



WORKSHOP ON MARINE AND COASTAL ZONE RESOURCES MANAGEMENT



STATUS OF THE COASTAL ZONE MANAGEMENT IN GAZA GOVERNORATES

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The Palestinian Authority
Ministry Of environmental affairs

Status of the Coastal Zone Management in Gaza Governorates

First Draft

Introduction

The Gaza landscape is part of a coastal plain on the Mediterranean coast sloping down gradually towards the west over a series of distinct sand dunes running parallel to the shore line. The land side area of the coastal zone as identified in the coastal zone plan covers an area of about 74 square kilometers (20,5 % of the Gaza region)and roughly consists of the beach and the coastal sand dunes next to the ocean.

The Palestinians were deprived from their right to access to their territorial and international waters and its resources by the Israeli occupation over the last 30 years. Oslo peace agreement gave the Palestinian Authority a limited mandate over an area extends 20 miles in the sea as a fishing zone and with coastal length of 44 Km.

Planning and development were completely neglected during the last 30 years of occupation by Israel, in which they neither planned nor implemented any type of infrastructure or services to the Palestinians, so it is assumed that most of the environmental problems were the direct result of occupation. The problems related to the coastal area are:- Destruction of beach landscape, Dumping of solid waste and construction waste, Waste water discharge to the sea environment, Beach erosion, Random and scattered development, conflicting land uses, lack of legislation, etc. .

After the return of the Palestinian Authority , steps have been taken to improve the legal and institutional arrangements for planning, the coastal zone was identified as area of priority for planning and a first step was taken , the drafting of the Emergency Resources Protection Plan . It aims at protecting the most critical resources in Gaza for which immediate protection is crucial . These are: ground water resources, prime agricultural land, potential recreation and tourism areas, unique undisturbed landscapes, archaeological sites. Most of these resources are located in the coastal zone area. The second step taken was the Coastal Zone Land Use Plan, which is basically a plan aimed at zoning and regulating functions and activities in the various areas of the zone. Its not aimed at detailed regulations of activities, but seeks to establish a common understood , respected and supported concept of the use of the Coastal Zone and the beaches and as an area of national interest.

A management plan is still needed to assess past trends, current conditions and predict alternative scenarios for future development and to promote environmentally sound development of the coastal area, also to recommend actions concerning rehabilitation of polluted areas and conservation of coastal resources, it is also needed to suggest special requirements for tourism and protected areas management, conservation of archaeological and historical sites and other coastal issues.

The area of Gaza Strip is 365 Sq. Km., and primarily privately owned. The land scarcity in Gaza is reflected in rapidly increasing land prices, notably in the Coastal Zone area where the pressure of development and land demand is the highest, this pressure also brought additional factors contribute to the deterioration of the coastal land and marine environment, in the form of pollution and random, un-planned development.

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Resources in coastal and marine zone of Gaza

Fisheries

Fishing is one of the important economic activities in the coastal and marine area of Gaza. The fishery in the Gaza Strip primarily takes place in four fishing communities:

- Gaza City
- Dir El-Balah,
- Khan Younis, and
- Rafah.

The only Gaza landing site is a fisherman's port (construction began in 1997, and is still ongoing). This port is still not capable of servicing all the boats in Gaza. At the other 3 landing sites, the boats must be brought up on shore.

After the Camp David agreement in 1978, the fishing zone off the Sinai, where a great part of the flotilla's fishing effort was concentrated, was forbidden to Gaza fishermen. Since then, they have operated in a narrow strip of sea. Today the fishing zone represents a trapezium whose base is the coastline of the Gaza strip (44 kilometres) and whose height is 20 nautical miles. In practice, this last distance is only 12 nautical miles. The additional 8 nautical miles are under Israeli observation and Palestinian fishermen are not permitted to work there. Next Fig. shows the Gaza Strip and Fishing Area. The area located off the Israeli settlements (south of the Gaza Strip) is forbidden to navigation (CARE/MA'AN, 1994).

The free fishing zone in Gaza is not rich in fish, but beyond that area fish may be found in considerable quantities. For that reason Gaza fishermen can be seen are fishing as far as possible from the coast in order to catch as much as possible.

Depth in the fishing territory

Depth in m	Distance from shore at Gaza City. Approx. nm
10	0.5
20	1.0
50	6.5
100	10.0
200	12.5

Note: nm nautical mile. 1nm= 1852 m

Source: Appraisal of Proposals for Fisheries Projects in the Gaza Strip, 1994

Vessel survey and employment

In a survey by the CARE/MA'An project (CARE/ MA'AN, 1996), a total of 818 fishing units were identified in this sector, engaging a maximum crew capacity of 2646 fishermen. The total number of fully employed fishermen realistically is about 1500 due to overlap between vessels, some boats being out of order and periods of over-manning due to closures. Closures are periods of days or weeks when the boarders with Israel are closed for security reasons and Palestinian workers are prevented from reaching their normal jobs in Israel.

Number of fishing vessels by type

Boats classification	specific type	Number
Trawler 19	Trawler	17
	Trawler shanshula	2
Launch 55	Launch shanshula	48
	Launch Gilib	4
	Launch out of order	3
Hassaka 431	Hasaka shanshula	60
	Motorized hasaka	351
	Hasaka out of order	5
	Feluka with motor	5
Feluka Megdaf 153	Feluka Megdaf	53
Hassaka Megdaf 131	Hasaka Megdaf	131
Tire 29	Tire	29
Total 818		Total 818

Key:

Shanshula - purse seine vessel

Gilib (hook)- Longliner vessel

Megdaf (oar)- Paddles/oars only

Tire- Floating tube from tractor or lorry tire

Source: (Gaza Fisheries Report, 1996, CARE/ MA'AN Project, p.4, 18)

The two sources of fish are the pelagic and bottom or 'demersal' fish. There are four main fishing methods in use:

- **Trawlers:** Trawlers are the largest vessels (~15 m), and are wooden and locally built. They stay out 24 hours and return to the shore for landing fish, get supplies and change crews. Trawlers take a variety of small demersal fish and prawns. Prawns are the target species and represent about half the income. Small mesh nets are used (usually 30 mm stretched mesh).

- **Shanshula (Purse Seiners):** These are the second category of large vessels (~13 m). These vessels focus on fishing with light for sardines (also mackerel and flying fish) with the aid of 4-5 smaller boats carrying lights (hasaks and felukas). The season for sardines is 2-3 months in the Spring, and 2-3 months in the Autumn. Most of the rest of the year these vessels are inactive. Other pelagic species caught include horse mackerel, shrimp scad, and occasionally Atlantic mackerel, squid, ray, flying fish and little tuna.

- **Hasakas:** Hasakas are small decked vessels (skiffs), 5-7 meters in length, for coastal fishing with nets. The main fishing method employed is gill netting, though there is a trend to upgrade the vessels to that they operate as small purse seiners (hasaka shanshula). Hasakas also serve as supply boats for trawlers. The hasaka shanshula is the most active and versatile vessel in the fleet after the trawler and is the main thrust in the expansion of the fishery in Gaza. The hasaka shanshulla presents the least problem for stock conservation as it targets pelagic fish.

- **Felukas, Hasakas with oars and tires:** These are all non-motorised units.

- **Sonar:** long line hook-vessels fishing for larger bottom-dwelling fish (grouper etc.). The vessels resemble the Shanshula.

Fish production in Gaza:

The production from marine fishing depends

Fish production quantities vary from year to year. Net fishing (sardines, bass etc.) account for ca. 75% of the total production, deep sea fishes (Loqus, Sultan

Ibrahim) some 15% and the rest, and some 20% include various kinds of fish plus prawns.

Variations in quantities are to some extent explained by the political situation, with restrictions on the fishing area dictated by Israeli considerations. In 1996, the CARE/MA'AN project worked to standardise fish names and train fish landings data collectors, in order to quantify correctly the fish landings of the Gaza strip. Also a database of landings by species, boat type and location was established. Since 1997, measurements of fish production have been made by monitors of the Department of Fisheries of the Ministry of Environment at the 4 fishing station locations. Table below shows quantities during the period 1978-1997.

Fish Production during the period 1978-1997
(after MOPIC, 1996 and Care/MA'AN, 1997)

Year	Quantity in tons
78/79	6000
79/80	941
80/81	1299.4
81/82	1045
82/83	835
83/84	1652.6
84/85	604.8
85/86	273.9
86/87	293.3
87/88	341.1
88/89	269.3
89/90	387.7
90/91	1837.4
91/92	1118.2
92/93	2080.4
93/94	1500
94/95	1500
96/97	2500
Annual Average	942

Value of the Sector

The CARE/MA'AN project (1997) has estimated the annual value of the fishery sector to be \$7,500,000 based on daily auction prices and volumes. This amount is split 62% for trawler production and 38% for hasakas and purse seiners.

The average price of fresh fish sold is \$3/kg, but this is influenced by the large landings of sardines which sell at less than \$2/kg plus large quantities which also

have a low price. The wholesale value of the larger fish and shrimps is actually very high, at least as good as the European average prices.

Several types of fish are exported to Israel where they obtain higher market prices: grouper, shrimp, processed cuttle fish and squid.

The figures suggest that the fishing sector represents approximately 2.5% of the GNP.

Identified environmental problems

In the current status of the marine fisheries, there is a number of identified environmental problems:

- There are concerns about overfishing, especially of the demersal fish. There is a high density of fisherman working in a limited zone and there is also some evidence of undersized or juvenile fish being caught (<11 cm) of selected species. In addition, there is the problem of 'by-catch' of small fish. However, based on the complexity of the situation and the available data for fish catches it is not possible to state that there is overfishing with complete certainty. In studies conducted by MI International (1994), fisherman in three fishing communities raised concerns that too much harvesting effort was in place for a sustainable fishery. The PNA continues to put pressure on the Israeli side to increase the fishing zone, which would decrease the fishing pressure in the current zone.
- There is no detailed data or accurate estimate of the sustainable yield of the fisheries; no data on the fish production (reproduction) within the Gaza marine zone is available. Old cars which have been dumped in marine waters by fishermen serve as artificial reefs, and apparently help to increase the production.
- The trawlers which are primarily fishing demersal species, are damaging the seabed with their nets; affecting the ecological status of the marine area. This in turn can affect the populations of the demersal fish, and contribute to the overfishing problem.
- There is some evidence of the use of poisons to catch fish (MI International, 1994; personal communication CARE/MA'AN project). More research needs to be done to know if this practice is still continuing, what kinds of poisons are being used by fishermen and how much is used to catch fish.
- Based on personal communication with fisherman, there is some indication that the quality of fish is affected by marine pollution. There is also evidence of weakened or poorly looking fish near the sewage outlets at the beaches. Some studies on the fish quality would need to be done to confirm this.

Tourism and recreation

The beaches of Gaza are actively used for recreation and are potentially interesting for beach tourism. A major problem, however, is the severe pollution of both seawater and beaches, providing a major health risk for swimmers and

marine life. Especially the beaches in front of Gaza City, Beach Camp and Deir ElBalah are polluted by sewage system outfalls and individual sewage and sludge drains, ending either on the beach and cliffs or a short distance away in the surf zone. Sea water quality is therefore below the standard for safe swimming in the proximity of these outlets.

The Gaza beaches are the only major source of recreation for Gaza's 1 million inhabitants (which is roughly expected to be doubled by 2015). This underlines the significance of the beach areas. The beaches of Gaza are intensively used for recreation during the summer, especially near Gaza City (north and south of the built up areas) due to the close location and the good access from the population areas. A survey conducted among beach users in the summer of 1996 as part of the MOPIC Coastal Zone Plan (1996) shows a definite public consciousness about the importance of keeping the beaches intact and open to public use.

In general, people prefer to use beach areas near their homes. Thus the highest concentrations of users are near the population centres. The fact that the southern coastal areas are under Israeli security control, so that the Khan Younis and Rafah inhabitants must pass through checkpoints to get to their beaches, reduces the concentration of people there.

Some of the main objectives of the Coastal Zone Plan are related to recreation and the public's needs and rights in the Coastal Zone Area. The aims for recreation as an element of the plan are to:

- preserves the beaches as a recreational resource for the population.
- ensures free access to the beaches, and the maximum degree free littoral access along the beaches.
- Disallow privatisation
- Halt random construction in the Coastal Zone area.
- Stop further pollution of beaches from solid waste, rubbish and garbage dumping, and sewage and wastewater outlets.
- Find mitigative measures where free public access must be restricted, such as security zones, ports/fishery wharves etc.

Tourism

The coastal area of Gaza is potentially interesting for beach tourism, not only for the local population but also for tourists from the West Bank and other Arab countries (Jordan, Egypt, and the Gulf countries) and some international tourists. Tourism potential for all of Gaza has been reviewed by Ayad (1998). In the coastal and marine area the tourism resources can be considered the beaches and the water area for natural, or scientific tourism, or the archaeological sites at the beach for cultural tourism.

Four beach locations seem to have the main potential for tourism development (Ayad, 1998) based on quality and natural conditions, access, low cost of investment and infrastructure provision, and low degree of social conflict with local residents:

- Jabalya / Beit Lahya beach area (medium use)
- Gaza City from beach area (close to Zahret El Madain) (light use)
- Nezarim / Wadi Gazi beach area (light use)
- Rafah / Khan Yunis beach areas (main beach development area)

Water related and sport activities such as swimming, sailing, windsurfing, sport fishing, boating, etc. can be considered as potential tourist activities in the coastal and marine area. Beach stands or shops renting beach items or selling food or other tourist items are similarly possible. Realisation of this potential will require some development, including the construction of harbour infrastructure, or marinas and jetties.

As of yet, there has been little or no development of this tourism potential. A major problem is the pollution of seawater and some parts of the beaches, providing a major health risk for swimmers and marine life, as well as aesthetic and odour problems. Development of tourism will most likely require improvement of the coastal water quality, stopping of wastewater discharges and removal of municipal waste sites.

A two-day seminar on tourism in Gaza was arranged by the MOPIC and the Ministry of Tourism and Antiquities in July 1996. The seminar arrived at certain conclusions in terms of what the tourism market actually is (MOPIC, 1996).

There are three main sources of tourists to the region:

- the visiting friends and relatives (VFR),
- beach resort tourists (sun sand sea: SSS tourists), and
- tourists who come to the Middle East for the historical and religious sites.

For Gaza, the international community working for donor countries and the UN should also be counted as an important tourist source. VFRs will normally have private accommodation. The SSS potential in Gaza is little, in a Mediterranean region with a declining mass tourism market. The main focus of a tourism concept for Gaza will therefore be on archaeology and history, including recent political history (the Middle East Conflict). The beach itself will be a benefit, but not the main purpose of arrival for the tourists who come to Gaza. The future might see an opening for the West Bank population to come to Gaza for weekends and vacations. This segment will be directed mainly at the Mediterranean beach and sand dunes.

The Tourism seminar expressed the following conclusions on the direction of tourism in Gaza:

1. No influx of international Mediterranean tourism is expected, at least in the first 5-8 years.
2. Scattered developments should not be permitted- they do not comply with the need to protect the virgin quality of Gaza's beach landscape, and they are too costly in terms of infrastructure (roads, sewage, electricity etc.).

3. Investments should be concentrated to the Gaza City beach area, where hotel and restaurant facilities can serve both tourists, the international community and locals, and where the multiplier effect would strengthen already established local shops, restaurants and other service.
4. One area should be reserved for resort tourism development, near the main population concentrations, preferably also major historical sites, and away from sensitive natural protection areas.
5. All proposals for tourism developments must be accompanied by a feasibility study including a comprehensive market analysis, a carrying capacity study and Environmental Impact Study or Assessment (this is required according to the Israeli- Palestinian Interim Agreement). All technical infrastructure must be an integral part of the development.
6. Tourism development projects must develop staff training programs. Other benefits to staff and families should be part of the plan (for instance housing programs).
7. A process of broad public information about developments must be part of the project, to lessen conflict potentials between the local population and tourism. Commercial activities connected to the project(s) must aim at enhancing local production and business, and not mean negative competition and possible ruin for existing trade and business.

Point 1 is important for the priorities of areas for tourism development. Points 2,3 and 4 have direct impacts on the tourism plan in the Coastal Zone Plan. Points 5,6 and 7 influence the guidelines following the plan.

The objectives of tourism as a sector of the Coastal Zone Plan can be summed up in four main points:

1. Direct and concentrate tourism investments to specific areas, in order to insure that the attractiveness of the Gaza beaches and coastal landscape will remain for the benefit of tourism and the greater public, Public investments in infrastructure of all sorts will be concentrated and optimised.
2. Make a phase plan to direct investments to prioritised areas, taking new areas into use only when and if tourism grows.
3. Emphasise the concept of sustainability in tourism development.
4. Find physical solutions to tourism developments, which do not inflict strong conflicts between tourism and public interest (recreation), and find mitigative measures, which will lessen possible conflicts of land use.

The Coastal Zone Plan map, Development plan shows three prioritised Tourism Developments areas. They are meant to serve different development purposes.

1. *The Tourism Development Area Jabaliya Beach* is a prioritised area for hotels with park connected to Mediterranean beach tourism. The area covers 1200 dunums.
2. *The Gaza City Beach Front* is a prioritised area for development towards a Mediterranean City Front, with an emphasis on hotels, restaurants and connected public service, and promenades and well-kept public beaches. The area needs an

Urban Design study as a basis for this development. An international architect's commotion for the redesign of the Gaza City Beach Front should be prepared, seeking the best design and a good basis for the international attention and investment. The area covers 190 dunums and roughly includes the beach and both sides of Rasheed street between Omar ELMukhtar street and Shohadda street.

3. In the south sector, *the Israeli settlement area* will be seen as a future tourism development area, on the condition that the final agreement brings a change to the present occupation. According to the Interim Agreement, the Palestinian Authority has no authority over planning and zoning in this area. However, three Tourism Villages Development Areas are shown as part of the Coastal Zone Plane. The three areas are Tourism Village Development Area Rafah (6200 dunums), Khan Younis 1 (2200 dunums) and Khan Younis 2 (2900 dunums)

The political situation between Israel and PNA has created a policy of segregation and resulted in measures like security fences which restrict access to certain coastal areas, and at present prevent the whole Coastal Zone to be considered as one open, accessible space.

Identified environmental problems

The main problem affecting the tourist and recreation potential of the coastal and marine zone is destruction of beach landscapes by sewage pollution and waste dumping: Sewage discharges at the beach are causing polluted water, potential health threats and bad smells. Also illicit solid waste and construction rubbish dumping, and general garbage dumping over the sand cliffs make the beach unattractive.

Additional problems affecting the tourist and recreation potential of the coastal and marine zone are:

- Random, scattered development: Poor planning, poorly planned and designed constructions and developments on and near beaches (hotels in Gaza City, restaurants near beaches and on cliffs, police developments etc.)
- Privatisation drive: Police units have been splitting up and fencing off public beaches for non beach-related activities like camps, training grounds, motels etc. without seeking licensees and permits from the proper government authorities.
- Neglect of landscape and beach quality: Beaches, sand cliffs and dunes are not generally being looked after by an agency like a park authority. The sand dune area is very vulnerable in terms of natural resources and nature and landscape conservation issues. Therefore very strict measures should guide any future development in terms of heights, density and built up pattern. The priority is to develop low-rise, low-density village or bungalow areas, not unlike the present settlements.
- Lack of beach service facilities: toilets, showers, garbage, bins etc. are needed, particularly at the most intensively used beaches.

- There is a very clear conflict potential between recreation interests (public needs) on one side, and private investments in land for tourism developments and land taken for police developments not the other.

The above information was adapted from the Coastal Zone Plan For Gaza, (MOPIC, 1996, p.39-40).

Transport/Shipping/Harbours

There are two significant projects in Gaza for constructing ports:

- fisherman's port (ongoing)
- deep sea port (planning stage)

Construction of the fisherman's port in Gaza City is already underway. Additionally, the Palestinian National Authority (PNA) has taken the initiative to develop a sea port on the Gaza strip to stimulate the economic development of the area. A deep water seaport in Gaza would contribute substantially to reducing the dependency on Israel for the import and export of capital goods, construction materials, fuels, consumer commodities, and other goods. The objective is to create a port for handling containerised and general cargo, to include a fishing port and facilities for small craft. The location selected for the port is between Wadi Gaza and Gaza city.

During the construction and operation of the sea port, there are some expected environmental impacts to the marine environment (flora and fauna), as well as to coastal morphology and sediment transport. These have been thoroughly summarised in an EIA study (DGIS, 1997). In order to ensure that the negative environmental impacts of the Gaza Sea Port are minimised, a set of compensating measures was proposed:

1. Legal and institutional measures
 - development and implementation of environmental legislation
 - installation of an environmental control and enforcement unit
 - preparation of a coastal zone management plan
 - installation of a port management authority
 - execution of proper supervision during port construction
2. Safety measures - preparation and implementation of a contingency plan
3. Water and soil management measures
 - implementation of the MARPOL convention
 - prevention of spills
 - prevention of waterfront discharges of waste
 - development and implementation of wastewater collection and treatment systems
 - development and implementation of water conservation and management plans
4. Principle planning measures
 - implementation of zoning

- set up an industrial planning board
 - preparation of a resettlement plan
5. Nature conservation and archaeological conservation measures
- rehabilitation of valuable nature areas
 - preparation of a rescue plan for archaeology
6. Technical measures
- sand bypassing for minimising coastal erosion
 - solid waste handling

Mawasi Agriculture

A special type of agriculture takes place in certain areas of Mawasi. The water table in Mawasi is very close to the surface (30-50 cm). In the traditional Mawasi agriculture, a thin sandy surface layer is removed, after which it is easy to plant and cultivate crops.

The Mawasi area in the Gaza strip is considered among the most beautiful places in Palestine. The area is in the Southwest of the Gaza strip in the coastal region of the Mediterranean sea, extending from the southern borders of the Deir El-Balah all the way to Egypt. It is bordered by Khan Yunis and Rafah to the east. The length of the area is about 12.5 km, with an estimated width of 1 km. It is still very natural, and is an important point for birds migrating from different Mediterranean island each autumn.

According to the Oslo agreement, Mawasi is considered a Yellow Zone area. This gives the Palestinians the right to use the land for agricultural purposes, but does not allow any further activities without Palestinian-Israeli coordination. There is no electricity or water connections and new sewer system. Light is usually provided by gas or kerosene lamps, and cesspools are used to get rid of wastewater.

There are two specific Mawasi agriculture sites: Rafah and Khan Yunis.

Mawasi Rafah agricultural lands are estimated to be 1500 dunums (150 ha), mostly used by intensive horticulture (tomatoes, potatoes, peas, green pepper). The groundwater is considered to be fresh (chloride levels of approximately 200 mg/l) and is used for human consumption and irrigation. Besides agriculture, people engage in fishing and sell their catches at the local market.

Agricultural lands in Khan Yunis are estimated to be 4800 dunums (480 ha), and non-agricultural land is estimated to be 3200 dunums (320 ha). Non-agricultural lands can be transformed into agricultural lands by removing the sands which cover them, and the planting vegetables such as cucumbers, tomatoes, potatoes, eggplant, green pepper and beans. The groundwater is considered to be good for human consumption and irrigation (chloride levels of approximately 200 mg/l). Most people are involved in agriculture, but a small number are fishing or raise herds.

At the moment, there are no known environmental problems associated with the Mawasi agricultural areas. It is possible that there can be impact from the use of chemical fertilisers or pesticides. This should be studied.

The Mawasi areas should be recognised as special natural area, and should be protected in the future.

Water for power/desalination plants

At the current time, there are plans to construct 3 desalination plants (one in the northern, one in the middle and one in the southern area) and one power and desalination plant (near Wadi Gaza). The 3 desalination plants are meant to provide potable water for domestic use (drinking and cooking). They will be of the reverse osmosis type and will likely have a final capacity of 5000 m³/d each. The middle plant near Gaza City will have an initial capacity of 700 m³/d in the initial phase.

The power and desalination plant will have a higher capacity to produce potable water.

The desalination plants are likely to use (brackish) groundwater from the dunes as their source water. The plants will discharge brine (high salinity effluent) to the coastal waters. The power and desalination plant will discharge heated brine to the coastal waters.

The environmental and ecological effects of these discharges will need to be evaluated before the plants can be constructed. A procedure for Environmental Impact Assessment should be followed.

Archaeological/Cultural sites

A number of archaeological/cultural sites exist in the coastal area of the Gaza Strip:

- The Tall Ajjoul ancient site in the Wadi Gaza natural area
- Anthedon Area (Roman Harbour)
- Tall Omm-Amer Site
- Recent Geopolitical Refugee Camps (?)

The Tall Ajjoul ancient site dates from the ancient Bronze Age (1600-1700 B.C.) to the Mamlouk period (1200 -1500 AD). The site is located in the Wadi Gaza natural areas, 6 km south of Gaza city. The area of the site is about 20,000 m² and contains the ruins and the roots of the Ancient origin of Gaza City and the five king palaces. The site is affected by the degraded natural landscape of the Wadi Gaza. The surrounding areas are cultivated without any consideration of the importance of the site.

The Anthedon Area (Roman Harbour) is located to the north of the Beach Camp in Gaza city and extends under the Beach camp. It covers the Assyrian, Roman, Greek Byzantine and early Islamic periods (800 BC - 1100 AD). It is about 20,000 m² and consists of a 65m long wall as part of the old commercial centre (east extension of the harbour). The site has recently been excavated and the further excavations are expected to continue to find the bays of the harbour, which are expected to be under water. This area is directly affected by sewage discharge from the adjacent dunes.

The Tall Omm-Amer Site is at the edge of the coastal area: the site of 101,000 m² is on a hill, located at the coastal road close to Deir al-Balah. It is from Byzantine period to early Islamic period (400-670 AD) and its origin was Tobata village (Heilaryo breast village 300 A.D.). The site consists of ruins and remittance of a Byzantine church, sand buildings, oil and grape grinding house, colonnades, marble columns, coins, statues, and other mosaic basements of the old village at the site.

The sites of Deir al-Balah and Beach camp are considered by the Palestinian Authority to be of cultural significance, as evidence of the Palestinian situation under Israeli occupation. The camps themselves are sources of sewage and solid waste affecting the coastal and marine zone.

Additional archaeological/cultural sites are located in Gaza, but are not mentioned here because they are outside of the coastal area.

Sea Water Quality

The only study concerning seawater quality has been done by Dr. Afifi (1998) of the Islamic University. The sludge and sewage running down the cliffs have serious effects on the spreading of unhygienic conditions of the beaches. The odour emanating from these sources of pollution is not only experienced on the beach, but reaches some 50-100 m into the nearby camp and town quarters.

In total some 13 point sources of pollution by sewage and sludge have been identified near the beaches of Gaza which contribute to a almost all sea water pollution in Gaza.

What are the problems of the Gaza coastal zone ?

1. Destruction of beach landscape:

illicit sand quarrying and leveling of ground is taking place all over Gaza, including the beaches. The result is significant destruction of the beach and change in local landscape and weakening the coastal defense.

2. Destruction of natural coastal habitat:

natural habitats are threatened by pollution and land use conflicts. The fencing off Gaza has left the Strip a virtual island and stopped the natural exchange of animals typical for the region (flora and fauna, amphibians, reptiles, etc.). Also, hunting and toxification of migratory birds and fish, and the destruction of turtles landing beaches during egg laying period.

3. Waste water discharge to the sea environment:

untreated liquid waste is discharged to low-lying areas and to the beaches and sea. A great deal of untreated sewage is discharged directly to Wadi Gaza and then to the sea. The environmental state of the Wadi is deplorable, and the same goes for numerous areas of the beach where sewage is being directly discharged on the beach. The effluent from Gaza City treatment plant is discharged into Wadi Gaza from where it reaches the sea. The effluent of Jabalia treatment plant is discharged to the area of the sand dunes. Rafah treatment plant effluent is discharged into the Mediterranean Sea.

4. Dumping of solid waste and construction waste directly on the beach :

most of the beach is polluted by waste and construction rubbish dumping, garbage dumping over the sand cliffs, and dumping of industrial waste directly on the beach causing land degradation and serious impacts on the public health and visual quality of the beach and coastal area.

5. Beach erosion

the sediments passing Gaza coast is estimated about 400 000 C.M. per year, two barriers with length of 120 meters, and 500 meters away from each other were constructed for fishing activities, they caused a serious damage to the beach north of it, each barrier prevent the free movement of sediments will lead to sedimentation on the south and erosion in the north. Aerial photographs from 1976 and 1984 show that the southern side beach was enlarged by 16 meters and the northern side of the beach was eroded by 35 meters over a 750 meters of beach length.

New structures along the present coastline, like breakwaters, jetties, marinas and commercial ports, have blocked the along shore sand transport and have caused an erosive effect on the coast downstream. An example is the recently constructed fishing harbour, that has locally disturbed the coastal erosion and sedimentation pattern, resulting in local coastal sand erosion problems. The planned Gaza Sea Port will even more accelerate this problem. Building and roads that have constructed close to the waterline are faced already with stability problems and other related negative impacts.

It is expected to have a serious erosion problems in the coming few years due to the construction Gaza commercial sea port and of the emergency harbor and the expansion of these barriers up to 1200 meter in the water without taking any measures to combat erosion.

6. Random and scattered development:

poorly planned and designed constructions and developments on and near the beaches like hotels , restaurants and other recreational facilities are adding to the degradation of the coastal area.

7. Conflicting land uses:

The dunes and beaches constitute a resource for recreational and tourism development. Given the lack of natural areas and other recreational open space, the coast and beaches are highly important for the Gaza population. The coast is threatened by many activities, including national defense, horticulture, residential development, restaurants and entertainment facilities and by the proposed construction of a port and associated trade and industrial activities.

Accelerated development activities in all sectors claim land. Some of the new activities are compatible with existing land uses or the environment, but others are not. Examples of the latter that were approved by the authorities are: a polluting industry in a groundwater recharge area, a police shooting range in coastal recreation area, and a housing project on archaeological site.

8- Lack of awareness of the public and government:

the population as well the politician lacks knowledge and understanding of the importance of nature conservation and marine and coastal protection, the issue has not been given priority during the occupation, there is also lack of understanding as well as lack of power and funds in government to effectively plan or deal with the environmental problems.

The Gaza coastal and marine environment is facing large and serious threats. The small Gaza strip contains a rapidly growing population that already counts about one million persons. The limited land resources, the physical isolation of the area and the underdeveloped environmental management system has caused various serious problems. These problems relate to pollution of the coastal zone and seawater, deterioration of natural resources and natural habitats and diminishing fish populations. The fishery and tourist sectors as well as the domestic and agricultural sectors are directly faced by the negative impacts.

The coastal land and sea zone of Gaza is subject to serious environmental threats. Limited land resources, large and rapidly growing population numbers, long term isolation as result of the regional political circumstances and an underdeveloped environmental protection system have caused serious deterioration of land and

water resources as well as pollution of various compartments of the coastal environment. Meanwhile, the coastal zone is very important from marine ecological, land resources, fishery, transport, recreation and tourist perspectives.

Depletion of Sand Resources

The sand resources in Gaza, especially the coastal sand dunes, represent important environmental values. These dunes traditionally protect the coastal areas against the sea. The sand dunes have a natural water cleaning capacity. They are the habitat for flora and fauna. They also represent certain natural landscape values. Meanwhile a total amount of at least 25 MCM of sand is estimated to have been excavated – mainly for building purposes – in the last 20 years, from an area of about 520 ha. Only 12 % of the sand excavations is licensed. The major part is removed without permission. The extensive sand quarrying practises in the Gaza strip not only shorten the time period that this non-renewable resource will remain available, it also decreases the protection function of the crimping coastal sand dunes, the natural water purification capacity of the sub-soil and the habitat function for flora and fauna.

Marine and Coastal Ecology

A recent biodiversity study in Gaza included a review of available information on coastal and marine ecology. Much attention is given to fish resources, as the fishery sector with some 800 fishing units, is very important economically. This sector is currently working under critical conditions, with an average area of fishing ground of about 0.5 square nautical miles per unit. This is extremely low for international standards and there are strong indications that the coastal fish population is diminishing due to overfishing, though exact data on the sustainable yield of the fisheries is not available. There is evidence that the fishing trawlers are damaging the seabed with their nets, affecting the ecological status of the marine areas and there are also indications that the quality of fish is affected by marine pollution.

Additionally, the endangered species of sea turtle is thought to exist in the coastal region of Gaza, and two turtle nesting beaches are known. In the past, these species and their eggs have been under extreme pressure from hunting and collecting, and there have been no reported sightings in the last two years, thus the existing status is uncertain. Only a very limited number of other marine reptiles have been reported. Little is documented on the status of marine mammals in the Gaza area, other than that the status of the Monk seals is unclear. Similarly, for marine flora, very little information is available. In any case, the marine ecological resources of Gaza are considered to be under great pressure from pollution inputs and the effects of the extensive fishery.

Pollution – Waste Water

The main source of pollution in the coastal zone of Gaza is the discharge of untreated waste water along the shoreline, both by the Palestinians as well as the Israeli settlements in the north, middle and south of Gaza. Especially the beaches

in front of Gaza city, Beach Camp and Deir El Balah are polluted by sewage discharges and individual sewage drains, ending either on the beach or a short distance away in the surf zone. About 80% of the waste water that is generated in Gaza is currently discharged without treatment into the sea (50,000 cubic meter per day). The pollution presents a major health risk for swimmers and marine life; there are also indications that the quality of fish is influenced by coastal pollution. Tourism development in the Gaza strip will largely depend on the extent to which the beaches and coastal cliffs will be cleared and stay clean from solid waste, and the extent to which the sewage effluent entering the surf zone of the coastal waters will be reduced.

Pollution – Solid Waste

Also dump sites for solid waste as well as littering contribute to the pollution of coast and seawater. Nevertheless, solid waste management has largely improved during the last years in Gaza. Also occasionally, shoreline cleaning actions take place on the initiative of PenA, Ministry of Youth and municipalities. These measures contribute to mitigate the problems of open dump sites and waste littering along the shoreline.

Lack of Communication and Co-operation

Currently, the awareness on environmental matters by the general public is not sufficient. This is partly caused by that fact that public information campaigns on environmental matters are only of very recent date, partly due to the fact that actual socio-economic problems tend to 'over rule' other issues, such as the environmental one, in the mind of the public. Target group information campaigns, for instance focused on the fishery sector, have not been organised yet. Co-ordination between different parties involved does not take place sufficiently either. As a result, different authorities and stakeholders may have different agenda's on coastal and marine development issues. Consultation and co-operation between these stakeholders is therefor urgently needed.

Lack of Information Management

Currently, data and information on coastal and marine environmental matters, such as the ones mentioned before, are scattered throughout different authorities and projects offices and donor organisations. Recently, the Palestinian Environmental Authority has initiated development of an overall environmental GIS/database for the whole of the West Bank and Gaza. An information system on the coastal and marine environment, needed to support actions and co-ordination has not yet been developed.

Wadi Gaza as a source of waste water pollution:

Untreated sewage is discharged to the Wadi Gaza from the middle camps (Nuseirat, Bureij and Maghazi), which reach the sea by flooding in winter. The

results are poisoning of water and soil causing a major health risk for swimmers and marine life.

Planning and management of the coastal zone of Gaza Governorates

A) Plans which already had been done

◇ Emergency Resources Protection Plan (ERPP).

It was realized that the development will be accelerated in various sectors and that if this took place without any form of guidance and government control, that then the already scarce resources of Gaza could suffer irreversibly, destroying future opportunities, therefore, the need was felt for an early protection of Gaza critical natural resources and it was decided to concentrate on protective measures at first. The most critical resources identified in Gaza for which immediate protection is crucial are the following:

- 1-ground water resources
- 2-prime agricultural land
- 3-potential recreation and tourism areas
- 4-unique , undisturbed landscapes
- 5-archaeological sites

The ERPP is a restrictive plan consists of two constituent documents: a map (fig.1), at scale 1:50,000 and a set of land use controls for a limited number of development projects which are expected to be implemented in the short term. The restrictions put on these projects in this plan are largely to there location.

The five principal resources are mostly located in the area identified as the Coastal Zone of Gaza and should be protected from undesirable activities by prohibiting certain land uses and projects in the respective resource area. In those instances where two resource areas overlap they have been joined into one single resource area. In such cases , permissible land uses are more restricted than in single resource area.

To facilitate land use control, the resource area have been grouped into restricted use zones, where resource areas overlap they have been combined into a single use zone. The following restricted use zones constitute the areas in which land use control is exercised:

- 1-Water Catchment 1 and Nature Conservation
- 2-Water Catchment 1 and Agriculture 1
- 3-Agriculture 1
- 4-Water Catchment 2 and Agriculture 2

- 5-Agriculture 2
- 6-Recreation
- 7-Archaeological sites

◇ *Coastal Zone Plan (CZP)*

The CZP is a land use plan (fig.2) for the coastal area, a more advanced planning step. It is basically a plan aimed at zoning and regulating functions and activities in the various areas of the zone. Its not aimed at detailed regulations of activities, but seeks to establish a common understood, respected and supported concept of the Coastal Zone and beaches as an area which belongs to the whole Palestinian nation. This plan is more aimed at controlling development than restricting use.

The main emphasis of the CZP is protection of the coastal area from un planned or compatible use, this reflects the significance of the coastal zone and the vision for future, development will play an important, but secondary role, and be principally restricted to ocean related activities.

There are different levels of protection or preservation. They reflect order of importance or size, from national parks and nature reserves via special protection zones down to site or object protection plans. Many of these are represented in the coastal zone plan, which is divided into two components as follows:

- protection plan:
 - recreation, nature conservation, landscape protection,
 - archaeology
 - and cultural history
- development plan:
 - tourism development, urban development, agriculture and
 - fisheries
 - infrastructure

◇ *Coastal Sensitivity Mapping*

The objectives of this project was to identify those natural resources be at risk in the event of chemical or oil spill and development of contingency plans to protect these resources.

B) plans under preparation

◇ *Coastal Zone Management Plan (CZMP)*

It is noted that a large number of demand for the use of limited Gaza coastal zone and the potential of some areas of the zone to be used for recreation, tourism,

nature conservation, or significant archaeological sites.etc. these conditions creates a situation in which short, medium and long term conflicts may arise between economic development and environmental management objectives unless a coastal zone management plan is developed and implemented.

This plan will have three primary elements: (a) conduct of a field based Coastal Zone Resource Inventory; (b) preparation of a Management and rehabilitation Plans which could later be updated as the planning process for Gaza progress; and (c) design and conduct of an applied training program for Palestinian specialists. It is anticipated that the Plan will assess past trends, current conditions and predict alternative scenarios for future development. The Plan will be prepared in the context of the on-going physical planning process and support concerned ministries and local government efforts to promote environmentally sound development of the coastal area. The findings and recommendations of the Plan will be presented in the form of a planning study, supported by maps, which would be fully complementary to the work being undertaken for the ongoing physical planning study for the Gaza Strip.

The area to be included under the plan would include the entire coast of the Gaza Strip and would extend inland to cover the effective "zone of influence of the coast" which has been defined by EPD to include the beaches and both the natural and semi-natural coastal sand dune areas. The study area would extend seaward to include all areas under the jurisdiction of the Palestinian Authority, with an emphasis on the area within the first two kilometers from the coast.

Special Development Planning Issues to be considered in the plan:

- ◇ Management of fishery resources and the critical areas of marine habitats with special attention to the trans boundary nature of this resource in the case of the Gaza Strip;
- ◇ Management of coastal erosion along the Gaza Strip;
- ◇ Management of large coastal sand dune and sandy beach areas;
- ◇ Management of mouth of Wadi Gaza;
- ◇ Redevelopment of areas currently used for both formal and informal disposal of liquid and solid wastes with special attention to Wadi Gaza area;

◇ Identification of suitable sites for the potential construction of properly designed marine out falls and the discharge of cooling water and brine;

◇ Development of beaches for recreational use by local residents and tourists;

◇ The influence of current and potential transboundary forms of pollution; including oil and trash from marine sources; offshore fishing operations;

◇ Evaluate potential ecological importance and proposed possible conservation measures for the "Hill of Tulips" a coastal site which has a variety of wild plants..

◇ *Oil Spill Contingency Plan (OSCP)*

The regional oil transport and the movement of oil tankers in the territorial waters and the activities within Gaza Governorates, including the planned construction of an international sea port, might pose a risk of oil spill, also the location of Gaza close to the Suez Canal and down stream of the main coastal currents might also have influence. An oil spill contingency plan should be prepared with the following components:

- identification of organizations capable of assisting EPD in the formulation and implementation of the contingency plan;
- recommendation of an appropriate and effective management structure and line of command for the implementation of the plan;
- preparation of an analysis of the level and type of existing risks deriving from regional oil transport and economic activities in Gaza and adjacent areas;
- evaluation of potential oil spill control measures in the port and harbor, energy and industrial facilities whose construction is currently under consideration in Gaza and the extent to which the aforementioned investment ought to include special arrangements for oil spill control and the means through which such arrangements may be funded;
- assessment of the personnel and equipment needs, and logistical / transport requirements for the carrying out of the contingency plan;
- identification of training needs for Palestinian experts involved in the implementation of the contingency plan ;
- assessment of the current plans for the port reception facilities in Gaza, including facilities for the disposal of ballast and bilge water, solid waste, oil products and hazardous materials and recommendation of measures aimed at upgrading these facilities .

General Environmental Legislation

The lack of a policy and institutional framework for comprehensive physical and environmental planning is in itself a complication. The situation is also affected by a complex set of legislation dating back to the beginning of this century.

Up until 1917 the area was subject to the law of the Ottoman Empire. During the period of British Mandate from 1922 to 1948, many British laws and regulations were introduced. At that time, the Gaza Strip came under Egyptian control. Since 1967 the Israelis have applied a combination of laws from three preceding regimes, modified by their own military orders.

This situation changed due to the Oslo agreement of 1993, in which Israel and the PLO reached understandings on the terms for a peace agreement, and the agreement in Cairo of May 4, 1994. This agreement founded the Palestinian National Authority (PNA) and established a schedule for withdrawal of Israeli forces. It also established the structure of the PNA and responsibilities and legislative powers.

The British mandatory antiquities law (marine law) no16/19

This is the valid law which is enforced up to the present day. Several articles are relevant to coastal and marine resources and prevention of pollution:

- Order 17, 1935, article (1) states (the prevention of the port's pollution)
- Article 2 mentioned that it's prohibited to throw any stones, waste, or any other material in the port area.
- Order 13 (1) if any one knows about any fish disease in public or private water and he or she did not tell the authority about this he would be guilty.
- There are many orders of fishery sector, (e.g. types of nets how to catch fish, the fishery area, etc.)

Draft of the Fisheries Law for the State Of Palestine

The draft document concerning the fisheries sector has been compiled jointly by the Department of Fisheries and the CARE-MA'AN Research Project, 1996-1997. It covers all fishing activities and other activities related.

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