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Appendices

MAIN POINTS OF THE ADVICE

The Commission for the Environmental Impact Assessment considers the following points in this advice as crucial in the Environmental Impact Statement for the Gaza Port:

- Description of coastal erosion north of the harbour due to existence of the port.
- Description of the impact of port operation on the coastal environment.
- Description of the impact of possible sea based sand mining on coastal erosion.
- Description of contract guarantees for sustained implementation of measures to prevent coastal erosion.
- Description of inventory of and rescue operations for archaeological values.
- Development and implementation of environmental and traffic legislation.
- Description of the need for institutional and human resources capacity building.
- Description of the claim of the port on scarce water resources.
- Description of the ways in which the development of the port will be related and fine tuned to the development of the Gaza Strip.

1. INTRODUCTION

The Palestinian Authority (PA) intends to realize a port in the Gaza Strip in order to support economic development of the Gaza Strip and the West Bank. The initiative is rooted in longly felt needs of the Palestinian people as expressed in the 'Declaration of Principles' (DOP). The DOP, that was signed on 13 September 1994, foresees establishment of a Gaza sea port Authority (Article VII DOP).

The Government of the Netherlands recognizes the need for establishment of a sea port and warrants funding of the port for 40 million Netherlands guilders if additional funding is assured by the PA. Netherlands funding will be provided via the ORET Programme of the Netherlands Government (Export Transactions relevant for Development).

The PA is the competent authority in the Gaza. The PA decides where the sea port will be located, what will be its capacity, how its development will be phased and how the sea port will affect physical planning of the Palestinian territory.

The Netherlands government is the competent authority with regard to agreement of the ORET funding of the Gaza sea port. Port construction is an activity that, according to OECD standards (Organisation for Economic Co-operation and Development) and international loan agreement conditions, requires an Environmental Impact Assessment (EIA). Objective of the EIA in support of Gaza sea port is to provide both competent authorities with relevant information on the environmental effects of the activity so that well-informed decisions can be made.

An additional benefit of the EIA for Gaza sea port is to familiarize the PA and the relevant Palestinian Institutions with EIA and to assist in building capacity to produce and review Environmental Impact Statements (EIS), the product of the EIA-procedure.

By letter dated 18 November 1994 (annex 1) the Directorate General for International Cooperation of the Netherlands Ministry of Foreign Affairs, as initiator of the EIA-procedure and as competent authority for ORET funding, has asked the Netherlands Commission for the EIA to advise on Terms of Reference (ToR) for the EIS.
Preparatory talks on the EIA procedure were held between the Commission and Dr. Nabeel Shaath, minister of planning and international cooperation of the PA, on 6 January 1995. Based on this discussion a 'Notification of intent' for the EIA was formulated, which was signed by the Director General of the Ministry of Planning and International Cooperation on 13 February 1995 (Annex 2).

A working group of the Commission, composed of four Dutch experts, a chairman and a technical secretary (annex 3), visited Gaza and Israel from 10 to 17 February. On request of the PA no Palestinian experts were invited to participate in the working group. Purpose of the visit was to collect, by means of interviews, intensive consultation and workshops, relevant information related to the Gaza sea port in order to enable formulation of project and site specific terms of reference for the EIS.

The working group accomplished its activities in close contact with the Palestinian Authorities, particularly with Dr. Mohammed Ajjour, Director General of the Environmental Planning Directorate (EPD) of the Ministry of Planning and International Cooperation (MPIC).

In this advice a lot of information is asked for. Much of this information, however, is available in existing documents. In the EIS available information may be summarized, referencing the source of the information.

2. SCOPE, OBJECTIVE AND TIME SCHEDULE OF THE EIA-PROCEDURE

The decisions on the Gaza sea port are taken in a dynamic diplomatic context. Due to the urgency of realisation of the port its approximate location had already been decided at the moment of the site visit and is thus not subject of EIA. The present EIA concerns the exact location, its capacity, the lay out and the design of the port, its operation and management and port-induced developments. The EIA-procedure aspires to contribute to environmentally sound decision making. Publication of the EIS is foreseen for the second part of August 1995. Publication of the final review advice is scheduled for the second part of September 1995.
For reasons of time and cost effectiveness (performance of unnecessary study can be avoided through fine tuning of the design activity and impact assessment) the Commission favours simultaneous execution of the EIS and the Detailed Design Study.

3. RATIONALE

3.1 Problem analysis

In the 'Notification of Intent' a summary description of the problems to be solved is given.
The EIS must state in clear terms the problems that are assumed to be solved by realisation of the Gaza port. A detailed analysis of the problems must be presented and quantitative evidence must be included to underpin the statement of the problem and the problem analysis. Sources of quantitative information must be referenced.

3.2 Objectives of the proposed activity

Clear definition of the objectives enables identification and formulation of alternatives and furnishes criteria for evaluation and monitoring.
In the EIS an unequivocal statement must be given about the objectives of the proposed activity. These objectives should logically ensue from the problem analysis, mentioned in the preceding paragraph. A distinction must be made between direct objectives and indirect objectives (e.g. anticipated induced developments).
Objectives must be formulated in such a way that identification of alternative initiatives – meeting the same objectives – remains possible.

4. SETTING OF THE GAZA SEA PORT

4.1 Legal and Institutional setting

4.1.1 Legal setting

International agreements on the protection of the marine environment, such as represented by I.M.O.[1] (SOLAS, Load Lines, MARPOL), London Dumping conventions and I.L.O.[2], impose strict environmental regulations on port operations. An appropriate legal framework is needed for management and protection of the port and the coastal environment. Therefore the EIS must present:

- an inventory and assessment of the state of affairs with regard to legislation concerning environmental protection and environmental quality standards (water, soil, air, noise, risk);
- a description of existing and proposed programmes for management and protection of the Mediterranean waters and coasts (national programmes and international programmes);
- an assessment of the probability of compliance with above mentioned agreements;
- description of the consequences of legal landownership with regard to responsibilities in case of pollution of soil and ground water. It must be made clear whether any clean-up costs can be claimed from the tenant or land user (the polluter pays principle).

4.1.2 Institutional setting

An appropriate institutional framework is needed for management and protection of the port and the coastal environment. In order to assess the necessity of additional institutions, the EIS must present an inventory and assessment of the existing institutional framework with respect to environmental protection and management.

1 International Maritime Organization.
2 International Labour Organization.

4.2 Physical planning

At this moment there is no regional physical plan for the Gaza Strip. During the site visit the Commission observed, however, that ideas on physical planning and the place of the port therein do exist. The EIS must describe physical planning visions with regard to compaction of the urban area of Gaza city, industrial and agricultural zoning, connecting infrastructure, settlements and open spaces between urban areas.

4.3 Public involvement

The EIS should describe how stakeholders in the port and the general public have been consulted and how their opinions and interests did influence the contents of the EIS.

5. THE PROPOSED GAZA SEA PORT AND ALTERNATIVES

5.1 General remarks

This chapter detailedly enumerates points of attention with regard to formulation of the Gaza sea port. Their elaborateness must be seen as an assistance to project formulation. All these aspects, however, are also related to anticipated environmental effects of the sea port. Therefore, they must be addressed in the environmental context as well.

The Commission for the EIA considers mitigating measures for negative environmental effects as an integral part of the activity as far as they can be implemented in the design, construction and operational phase of the activity. In describing elements of the proposed activity the accompanying mitigating measures must, therefore, be described as well.

5.2 Management of port realization and management of the port

5.2.1 **Legal requirements**

In the Gazaian context development of legal instruments is necessary to guide and control port establishment and operation. Therefore, the EIS must present:

- an inventory of required additional legislation necessary for realisation and operation of the Gaza port;
- a time schedule for realisation of the required legislation.

5.2.2 Institutional concepts

In the EIS a complete inventory must be presented of all tasks that must be performed in order to adequately manage the Gaza port. This inventory must include management of port construction and exploitation and management of induced developments. Organisation charts must indicate which institutional units may be required to perform these tasks. Alternative organisational structures may be proposed and their functionality and feasibility assessed.
It must be indicated which existing institutional units will be involved in the realisation and management of the Gaza Port (a Port Authority) and which functions (decision making, implementing, enforcing), responsibilities and which legal authority will be attributed to each institutional unit. Requirements for additional staffing, training and equipment must be presented.

The EIS must describe the additional institutions that must be created, staffed, trained and equipped to perform tasks and assume responsibilities that cannot be attributed to existing institutions. A distinction may be made between functions to be performed by governmental bodies and tasks to be performed by private bodies.
Sources of funding for equipment, staffing, training and functioning of all institutions must be given. A time schedule, indicating creation, appointments, training and equipment of these institutions must be presented.

5.2.3 Management practices, regulations and routines

A description must be given of daily operational routines for the port and the way they are regulated. It must be indicated how and to what extent the routines and regulations are designed to prevent environmental hinder and damage.

Port Management
- servicing port ships and shore facilities, supplies, operation of lifting equipment;
- identification, handling and treatment of port waste streams;
- nature of transhipped goods and materials, methods of transshipment;
- management measures to avoid spills and discharges of transshipped materials and goods and of waste streams;
- handling of hazardous and toxic materials (e.g. anti-fouling);
- calamity control and abatement procedures (including fire fighting).

Nautical Management
In the EIS routines and regulations must be described for the following points:
- traffic in the port and on sea;
- orderly and proper berthing;
- mooring and/or anchoring;
- vessel guidance from patrol boats;
- damage survey;
- spills and illegal discharges;
- traffic in case of spills and accidents;
- discharge of slops;
- pilotage;
- communication;
- tug service.

Mitigating measures preventing emissions of noise, odour, dust, cargo, drifting debris and hazardous or toxic materials and measures to diminish risk (individual and group risk) must be described as integral part of port procedures and routines.

The EIS must describe whether an Integral Environmental Care system (particularly for soil, water and marine bottom pollution) will be foreseen for the Port Authority, and if so, to what extent this system will comply with environmental law. The EIS must also describe which responsibilities in this field will be delegated to the Port Authority.

5.3 Location of the port

The selected location for the port is situated between the Wadi Gaza and the border of the Municipality of Gaza. The exact location of the port and the connecting infrastructure must be presented (maps).
The choice of the location must be motivated. The motivation must address the following aspects:

General aspects:

- fishing rights;
- dismantling of settlements;
- corridor with West Bank.

Physical planning aspects:

- access routes to hinterland (roads, pipelines, power transmission zones);
- physical planning (development of the city of Gaza and space for development of port related activities, including free trade zone);
- tourism development (including establishment of a marina);
- industrial production centres;
- fishery industry;
- agricultural production centres.

Environmental aspects:

- known Cultural Heritage (location and importance);
- impact on (potential) environmental values;
- environmental effects:
  - intensity of sand transport as calculated in part 11 of the Basic Engineering Study;
  - accretion and erosion south and north of the port;
  - possible maintenance problems of the port entrance;
  - dispersion patterns of (accidental) pollution;
  - spawning sites and migration of fish;
  - scarce remaining open land areas;
  - rest sites for migratory birds;
  - disturbance of coastline and coastal landscape;
  - sensitive habitats on land;
- location of sand borrow site(s) and borrow site(s) for other construction materials;
- flexibility for expansion (in relation to physical planning).

5.4 Coastal aspects

For judgement of port impact on coastal erosion the impact of adapted layout B phase IA and phase III in part 10 of the Basic Engineering Study (annex 4) must be chosen. The effects of the port on the coast are adequately described in Part 11 of this study. The study mentions various measures, mitigating adverse environmental effects of the proposed lay out. The EIS may refer to this study and must summarize the results.
In the EIS criteria for the acceptability of coastal erosion must be given and proposed mitigating measures must be evaluated according to these criteria. Other designs and mitigating measures proposed in the EIS must be evaluated according to these same criteria.

No detailed survey of resistant coastal kurkar layers[3]] is deemed necessary as it is not likely that coastal erosion north of the port will be accepted by the PA.

In order to prevent coastal erosion following construction of the port considerable quantities of sand must be nourished as mitigating measure to the beach north of the port immediately after construction of the breakwaters. Also great quantities are required for the construction of the actual port site. In the EIS these quantities must be specified and possible (land or sea based) borrow areas must be identified.

In order to prevent sand sedimentation south of the port, silting of the port itself and coastal erosion of the beaches north of the port up to Gaza City, annual transport of an estimated 350.000 cubic meters of sand from south to north around the port is imperative. Any failure to perform this annual sand moving of sand will result in serious coastal erosion to the north of the port. It is assumed that the task is most easily and reliably performed using dredging vessels.
Considering the importance of this sand movement the Commission deems it necessary that in the financing contract for construction of the port a condition is included, obliging the PA to perform on a regular basis the transport of an annual average of 350.00 cubic meters of sand from south of the port to north of the port. This contract-condition must be described in the EIS.

3 Pleistocene calcareous sandstone/limestone layers.

5.5 Land acquisition and resettlement

The EIS must present (in text and on maps) an inventory of formal and informal land titles in the area consigned for port construction, for establishment of connecting infrastructure and, if relevant, for borrow sites for construction materials. The EIS must also present a compensation and resettlement plan including a time schedule and funding guarantees. Moreover the EIS must indicate the institutions responsible for deciding, implementing and monitoring this plan.

5.6 Cultural heritage

The whole Gaza Strip and especially its coastal area is extremely rich in known and undiscovered archaeological values. An archaeological inventory must be executed in the area consigned for port construction (on land and in the sea) and in the area where port related activities are foreseen, including construc tion material borrow areas. Rescue operations for remains of high archaeological value may be described in the EIS. The EIS must present an inventory and rescue plan including a time schedule, information on funding and an indication of the institutions responsible for deciding, implementing and monitoring this plan.

5.7 Development of port capacities in time

5.7.1 **Commercial port**

Traffic forecasts must be presented in the EIS. The forecasts must be specified for each of the productive sectors and the trade sector. They must be based on assessment of the anticipated development in time of the quantities of trafficable goods for every sector. Maximum and minimum forecasts must be presented. An estimation must be made of the proportion of hazardous materials. In the EIS it must be made explicit for which reasons each of the cargo streams is expected to be shipped via Gaza Port and not via other ports in the region. On the basis of presented forecasts the most probable development phasing of the port must be indicated. Consequences of not meeting the traffic forecasts must be described.

5.7.2 **Fishery port**

Traditionally the fishery sector has played an important role in economy of the Gaza Strip. Development of the fishery sector may be limited by restrictions in access to international waters and by international agreements with regard to management of limited fish resources in the Mediterranean. In the light of these possible limitations, forecasts must be made and quantitatively underpinned. The forecasts must be translated in numbers of vessels (per type of vessel) and port requirements. Maximum and minimum forecasts must be given.

5.7.3 **Marina**

Depending on the policy of the PA with regard to tourism, establishment of a marina in the Gaza sea port area may be anticipated. In the EIS the subject must be addressed. Projected marina capacity must be assessed and underpinned.

5.8 Lay out and design alternatives

5.8.1 **General**

International requirements and standards for port services must be observed if the port is to be competitive in the international context. These requirements and standards are not influenced by local developments and must, therefore, be considered as mandatory. In the EIS these standards must be described.

Lay out and design of the Gaza Port also depend on port requirements related to cargo forecasts and prospects for development of the fishery and tourist sectors. In the EIS phased development designs must be presented. These designs must be flexible enough to accommodate establishment of both minimum and maximum capacities for the commercial port, the fishery port and, if relevant, the marina.

In the description of the designs special attention must be given to:

- approach channels, turning basin;
- ground budget;
- nature, origin and transport of construction materials used for breakwaters, piers, berths, cofferdams, jetties, groynes and similar structures;
- location of dredge material surplus dumps or fill and construction material borrow areas (on land or in sea);
- possible damage to coastal aquifers (perforation, salt water intrusion, pollution);
- works to prepare the site for construction;
- design and construction of port offices and other buildings;
- linkages to existing infrastructure;
- linking infrastructure to be created;
- expected transport frequencies on connecting access roads;
- paving (type, porosity) and patterns of surface run-off, run-off drainage or infiltration;
- facilities to avoid pollution of ground and sea water;
- landscaping of the port and its facilities and proposed (ecological) buffer zones;
- anticipated frequency of breakwater and terminal overflow;
- location in relation to residential, recreational and sensitive areas;
- facilities to avoid and mitigate noise, dust hinder and individual risk;
- physical planning aspects of the induced developments ([competing] land use, resettlements, claim on waste treatment capacity, claim on water and energy supplies, loss of habitats and economic potential, loss of Cultural Heritage, social acceptance).

5.8.2 Commercial port

Design and lay out alternatives for the commercial port must be developed in the iterative process of detailed design and EIS-preparation.
The alternatives considered in this process must be described in the EIS. The alternative alignments of the approach channel must be evaluated with respect to prevailing current patterns and wave and wind directions, preferably in a fast time simulator. Results of this evaluation must be described in the EIS.
Moreover the proposed designs must be evaluated for:

- safety aspects: restrictions on spatial combination of activities that are conflicting for reasons of risk (bulk, crude, ro-ro, marina, multi-purpose, containers et cetera);
- flexibility for expansion.

5.8.3 Fishery port

It must be considered whether the existing small scale landing site for fishing boats and the fish auction site should be upgraded and maintained. In the future in the new port a site for far-sea fishing vessels could be created.

Another alternative to be considered is the inclusion of the complete fishing port in the commercial port. Consequences (risk, regulations) thereof must be described as well.

5.8.4 **Marina**

As a separate marina with proper breakwaters will probably not be feasible in any foreseeable future, a marina can be planned in the commercial port.

5.9 Dredging and construction

The following port construction aspects, including measures taken to prevent accidents and environmental damage, must be described in the EIS:

- dredging methods, excavation and land filling methods including transport of materials;
- ground budget;
- land or sea disposal of dredging material;
- measures to prevent disturbance or pollution of coastal aquifers;
- employment of heavy machinery (excavators, dredgers, earth moving equipment);
- possible use of a concrete plant;
- relation to the archaeological inventory and rescue plan, methods of construction that allow for timely screening for Cultural Heritage, for its 'on site' conservation or timely evacuation;
- employment of foreign or local labour, requirements for temporary housing, water supply, sanitation and health services.

5.10 Services

The EIS must address the ports (ships and terminals) requirements of and the way in which these requirements will be provided for:

- energy
- water
- fuels
- solid and liquid waste treatment and disposal capacity

Mitigating measures to alleviate adverse environmental effects of increased demand for these services must also be described in this paragraph.

5.11 Port equipment and installations

A description must be given of necessary and proposed port installations and equipment, their ownership and responsible institution for their exploitation. This description must include port offices and other buildings and equipment for:

- handling and treatment of waste streams;
- handling of cargo;
- maintenance equipment for port installations;
- control and abatement of calamities (including fire fighting);
- cleaning (containers);

and installations for:

- controlled storage of damaged packs or containers with hazardous materials.

Mitigating measures on equipment and installations to prevent emissions of noise, odour, dust and toxic or hazardous materials and measures to diminish risk (individual and group risk) must be described.

5.12 Port maintenance

Maintenance activities for the port and its additional structures must be described.

- maintenance dredging, anticipated quality, transport and disposal of dredging material;
- maintenance of port installations.

In the description of the proposed maintenance activities and possible alternatives, mitigating measures for alleviating adverse environmental impacts must be included. Prospects (technical, organisational and financial) for continuity of their implementation must be addressed.

5.13 'No action' alternative

The 'No action' alternative describes the situation that develops if no port is established. The EIS must describe how and to which extent the objectives of the proposed activity can be achieved without the Gaza sea port and how the Gaza Strip and the West Bank will develop in that case. The EIS must also indicate if no-action represents a feasible alternative or not. In the latter case the no-action situation must be seen as a reference situation.

5.14 Alternative most friendly to the environment

The alternative most friendly to the environment must be described in the EIS as a full fledged alternative. It may be the 'no action' alternative (if this appears to be realistic). It may also be a combination of the environmentally most favourable lay out, construction technique, spatial and physical development of the port and surrounding areas and the environmentally most favourable management method.
This alternative must be compared to other alternatives in chapter 8.

6. CURRENT SITUATION OF THE ENVIRONMENT AND ITS AUTONOMOUS DEVELOPMENT

6.1 General

The EIS must contain a description of the current situation of the environment and its development if no port will be established (the autonomous development). This description serves as basis for comparison of the environmental effects of the various alternatives. The description must be limited to those aspects that may be influenced by construction, by operation or by the mere existence of the port and must cover the complete affected area. This area may differ per aspect. The study areas must be indicated on maps. If on certain aspects adequate information is available in existing documents a synthesis of the information must be presented in the EIS and the document must be referenced.

6.2 Natural environment

The following aspects must be addressed:

- the climate;
- geology and geomorphology;
- hydrography (currents, tides, salinity et cetera);
- physical and chemical condition of the sea bed;
- coastal morphology (existing impacts);
- hydrology (ground water and surface water quantity and physical-chemical characteristics, including existing impacts)
- flora and fauna:
  - ecosystems and their characteristic flora and fauna (terrestrial, Wadi Gaza, tidal zone, marine environment);
  - identification of vulnerable ecosystems and environmentally valuable areas;
  - protected areas, protected or endangered species;
  - ecological requirements of main fishery resources;

- landscape (vulnerable elements and areas);
- assessment of the assimilative capacity of the environment;
- actual risk situation;
- air quality (chemical pollutants, odour, airborne particulates);
- noise.

6.3 Socio-economic environment

6.3.1 Population characteristics

- population density, growth, employment et cetera;
- availability of qualified workers.

6.3.2 Water supply and sanitation

- availability of freshwater resources, existing impacts (ground water depletion, saline water intrusion);
- current status of treatment and discharge of sewage;
- current status of solid waste treatment and disposal.

6.3.3 Economic activities

- Agriculture:
  - soils and land use;
  - crops;
  - use of pesticides and fertilizers;
  - impacts on coastal environment.

- Fishery
  - fishing zones;
  - fish landing sites;
  - current status of exploitation of fishery resources: catch composition and yields, including CPUE[4]], manpower involved, composition of fishing fleet.

- Industry
  - types of industry;
  - impacts on coastal environment.

7. IMPACTS

7.1 General

The impacts must be described per alternative considered. They must be given for the development phase 1 (minimal traffic forecast) and for the development phase that will be reached when maximum traffic forecasts are realised.
The description is limited to impacts that are not controlled by project-integrated mitigating measures and must cover the complete affected area. This area may differ per aspect.

4 Catch per unit entry.

7.2 Institutional impact

Realization and exploitation of the port are expected to have a range of effects on the buildup and functioning of the PA institutions. Anticipated positive and negative effects must be described in the EIS.

- ! environmental effects of institutional malfunctioning (risk assessments should be included);
- ! effects of ineffective implementation of environmental management measures through use of insufficiently skilled labour.

7.3 Environmental impact in the construction phase

7.3.1 Impacts on the physical and natural environment

Port site and its surroundings

Soil, ground water and surface water

- ! effects of ground works and landfill operations;
- ! effects of increased paved surface area on hydrology and aquifer recharge;
- ! effects of potential physical disturbance of coastal aquifer;
- ! expected subsidence of soil layers and its effects;
- ! pollution of surface water and marine water bottoms;
- ! changes in the geo-hydrological and hydrological situation;
- ! environmental effects of materials used;
- ! impacts of land disposal of port sludge;
  - contamination of ground water and runoff;
  - reduction in soil quality;
- ! effects of transport of construction materials;
- ! effects of operation of a concrete plant for artificial units.

Flora and fauna

- ! loss of natural habitat;
- ! impacts from dredging on flora and fauna and primary productivity (destruction of bottom habitat and turbidity);
- ! impacts from disposal of dredged material and port sludge;
  - on flora and fauna and primary productivity in the aquatic environment (turbidity and destruction of bottom habitat);
  - on vegetation cover and on soil and ground-water quality on land.

Landscape, archaeology and cultural heritage

- ! impact on coastline integrity and coastal landscape (graphic imaging);
- ! effect on functional and spatial structure;
- ! loss of Cultural Heritage (archaeological sites).

Borrow areas (land based)

Soil, ground water and surface water

- ! effects on aquifer;
- ! changes in the geo-hydrological and hydrological situation.

Flora and fauna

- ! loss of vegetation cover and wildlife habitat.

Landscape, archaeology and cultural heritage

- loss of scenery and typical landscapes (graphic imaging);
- effect on functional and spatial structure and land use;
- loss of Cultural Heritage (archaeological sites).

Borrow areas (sea based)

- impacts from dredging on flora and fauna and primary productivity (destruction of bottom habitat and turbidity);
- impacts on the coastline and the foreshore.

7.3.2 Impacts on the socio-economic environment

The following aspects must be addressed, if possible gender specific:

- effects of displacement and compulsory resettlements (from port area and eventually land based borrow areas) on resettlers and on recipient areas and communities.
  - loss of housing;
  - loss of (agricultural) land;
  - financial losses;
  - living conditions:
    - noise;
    - air quality (dust);
    - risk (accidents);
- effects of temporary influx of workers (requirements for housing goods and services, health risks);
- effects on land prices and social impact thereof.

7.4 Environmental impacts in the exploitation phase

7.4.1 Impacts on the physical and natural environment

Soil, ground water and surface water

- ! pollution of (coastal) aquifers;
- ! salt water intrusion in coastal aquifers induced by changes in hydrology and geo-hydrology;
- ! environmental pollution (marine waters, soil, ground water, including spreading patterns);
  - due to ship handling (accidental spills) and storage in port area;
  - due to waste disposal (solid, liquid), originating from ships and generated by port itself (sewage and contaminated drainage water);
  - from maintenance dredging;
  - from deposition of dredging material;
  - from breakwater and terminal overflow;
  - from calamities;
- ! changes in coastal morphology;
- ! function loss of surrounding areas.

Flora and fauna

- ! effects of contamination of sea and land on ecosystems and fishery resources;

7.4.2 Impacts on the socio-economic environment

The following aspects must be addressed, if possible gender specific:

- ! occupational health impacts:
  - noise;
  - dust;
  - risk.

- ! Environmental impacts in port surroundings:
  - noise (night, day and 24 hour-average contours of the port on maps, indicating noise sensitive areas and objects) and its consequences for physical planning.
  - vibrations resulting from increased traffic frequencies;
  - dust (expected areas affected, indicated on maps);
  - air pollution;
  - risk and its consequences for physical planning.

- ! socio-economic impacts
  - impact on employment and income levels;
  - claim on available qualified workforce and effects thereof;
  - effects of permanent influx of people attracted by opportunities;
  - urban population growth and urbanization of the port area;
  - containment of urban expansion southward;
  - tourism;
  - increased demands for services: impact of port activities on available domestic water supply, on waste water disposal and treatment systems, on solid waste disposal system, on energy supply system (projections should be made of the possible impacts from project implementation on the existing services).

7.4.3 Induced developments

The EIS must describe the anticipated induced developments and their physical planning. It must broadly address environmental effects of these induced developments (competing land use, resettlements, claim on waste treatment capacities, claim on water and energy supplies, loss of habitats and economic potential, loss of Cultural Heritage, social acceptance, air pollution, noise, odour, dust et cetera).
For every development phase of the port the individual and group risk must be estimated, in the port as well as on the shore.

8. COMPARISON OF ALTERNATIVES

Alternatives must be compared for their environmental effects. It is recommended to present the comparison in the form of tables and diagrams. In the comparison the current environmental situation and the alternative most friendly to the environment must be given. All alternatives must be compared to international and commonly accepted standards as much as possible.

9. GAPS IN KNOWLEDGE, EVALUATION AND MONITORING

In the EIS lacking information must be identified. The importance of this information for decision making must be evaluated.

An evaluation plan for port realization and exploitation must be presented in the EIS. This plan must foresee regular evaluation on the following points:

- legislative activity;
- institutional build up, staffing and training;
- implementation of archaeological inventory and rescue plan;
- implementation of land acquisition;
- implementation of resettlement plan;
- construction activities.

The EIS must indicate the institutions responsible for these evaluations.

In the EIS an environmental monitoring plan must be presented. This plan must include monitoring of:

- changes in coastal morphology;
- effectiveness of mitigating measures for coastal erosion;
- spreading patterns of pollution from the port;
- changes in chemical and physical composition of the sea bed in the area influenced;
- pollution of the sediment deposited in the port;
- enforcement of environmental legislation and regulations;
- emissions.

The monitoring plan must indicate the institutions responsible for its implementation and the way implementation is funded.

10. SUMMARY, FORMAT AND PRESENTATION OF THE EIS

A nontechnical summary must be included in the EIS. This summary must address the major subjects of the EIS, using comprehensive maps, tables and diagrams, and be written in such diction that it provides non-technicians and decision makers with a clear insight in the issues treated.

It is suggested that the EIS is written in the same format as this advice for Terms of Reference. Also in the EIS itself the use of maps, tables and diagrams may considerably increase comprehensiveness and is therefore recommended.