the marine environment and the need to conserve it as a vital resource for tourism, fisheries, scientific research and the *intrinsic* values of a pristine marine ecosystem. This involves the promotion and capacity-building of facilities such as the Marine Park (which already has high quality conference and public facilities but lacks the staffing capacity), the MSS Aquarium and other public beach facilities. The intention of increasing public awareness is to encourage pressure on governmental agencies and the private sector to adopt marine conservation initiatives.

1. *Output****:*** *Media campaign on marine biodiversity undertaken.*
2. *Activities****:***

2.3.1.1 Use of Marine Park facilities and MSS aquarium for promotion of Aqaba’s marine environmental resources;

2.3.1.2 Undertake public awareness programmes and media campaign focusing on (reasons for and efforts to transplant coral reef habitat to undisturbed or protected locations, and the business case/economic value of marine biodiversity conservation); targeting local community, investors, school children, hotel staff, tourists, divers, marine park visitors, etc; and

2.3.1.3 Enhance existing, and develop new, educational material promoting the importance and the conservation of marine biodiversity.

1. ***Project Component 3: Institutional capacity for ICZM and biodiversity conservation.*** This component involves the development of a comprehensive ICZM process that places marine biodiversity conservation on an equal footing with economic development in recognition of the ecosystem services provided by the *former* on which the latter depends. The project’s activities will include preparation, approval and implementation of a marine spatial plan and a capacity-needs assessment for implementation of the ICZM regulatory framework. This will require a full consultation process with all sectors and stakeholders, building on the experiences garnered during the PPG.

**Outcome 3.1: Negative impacts on biodiversity from coastal development minimized**

1. This outcome is intended to reduce the actual and potential impacts of coastal developments on the marine environment through the development and implementation of a marine spatial plan and zonation of the *coastal* region prior to the possible fast-tracking of proposed construction activities. This aims to ensure that coastal activities are placed in appropriate locations along the Aqaba coast and that beaches and other marine activities remain accessible and in good condition for the enjoyment of the local public as well as visitors to the area.
2. ***Output 3.1.1:*** *Marine spatial plan for the ASEZ, identifying user rights allocations and regulations, developed and approved with full public consultation and participation.*
3. *Activities****:***

3.1.1.1 Prepare and implement a strategy on public consultation for the plan development;

3.1.1.2 Promote awareness of coastal zone management, coastal vulnerability and climate change effects;

3.1.1.3 Identify conflicting uses of the coastal environment; as well as information gaps and means for filling them;

3.1.1.4 Use an ecosystem-based approach, science and robust data in developing the plan;

3.1.1.5 Collect geospatial data in previous project components incorporated into the planning framework;

3.1.1.6 Evaluate the efficiency of the current regulatory regime for enhancing marine biodiversity conservation;

3.1.1.7 Test scenarios by which enhanced marine biodiversity conservation can be incorporated into the operations of key sectors (e.g., fishing, tourism, shipping);

3.1.1.8 Integration of incentive measures into regulations/policies;

3.1.1.9 Regular review of the plan incorporated to permit adaptive management;

3.1.1.10 Revised land-use/zonation program, incorporating the principles of the Marine Spatial Plan, of the coastal environment implemented.

**Outcome 3.2: Benefits of marine biodiversity equitably shared.**

1. The purpose of this outcome is to ensure that the marine and coastal resources of Gulf of Aqaba are shared *equally* for the benefit of the local Aqaba population and visitors to the area. This includes consideration of th*e activities already occurring in the region such as glass boat operations, diving activities, the Marine* Park and MSS to be in balance with the development of new resort and port facilities.
2. *Output 3.2.1****:*** *Existing CZM plans updated and formal ICZM process established to oversee implementation of ICZM activities and ensure marine biodiversity needs are addressed.*
3. *Activities****:***

3.2.1.1 Identify value of resources provided by marine biodiversity through stakeholder workshops and consultation, including NGOs and community groups.

3.2.1.2 Review and update the existing CZM plan and ensure appropriate and adequate public beach and accessible dive sites for all users are available;

3.2.1.3 Promote cross-sectoral initiatives to improve communication and conflict resolution between stakeholders to deliver mutually compatible benefits;

3.2.1.4 Develop a targeted, structured program for implementing the CZM plan; and

3.2.1.5 Conduct and promote an inclusive and equitable participatory process for balancing social, marine biodiversity conservation and economic components of the coast.

**Outcome 3.3: Capacity to ensure implementation of effective ICZM strengthened (measured by changes in results of UNDPs capacity development scorecard)**

1. This outcome is aimed at the authorities responsible for effectively implementing the ICZM and includes *building* capacity in ASEZA as well as other institutions such as the Marine Park, MSS, Glass boaters organization and the Aqaba Diving Association.
2. *Output 3.3.1****:*** *Capacity needs for implementation of ICZM identified, and capacity development programme undertaken.*
3. *Activities****:***

3.1.1.1 Conduct capacity needs assessment across all relevant sectors for ICZM;

3.1.1.2 Prepare relevant capacity development strategy;

3.1.1.3 Implement capacity development strategy;

3.1.1.4 Identify and incorporate (where appropriate) traditional or customary management practices in ICZM planning;

3.1.1.5 Monitor progress of the ICZM plan against achievement targets; and

3.1.1.6 Implement open and accountable planning and implementation processes that are subject to public scrutiny through audit and monitoring.

1. ***Project Component 4: Coral reef protection.***Relocation of the main cargo port to an undeveloped site near the international border with Saudi Arabia will result in the destruction of approximately 4 ha of high quality *coral* reefs. In recognition of the importance of coral habitat, the regulatory authority, ASEZA, has a policy of requiring project proponents provide significant financial compensation for any planned or accidental destruction of coral reefs. An opportunity has thus been provided to preserve some portions of coral reef that are currently slated for complete destruction.

**Outcome 4.1: Southern reef translocated using globally recognized best practices, and all other natural reefs under long-term protection**

1. This outcome involves the implementation of the coral translocation plan and subsequent monitoring of the success of the transplantation and creation of artificial reefs. This component of the project will be financed through the compensation package to be provided by ADC for the translocation of the corals that would otherwise be lost through the south coast port development. A high profile implementation of this model project component would provide needed outreach in support of mainstreaming marine biodiversity conservation in the ASEZ. Implementation of this component of the project will rely upon current world-wide best practices for coral reef transplantation. ASEZA has initiated the translocation process of coral reefs at the ACT area during October 2009, and it is expected that the process will be finalized by April 2010. ASEZA plans to translocate the corals that would be affected during 2010, and the details of the linkages between this project and the translocation plan are to be discussed during the project inception phase. The ADC will be managed directly by ASEZA and considered as in-kind contribution to the project. The coral reef restoration guidelines produced by the GEF/World Bank[[2]](#footnote-2) as well as experiences from transplantation experiments in Jordan (ASEZA and the Marine Science Station, MSS) and similar initiatives elsewhere in the world will be employed (Omori and Shuichi, 2004; Gayle et al., 2005; Jokiel et al., 2005).
2. ***Output 4.1.1:*** *Corals translocated, and long-term monitoring programme in place.*
3. Activities***:***

4.1.1.1 The concept coral transplantation plan (a revision of Annex 2) is finalized;

4.1.1.2 Donor coral habitat and recipient sites identified and approved;

4.1.1.3 Timelines are finalised;

4.1.1.4 Operational Work Plan (based on the concept coral transplantation plan) utilising a staged approach (to permit refinement of operations) is finalized and approved by an independent expert peer review group;

4.1.1.5 Public education and awareness plan prepared and implemented;

4.1.1.6 Implementation of the first stage of the coral OWP;

4.1.1.7 Review of the first stage of the coral transplantation is complete and required amendments are made to subsequent stages incorporated to the coral OWP;

4.1.1.8 Subsequent stages of the coral OWP implemented, with a review step after completion of each stage;

4.1.1.9 Experimental design for monitoring the coral transplantations is prepared for review and approval by the peer review group; and,

4.1.1.10 Implementation of coral transplantation monitoring plan.

1. ***Output 4.1.2:*** *Management of visitors to, and tourism developments around, Aqaba Marine Park improved to enhance reef protection.*
2. ***Activities:***

4.1.2.1 Revise or re-develop the Marine Park Management Plan, referring to visitor access, activities and dive sites management;

4.1.2.2 Develop and implement an enhanced record keeping of activities within the Marine Park and upload to the Marine GIS (see outcome 1);

4.1.2.3 Implementation of the solid waste minimisation strategy, including collection operations;

4.1.2.4 Formation of a ‘Sustainable Tourism’ management group within the Marine Park which regularly liaises with tourist facilities (resorts, dive organisations, NGOs, both inside and outside the park boundaries) to discuss visitor activities and impacts and marine biodiversity conservation.

## Key indicators, risks and assumptions

**Indicators**

1. There are a range of direct and indirect positive effects which will arise from the implementation of the project. The most direct effect that the project will have is in the preservation of coral reefs currently slated for destruction at the site of the new port near the international border with Saudi Arabia. The associated results of this direct intervention include:

* marine biodiversity conservation;
* an increase in technical capacity;
* improved integration of biodiversity concerns in investments and development;
* improved awareness of the importance of marine biodiversity; and,
* the potential for positive spin-offs for tourism in general and eco-tourism specifically.

1. Setting up a more extensive and up-to-date geospatial information system, which permits incorporation of habitat and landscape features as well as other information layers, will have a direct and significant benefit for coastal planners and managers.
2. A baseline of coral ecosystem conditions has already been undertaken including measurable indicators, which can be used to properly monitor the impact of the project on the marine environment.
3. The following indicators are proposed to measure the impact of the proposed initiatives:

|  |  |  |
| --- | --- | --- |
| **Impact to be Monitored** | **Means of Verification** | **Assumption** |
| Objective level indicators | | |
| 1 – Coral cover maintained at 400ha at end of project | Reef checks undertaken by ASEZA and/or stakeholders engaged in reef monitoring | These indicators are retained on the assumption that (i) expanse and composition of reefs provides an indication of reef health; (ii) the project will provide ASEZA and other operators in the Gulf with sufficiently acceptable alternative such that they enable the maintenance of the existing reefs; (iii) the reef relocation effort will be successful in replacing the relocated coral and hence maintaining overall coral coverage.  Another basic assumption underlying these indicators is that Aqaba’s corals have developed significant resilience to climate change and that changes in water temperatures that may occur during the lifetime of the project will not generate a significant loss in coral cover. |
| 2 – Proportion of soft to hard coral maintained at 2-98% at end of the project (Coral diversity index H’=3.23 and 3.42 maintained at the end of the project | Reef checks undertaken by ASEZA and/or stakeholders engaged in reef monitoring |
| Component 1 indicators | | |
| 1 ASEZA annual report comprises section on status of marine and coral BD | ASEZA annual report – published on the ASEZA website and submitted to PM’s office | This indicator is intended to capture an institutional improvement in reporting on environmental impact parameters in the ASEZ. The current reporting does not include such reporting, and it is assumed that through the project intervention in support of knowledge management and creation, awareness raising and enhanced compliance ASEZA will start reporting on the status of the marine environment and environmental performance of investments. |
| 2 Proportion of new developments taking into account information generated by ASEZA’s MIS | * Results of monitoring of coastal water quality and other marine environmental conditions in and around new developments * Number of complaints/issues raised by local communities and environmental NGOs operating in Aqaba | Underlying this indicator is the level of compliance by development projects with regulatory policies and standards ultimately contributing to marine environmental quality and higher level impact indicators at the level of the objective. |
| Component 2 indicators | | |
| 1 Green key/Blue flag certification obtained during the lifetime of the project | Survey of the number of new developments and beaches achieving certification | These two indicators are intended to measure the level of success of introduction of environmentally friendly activities and incentives in the Gulf. As a proxy, they also serve to measure the success of awareness raising activities and behavioural change in terms of waste disposal on the beaches, adoption of environmentally friendly practices and correlation of economic return with the status of marine biodiversity.  While it is recognized that the methodology for assessing TVA may have flaws, for the purpose of monitoring and evaluation the TVA will use the same methodology in order to avoid debates. However a business case for coral conservation may well require a finer financial and economic assessment, and this will be undertaken during the project’s lifetime. If recommended by experts and agreed upon by the project board, the results of this finer assessment may be considered as baseline and a new target set. Should these changes occur they will be reported to the GEF through the PIR. |
| 2 Total Value Added of Corals to the Jordanian economy increases by 20% at end of project from a baseline of 3Million JD (2009 estimates) | Repeat of the Economic valuation of corals at the end of the project lifetime using the same methodology |
| 3 Reduced coral damage from anchoring/cruise line density | Survey of coral reefs  ASEZA data on cruise line use | Underpinning this indicator is the assumption that, through enhanced awareness of cruise liners and the introduction of coral-friendly anchoring practices and alternative points, the ASEZA will be able to achieve its objective of increasing Aqaba as a cruise line resort without leading to significant impact on corals in particular. While a baseline for this indicator is still missing, it will be generated during the first six months of the project, using data from JREDS and other sources on coral damage as well as ASEZ data on cruise line density. Depending on the level of attribution and assessment of experts, this indicator may be adjusted to provide a more robust basis for adjusting practices and anchor locations. |
| Component 3 indicator | | |
| 1 Environment revenue/total revenue increases from 1% in 2008 to 5% at end of the project | * End of project assessment using the same methodology as USAID assessment * Survey of glass boat usage * Survey of diving operations * Survey of Marine Park usage (camping ground, beach access) * Survey of marine-based resort activities undertaken by guests | Underlying this indicator is the assumption that increasing environment revenue will be correlated with additional new ventures, a higher valuation of natural assets, and that these will be translated into financial and economic benefits accruing to ASEZA. However, this indicator and its components will be closely monitored to avoid a situation where offsets are favoured as opposed to avoidance and mitigation. |

* + 1. **Risks and Assumptions**

1. There are a number of risks associated with this project which were assessed during the project preparation phase and appropriate activities and measures were taken to mitigate them:
2. **Development of southern port and new tourist resorts take place so rapidly that negative environmental impacts on coral reefs cannot be mitigated**: The timeframe for the development of the main port location requires that new port facilities planned of the south port area as well as the relocation of the passenger ferry terminal, changes to the phosphate wharf and decommissioning of the Jerash oil storage tanker are likely to occur sooner than anticipated. There is the potential for these developments to occur before the planned mitigation measures are put in place, including the coral transplantation program. However, this project has already developed a coral translocation plan and technical expertises in this field are available through the Marine Science Station. Proposed media coverage should also encourage public support for the maintenance and proper management of marine biodiversity for the benefit of a variety of sectors including tourism, artisanal fisheries and for scientific research.
3. **Spatial plan not implemented or recognized because of economic pressure for development and insufficient capacity:** Successful implementation of this project requires the adoption of a spatial plan by the regulatory body (ASEZA) and consideration by development companies. However, the increasing focus on encouraging investment opportunities could lead to the potential for the spatial plan to be disregarded in favour of additional coastal developments. The project will seek to mitigate this risk by developing public awareness for the significance of marine biodiversity conservation and encouragement for the public to put pressure on governmental authorities to manage marine resources equitably, as well as increasing the capacity of institutions to responsibly manage coastal development activities.
4. **Continued inequality in access to marine resources, with local residents needs subjugated to the demands of the foreign tourism industry:** The rapid rate of development along the Aqaba coastline means that regulatory authorities may not have the capacity to process EIAs thoroughly and manage follow-up assessment of mitigation measures. Furthermore, with the focus on encouraging investment in coastal locations, beach access and other coastal resources may become increasingly limited for the local population. This project aims to overcome this possibility by developing spatial planning including the zonation of the Jordanian coastline for industrial, port, recreational and public use. The capacity of ASEZA and the Marine Park should also be increased to effectively manage the proposed development activities at Aqaba.

1. **Exceptional climatic events: (i.e., heavy rainfall, extreme low tides, increases in sea temperature):**  Extreme weather conditions occur that may affect the success of the coral transplantation and also interfere with the monitoring of marine environmental effects and mitigation measure for coastal development activities. Exceptions climatic events could include extreme rainfall resulting in increased sedimentation and dispersal of soil contaminants (pesticides, oils, phosphate, other industrial residues) into the marine environment, or extreme low tides and/or increases sea temperatures which can result in coral bleaching and mass mortality of coral reefs communities. The project will take into account the possibility of unpredicted climatic events through monitoring initiatives undertaken following the coral translocation program.
2. **Lack of coordination between government agencies:**  The rapid development of the area has created considerable pressure to undertake both operational and management activities at a rapid pace. There is a risk that this rapid pace will result in diverging priorities between agencies. For example, a pressing economic need for a development proposal to be approved could be directly in opposition to an equally pressing social need to limit such development. Divergence between agencies is considered to be of relatively low risk overall given the coordinated nature of the ASEZA. The project will also ensure that there is close coordination between the relevant agencies within the ASEZA and wider government of Jordan.
3. **Institutional capacity:** Information management capability is identified as a key capacity gap to be addressed. Management in the absence of accurate, geospatially referenced environmental information is fraught with difficulty. There is an urgent need to enhance capability (both technical skills and the supporting infrastructure) in information management; development of a GIS with multiple layers of environmental information (habitats, species, water and sediment quality, planning zones etc.) for use by managers and the public is critical for the success of the project and is an identified outcome. An additional capacity gap is in managing environmental issues as they arise. Development pressure in the region is high but there are limited staff and supporting infrastructure to conduct environmental monitoring and respond appropriately in the event of breaches. Capacity development (training, personnel, supporting infrastructure) is required.
4. **Socio-economic impacts on local communities:** The increased use of the coastline by large tourist resorts and associated developments will create increased pressure for limited resources and on infrastructure in the local community. Water and energy are key limiting resources and there is a risk that a ‘user-pays’ environment would result in disparity of access. Large-scale developments are also creating new, site-specific infrastructure; such infrastructure developments must be extended to the wider community to cope with increased pressure on water and wastewater reticulation systems, garbage collection, roading and similar services. There is also a risk that high-quality developments will retain clients within their systems, preventing economic spillover to nearby communities, resulting in community dissatisfaction with the large developments. The project will aim to overcome these obstacles through improved management practice (updated CZM plans), the involvement of the public and developers in the project activities and outcomes and by improved coordination between developers requirements and community development agencies.
5. **Accidental and illegal activities:** Given the relatively small size of the Jordanian coast, there is a risk that marine accidents (e.g., oil tanker groundings, chemical or waste spills) or illegal activities (e.g., cyanide or blast fishing for corals and ornamental fish) could affect the viability of the project outcomes. The key means by which such activities are mitigated are through effective communication and public awareness strategies. While these cannot stop accidents from occurring, they can reduce the risk through increasing the level of caution and consideration given to operating in the marine environment. Likewise a broad public awareness program focussing on the importance and economic benefits of marine biodiversity conservation can result in reduced levels of illegal activity in the face of additional public awareness and scrutiny.
6. ***Critical risks and possible mitigation measures are summarized as follows:***

| **Risk** | **Risk Rating** | **Risk Mitigation Measure** |
| --- | --- | --- |
| Development of southern port and new tourist resorts take place so rapidly that negative environmental impacts on coral reefs cannot be mitigated | H | * ‘Business case’ for coral reef and marine diversity conservation and standards for environmentally friendly tourism operations should trigger a shift towards more sustainable operations * Media campaign will increase appreciation of marine biodiversity and ecosystem services by both government and civil society * Translocation project will adhere to World Bank/GEF Targeted Coral Reef Research guidelines on reef restoration; advance feasibility study undertaken and appropriate technical expertise brought in. |
| Spatial plan not implemented or recognized because of economic pressure for development and insufficient capacity | H | * Plan formally endorsed and made publicly available * Media campaign to convey messages on biodiversity values and co-opt sector’s support for conservation * Mechanisms established to ensure that MSS, ASEZA and other relevant agencies work together * Capacity built for improved implementation |
| Continued inequality in access to marine resources, with local residents needs subjugated to the demands of the foreign tourism industry | M | * Marine spatial plan developed in a participatory manner with input from all stakeholders including NGOs and community groups (i.e., JREDS, the Marine Park, glass boat and diving operators) * Zoning to ensure adequate public beach and accessible dive sites for all users |
| Institutional Capacity in Information Management | **M** | * Identified gap at project preparation phase * Capacity needs assessment conducted at outset of Project * Project outcome focused on developing GIS infrastructure and technical capability |
| Institutional capacity in environmental management | **M** | * Identified as a gap in capacity- the EIA process is theoretically strong but additional human and infrastructure resources required * Third component of the project is aimed at developing institutional capacity |
| Socio-economic effects on local communities | **M** | * Improved coastal zone management practice will result in greater resource sharing * Greater communications with developers as potential employers for improved coordination of training opportunities for locals * Identification of resource limitations through improved information management and intra-governmental coordination * Increased public participation in EIA permitting process, biodiversity conservation activities, consultation workshops will serve to improve communications and identify risk areas for consideration |
| Intragovernmental cooperation | **L** | * Intragovernmental agency liaison by the Project Management Unit * Scrutiny of coordinated activities by the Project Board * Overview of coordinated activities by the Project Steering Committee |
| Accidental and illegal activities | **L** | * Improved public awareness of the importance of marine biodiversity conservation * Improved professional awareness (among commercial resource users) of the importance of marine biodiversity conservation |
| Exceptional climatic conditions | L | * Identification and protection of resilient reefs * Introduction of ecosystem-based management with spatial planning * Introduction of performance monitoring and adaptive management * Monitoring of coral reef transplantation and coral health surveys |
| **Overall Risk Rating** | **M** |  |

Note: L: Low, M: moderate; S: substantial; H: high.

## Overview of climate change effects

1. In view of the importance attributed by the GEF and UNDP to climate proofing investments, this specific section is intended to provide the baseline as well as rationale as to why climate change impacts are not considered as a major threat to the viability of the project or to the bio-physical status of corals in Aqaba.
2. Large-scale climate change has the potential to have significant effects on marine biological communities. The major threats relate to sea level rise, reduced light penetration, increased sea temperature, salinity and ocean acidity from rising atmospheric concentrations of carbon dioxide (CO), as well as a potential increase in the occurrence and severity of storms.
3. Changes in sea temperature, light penetration and salinity can cause corals and other symbiotic invertebrates to rapidly pale or become ‘bleached’ (Hoegh-Guldberg 1999 and references therein). In most cases this rapid bleaching of corals is found to be due to the loss of zooxanthellae or the loss of the pigments of the zooxathellae (Coles & Jokiel 1977, 1978; Hoegh-Guldberg & Smith 1989a; Glynn & DiCroz 1990; Lesser et al. 1990). Six major episodes of coral bleaching have occurred worldwide since 1979, with entire reef systems losing almost all of their living reef-building corals (e.g., Brown & Suharsono 1990).
4. Coral reefs dominate coastal tropical environments between the latitudes 25°S and 25°N and roughly coincide with water temperatures between 18°C and 30°C and at salinities that range from 32 to 40 (Veron 1986). Coral bleaching occurs when the environmental tolerance of corals and their photosynthetic symbions (zooxanthellae) is exceeded.
5. Studies have shown that there is a correlation between bleaching events and high sea surface temperatures (Goreau & Hayes 1994). Most tropical seas have warmed in the past 100 years (Bottomley et al.1990; Brown 1997a; Cane et al. 1997; Winter et al.1998), with sea temperatures increasing by almost 1°C during that time. It is reported that sea temperatures are currently increasing by ~1-2°C per century (Hoegh-Guldberg 1999) and if temperatures continue to rise, coral bleaching events would likely increase in frequency and intensity (proportional to the size of the thermal anomaly) with proportionally serious consequences. By approximately 2050 it is predicted that sea temperatures in tropical oceans will experience anomalies every year that will be several times those seen during the worst bleaching event in 1998 (Hoegh-Guldberg 1999).
6. Other factors such as reduced salinity may cause colour loss, although affected corals do not resemble those after mass bleaching events (Hoegh-Guldberg & Smith 1989a). Corals are known to survive salinities down to 23 (two-thirds that of seawater) but then die, with tissue sloughing off to reveal the white skeleton below (Hoegh-Guldberg & Smith 1989a).
7. Increasing concentrations of CO2 lower the pH of seawater (ocean acidification) with a coincident decrease in the concentration of carbonate ions. This reduces the capacity of corals and other calcifying organisms to make calcium carbonate skeletons. CO2 levels in the surface ocean are expected to reach double pre-industrial levels within 40-50 years, and seawater pH will decrease by another 0.2 units (Eakin et al. 2008). There has already been a reduction globally of 0.1 pH units, with average global ocean pH dropping from around 8.2 to 8.1 (Eakin et al. 2008). Ocean acidification also may increase the susceptibility of corals to bleaching during thermal stress.
8. Overall, these stresses on corals affect their ability to reproduce and increase their susceptibility to disease and the impacts of other detrimental conditions such as marine pollution. In the case of Aqaba and in view of the fact that there have been no bleaching events so far, the impacts of temperature change on the composition and health of the reefs will be monitored on a preventative basis. Indeed, these reefs are acknowledged for having developed an intrinsic resilience in view of their occurrence in stable yet high temperature waters. Along the same lines, it is estimated that investing in lifting biophysical stressors on the corals will prove to be a much more cost-effective strategy and will ultimately contribute to enhancing their resilience to climate extremes.

## Financial modality

1. GEF and UNDP resources will be transferred to ASEZA on the basis of quarterly advances per standard UNDP National Execution modality for institutions rated moderate to low risk by the HACT. Both sources of funds will be provided as grants to support the development of capacities among the ASEZA and other stakeholders as identified in the stakeholder engagement plan.
2. The resources will be allocated as follows:
3. **Co-financing sources by outcome**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Type** | **Outcome 1** | **Outcome 2** | **Outcome 3** | **Outcome 4** | **Project Management** | **Total** |
| GEF |  | 200,000 | 350,000 | 305,000 | - | 95,000 | **950,000** |
| GOJ | In kind | 150,000 | 300,000 | 445,000 | 5,700,000 | 655,000 | **7,250,000** |
| UNDP | Cash |  |  |  |  | 50,000 | **50,000** |
| **Totals** |  | **350,000** | **650,000** | **750,000** | **5,700,000** | **800,000** | **8,250,000** |

## Cost-effectiveness

1. During project preparation a number of alternative approaches were explored, and their different impacts assessed against (i) the resources available; (ii) global BD benefits generated and (iii) local social and economic benefits. These approaches included different conservation approaches as well as different management approaches. They are summarized below, in terms of their overall cost-effectiveness:
2. Protected area v/s mainstreaming approach: Aqaba constitutes the only coastal zone in Jordan and as such is its only access to the sea. A Marine Park has already been established and is contributing to conservation of marine and coastal resources, however ineffectively and financially unsustainable. In view of the fact that Aqaba provides the only coastal outlet of the Kingdom of Jordan, a protected areas approach was neither feasible nor desirable. The mainstreaming approach – requested from the onset by the government of Jordan – proved to be the most likely to result in conservation dividends following appraisal of both options.
3. Focus on a mix of command and control v/s entirely voluntary mechanisms: The main productive sector active in the gulf of Aqaba is tourism, with voluntary expansion planned by the government and the ASEZ, coupled with strong incentives to facilitate foreign direct investment. During the preparatory phase a review of best practices and lessons generated from other countries engaging with the tourism sector has signalled that voluntary schemes take a long time to materialize and to generate concrete impacts on the natural capital (energy and water consumption are impacted much faster). On the other hand, experience in the region and the country on regulatory measures shows that seldom are all the resources from policy setting to policy enforcement provided in a manner that provides credibility to policies and leads to their respect. The suggested combination of push and pull was retained on the basis that (i) ASEZA has already developed policies to minimize impacts of development on the environment at large, and that these policies were enforced to a certain extent; (ii) key enterprises and private sector investors in the Gulf are of a global nature and to some extent have Corporate Social Responsibility charters that would be conducive to respecting local regulation and engaging in voluntary action for the environment; (iii) the ASEZA and the Government of Jordan at the highest political levels have ascertained the desire for ASEZ to be one of the leading examples of sustainably developed and managed special economic zone.
4. The choice of the implementing partners was further assessed from a perspective of fiduciary management, however from a technical and results based perspective there is no question that ASEZA is the most adequate partner and would have the ability to deliver on the project objective and in particular on the consultative and partnership dimensions at the lowest cost than any other institution who would need to start from scratch and develop the necessary relationships.
5. By adopting a mainstreaming approach in the productive landscape and sectors, the project has placed itself at the heart of ASEZA’s priorities as indicated in the ASEZA strategic plan for the years 2007-2010, whereby ASEZA will aim at improving its revenue collection and reduce expenditures. This will increase ASEZA’s revenue allocation and that of the treasury, keeping it financially sustainable and helping to reduce the national budget deficit, which exceeds JD 10 millions of which around JD 4 million are allocated to environmental management. The cost recovery ratio is the amount of revenue compared to the cost of providing a service. A service is said to be self-financing if revenues equal or exceed the costs. If a service is not self-financing, then ASEZA must make up the difference, that is, provide a subsidy. If the full cost of a good or service is not recovered, then an explanation of ASEZA's rationale for this deviation should be provided.
6. In standard economics, the market is used to obtain or derive these values. However, environmental goods are not traded in the market and hence, no market prices exist in general. Therefore, over the last decade the environmental economics literature has developed alternative methods of measuring environmental goods and services. The Total Economic Value (TEV) is derived from the value of the sum of all the goods and services provided by the coral reef ecosystems (e.g. Sarokin and Schulkin, 1993). The TEV can be broken up to obtain the value for different components of reef use, i.e. tourism areas, fishery areas, preservation areas etc. Based upon estimates made by quantifying the Recreational Value of coral reefs, the economic value of ecotourism as a service of the Aqaba coral reef ecosystem ranges from about 17 million JD annually (24.6 million US$) to 34.4 million JD (49.2 million US$). In 2008 alone, the total recreational benefits of the Jordanian coral reefs were estimated as JD 19.5 million. The total value added to the national economy was approximately JD 3 million.
7. The above result is a rough estimate and only provides indicative figures. For the purpose of determining offset values, engaging with decision makers, developing a business case and undertaking advocacy for coral conservation, it is necessary to conduct in depth study on the coral reef values in Jordan using the standard methodology to quantify the total economical values of coral reefs. While this first assessment was undertaken during the preparatory phase to provide for a baseline value and provide a starting point for interventions related to the development of a business case for biodiversity conservation, more in depth assessments will be undertaken during the lifetime of the project as tourism related information is better documented and collection of data becomes more rigorous.
8. Through this project, ASEZA will be able to develop appropriate criteria for the selection of environmental compensation and mitigation options in development activities and productive sector. The project will support the design and implementation of Payment for Environmental Service (PES) schemes to internalize the economic value of important biodiversity and ensure its safeguard. The project will assess current financial penalties for destruction of coral reefs, assessed at JD 4,000/m2 and will support the establishment and operation of compensation funds for mitigation of coral reef loss resulting from the new development projects.
9. The project will also address current financial operations of the Aqaba Marine Park which plays a major role in monitoring law violations on the beach and sea-side area within the boundaries of the park, enforcement of related regulations, tourism activities and services, awareness raising of visitors and local community. Nevertheless, the Park and other parts of the southern public beach are facing growing pressure stemming from the unregulated number of visitors and lack of enforcement of the entrance fees system which renders the park is not financially unsustainable, with around JD 1 million deficit. Most notably, the project will allow the Park to develop a business plan which would enable it, among others, to determine entrance fee levels that would contribute to its effective management and sustainability.
10. Finally, the mainstreaming approach adopted by the project in the tourism sector and the “preventive approach” in the fishing sector will produce by default a cost-effective and sustainable models of win-win initiatives whereby the support provided through the project in the form of training, marketing and facilitating access to financing will be coupled with the adoption of a sectors specific and voluntary certification system capturing global biodiversity benefits as well as local economic and environmental benefits.

## Sustainability

1. Sustainability of the project’s impacts will be promoted in a number of ways:

* Environmental sustainability will be promoted through the emphasis of the project on developing capacities and conditions for the application of productive practices that are compatible with the regenerative capacity of the natural resources in the area, the effective regulation of practices that are not, and support to the overall planning of conservation and development initiatives in line with resource characteristics and conditions.
* Social sustainability will be promoted through maximizing local participation in the development and application of productive alternatives, through strengthening the capacities of community-level and private sector entities for participating in developing conditions of environmental governance, and through the establishment of broad-based mechanisms for participation and consultation of diverse stakeholders in the decision-making processes as well as their empowerment through access to open source and transparent information.
* Institutional sustainability will be ensured through strengthening the capacities of existing institutions such as the ASEZA, but also through the multi-stakeholder approach proposed by the project which will introduce stronger ownership and endorsement of the investments in conservation.
* Financial sustainability: the project will emphasise the promotion of productive alternatives and marketing mechanisms that not only deliver biodiversity benefits but also are financially attractive to local people. These will include, for example, ecotourism, for which there is a large untapped potential in the project area. Information on these socio-economic benefits is provided below, as they constitute a cornerstone of the design logic of the project.

## socio-economic benefits.

1. Ecotourism has a huge potential for generating socio-economic benefits to local communities. Coral reefs rival most every other natural resource as being among the most important and biologically productive ecosystems on Earth. Their immense beauty not only attracts millions of visitors worldwide but also provides mankind with an array of resources on which to survive. Coral reefs attract many tourists to dive and snorkel in Aqaba. Also, coral reefs play an important role in protecting the coast form wave action.
2. The monetary benefits of tourism in Jordan go well beyond the direct revenue generated by the dive shops and the snorkeling operators. Hotels and resorts thrive from diver-related tourism, as do other service industries. A field study using travel cost methods conducted in Aqaba during 2005 revealed that the economic value of ecotourism as a service of the Aqaba coral reef ecosystem ranges from about 17 million JD annually (US$ 24.6 million) and 34.4 million JD (US$ 49.2 million) a year. The total recreational benefits of the Jordanian coral reefs shows that the total expenses on diving activities reached to about JD 19.5 million. Whereas, the total net value added to the national economy reach to about JD 3.0 million annually.
3. Dirreh Bay in the south of the country is considered one of the most important diving sites in the Gulf of Aqaba, because of its uniqueness in terms of coral cover, biodiversity and the presence of the famous coral wall that attracts many recreational divers to the site. This proposed site for relocating the ports is also visited by many local tourists, especially during summer. At this time the public beaches are becoming extraordinarily crowded during the weekends and holidays, where in some weekends about 80,000 people visit Aqaba.
4. The amount of corals expected to be affected by the project is about 43,000 m2. The value of the damages is estimated based on JD 4,000 per m2 as per Jordanian law to act as a deterrent for damages. This equivalents to about JD 172 million (US$ 240 million). The EIA of port relocation estimated the direct damages based on the concept of Total Economic Value, it indicates a value of damages of direct losses of US$ 7.8 million, with additional losses of US$1.2 million for partial permanent loss of diving access or US$ 3.3 million for complete permanent loss of dive access
5. The glass bottom boats (GBB) prevalent along the coast allow the underwater habitats to become available not only to those who can swim or to those who can afford scuba diving, but also to the majority of the population. These provide the general public with an awareness of what is the life underwater and more importantly, the relevance of marine biodiversity conservation.
6. The GBB not only cater to tourists and the general public. They are used to provide an alternative livelihood to about 120 of the fishermen and locals as income generating activities. Using a simple quantification method to assess the economic value and income generated from GBB shows the total revenue of JD 2.16 million a year (about US$ 3.02 million).
7. An estimate can therefore be made of the economic values that coral reefs provide to society, coastal resource management and development decisions. The results indicate the gross revenue associated with coral reefs are estimated to about US$ 24 million. The total net revenue to society is about US$ 5.2 million. Furthermore, the direct transfer to economy in a form of taxes, labor wages and services charges is estimated at US$ 10.7 million. Therefore the total direct economic benefit to the economy is estimated with US$ 15.8 million per annum.

## Local and global benefits expected out of the transplantation;

1. The coral reefs of the Middle East vary considerably, ranging from the well-developed, highly diverse and near-pristine reefs of the Red Sea, to the shallow fringing reefs in high sediment areas of the Arabian Gulf (Fouda 1998). The Gulf of Aqaba contains a relatively pristine and valuable coral resource that may not be found in other regions of the Middle East or globally.
2. The coral reefs in the Gulf of Aqaba represent the northernmost distribution of reefs on earth. The Red Sea is a semi-closed sea linked to the Indian Ocean and the Gulf of Aqaba is a semi-closed basin in the northern region of the Red Sea. In this instance, the tides of the Indian Ocean do not propagate into the Red Sea, hence there is no progressive tidal wave that raises and lowers the water level within the Red Sea basin (Fouda & Gerges 1994). This geographical isolation has resulted in the evolution of many marine species that are endemic to the Gulf or Red Sea.
3. Equally important is the high resilience demonstrated by these reefs which to date have been unaffected by bleaching and other effects of global warming, due to their semi-isolated, northerly location and the fact that water temperatures do not exceed 27ºC in summer. The Jordanian reefs are thus a vitally important potential reservoir of reef species and a natural laboratory for the study of the impacts of climate change on coral communities, and home to both endemic and globally threatened species. As a point of special scientific interest, the potential isolation from the greatest effects of climate change infers that Gulf of Aqaba may provide a global refugium for hard corals and coral reef habitats and communities.
4. The proposed coastal development activities (i.e., relocation of Aqaba port facilities to the southern shore, expansion of existing ACT container port facilities, and relocation of the passenger ferry terminal) will likely impact on marine areas that are characterized by very high coral cover and biodiversity in relation to other areas of the neighboring coastline. Moreover, many of the coral colonies are thought to be in the order of 100 years old or more (F. Al-Horani pers. comm.). Thus, the transplantation of coral communities from impacted areas will aide in the survival of important habitats and species.

## Replicability

1. The project will generate practices for replication at various levels and through various mechanisms:
2. In terms of coral relocation, the project will generate experiences with regards to different methodologies, possibilities and success factors. This may become increasingly important as the impacts of climate change on ocean acidification and temperatures start to manifest themselves and relocation could become one of the response measures to maintain partial coral cover under different climatic conditions.
3. Along the same lines and in view of the specific bio-physical characteristics of reefs in Jordan, the project will support the Jordanian government document and establish practices which can be replicated regionally (through presentations to CAMRE or PERSGA) and globally through the homologue approach.
4. Economic valuation of corals and marine biodiversity – key elements of Jordan’s biodiversity – will also produce lessons and establish the practice of looking into the values of ecosystems and their elements through the broader lense of local, social, economic and financial contribution to the economy rather than their strict ecological and biological value. The testing of this approach through this project will enable (i) the development of local capacities, within economists, to undertake such assessments; (ii) the testing of communication approaches for decision-makers to fulfil the dual goals of socio-economic development and environment conservation; (iii) the establishment of public-private sector partnerships as well as the determination of offset values on the basis of factual data. Within the Jordanian national and regional context these approaches and capacities are still lacking and the project will thus establish a nascent albeit yet to be further developed, expertise in this area of work. Further, the project will test the functioning of this logic in the context of the local culture, an important element to determine whether or not investments in economic valuation approaches should be further supported in a region where natural assets are considered a gift of god.
5. Nationally speaking this project carries a strong potential for replication of its first three components at a national level as 4 other Special Economic Zones have been established in ecologically valuable areas of the country, and as more countries within the region aim at setting up similar Special Economic Zones. For instance, the Yemeni government has already approached the ASEZA for a study tour linked to the establishment of an Island Wide Authority for the Island of Socotra. It is therefore highly likely that measures proposed in the project from an institutional (planning), partnership (PPP), financial (ETF) and knowledge management perspective (MIS and GIS) will be in high demand both nationally and regionally. While the project budget itself does not allow for the transfer of this experience through face to face and direct study tours, efforts will be undertaken to document the processes and results in a way that is conducive to replication and provides hands on information for practitioners rather than general information.
6. **Project Results Framework:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD:** | | | | | |
| **Country Programme Outcome Indicators:** | | | | | |
| **Primary applicable Key Environment and Sustainable Development Key Result Area 2. Catalyzing environmental finance** | | | | | |
| **Applicable GEF Strategic Objective and Program:** | | | | | |
| **Applicable GEF Expected Outcomes:** | | | | | |
| **Applicable GEF Outcome Indicators:** | | | | | |
|  | **Indicator** | **Baseline** | **Targets**  **End of Project** | **Source of verification** | **Risks and Assumptions** |
| **Project Objective[[3]](#footnote-3)**  **To mainstream marine biodiversity conservation into the coastal management framework in the Aqaba Special Economic Zone (ASEZ).** | **Coral cover**  **Proportion of soft to hard coral** | **400 Ha**  **2 : 98 – 5:95** | **400 Ha**  **2 : 98 – 5:95** | Reef checks | These indicators are retained on the assumption that (i) expanse and composition of reefs provides an indication of reef health; (ii) the project will provide ASEZA and other operators in the Gulf with sufficiently acceptable alternative such that they enable the maintenance of the existing reefs; (iii) the reef relocation effort will be successful in replacing the relocated coral and hence maintaining overall coral coverage.  Another basic assumption underlying these indicators is that Aqaba’s corals have developed significant resilience to climate change and that changes in water temperatures that may occur during the lifetime of the project will not generate a significant loss in coral cover. |
| **Component 1:**  **Knowledge management systems for planning and investment** | ASEZA annual report comprises section on status of marine and coral BD  Proportion of new developments taking into account information generated by ASEZA’s MIS | No environment section in ASEZA’s report  Less than 1% | Environment performance and indicators reported against  At least half of the 14 planned developments | ASEZA annual report – published on the ASEZA website and submitted to PM’s office   * Results of monitoring of coastal water quality and other marine environmental conditions in and around new developments * Number of complaints/issues raised by local communities and environmental NGOs operating in Aqaba | This indicator is intended to capture an institutional improvement in reporting on environmental impact parameters in the ASEZ. The current reporting does not include such reporting, and it is assumed that through the project intervention in support of knowledge management and creation, awareness raising and enhanced compliance ASEZA will start reporting on the status of the marine environment and environmental performance of investments.  Underlying this indicator is the level of compliance by development projects with regulatory policies and standards ultimately contributing to marine environmental quality and higher level impact indicators at the level of the objective. |
| ***Outcome 1:***  ***Spatial planning and sharing of benefits from marine resources informed by sound knowledge*** | Adequate, geospatially referenced information is publicly available |  |  | External access | Internet based access to the database is inferred |
| ***Output 1.1:***  *A coastal and marine database, with associated GIS, established and information available to all stakeholders*. | A GIS-based marine biodiversity database will be established  The database will be regularly updated with relevant marine biodiversity information  The database will be made publicly available via a web-based portal |  |  | * + - 1. Examination of the database is required       2. Update tracking and reporting of the database will occur regularly       3. Unrestricted access to the database is apparent | Requires adequate resourcing of the internet host by the sponsoring agency |
| ***Outcome 2:***  ***Trends in status of marine biodiversity documented and causes of changes identified*** | Baseline and monitoring information is available |  |  | Notification of information updates is provided | Information is routinely updated as it comes available |
| ***Output 2.1:***  *Monitoring of marine biodiversity strengthened and expanded* | Monitoring work plans and timetables regularly provided/updated  Monitoring activities occur regularly and are logged when complete  Monitoring information incorporated into the database |  |  | * + - 1. Work plans/timetables independently verified       2. Activity recording independently verified       3. Automatic notification of updates permits verification |  |
| **Component 2: Biodiversity friendly investment and development** | |  | | --- | | 1. Green key/Blue flag certification obtained during the lifetime of the project | | 2. Total Value Added of Corals to the Jordanian economy increases by 20% at end of project from a baseline of 3Million JD (2009 estimates) | | 3. Reduced coral damage from anchoring/cruise line density | | No certified schemes  3 million JD  N/A | At least 5 by end of the project  3.6 million JD  TBD | |  | | --- | | Survey of the number of new developments and beaches achieving certification | | Repeat of the Economic valuation of corals at the end of the project lifetime using the same methodology | | Survey of coral reefs  ASEZA data on cruise line use | | These two indicators are intended to measure the level of success of introduction of environmentally friendly activities and incentives in the Gulf. As a proxy, they also serve to measure the success of awareness raising activities and behavioural change in terms of waste disposal on the beaches, adoption of environmentally friendly practices and correlation of economic return with the status of marine biodiversity.  While it is recognized that the methodology for assessing TVA may have flaws, for the purpose of monitoring and evaluation the TVA will use the same methodology in order to avoid debates. However a business case for coral conservation may well require a finer financial and economic assessment, and this will be undertaken during the project’s lifetime. If recommended by experts and agreed upon by the project board, the results of this finer assessment may be considered as baseline and a new target set. Should these changes occur they will be reported to the GEF through the PIR. |
| **Outcome 2.1:**  **Marine biodiversity and ecosystem services accounted for within the ASEZ decision-making** | Investment decisions make reference to marine biodiversity and ecosystem services |  |  | Independent audits of investment decisions conducted | Appropriate information provided by the Investment Commission |
| **Output 2.1.1:**  Ecosystem services identified, their economic value and carrying capacity estimated, and a ‘business case’ for marine biodiversity conservation prepared | Robust valuations of ecosystem services are made  Carrying capacity/external pressure assessments of habitats are provided  Financing and incentive options implemented in ASEZA systems  Reference to ecosystems services and benefits of biodiversity conservation provided by developers in applications |  |  | Valuation and carrying capacity studies provided  Evidence of developers incorporating environmental principles into plans is provided | Developers accept that the business case for environmentally sound business practice is valid. |
| **Output 2.1.2:**  Guidelines for environmentally sound investments | Guidelines for environmentally sound investments provided to all developers.  Reference to environmentally sound investments provided by developers in applications |  |  | Guidance documents available for independent review  Evidence of developers incorporating eco-labeling/certification programs in their investments is provided | Developers accept the need environmentally sound business practice and eco-labeling. |
| **Output 2.1.3:**  Marine biodiversity and ecosystem services in ecologically sensitive areas identified managed effectively | Membership in an independent expert panel is assessed  Risk-based approaches to marine biodiversity conservation in sensitive areas are incorporated into decision making |  |  | 1. The qualifications and relevance of the expert panel membership is reviewed by an independent body 2. Evidence of developers receiving and using risk-based advice when considering development in sensitive areas | Developers accept the need/requirement for environmentally sound business practice |
| **Outcome 2.2:**  **Tourism sector contributes to marine biodiversity conservation.** | Tourists provided with facilities and activities which actively promote marine biodiversity conservation. |  |  | Independent auditing of tourism activities | Appropriate records of opportunities and actual activities are kept |
| **Output 2.2.1:**  Mechanisms to promote marine-biodiversity friendly tourism identified and implemented | Capacity needs assessment completed  Environmentally-friendly tourism initiatives are developed and promoted by facilities operators  Financial and incentive measures included in the ASEZA development framework  Environmentally friendly tourism strategy prepared and adopted by ASEZA  ‘Natural Information and Interpretation Centre’ present in Aqaba city |  |  | 1. Capacity needs assessment report audited 2. Independent auditing of the implementation of a coordinated ‘green’ tourism strategy 3. ASEZA development framework updated. 4. Presence of an expanded and revised visitor information centre | Clear guidelines on environmental incentives for tourism operators are developed. |
| **Output 2.2.2:**  Identify and implement eco-labeling/certification schemes to promote marine-biodiversity friendly tourism | 1. Aqaba Ecotourism Criteria developed 2. Guidelines for eco-labeling systems prepared 3. Eco-labeling incentives are adopted by facilities operators and developers |  |  | 1. Aqaba Ecotourism Criteria audited by an independent agency 2. Guidelines available for independent audit 3. Internationally-recognized eco-labeling certifications and activities are provided by facilities operators |  |
| **Outcome 2.3:**  Public understanding pressures political commitment for strengthened marine biodiversity conservation | Increased public participation and interest in EIA scoping and review sessions for coastal developments |  |  | Independent audits of participatory processes reveal increased public/stakeholder participation | Sufficient public notification of scoping and review sessions is provided by the regulator |
| **Output 2.3.1**  Media campaign on marine biodiversity undertaken | 1. Publicity strategy prepared and implemented 2. Variety of media used, including public meetings, newspaper advertisements, marketing brochures and one-on-one consultations with local stakeholder groups |  |  | Publicity programme provided for comment.  Records of media used provided | Appropriate records are kept; a single coordinating body is involved in the media campaign |
| **Component 3: Institutional capacity for Integrated Coastal Zone Management (ICZM) and mainstreaming of marine biodiversity conservation** | Environment revenue/total revenue | 1% in 2008 | 5% at end of project lifetime | * End of project assessment using the same methodology as USAID assessment * Survey of glass boat usage * Survey of diving operations * Survey of Marine Park usage (camping ground, beach access) * Survey of marine-based resort activities undertaken by guests | Underlying this indicator is the assumption that increasing environment revenue will be correlated with additional new ventures, a higher valuation of natural assets, and that these will be translated into financial and economic benefits accruing to ASEZA. However, this indicator and its components will be closely monitored to avoid a situation where offsets are favoured as opposed to avoidance and mitigation. |
| **Outcome 3.1:**  **Negative impacts on biodiversity from coastal development minimized** | There is minimal to no degradation of coastal marine habitats associated with new coastal developments |  |  | Baseline and monitoring information | Appropriately designed baseline and monitoring studies have been conducted |
| **Output 3.1.1:**  Marine spatial plan for the ASEZ, identifying user rights allocations and regulations, developed and approved with full public consultation and participation | 1. Development of a Marine Spatial Plan is advertised 2. Full public participation (with representatives of all significant stakeholder groups) in the development of the plan occurs 3. A Marine Spatial Plan is prepared and implemented |  |  | 1. Surveys of public awareness during the participatory period 2. Marine Spatial Plan prepared 3. New, relevant Bylaws or Laws are passed relating to the regulation of coastal resource allocation according to the Marine Spatial Plan | Key players work together cooperatively to develop the Marine Spatial Plan |
| **Outcome 3.2**  **Benefits of marine biodiversity equitably shared** | Equitable public and private use of the coastline and coastal and marine resources is provided |  |  | Visitor number records from the Marine Park and coastal resorts | That all partners are committed to an equitable sharing of Jordan’s limited coastal resources |
| **Output 3.2.1**  Existing CZM plans updated and formal ICZM process established to oversee implementation of ICZM activities and ensure marine biodiversity needs are addressed | The Aqaba Master Plan, and Land Use Plan are updated  Plans governing use and protection of the Aqaba Marine Park are updated  A formal ICZM process is established and implemented  Relevant regulations for implementing the ICZM strategy are adopted |  |  | Updated plans provided  Relevant laws/bylaws/regulations passed  An ICZM strategy is publicly adopted by ASEZA | That all partners work constructively towards the principles of ICZM |
| **Outcome 3.3**  **Capacity to ensure implementation of effective ICZM strengthened (measured by changes in results of UNDP’s capacity development scorecard)** | Improved results on the UNDP capacity development scorecard |  |  | UNDP |  |
| **Output 3.3.1**  Capacity needs for implementation of ICZM identified, and training and infrastructure development undertaken | Capacity needs assessment is completed by project team  Appropriate training strategies are developed and implemented  Appropriate infrastructure development is implemented |  |  | 1. Audit of the assessment 2. ASEZA Environment Directorate prepares and implements new training strategies for staff 3. Identified ASEZA units undertake training and other professional development relevant to ICZM 4. Key Aqaba Marine Park personnel undertake training on marine spatial planning andmanagement 5. Key of the PHOSCC undertake training in marine biodiversity conservation | Appropriate resources (time and funding) is made available for staff to undertake professional development |
| **Component 4: Coral Reef Protection** | Coral reefs slated for destruction are protected through a programme of transplantation to a suitable site |  |  | Records kept by transplant team | There are sufficient resources and expertise present to successfully implement the transplantation plan |
| **Outcome 4.1**  **Southern reef translocated using globally recognized best practices, and all other natural reefs under long-term protection** | 1. Greater than 75% of all accessible corals affected by the southern port expansion are transplanted from the site 2. Survival of transplanted corals greater than 75% by project end-point. |  |  | Independent monitoring of the transplantation results is conducted | Baseline information on reef community composition is available at donor and receptor sites |
| **Output 4.1.1**  Corals translocated, and long-term monitoring programme in place | * + - 1. Expert peer review group formed       2. Coral transplantation operational work plan OWP provided       3. Public awareness plan implemented       4. Staged implementation progress reports       5. Experimental design of the monitoring program provided for review       6. Coral health checks and assessment of associated reef fauna and flora undertaken on a regular basis       7. Results of monitoring submitted for consideration on a regular basis. |  |  | 1. Coral OWP reviewed by expert peer group 2. Public awareness plan reviewed 3. Progress reports assessed by expert peer review group, Project Board 4. Assessment of biological indicators such as % coral cover, abundance of corals and associated taxa (reef fish, invertebrates) 5. Growth rates of transplanted corals equal to or greater than baseline growth rate | There is sufficient capacity to carry out monitoring in a scientifically robust manner;  Appropriate data management procedures are in place;  There is sufficient baseline information in donor and transplant communities to permit statistically robust comparisons |
| **Output 4.1.2**  Management of visitors to, and tourism developments around, Aqaba Marine Park improved | Aqaba Marine Park Management Plan Revised  Visitor management plans are prepared and implemented  Marine Park staff upskilled  Public awareness materials available and campaigns underway  Visitor numbers and activities in the Marine Park recorded.  Sustainable Tourism Liaison group formed |  |  | 1. Inquiries at Visitor’s information kiosks and at Aqaba Marine Park increased by 50% 2. Public awareness campaign 3. 50% reduction in beach litter present in the Aqaba Marine Park; 4. Additional damage to coral reef areas in Aqaba Maine Park is reduced by 50% year-on-year. | Resources for implementation of the Visitor Management Plan are provided.  Beach cleanups occur on a regular basis |

**Total budget and workplan**

|  |  |  |  |
| --- | --- | --- | --- |
| **Award ID:** | 00061764 | Project ID(s): | Project ID 00078516 |
| **Award Title:** | Jordan: Mainstreaming Marine Biodiversity Conservation into Coastal Management in the Aqaba Special Economic Zone | | |
| **Business Unit:** | JOR10 | | |
| **Project Title:** | Jordan: Mainstreaming Marine Biodiversity Conservation into Coastal Management in the Aqaba Special Economic Zone | | |
| **PIMS no 4002** | PIMS 4002 | | |
| **Implementing Partner (Executing Agency)** | ASEZA | | |

| **GEF Outcome/Atlas Activity** | **Responsible Party/** | | **Fund ID** | | **Donor Name** | **Atlas Budgetary  Account Code** | **ATLAS Budget Description** | **Amount Year 1 (USD)** | **Amount Year 2 (USD)** | **Amount Year 3 (USD)** | **Total (USD)** | **See Budget Note:** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Implementing Agent** | |
| **1: Knowledge management systems for planning and investment** | **ASEZA** | | **62000** | | **GEF** | 71300 | Local Consultants | 15,000 | 20,000 | 15,000 | 50,000 | 1 |
| 71600 | Travel | 10,000 | 6,000 | 3,000 | 19,000 |
| 72100 | Contractual Services-Companies | 15,000 | 35,000 | 0 | 50,000 |
| 72300 | Materials & Goods | 5,000 | 3,000 | 0 | 8,000 |
| 72400 | Communication & Audio Visual Equip | 3,000 | 3,000 | 0 | 6,000 |
| 72800 | Information Technology Equipment | 30,000 | 0 | 0 | 30,000 |
| 74200 | Audio Visual & Print Prod Costs | 2,000 | 6,000 | 0 | 8,000 |
| 74500 | Miscellaneous Expenses | 2,000 | 1,000 | 1,000 | 4,000 |
|  | **Total Outcome 1** | **82,000** | **74,000** | **19,000** | **175,000** |  |
| **2: Promotion of biodiversity friendly investment and development** | **ASEZA** | | **62000** | | **GEF** | 71200 | International Consultants | 0 | 30,000 | 15,000 | 45,000 | 2 |
| 71300 | Local Consultants | 10,000 | 10,000 | 0 | 20,000 |
| 71600 | Travel | 10,000 | 40,000 | 20,000 | 70,000 |
| 72100 | Contractual Services-Companies | 15,000 | 30,000 | 20,000 | 65,000 |
| 72200 | Equipment and Furniture | 25,000 | 25,000 | 10,000 | 60,000 |
| 72300 | Materials & Goods | 9,000 | 11,000 | 9,000 | 29,000 |
| 72500 | Supplies | 3,000 | 3,000 | 4,000 | 10,000 |
| 73100 | Rental & Maintenance-Premises | 6,000 | 6,000 | 3,000 | 15,000 |
| 75700 | Training | 10,000 | 30,000 | 20,000 | 60,000 |
| 74500 | Miscellaneous Expenses | 8,000 | 7,000 | 5,000 | 20,000 |
|  | **Total Outcome 2** | **96,000** | **192,000** | **106,000** | **394,000** |  |
| **3: Institutional capacity for ICZM and biodiversity conservation** | **ASEZA** | | **62000** | | **GEF** | 71200 | International Consultants | 0 | 15,000 | 20,000 | 35,000 | 3 |
| 71300 | Local Consultants | 10,000 | 5,000 | 5,000 | 20,000 |
| 71400 | Contractual Services - Individ | 6,000 | 6,000 | 6,000 | 18,000 |
| 71600 | Travel | 2,000 | 10,000 | 12,000 | 24,000 |
| 72100 | Contractual Services-Companies | 0 | 30,000 | 25,000 | 55,000 |
| 72200 | Equipment and Furniture | 6,000 | 7,000 | 7,000 | 20,000 |
| 72300 | Materials & Goods | 2,000 | 5,000 | 5,000 | 12,000 |
| 72400 | Communic & Audio Visual Equip | 2,000 | 3,000 | 2,000 | 7,000 |
| 72500 | Supplies | 5,000 | 5,000 | 5,000 | 15,000 |
| 74200 | Audio Visual&Print Prod Costs | 2,000 | 3,000 | 2,000 | 7,000 |
| 75700 | Training | 10,000 | 20,000 | 30,000 | 60,000 |
| 74500 | Miscellaneous Expenses | 3,000 | 5,000 | 5,000 | 13,000 |
|  | **Total Outcome 3** | **48,000** | **114,000** | **124,000** | **286,000** |  |
| **Project management** |  | | **6200** | | **GEF** | 71400 | Contractual Services - Individ | 22,000 | 25,000 | 10,000 | 57,000 | 4 |
| **ASEZA** | | 71600 | Travel | 2,000 | 5,000 | 5,000 | 12,000 |
|  | | 72200 | Equipment and Furniture | 5,000 | 0 | 0 | 5,000 |
|  | | 72500 | Supplies | 2,000 | 2,000 | 1,000 | 5,000 |
|  | | 72800 | Information Technology Equipmt | 2,000 | 2,000 |  | 4,000 |
|  | | 74200 | Audio Visual&Print Prod Costs | 2,000 | 2,000 | 2,000 | 6,000 |
|  | | 74500 | Miscellaneous Expenses | 2,000 | 2,000 | 2,000 | 6,000 |
|  | |  | **Sub-total GEF** | **37,000** | **38,000** | **20,000** | **95,000** |
|  | | **4000** | | **UNDP TRAC** | 71400 | Contractual Services - Individ | 11,000 | 11,000 | 11,000 | 33,000 |
|  | | 71600 | Travel | 1,000 | 2,000 | 2,000 | 5,000 |
|  | | 72200 | Equipment and Furniture | 5,000 | 2,000 | 2,000 | 9,000 |
|  | | 74500 | Miscellaneous Expenses | 1,000 | 1,000 | 1,000 | 3,000 |
|  | |  | **Sub-total UNDP** | **18,000** | **16,000** | **16,000** | **50,000** |
|  | | | | | | | **TOTAL MANAGEMENT** | **55,000** | **54,000** | **36,000** | **145,000** |
|  | |  | |  |  | **PROJECT TOTAL** | | 281,000 | 434,000 | 285,000 | 1 000,000 |  |

**Summary Atlas Budget**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Atlas Code | Budgetary account | Year 1 | Year 2 | Year 3 | Total |
| 71200 | International Consultants | 0 | 45,000 | 35,000 | 80,000 |
| 71300 | Local Consultants | 35,000 | 35,000 | 20,000 | 90,000 |
| 71400 | Contractual Services – Individ. | 39,000 | 42,000 | 27,000 | 108,000 |
| 71600 | Travel | 25,000 | 63,000 | 42,000 | 130,000 |
| 72100 | Contractual Services-Companies | 30,000 | 95,000 | 45,000 | 170,000 |
| 72200 | Equipment and Furniture | 41,000 | 34,000 | 19,000 | 94,000 |
| 72300 | Materials and Goods | 16,000 | 19,000 | 14,000 | 49,000 |
| 72400 | Communication and Audiovisual Equipment | 5,000 | 6,000 | 2,000 | 13,000 |
| 72500 | Supplies | 10,000 | 10,000 | 10,000 | 30,000 |
| 72800 | Information Technology Equipment | 32,000 | 2,000 | 0 | 34,000 |
| 73100 | Rental & Maintenance-Premises | 6,000 | 6,000 | 3,000 | 15,000 |
| 74200 | Audio Visual & Print Prod Costs | 6,000 | 11,000 | 4,000 | 21,000 |
| 74500 | Miscellaneous Expenses | 16,000 | 16,000 | 14,000 | 46,000 |
| 75700 | Training | 20,000 | 50,000 | 50,000 | 120,000 |
|  | **Totals** | **281,000** | **434,000** | **285,000** | **1,000,000** |

**Co-financing sources by outcome**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Type** | **Outcome 1** | **Outcome 2** | **Outcome 3** | **Outcome 4** | **Project Management** | **Total** |
| GEF |  | 175,000 | 394,000 | 286,000 | - | 95,000 | **950,000** |
| GOJ | In kind | 150,000 | 300,000 | 445,000 | 5,700,000 | 655,000 | 7,250,000 |
| UNDP | Cash |  |  |  |  | 50,000 | 50,000 |
| **Totals** |  |  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Summary of funds** |  |  |  |  |  |
|  |  | **Amount** | **Amount** | **Amount** | **Total** |
| **Year 1** | **Year 2** | **Year 3** |
|  | **GEF** | 281,000 | 434,000 | 285,000 | **950,000** |
|  | **GOJ** | 2,100,000 | 3,650,000 | 1,500,000 | **7,250,000** |
|  | **UNDP** | 18,000 | 16,000 | 16,000 | **50,000** |
|  |  | **2,364,000** | **4,102,000** | **1,784,000** | **8,250,000** |

**Budget Notes:**

|  |  |
| --- | --- |
| **1** | **Component 1**  Financial allocations for the achievement of component 1 are distributed as follows and will primarily aim at developing the necessary systems, capacities and structures to undertake proper monitoring of marine and coral biodiversity and proxy indicators associated with their health. In line with the UN programming principles and with the Paris Declaration, monitoring and evaluation for the project is embedded within broader capacity development of the national institution in undertaking such action. The following budget lines are foreseen with adjustments and fine-tuning to be done on a regular basis:  **Local expertise** will be recruited by the project over its lifetime to undertake the following assignments: (i) refining the project and ASEZ environmental performance monitoring framework with associated indicators and means of verification; (ii) collecting baseline information on these retained indicators and establishing a long term monitoring protocol for use by the ASEZA; (iii) training the ASEZA technical staff and other potential partners – such as NGOs – on the collection and analysis of this data. Local technical experts will be recruited throughout the lifetime of the project, winding down on year 3 to enable a sustained mentoring and phase in of this monitoring function into ASEZA operations.  A **company** will be competitively recruited to work with the GIS and MIS departments of the ASEZA on the development, operation and input to a database which enables the capture of information generated by the local technical experts above. This company will work concurrently with the technical experts to design an interface that is able to absorb the raw information provided and overlay this with other parameters in such a way that it becomes a visual tool conducive for decision making and determining trade-offs. The TORs of the company will include the delivery of training and capacitating the ASEZA team for the implementation, use and maintenance of the database and associated equipment.  **IT equipment** to enable the deployment of the database and its use will be purchased, however costs will be shared with ASEZA and the maintenance and running costs provided by ASEZA.  Other items budgeted under this component include (i) **printed materials** – monitoring logs, reef check guides, ASEZA state of the environment report; (ii) **materials** and **goods** – such as interpretation materials, ropes, fins, lab equipment and products for measuring environmental parameters; Communication and audio-visual equipment will consist of underwater GPS and camera systems that will enable the capture of visual and georeferenced monitoring data.  Travel costs incurred under this component are primarily targeted at providing boats and other marine transport to the ASEZA and other experts operating under this component and in particular for the collection of raw data. Other travel costs under this component include study tour to locations with similar dynamics on coral conservation and marine biodiversity management. Such study tours will only be undertaken in case local expertise is not available and in case of a best practice which would significantly benefit the ASEZ and enable it to leap frog. |
| **2** | **Component 2**  Component 2 of the project receives the highest level of budget, as it entails significant partnerships and investment in time and effort to be able to support such partnership development.  **International consultants** will be recruited in year 2 and 3 of the project to provide support with the following (i) guiding the identification and implementation of financing and incentive options; (ii) supporting the development and implementation of selected certification schemes; (iii) providing support and technical inputs for the preparation of the guidelines on ecolabelling and environmentally sound marine based activities, including mooring, anchoring, etc...  **Local consultants** and experts will be recruited during the first two years of the project and will focus primarily on undertaking the participatory process required for undertaking the capacity assessment, preparation of and initiation of the implementation of the capacity development plan. Technical expertise will also be locally sourced to support with the ecolabelling efforts and with the deployment of the guidelines, their adaptation to the local context and the development of the interpretation center.  **Specialized companies** will be competitively recruited notably to deliver a high class media campaign, and to provide the expertise for the design of an interpretation center that’s in adequacy with the natural environment and with the touristic ambitions of the ASEZ. It is yet to be determined whether a specialized company or an individual consultant will be needed to support ASEZA develop a new application format which takes into account coral and marine issues. A financial allocation has been made under the specialized company budget line but may be transferred to one which may be deemed more adequate by the project board.  **Equipment and furniture** will be purchased on a cost-sharing basis with ASEZA for the refurbishment of the interpretation center, introducing elements and materials which are environmentally friendly and provide an additional opportunity for education and awareness raising.  **Materials and goods, supplies and travel budget lines** are intended to support the local participatory processes and consultations that will take place. Similarly they will also provide financial support to the private sector in the form of catalytic funding for the implementation and adoption of the certification schemes and provide them with the material resources – such as flags, testing materials etc... – to enable them pick up and apply the new guidelines and voluntary certification schemes.  **Training** and investment in capacity development for (i) ASEZA; (ii) the private sector; (iii) the NGOS; (iv) individual potential certifiers will be essential to ensure a full understanding and establishment of technical capacity in the ASEZA and in the country for the deployment and long term monitoring and verification of compliance. |
| **3** | **Component 3**  Component 3 consists essentially in establishing the long-term regulatory framework for adequate management of the marine resources from an institutional perspective. It consists primarily of measures associated with the barriers identified during preparation, such as awareness, planning and others. **International consultants** will primarily provide technical assistance and backstopping for the development of the Marine Spatial Plan and subsequently the ICZM strategy and associated regulation by bringing in international lessons and best practices. An international consultant will also be recruited under this component to undertake the final evaluation of the project; while this final evaluation will look into the achievements and impacts of the GEF project, it will more importantly provide a forward looking assessment of what still needs to be done and how to scale up initiatives through their institutionalization both within the public and private sector.  **Local consultants** will be recruited for the preparation of the Marine Plan, for the development of the ICZM plan and more importantly for undertaking the local consultations which will serve as a basis for the adoption and local ownership of both of these plans. Local expertise in law may also be required to provide the legal basis for the anchoring of these plans and strategy at the right level to ensure compliance and enforcement.  Material support in the form of equipment, printed documents, furniture, communication equipment will be provided on a co-financing basis with ASEZA to enable a wide dissemination of project results and its products. Under this component, the lessons learnt element of the project will be financed, and will enable to generation and sharing of lessons between the ASEZA, other newly established SEZAs in Jordan and other global SEZs. |

## Management Arrangements

1. The project ‘Mainstreaming Marine Biodiversity Conservation into Coastal Management in the Aqaba Special Economic Zone’ will be nationally executed, in accordance with UNDP procedures. The executing agency is ASEZA, a choice which was made on the basis that (i) ASEZA requested the proposal; (ii) has the mandate and institutional set up to deliver on the objective of the project. The UNDP Jordan Country Office will be responsible for high level oversight of the project.
2. ASEZA will appoint a National Project Director (cf TORs attached) who will be a full time staff member of ASEZA and will be responsible for approving the project annual workplan, budget and financial reports together with UNDP Jordan.

***Project Management Unit***

1. A Project Management Unit (PMT) comprised of a Management Advisor and a Programme Assistant will be recruited and will be based in the ASEZA. The PMT will support the National Project Director to undertake the coordination and the day-to-day management of the programme with due time and diligence including preparation of the annual work-plan, the reporting requirements (quarterly, annual and donors reporting). External technical consultants will be involved in providing technical support for the different components of the programme and creating national global knowledge products. The program will also draw upon the substantial expertise of the National partners and actors (academia, UN specialized agencies in the region, ASEZA) as well as internal UNDP expertise at the national, regional and global levels.
2. The PMT will be responsible for the planning and overall management of project activities including project reporting, accounting and monitoring, recruitment, procurement and services solicitation, supervision of the implementing partners and managing project resources. It will be accountable to the Government Coordinating Authority (i.e., MoPIC) and to UNDP for the production of outputs, the achievement of project objectives and the use of project resources. It will facilitate dialogue and networking between the partners and utilize relevant expertise to support the project.
3. The recruitment for required human resources will take place in the first quarter of project implementation. The PMT will appoint a suitably skilled project manager to have overall project control and implementation responsibilities. The PMT could also recruit a Chief Technical Advisor (CTA) to facilitate the PMT’s technical works in implementing the project. An Operational Focal Point (OFP) from ASEZA will also be appointed to sit within the PMT. Each project component or major work package will be coordinated by a Component team leader (CTL).
4. The Project CTA will have the authority to follow up on delivering the technical components of the project on behalf of the National Project Director within the constraints laid down by the Project Board. His/her prime responsibility will be to ensure that the project produces the results specified in the project document, to the required standards of quality and within the specified constraints of time and cost.

***Project Steering Committee***

1. A Project Steering Committee (PSC) will be established to oversee the implementation of this complex, multidisciplinary project. This will be a particularly critical group responsible for making, on a consensus basis, management decisions for the project when guidance is required by the Project Manager. This group will be responsible for ensuring that the overall goals of the programme are being effectively addressed by each of the project components. The PSC will consist in representatives from the MoPIC, UNDP, and PMT and will meet quarterly or as necessary when requested to do so by the Project Manager. The PSC will be consulted by the Project manager for decision-making when the Project manager’s tolerances have been exceeded.

***Project Board***

1. A Project Board (PB) will be established to provide strategic, long-term guidance for the programme and provide consultations whenever needed. The PB will make recommendations on issues such as the prioritization of project activities, shifts in strategic direction when required and also help to secure project partnerships with other relevant institutions. The PB will meet twice a year and include representatives from UNDP (Chair) and key stakeholders such as the Jordanian Ministry of Planning and International Cooperation (MOPIC) and Aqaba Special Economic Zone Authority (ASEZA).
2. As the over-arching goals of the project are of mainstreaming biodiversity conservation into effective management of the coastal zone, the PB has a particularly crucial role in ensuring the long term continuity of the programme following completion of the designated project components. The PB should be empowered and appropriately funded to have a long-term, strategic horizon with a vision in keeping with the over-arching programme goal. This is seen as essential to effective long term management of Jordan’s coastal zone.

***Project Assurance Advisor***

1. The Project Assurance Advisor’s role will be to support the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures that appropriate project management milestones are managed and completed, the respective UNDP Programme Officer will hold the Project Assurance Advisor’s role for the UNDP Board members.
2. The above project management structure is illustrated in Figure 10 below.

**National Project Director**

**Project Board**

**Aqaba Special Economic Zone Authority**

**Ministry of Planning and International Cooperation**

**United Nations Development Programme**

**Project Assurance**

UNDP Programme Analyst

**Management Advisor**

**Project Organisation Structure**

**TEAM A**

**(Focus Group 1)**

**TEAM C**

**(Focus Group 3)**

**TEAM B**

**(Focus Group 2)**

**Project CTA (if necessary)**

**Figure 10: Proposed Organizational Structure**

***Collaborative and Complementary Arrangements***

1. There are a number of complementary projects occurring in the wider region that may be related to this project. Coordination with these projects and programmes, both within Jordan and financed by international agencies, will be required to achieve the best use of limited resources for improved environmental outcomes across the whole region.
2. For example, co-ordination will be required with other incipient projects for strengthening national park financing in Egypt (UNDP/GEF, start-up phase) and a regional project on fisheries strengthening (recently submitted by the World Bank). The project team should also ensure collaboration with the USAID-funded ‘Red Sea Sustainable Tourism Initiative’ in Egypt. This programme is introducing Environmental Management Systems to the tourism industry, possibly providing ‘lessons learned’ opportunities for the Jordanian tourism industry.
3. The project will build on the work of PERSGA, in which Jordan is an active participant, in particular the activities initiated under the GEF/UNDP/UNEP/World Bank supported PERSGA Strategic Action Programme. As recommended by PERSGA, the indicators proposed by IOC-UNESCO for measuring progress in ICZM will be used. The MPA training provided by PERSGA will be used to improve management of the Marine Park; and other PERSGA-supported capacity development activities will be followed-up at national level.
4. A variety of local arrangements and complementary programmes are also operational in the country which may influence project strategy:

* As indicated above a compensation fund for mitigation of coral reef loss resulting from the new port development in the south of the country has been assessed against the Aqaba Development Corporation (ADC). This fund is based upon financial penalties for destruction of coral reefs, assessed at JOD4000 per square metre. The project aims to help the government in developing the criteria for the environmental compensation fund or to help the beneficiary to access the funds.
* A similar penalty has been assessed against the Aqaba Container Terminal (ACT) for damage to reef relating to expansion of the container port and temporary relocation of the ferry terminal. At this point in project design, ASEZA is in the process of supplying a work plan for conducting transplantation experiments themselves.
* MSS staff have been involved in coral transplantation experiments within the Gulf Of Aqaba. Staff are well experienced in the experimental design and monitoring studies required for the proposed reef transplantation.

1. While projects and initiatives under implementation have already been identified for synergies, partnerships with new and emerging initiatives will also be pursued, and while the project’s framework and scope may not be reduced, it may be adjusted to accommodate for these synergies and new partnerships. The project management structure may be adjusted to accommodate for these, however at no additional cost to the GEF resources allocated for project management.

## Monitoring Framework and Evaluation

1. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the Project Team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF. The Results and Resources Framework in section II part I provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the project's Monitoring and Evaluation system will be built.
2. The following sections outline the principal components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Workshop following a collective fine-tuning of the indicators, means of verification and the full definition of the M&E responsibilities of the project staff. Further details on the baseline values, adjustment and modification of project indicators and specification of target values will be provided during the inception phase of the project, recorded in the inception report and serve as a basis for the development of a full-fledge monitoring and evaluation system which will serve the dual purpose of the project in the immediate term and of ASEZA on the longer run.
3. The Project strategy and objectives, intended outcomes and outputs, implementation structure, work plans and emerging issues will be regularly reviewed and evaluated annually by the Project Board. Periodic Status Reports will be prepared at the request of the Board for presentation at key meetings associated with the project.
   1. **Project Start**
4. A Project Inception Workshop will be held within the first 2 months of project start or as soon as the project team is on board. The inception workshop will mark the official starting date of the project. A Project Inception Workshop will be conducted with the Project Team, relevant government counterparts, co-financing partners, the UNDP-CO and representation from the UNDP-GEF Regional Coordinating Unit. The objective of this Inception Workshop will be to help the Project Team to understand and take ownership of the project’s goals and objectives, as well as finalize the preparation of the project's first annual work plan on the basis of the project's logframe matrix. This will include reviewing the logframe (indicators, means of verification, assumptions), imparting additional details as needed and, on the basis of this exercise, finalize the Annual Work Plan (AWP) with precise and measurable performance indicators and in a manner consistent with the expected outcomes.
5. The Inception Workshop should address a number of key issues including:
6. Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
7. Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
8. Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
9. Discuss financial reporting procedures and obligations, and arrangements for annual audit.
10. Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.
11. An Inception report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting as well as modifications to the project document. The inception report documents changes to the baseline situation, external circumstances, changes in risks, new partnerships and opportunities. The Results and Resources Framework is therefore fine-tuned and adjusted in the inception report, which from thereon, serves as the reference document for project implementation.
    1. **Monitoring Responsibilities and Events**
12. A detailed schedule of project review meetings will be developed by the Project Management Unit, in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. This schedule will include: (i) tentative time frames for annual reviews, Project Board meetings, and (ii) project related Monitoring and Evaluation activities.

* In accordance with the programming policies and procedures outlined in the UNDP User Guide, the project will be monitored through the following:

**Quarterly:**

1. Progress made shall be monitored in the UNDP Enhanced Results Based Managment Platform.
2. Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
3. Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
4. Other ATLAS logs can be used to monitor issues, lessons learned etc... The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

**Annually:**

1. Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

* Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
* Project outputs delivered per project outcome (annual).
* Lesson learned/good practice.
* AWP and other expenditure reports
* Risk and adaptive management
* ATLAS QPR
* Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

**End of Project:**

1. An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project’s results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.
2. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the [UNDP Evaluation Office Evaluation Resource Center (ERC)](http://erc.undp.org/index.aspx?module=Intra). The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.
3. End of Project Terminal Review. The Terminal Review will be held in the last month of project operations on behalf the Project Board. The ASEZA- Environment Commission will be responsible for preparing the Terminal Report and submitting it to UNDP-CO and GEF's Regional Coordinating Unit for Arab States. It shall be prepared in draft format at least two months prior to the Terminal Review meeting in order to allow review and will serve as the basis for discussions. . This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project’s results. The Terminal Review will consider the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It will decide whether any actions are still necessary, particularly in relation to the sustainability of project results and will act as a vehicle through which lessons learned can be captured to feed into other projects under implementation or formulation. The Project Board will have the authority to suspend disbursements if project performance benchmarks are not met. Benchmarks will be determined at the Inception Workshop, based on delivery rates and qualitative assessments of achievements of outputs.
   1. **Periodic Monitoring through site visits:**
4. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.
   1. **Financial reporting and accountability**
5. The ASEZA will provide the UNDP Resident Representative with certified periodic financial statements and with an Annual Audit of the financial statements relating to the status of the UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance Manuals. The Audit will be conducted by the legally recognized commercial auditor hired by the UNDP Jordan Country Office. UNDP will be responsible for making audit arrangements for the project in communication with ASEZA. UNDP and the ASEZA will provide audit management responses and the NPD, with support from the management advisor and project team will address audit recommendations.
6. In order to accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF project publications, including among others, project hardware and vehicles purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF.
7. UNDP has been requested by the government to provide technical and substantive assistance in setting-up the project. UNDP is in a prime position to assist the Government through its ability to build partnerships, coordinate between the various parties involved, obtain knowledge from global sources and experiences, build capacities, and assist with fund raising efforts. The project will open a separate bank account and funds will be disbursed through direct payments cash transfer modality, the NPD with assistance from the Management Advisor will be responsible for keeping record of payments, and will report technically and financially to UNDP on the use of the fund, prior to requesting the advance for the following quarter. UNDP Jordan will enter into an agreement with ASEZA to provide technical support to the project. The ASEZA is contributing USD 7,250,000 in kind contribution, and the UNDP will provide a financial contribution of USD 50,000 in addition to the 950,000 US$ financing from the GEF administered by UNDP.
8. Upon the request of the NPD, UNDP will be responsible for the recruitment and contracting of project staff in coordination with the Project Steering Committee and will be responsible for the purchase of non-expendable equipment in accordance with UNDP rules and procedures. An Implementation Support Service (ISS) fee will be charged by UNDP to the project for these services in accordance with the new UNDP cost recovery policy and the latest update of the UNDP Universal Price List.
9. UNDP is responsible for providing the NPD, Management Advisor and project team with copies of the operational manual, financial rules and procedures as well as any standard operating procedures which may be required for the tem to successfully implement the project without running into logistical and operational hindrances.
   1. **Learning and knowledge sharing:**
10. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.
11. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.
12. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

**M& E workplan and budget**

| **Type of M&E activity** | **Responsible Parties** | **Budget US$**  *Excluding project team staff time* | **Time frame** |
| --- | --- | --- | --- |
| Strategic Planning Matrix (Annual Work Plan) | * Project Team * UNDP-CO | 0 | Annually, first SPM immediately following approval of the project |
| Baseline and End-of Project Study of Project Indicators | * PMT * Hired experts | 45,000 | Start and end of project. |
| Measurement of Means of Verification for Project Progress and Performance (measured annually) | * Overseen by UNDP-GEF RCU, NPD and Management Advisor * Counterpart organizations in the field or hired Consultants on needs basis | Part of the SPM’s preparation. | Annually, prior to APR/PIR and to the definition of Annual Work Plans |
| APR-PIR | * PMT * UNDP-CO | 0 | Annually |
| Steering Committee Meetings | * NPD supported by Management Advisor * UNDP-CO | 0 | Following Project IW and held regularly |
| Technical Reports | * PMT * Hired Consultants | As part of project activities | To be determined by Project Team and UNDP-CO |
| Final External Evaluation | * PMT * UNDP-CO * External Consultants | 25,000 | At the end of project implementation |
| Terminal Report | * NPD with support from Management Advisor * UNDP-CO | 0 | At least one month before the project’s end |
| Lessons Learned | * PMT * UNDP-CO (suggested formats for documenting best practices, etc) * External Consultant | 10,000 | Yearly |
| Audit | * UNDP-CO * PMT * External Auditor | 5,000 | Yearly |
| Visits and monitoring activities to the project’s sites (UNDP staff travel costs to be charged to IA fees) | * UNDP-CO * Government Representatives | 20,000 | Yearly |
| **TOTAL indicative COST** Excluding Project Team staff time and UNDP staff and travel expenses. | | US$ 105,000 |  |

## Legal Context

1. *This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Government of the Hashemite Kingdom of Jordan and the United Nations Development Programme, signed by the parties on 1976 January 12. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.*
2. *The UNDP Resident Representative in Amman, Jordan is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:*
3. Revision of, or addition to, any of the annexes to the Project Document;
4. Revisions that do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
5. Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
6. Inclusion of additional annexes and attachments only as set out here in this Project Document.
7. *Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP’s property in the implementing partner’s custody, rests with the implementing partner.*
8. *The implementing partner shall:*
9. put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
10. assume all risks and liabilities related to the implementing partner’s security, and the full implementation of the security plan.
11. *UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.*
12. *The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via* [*http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm*](http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm)*. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.*

Annex 1 List of 151 Corals species likely to be found at Dirreh Bay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Astreopora cucullata* | *Favia laxa* | *Goniopora burgosi* | *Montipora circumvallata* | *Podabacia sinai* |
| *Astreopora cucullata* | *Favia maritima* | *Goniopora columna* | *Montipora cryptus* | *Porite nodifera* |
| *Astreopora gracilis* | *Favia maxima* | *Goniopora lobata* | *Montipora efflorescens* | *Porits columnaris* |
| *Astreopora listeri* | *Favia rotundata* | *Goniopora savignyi* | *Montipora informis* | *Porits cumulataus* |
| *Astreopora myriophthalma* | *Favia veroni* | *Goniopora stokes* | *Montipora meandrina* | *Porits echinulata* |
| *Astreopora suggesta* | *Favia veroni* | *Goniopora sultani* | *Montipora stellata* | *Porits lichen* |
| *Blastomussa merleti* | *Favites abdita* | *Goniopora tenella* | *Montipora stilosa* | *Porits lobata* |
| *Cantharellus noumeae* | *Favites chinensis* | *Herpolitha limax* | *Montipora tuberculosa* | *Porits nodifera* |
| *Coscinaraea monile* | *Favites complanata* | *Herpolitha weberi* | *Mycedium elephantotus* | *Porits rus* |
| *Ctenactis crassa* | *Favites flexuosa* | *Hydnophora exesa* | *Mycedium umbra* | *Psamocora contogua* |
| *Ctenactis echinata* | *Favites halicora* | *Leptastrea bottae* | *Oxypora convolute* | *Psamocora haimeana* |
| *Cycloseris costulata* | *Favites paraflexuosa* | *Leptastrea pruinosa* | *Oxypora crassispinosa* | *Psamocora nierstraszi* |
| *Cycloseris patelliformis* | *Favites pentagona* | *Leptastrea transversa* | *Oxypora egyptensis* | *Psamocora profundacella* |
| *Cyphastrea hexasepta* | *Favites russelli* | *Leptoria sp.* | *Oxypora lacera* | *Pseudosiderastrea tayami* |
| *Cyphstrea chalcidicum* | *Favites spinosa* | *Leptoseris explanata* | *Pachyseris speciosa* | *Seriatopora caliendrum* |
| *Cyphstrea hexasepta* | *Favites vasta* | *Leptoseris foliosa* | *Padobacia sinai* | *Seriatopora hystrix* |
| *Cyphstrea serailia* | *Fungia concinna* | *Leptoseris hawaiiensis* | *Pavona cactus* | *Siderastrea savignyana* |
| *Diaseris fragilis* | *Fungia corona* | *Leptoseris incrustans* | *Pavona danai* | *Stylocoeniella armata* |
| *Diplostrea heliopora* | *Fungia fungites* | *Leptoseris mycetoseroides* | *Pavona decussata* | *Stylophora danae* |
| *Echinophyllia aspera* | *Fungia granulose* | *Leptoseris scabra* | *Pavona diffluens* | *Stylophora kuehlmanni* |
| *Echinophyllia orpheensis* | *Fungia kluzingeri* | *Leptoseris yabei* | *Pavona frondifera* | *Stylophora pistillata* |
| *Echinopora forskaliana* | *Fungia paumotensis* | *Lobophyllia corymbosa* | *Pavona maldivensis* | *Stylophora subseriata* |
| *Echinopora fruticulosa* | *Fungia scutaria* | *Lobophyllia hemprichii* | *Pavona varians* | *Symphyllia erythrea* |
| *Echinopora hirsutissima* | *Galaxea fascicularis* | *Lobophyllia robusta* | *Platygyra daedalea* | *Tubasrea micranthus* |
| *Echinopora irregularis* | *Goniastrea aspera* | *Merulina ampliata* | *Platygyra lamellina* | *Tubastrea faulkneri* |
| *Echinopora lamellosa* | *Goniastrea australensis* | *Merulina scheeri* | *Platygyra sinunses* | *Turbinaria mesenterina* |
| *Echinopora teranensis* | *Goniastrea edwardsi* | *Millepora dichotoma* | *Plerogyra sinuosa* | *Turbinaria reniformis* |
| *Erythrastrea falbellata* | *Goniastrea pectinata* | *Montastrea annuligera* | *Pocillopora damicornis* |  |
| *Favia danae* | *Goniastrea peresi* | *Montastrea curta* | *Pocillopora eydouxi* |  |

Annex 2 List of corals endemic to the Red Sea and Gulf of Aden.

|  |  |
| --- | --- |
| ***Species*** | **Location** |
| *Acropora maryae* | Red Sea |
| *Acropora parapharaonis* | Red Sea |
| *Acropora rufus* | Red Sea |
| *Anacropora spumosa* | Red Sea |
| *Echinopora irregularis* | Red Sea |
| *Echinopora tiranensis* | Red Sea |
| *Favia albiddus* | Red Sea and Gulf of Aden |
| *Favia lacuna* | Red Sea |
| *Goniopora ciliates* | Red Sea and Gulf of Aden |
| *Goniopora pearsoni* | Red Sea |
| *Goniopora savignyi* | Red Sea |
| *Mersullina scheeri* | Red Sea |
| *Montipora aspergillus* | Red Sea |
| *Montipora circumrallata* | Red Sea |
| *Montipora cryptus* | Red Sea |
| *Montipora hemispherica* | Red Sea |
| *Montipora pachytuberculata* | Red Sea |
| *Montipora saudii* | Red Sea |
| *Montipora spongiosa* | Red Sea and Gulf of Aden |
| *Mycedium umbra* | Red Sea and Gulf of Aden |
| *Oxypora convolute* | Red Sea |
| *Oxypora egyptensis* | Red Sea |
| *Podabacia Sinai* | Red Sea |
| *Sandololitha Africana* | Red Sea and Gulf of Aden |
| *Stylophora danae* | Red Sea and Gulf of Aden |
| *Stylophora kuehlmanni* | Red Sea and Gulf of Aden |
| *Stylophora mamillata* | Red Sea and Gulf of Aden |
| *Stylophora wellsi* | Red Sea and Gulf of Aden |
| *Symphyllia erythraea* | Red Sea and Gulf of Aden |

Annex 3 Terms of reference for key project personnel

**National Project Director**

The National Project Director (NPD) is assigned by ASEZA and is ultimately responsible for the project, supported by the Senior Beneficiary and Senior Supplier. The NPD’s role is to ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes. The NPD has to ensure that the project gives value for money, ensuring a cost-conscious approach to the project, balancing the demands of beneficiary and supplier.

Specific Duties and Responsibilities:

* Represents the Government of Jordan as the person responsible for project implementation from the government side;
* At the outset of project implementation, in-cooperation with UNDP ensures the selection of the project implementation team and duly initiation of the start-up phase;
* Ensures that there is a coherent project organisation structure and logical set of plans; The National Project Director ensures the coordination of project inputs and outputs between ASEZA and UNDP;
* Supervises implementation of the project during the entire period, assuring that work is carried out in accordance with the Project document and anticipate any changes that may be required;
* Monitors and control the progress of the project at a strategic level and informs UNDP in time of any anticipated delays;
* Clears the procurement plans, terms of references, final selection of and recruitment of experts, clears and approves technical reports submitted by experts and consultants recruited by the project;
* Secures all required authority to project experts for successful project implementation and facilitates access to and participation of government administrations relevant to the projects objectives;
* Ensures presentation of all project expenses to authorized officials, in accordance with operational principles of national implementation;
* Ensures that risks are being tracked and mitigated as effectively as possible;
* Organizes and reports to Project Board meetings and informs relevant stakeholders about project progress;
* Ensures coordination between project activities and other governmental activities, and facilitates the tracking of government contributions to the project;
* Establishes relationships with national and international financial organizations for identification of cooperation and synergies to achieve project goals;
* Identifies and resolves problems, relating to project implementation, as necessary.
* Provide other types of support to assure successful implementation of the project and further activities, including the sustainability and dissemination of the results.

The NPD is responsible for overall assurance of the project. If the project warrants it, the NPD may delegate some responsibility for the project assurance functions. The following documents shall be signed by the NPD:

Administrative and financial documents:

* Project revisions (if the project total budget or duration of the project is being changed)
* Combined Delivery Reports
* Transfer of Assets Form
* Appointment of the Project Manager
* Forms and documents related to procurement of expertise and services, and clearance of payments.

Monitoring and evaluation of the project

* Minutes of the Project Board meetings
* Annual reports and Project Implementation Review Reports
* Final review report

**Management Advisory**

Under the overall supervision of the National Project Director, the Advisor will have the following responsibilities:

* Assists the National Project Director in coordinating project activities in compliance with Annual Work Plans and Budgets (APWBs).
* Supports the procurement of services for the delivery of results and works with the NPD to ensure quality of final deliverables, thereby ensuring their relevance, effectiveness and efficiency.
* Ensuring that the project is implemented with the full participation of local actors and that functioning mechanisms exist that ensure that their interests are taken into account, communicated and reflected in the implementation of the project.
* Promotion of the coordinated participation of Government institutions and NGOs, at central and local levels, in project implementation.
* Realization of continuous and periodic monitoring of project impacts, in relation to the achievements foreseen in the APWBs and the impacts foreseen in the project results framework.
* In communication with the NPD, ensuring that the project is implemented in accordance with the policies and plans of ASEZA.
* In communication with the Programme Official of UNDP, ensuring that the project is implemented in accordance with the United Nations Development Assistance Framework (UNDAF) in Jordan.
* Identification and promotion of opportunities for actions by other agencies of the UN system in the project area, in particular as they relate to MDGs.
* Ensuring that a cross-cutting gender focus is incorporated into the actions of the project.
* Together with UNDP, preparation of Periodic Implementation Reports (PIRs), detailing project progress, to be presented to GEF.
* Together with UNDP and the project team and in discussion with local stakeholders, preparation of APWBs for approval by the Project Board and UNDP/GEF.
* With support from the project administrative team, ensuring efficient and transparent execution of financial and physical resources, in conformity with the rules of the Government, GEF and UNDP.
* Design and implementation of professional development plans for the members of ASEZA towards long term capacitation.
* Identification of risks that could affect the achievement of the foreseen impacts of the project, and the definition and application of corresponding mitigation strategies.
* Support to the functioning of different entities at ASEZA, through the provision of advice and logistics.
* Preparation and oversight of the implementation of the operational manuals for the implementation of the project.
* Organization and support of external evaluations of the project.

Annex 4 Consulted parties

|  |  |  |
| --- | --- | --- |
| **Date** | **Individual Contact** | **Organisation** |
| 29/08/09 | Amal Dababseh | UNDP |
| 30/08/09 | Dr. Salim M. Al-Moghrabi | ASEZA-EC |
|  | Walid Abdullah | ASEZA Legal Unit |
|  | Eng. Mohammad Al Darbasawi | ADC |
|  | Klaus Holm Laursen, CEO | ACT |
|  | Abdullah Al Moumani | Red Sea Dive Centre, Aqaba Dive Association |
| 31/08/09 | Dr. Ayman Soleiman  Eng. Wael Suleiman  Eng. Jihad Alsawair | Ben Hayyan Aqaba International Laboratories |
|  | Dr. Bilal Bashir | ASEZA Investment Commissioner |
|  | Karema Al Dabet | ASEZA Community Development Unit |
|  | Mona Hawa | ASEZA Marketing and Tourism Director |
| 01/09/09 | Dr.Saed Damhoureh,  Dr. Saber Al-Rousan,  Dr. Mohammad Zibdeh,  Dr. Riyad Manasrah,  Dr. Tariq Al-Najjar | Marine Science Station |
|  | Eng. Fadi Sharaiha,  Arwa El-Halou Khreis  Faisal Abu Sondos | Royal Marine Conservation Society of Jordan (JREDS) |
|  | Ahmad AsShour | ASEZA GIS Unit |
|  | Mazen M Haobsha | ASEZA Director of Environment |
| 02/09/09 | Eman Al Kouz | Environmental Directorate, EIA section |
|  | Eng. Omar Obudiat | ASEZA MIS Director |
|  | Abdullah Yassen | City Service Centre, Financial System |
|  | Cpt Mohammed Halouwi | Prince Hamzah Oil Spill Response Unit |
|  | Neil Carruthers | Project Management Unit for Port Development (ADC) |
| 03/09/09 |  |  |
|  | Hassan Qutaishat | Finance Unit ASEZA |
|  | Abdullah Abu Awali | Head, Marine Park |
|  | Ahmad Yassein | Head, Glass Boat Association |
| 06 -09 /09/09 | Luc Stevens | UNDP Regional Representative |
|  | Saleh Kharabsheh | MoPIC |
|  | Mirey Atallah | UNDP RTA |

*Consultation & Liaison Strategy*

1. The key sector groups identified and consulted during the field mission in late August/early September 2009, and in a national workshop in November 2009, should be consulted further during the development and implementation of the project. These sector groups, of which each member can be consulted in a similar fashion are as follows:

* Governmental departments and agencies
* Quasi-nongovernmental organisations
* Nongovernmental organisations
* Private (or publicly listed) companies
* Members of the general public

1. The critical success pathway for ensuring adequate consultation and uptake (‘buy-in’) among governmental bodies is to ensure that a senior staff member from each of the main operating units is involved in a meaningful way. In addition, a ‘Project Champion’ from within one of the upper management layers should be appointed (or preferably the Project Champion would volunteer) to lead the development of the program and ensure overall coordination between participating units. The key point of contact within the project team will be the Operational Focal Point, within the Project Management Unit.
2. Quasi-nongovernmental organisations are those with policy linkages to government but operate effectively independently. The most appropriate means by which these organisations can be involved in the program is to nominate an Operational Liaison from within each agency. The Operational Liaison will be responsible for discussing project progress with the Project Management Unit. The Operational Liaison will be responsible for internal coordination of any required duties or actions for the project and also for identifying any limiting factors or constraints that may hinder progress
3. Consultation with non-governmental organisations, being completely independent, may require additional resources to achieve. In this context, however, the identified organisations have a high level of interest in the outcomes of the project and thus difficulties in facilitating involvement are not considered likely. A member of the Project Management Unit should be charged with conducting regular consultation meetings with NGO representatives.
4. Members of the general public will likewise have varied interests in the project and its outcomes. As improving public awareness of the importance of marine biodiversity conservation is one of the cornerstone outcomes of the project, it is incumbent on the Project Management Unit to develop and implement a detailed strategy for raising the level of public awareness. This strategy should include consideration of public workshops and presentations, advertising, information brochures and posters and advertising in the press. The ‘Natural Interpretation and Information Centre’, development of which is one of the project outputs, could serve as a public focus for advertising the program, its progress and successes. Utilisation of the educational resources of the Aqaba Marine Park should also be encouraged as a means by which the public can be kept informed.
5. Effective consultation and stakeholder involvement is critical for the success of the project. The Project Management Unit holds primary responsibility for ensuring that such involvement is maintained throughout the life of the project.

Annex 5 Draft Coral Transplantation Plan

**Coral Translocation Management Plan**

**Introduction**

1. One of the mitigation measures that can significantly reduce the negative impacts of port developments on coral habitats is the transplantation of coral from the site of impact to unaffected areas of the coastline. The main aims of this form of mitigation is to preserve as many of the sessile and associated species as possible from the impact site and to keep the coral ecosystem intact for other organisms that use the resources provided by the reefs.
2. This management plan is based on coral reef restoration guidelines produced by the Coral Reef Targeted Research & Capacity Building for Management (CRTR) Program (which is a partnership between the Global Environment Facility, the World Bank, The University of Queensland (Australia), the United States National Oceanic and Atmospheric Administration (NOAA), and approximately 40 research institutes & other third parties around the world), as well as experiences from translocation experiments in Jordan (Al-Horani 2007c, F. Al-Horani pers. comm.). The document does not contain specific reference to the advice provided from these resources but appropriate reference will be made to particular publications of similar experience and initiatives elsewhere in the world. There are also various other manuals available (e.g., Clark 2002, Harriott & Fisk 1995, Heeger & Sotto 2000, Job et al. 2003, Miller et al. 1993, Omori & Fujiwara 2004). It should be noted that there is still much uncertainty in the science underpinning coral reef restoration, not least due to the inherently great complexity of reef ecosystems.
3. Corals are keystone species of tropical reef ecosystems in the same way that trees are keystone species of forest ecosystems.

* Corals provide the major constructional and accreting element for the sea-defense service provided by reefs.
* Corals provide structural complexity (usually correlated with biodiversity) and shelter for fishes and invertebrates.
* Coral habitats provide shelter for herbivores, which can help control algal overgrowth.
* Living corals are attractive and representative of healthy reefs in the minds of tourists.

1. When corals are lost, fish biodiversity and abundance may decline also, along with revenues from tourist diving and fishing. If a sustainable coral population and some structural complexity can be established in a new location, then it is more likely that other elements of the system will re-establish naturally, promoting increasingly natural ecosystem function (e.g., self sustaining reefs with good meta-population connectivity and feedback loops).
2. Most transplantation studies have focused on stony corals with symbiotic algae, which are the main reef builders (zooxanthellate scleractinian corals), but other hard corals such as the blue coral *Heliopora*, organ-pipe coral *Tubipora* (related to soft corals in the subclass Octocorallia), and fire coral *Millepora* (class Hydrozoa) can be important in certain habitats and can be successfully transplanted.
3. Transplantation may be effected either through relocating large colonies or bommies *in toto*, or by implanting small pieces within or on artificial substrates. Such artificial reefs can play multiple roles in reef restoration, including:

* Stabilising, restoring or increasing topographic complexity.
* Stable substrate for coral and other invertebrate settlement (or for coral transplantation).
* Will act as fish attraction devices (FADs).
* Tourism or marine park education and public awareness with easy and safe access to coral ecosystems.
* Reducing diver pressure on natural reefs in areas with large numbers of tourist divers.
* Hard structures that discourage various forms of net based fishing (including trawling and seine net fishing) which cause reef damage.

1. This document contains coral translocation procedures employing the most current best practice to assure high survival rate of the corals. This plan includes specific information on, but not limited to, the following:

* Translocation methodology (e.g. community or individual corals etc.)
* Specific means of translocation (e.g. collection to deployment)
* Locations of potential receiving areas
* Monitoring
* Qualifications of team leading the translocation project and dive team composition Equipment/materials for coral collection, transport and reef construction

1. In this document the terms transplantation and translocation are considered equivalent and are used interchangeably. Both terms refer to the transfer of coral or coral fragments to a novel locations with the intention of creating a new reef structure or enhancing an existing coral community.

**Baseline Studies**

1. A comprehensive study has been undertaken to provide a profile of the current state of coral communities along the coastline of Aqaba (Al-Horani 2007a, b). It is hoped that these studies will aide in identifying the coral colonies intended for community translocation. The underwater photographs produced during these coral mapping exercises should also provide evidence of the condition of the corals prior to the relocation and can be used to evaluate the potential success and survival of the translocated coral colonies.
2. Other information, such as a fish species inventory (e.g., Al-Horani 2007a), may also be useful to provide information of the other taxa affected by the translocation at both the donor and receptor sites. This can provide the basis as to how the relocated corals will help in the recruitment and improvement of diversity especially in the receptor site.

**Collection and handling**

1. The decision on whether to collect large coral formations or individual coral fragments will be made according to the nature of the corals and type of substrate present at the donor site and based on an assessment by the lead scientist/chief technical advisor. The methodology should assure that the approach minimizes potential damage to corals, which could decrease the chance of survival and growth rates in transplanted colonies or individual corals owing to increased stress. A healthy, diverse collection of coral species should be chosen for translocation.
2. There is evidence that the size of the transplant affects the chances of survival, with larger sizes having a higher survival success. The benefits in terms of survival may operate over a wide range of sizes from 1 mm to 10 cm. Work with very small coral transplants suggests a marked improvement in survival above 10 mm (1 cm) in diameter, whereas some experiments working with larger transplants have shown better survival of transplants over a size of about 10 cm compared to smaller ones. The critical sizes may vary with both species and site, being dependent on both the amount and type of algae (and other organisms) competing for space and the abundance and size of potential coral grazers (such as parrotfish).
3. At present we do not know enough about how size and survival vary from species to species or the trade-offs between size and survival, indeed, it is unclear whether there really is a critical size at which survival dramatically improves, or a continuum of improved survival with size. It seems likely, however, that transplanting asexually-derived fragments at a minimum size of 5-10 cm will promote better survival and do more to enhance topographic diversity. Given the time and labour involved in transplantation it is more cost-effective to use larger and less vulnerable transplants until better information becomes available. Smaller fragments (i.e., 2-3 cm) may be successfully cultured in the sea in ‘nurseries’ until they are large enough to survive well. This has additional costs but makes better use of coral material. Very small fragments do not usually survive well.
4. However, it should also be noted that there is often an increased likelihood of mortality from transplantation of large formations, i.e., for some sensitive species, up to 50% of the colonies that are transplanted on whole reefs have died within two years (Edwards & Gomez 2007).
5. If intact donor colonies are used as a source of fragments for either direct transplantation or a period of culture followed by transplantation, the limited research suggests that only a small part of the colony (less than c.10%) should be excised in order to minimise stress to the donor colony (Edwards & Gomez 2007). For massive coral colonies it would appear best to remove fragments from the edge of the colony.
6. Depending on the coral species and the size, there are several methods used for the recovery and transplantation of coral communities. Small coral colonies (less than 50 cm in diameter), which are relatively easy to handle, can be transplanted manually without the need for lifting equipment. Massive corals such as *Porites* sp. and coral boulders (live coral rock) that exceed 1 m in diameter have to be transplanted as one unit. The most cost-effective method is typically to collect corals directly from the reef and transplant directly to the new location. For the transplantation of coral fragments and coral colonies that have small diameter, the colonies are first separated from the base using equipment such as a chisel and hammer. In addition, coral fragments resulting from the breakage of larger colonies or micro-atolls should be collected and used in the transplantation.
7. For larger colonies, the colony base is separated from the seafloor using a chisel, taking care not to damage the corals. The coral formation can be raised to just below the water surface for transplantation using diver-deployed life bags or, if extremely heavy, using a hydraulic winch system operated from the support vessel (i.e., barge).
8. At present there is limited information on which coral species are suitable or unsuitable for transplantation. For some species, the results of studies by different researchers are apparently contradictory (Edward & Gomez 2004). This may be due to misidentification, differences in handling, or differences in the transplant sites; however, some general guidance can be taken from previous research.
9. The first priority must be to find out which species would be expected to survive at the receptor site. Branching species such as those in the families Acroporidae and Pocilloporidae tend to be fast-growing and easy to fragment (or find natural fragments of). As such they have been much favoured in transplantation as they can produce a rapid increase in % live coral cover in a relatively short time. On the downside they tend to be somewhat more sensitive to transplantation than slower growing sub-massive and massive corals, such that survival rates can be much lower. These families also tend to be more susceptible to warming associated with El Niño Southern Oscillation events and thus more likely to be subject to mass-bleaching and subsequent mass mortality (if the warming event is prolonged), and to be more susceptible to disease than some other families.
10. Other growth forms (massive, submassive, foliaceous) and branching species in other families such as the Poritidae and Merulinidae, which tend to be slower growing, have been less-studied in terms of restoration potential. Although there is considerable variation between genera and even species within these other families, it is clear that at least some of these species are less sensitive both to transplantation and to warming anomalies and are thus likely to survive better in the long term despite growing more slowly. The drawback for these slower growers is that the desired topographic complexity (which provides shelter and tends to attract fish and other fauna) is achieved far more slowly with these species. A sensible compromise is to transplant as wide a range as possible of coral species, i.e., 50% of the species found at the donor site.

**Coral Culture**

1. Methods for both asexual and sexual propagation of large numbers of corals have now been successfully demonstrated. *Ex-situ* culture in aquaria is generally more expensive than *in-situ* culture in the sea in ‘nurseries’; however, survivorship of very early stages or very small transplants (e.g., <5-10 mm diameter) is generally only satisfactory in *ex-situ* aquaria. There are thus a range of trade-offs between survival, type of culture and costs.
2. Corals can be grown asexually from fragments (known as ramets when derived from the same colony (clones) and when very small, often called “nubbins”), which is the most common form of culture. For most projects, larger fragments (3-10 cm in size) are more likely to be used as these can be cultured in *in-situ* nurseries. The aims of asexual culture are:

* To maximise benefits from a given amount of source material.
* To grow fragments into small colonies which should survive better than the fragments would have done if just transplanted directly to the reef.
* To have banks of small corals readily available for transplant in the event of an impact such as unanticipated and detrimental climatic conditions or other means of damage.

**Transportation**

1. Support vessels and a range of lifting equipment as well as a competent dive team will be required for transporting corals from the donor site to the receiving location. Diver-deployed lift-bags or hydraulic winches (or other available lifting equipment) should be provided to assure easy lifting while lessening unnecessary movements and abrasions that can damage the corals. Baskets or ropes to hold the corals submerged under water on the side of a slow-moving barge (or similar vessel) are tested methods for relocating individual or small boulder communities.
2. The speed of any vessel used to transport corals should not exceed 4 knots to lessen hydrodynamic stresses on the coral fragments. This needs to be balanced, however by a need to keep the time for transport as short as possible to minimize the time that corals are exposed to the stresses of temperature, wind and other elements that can be detrimental to the condition of the relocated corals. Consideration should be given to the specific requirements of different species types; for instance *Acropora gemmifera* and *Favia stelligera* are species that can be transported out of water for up to two hours while *Stylophora pistillata* and *Rumphella* species should be transported submerged in water.
3. Smaller coral colonies can be transported in containers such as plastic baskets or buckets to ensure that the coral fragments are submerged in seawater during transport (i.e., baskets hung over the side of the transport vessel). If stored on the deck of the vessel, adequate coverage of the containers is also suggested to limit the exposure of the corals to intense sun light.

**Deployment and attachment of corals**

1. Deployment of fragments and colonies should be done with care to minimize abrasions and crushing to avoid stress and mortality of coral. Corals will be strategically positioned taking into considering, but not limited to, the distance from other coral boulders, orientation for better photosynthetic activities.
2. Larger coral boulders should be aggregated within a distance of 1-3 m. The minimum distance of 1 m will ensure that contact abrasion between adjacent rocks is minimized during placement, while 3 m is recognition as suitable for the broadcast spawning characteristics of most corals. Larger distances will limit the success of fertilization and community development.
3. For fragmented corals, two main settlement substrates are usually used: an artificial substrate (i.e., concrete plate) and a natural base rock. If a base rock is used, it is necessary to anchor/adhere the colony to the base rock. Transplantation of smaller boulders or fragments should not be done directly on sandy substrates as this will lead to coral death owing to sedimentation and the potential to be carried away with the current. Boulders and rock substrates should be at least 0.5 m in height above the sea bottom in order to protect the transplanted coral colonies from sedimentation effects.
4. Artificial reefs may range from limestone boulders to designed concrete (e.g., ReefBallsTM) or ceramic (e.g. EcoReefsTM) modules. For restoration, the aesthetics and ‘natural look’ of the artificial structures, both initially and after colonisation by corals and other reef organisms, should be taken into consideration.
5. Transplants should generally be securely attached to the reef unless they are in such sheltered conditions that fragments will remain in place without assistance. This can be done with cement, a range of epoxy adhesives, nails, stainless steel wire, insulated wire, and cable-ties. Nails or long staples hammered into the reef may provide attachment points for cable-ties or wire where otherwise difficult to attach. Small corals have even been successfully attached to plastic pins (for *in-situ* nursery culture) and other substrates (e.g., giant clam shells) using cyanoacrylate glues (‘Superglue’). Species which naturally reproduce by fragmentation are usually able to self-attach within weeks, if conditions are stable. On exposed reefs, detachment of transplants can be the main cause of death and can decimate the transplant population. The most effective method will depend on:

* The size and growth-form of the transplants;
* The exposure of the habitat to currents and wave action; and.
* The nature of reef substrate itself.

1. Acceptably low rates of loss (detachment) from the reef have been achieved successfully with epoxy compounds, cement, and wire. Methods of attachment that allow any movement of the fragment may cause abrasion and tissue loss and are not recommended. This sometimes occurs when fragments are tied to the reef rather than cemented.
2. Coral fragments are often able to grow over the wires or cable-ties attaching them within months. However, introductions of man-made materials into the reef environment should be minimised. Where living coral tissue is in stable close contact with a reasonably clean surface (i.e., clear of thick sediment or algal turf), the coral can self-attach by growing onto the surface. Once the coral fragment has grown onto the substrate then the risk of detachment is much reduced. This self-attachment process can occur within a few weeks to a few months and methods that encourage the process are recommended.
3. One low-cost method which has been used successfully for transplanting branches to coral rock areas is to find natural holes that are approximately the same diameter as the base of the branch, or to make holes in the reef with a chisel or broad screwdriver to this size. The area around the hole is scraped back to bare substrate and the branch inserted, being fixed in place with epoxy-putty on one side but with live tissue pressed against the bare substrate on the other side. This promotes self-attachment on that side and appears to work well.
4. Cultured coral fragments are usually already attached to some substrate. These may range from plastic pins to 20 cm x 5 cm pieces of limestone used in nurseries. Fragments or small colonies from nurseries are likely to have already self-attached to the substrates on which they have been cultured. Plastic pins can be fixed into natural or man-made holes in the reef, with epoxy if necessary. The area surrounding the hole should be scraped clean and the growing base of the coral should be given every encouragement to extend onto the reef substrate itself. Where fragments have been grown on pieces of limestone, these have been wedged onto the reef between the branches of dead corals and additional attachment points encouraged with branches pressed against the substrate.
5. There are a range of constraints that must be considered to achieve the aim of a self-sustaining coral population. Colonies of the same species will need to be near enough each other to be able to reproduce successfully; clumping might assist this, rather than spreading transplants thinly over the receiving area. In terms of topographic complexity, clumping or aggregation of fragments may also be beneficial with clusters of coral transplants aggregating fish more effectively than small isolated transplants. At the other extreme, some species of coral are quite aggressive and may kill others if placed close to them. Incompatible species should not be placed close together and thus specific knowledge of the biology of these taxa is essential.

**Receiving sites**

1. The conditions of the receiving sites play an important role in determining and assuring the success of the translocation activity. Factors such as water quality, temperature, type of sediment, salinity, and depth should be taken into consideration during the selection of a suitable site. The receptor site should have environmental conditions similar to the site where the corals are originally from (donor site). This will require fewer adjustments or adaptation, and better recuperation of translocated corals.
2. Several sites have been nominated as recommended receiving areas for the coral transplantation project in the Gulf of Aqaba:
3. *The northern tip of the Gulf.* This area is devoid of well-developed coral reefs, except for some sparsely-distributed coral patches. The coastal profile in this area has a low gradient, creating a wide area of shallow seabed that is mainly occupied by seagrass meadows or unoccupied sandy bottom. This type of environment is considered suitable for development of artificial reefs (Al Horani 2007). This area is also close to many hotels and resorts, which could benefit from the tourist attraction of having coral reefs at their vicinity.
4. *Main ports, phosphate loading berth and clincker areas.* This area is expected to have significant tourism-based developments occurring in the area in the near future, after removal of the current port facilities. This section of coastline currently has small coral reefs, however much of there have been damaged as a result of port and other industrial activities. The construction of artificial reefs in the area will be of benefit for the restoration of these reefs as well as the rehabilitation of the area for future tourism.
5. *Marine Park and Tala Bay Resort.* Much of this section of coastline is located within a reserved marine area and contains both very well-developed coral reefs in some parts and sandy or seagrass bottoms. The construction of artificial reefs in this area will aide in habitat enhancement of the marine park environment and provide an opportunity to diverting the high rate of recreational diving and other marine activities away from the natural reefs, thereby acting to protect the natural population source of corals and other reef organisms in the area.
6. *Localized areas within the new ports location.* Additionally, it may be beneficial to consider the development of artificial reefs in relatively undisturbed areas within the vicinity of the proposed port facility, with the aim of restoring or rehabilitating reefs that will be damaged during the construction phase of the port facilities. This will also help to maintain connectivity between coral reef ecosystems along this shoreline, which is important to ensure the reef organisms have a continuous stretch of suitable habitat in which they can migrate or disperse along the coastline

**Monitoring**

1. Firstly, it is important to measure the state of the transplanted coral reef systems immediately after deployment, to provide a ‘post-translocation baseline’ for comparison to further monitoring. It is recommended that the transplanted coral colonies are regularly checked by qualified marine ecologists with trained divers who can carry out monitoring programs on a regular basis for at least four years, including monthly assessment for the first three months and quarterly for the remaining period after transplantation. The time-span over which changes are evaluated should be at least several years to match the expected time-course of recovery. Studies show that natural recovery takes at least 5-10 years. Long-term (5-10 years or more) restoration is the goal, not short-term, often ephemeral, improvements in indicators.
2. Dive surveys for post-translocation monitoring should collect the same information as for the baseline survey. Information gathered during each post-translocation monitoring survey should include observations on the presence, survival, and health conditions of the transplanted coral colonies, as well as for other taxa/species such as fish, invertebrates and other species attracted to the area (i.e., naturally dispersed corals) and utilizing the reef. It should also include conditions of the surrounding environment as well as weather, sea and tidal conditions. The monitoring indicators should match the aims of the transplantation so that, if the targets are attained, there is conclusive evidence that the aims have been successfully achieved. Furthermore, the targets need to be realistic and easily assessed, and the timeframe in which they are to be achieved should be defined. An explicit timeframe with milestones allows the progress of the restoration to be monitored over time and corrective actions (adaptive management) to be undertaken if appropriate, such as when indicators fail to perform within the predicted timeframe. Recommended indicators include endpoints such as percentage of live coral cover, or evidence of the restoration of key ecosystem processes such as coral recruitment or fish grazing (e.g., rates of coral recruitment, numbers of fish grazers).
3. Survival or health issues that arise after the transplantation should be addressed as soon as practicable, especially when disease or corallivorous organisms are spreading (i.e., crown-of-thorns starfish). Treatment of the diseased colonies may be carried out in specialized laboratories, such as the MSS, especially when endemic or rare coral colonies are impacted.
4. The collected data to should be carefully managed by the appointed chief technical scientist, who would be responsible for developing a suitable data management systems and ensuring that:

* Any electronic data is entered correctly against hard copies of field data sheets,
* All electronic and hard copies of data are backed up elsewhere (i.e., offsite), in case of accidental loss (such as fire).
* The data management system is maintained in order that others can readily access the information in an easy-to-interpret manner.
* The data is in a format that can be easily transferred as geospatial information and maps
* All data recording is consistent between monitoring events and that any inconsistencies are picked up in the quality assurance procedures of the data management system.

**Other Considerations**

*Dive Team Management*

1. A qualified marine specialist who has suitable coral knowledge and sound experience in identifying corals in field situation should mange the coral translocation and monitoring exercises.
2. It is recommended to have the majority of the team available for the entire transplantation process from collection to deployment. It is also advisable to have a team (or at least part of the team) that is available for the duration of the monitoring programme. Training will be required to ensure that the monitoring methodology is carried out accurately and in a manner that allows for comparison over the duration of the project (i.e., the same people are conducting the monitoring in the same way each time so as to minimise human inconsistencies in data collection)
3. The team should have at least one (or more) marine technical expert and supervisors. Their role would be to ensure that the transplantation is carried out in a robust scientific manner and to make decisions regarding the detailed arrangements of the transplantation process itself; for instance, choosing the types of corals to be collected, deciding whether coral culture is needed, finalizing the design of the monitoring program (choosing monitoring sites), deciding on the type of lifting equipment to be used after assessment of the coral formations to be moved, number of divers required for transplantation and monitoring.
4. The dive team should include suitably qualified divers that have been trained in the implications of undertaking a coral transplantation. They should be aware of the types and size of corals needed for transfer and the methods of handling that avoid unnecessary damage to the fragments. They should also be capable of carrying out highly technical underwater operations, particularly with regards to the removal and deployment of large coral boulders. For instance, the divers should be familiar with the use of lift bags and/or winch systems. Thus, the dive team should have a relatively high level of both scientific and technical knowledge. Furthermore, they should have safety procedures in place that are acceptable to the standard of UNDP and the local authorities.

*Support staff*

1. Technicians and other support staff will be required to undertake the handling procedures of the coral fragments during the transplantation process, and may also be required if coral nurseries are used during the project. It should be the decision of the chief technical advisor as to the number of support staff required for these tasks. Personnel will also be required for data management of the information collected during the monitoring program and to provide support for reporting requirements. It is expected that 2-3 junior technicians may be necessary to provide assistance to the chief technical advisor and dive team during the translocation process and 1-2 junior personnel for the monitoring program.

*Equipment*

1. The equipment needed for the transplantation and monitoring program will be determined by the assessment of the chief technical advisor, i.e., once the nature and extent of the corals to be moved is known.

*Health & Safety*

1. Safety procedures are required to in place that are acceptable to the standard of UNDP and the local authorities. All diving safety procedures as identified is training courses provided by PADI (or equivalent) should also be adhered to.

*References*

Edwards, A.J., Gomez, E.D. (2007). Reef Restoration Concepts and Guidelines: making sensible management choices in the face of uncertainty. Coral Reef Targeted Research & Capacity Building for Management Programme: St Lucia, Australia. iv + 38 pp.

Annex 6 GEF CEO Endorsement document

**SIGNATURE PAGE**

Country: JORDAN

UNDAF Outcome(s)/Indicator(s): Sustainable management of natural resources and the environment.

Indicator(s): Number of new and revised national & sectoral plans incorporating international environment conventions provisions

Expected Outcome(s)/Indicator (s): Environmental policies aligned to global conventions and national implementation capacities enhanced.

Indicator (s): i) Number of new and/or revised development and sectoral plans incorporating international environmental conventions approved.

ii) Increase in number of articles in local newspaper highlight biodiversity issues in Aqaba, and

iii) Percentage of households with diversified income sources in areas implementing eco-tourism/ rural tourism projects

Expected Output(s)/Indicator(s): The protection and sustainable use of agricultural resources and biological diversity included in relevant national and sectoral plans particularly for major hotspots

Indicator(s): i) Number of draft development and sectoral plans incorporating biodiversity conservation issues, and

ii) Number of new participatory eco-tourism/ rural tourism initiatives to promote livelihoods in targeted areas

Implementing partner: Aqaba Special Economic Zone Authority

*(designated institution/Executing agency)*

Total budget: US$ 1,000,000

Allocated resources: \_\_\_\_\_\_\_\_\_\_\_\_

* UNDP US$ 50,000
* Other:
  + GEF US$ 950,000
* In kind contributions US$ 7,250,000

Programme Period: 2008- 2012

Programme Component: Environment and Energy

Project Title: Mainstreaming Marine Biodiversity Conservation into Coastal Management in the Aqaba Special Economic Zone

Project ID: 00078516

Project Duration: Three years

Management Arrangement: NEX

**Agreed by (MOPIC): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Agreed by (ASEZA):**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Agreed by (UNDP):\_\_\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Al-Horani, F.A. et al., 2006. The status of coral reefs on the Jordanian coast of the Gulf of Aqaba, Red Sea. *Zoology in the Middle East* 38: 99-110. [↑](#footnote-ref-1)
2. Edwards, A.J., Gomez, E.D. (2007). Reef Restoration Concepts and Guidelines: making sensible management choices in the face of uncertainty. Coral Reef Targeted Research & Capacity Building for Management Programme: St Lucia, Australia. iv + 38 pp. [↑](#footnote-ref-2)
3. *Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR* [↑](#footnote-ref-3)