KEY PRINCIPLES FOR PORT AND HARBOUR DEVELOPMENT

Globally, the need for coastal facilities has risen dramatically in the last decade due to growing commercial, industrial and recreational needs. New ports and harbours are being developed and existing facilities expanded with great momentum.

Port facilities generally require large areas of coastal land and waters, particularly for the construction, conversion or extension of port installations, but also to a large extent for the operation of all port installations and accompanying industrial and commercial installations and transport systems. Consequently, the impacts of ports on the coastal environment are considerable, but often development of the ports and harbour facilities is unavoidable given their intended use and their national and global economic significance. Noting the above, opportunities to minimize significant impacts in the planning and design phases must not be overlooked, as mitigation or restoration during or after construction is prohibitively expensive. To address this, eeffective government policy and regulations are important, but self-regulation by the industry, including the adoption of good management practices during planning, design and operations, will significantly help to ensure sustainable port development, in which an optimal balance may be found between socio-economic activities and physical, morphological and ecological issues. The key principles as elaborated below are developed to increase understanding and recognition of actions necessary to minimise the impacts of port development on the coastal zone within an economically and socially sound structure. The principles are generic and thus do not cover approaches designed for a particular regional setting.

1. All new port development must be compatible with national port development plans and integrated coastal zone management (ICZM) plans.

Port development, expansion and operation have significant impacts on the natural landscape, habitats and the ecological functioning of the coastal environment. Countries must develop national port and harbour development plans, which form an integrated part of the rural/urban development and ICZM plans and ensure that port development is compatible with national economic, social and environmental development goals.

1.1 Have the national or regional authorities developed Port and harbour Development Plans that identify port development areas, types, scale and intensity of port development taking into account the carrying capacities of the different areas, biophysical parameters of the coastal environment, and potential cumulative impacts? Are these plans regularly updated?

1.2 Are the national or regional Port Development Plans easily accessible to the prospective developers, and are they in a form that is readily understood by developers?

1.3 Does national or regional plan provide guidelines for the future expansion of port development?

1.4 Do national and regional plans promote protection of sensitive areas and minimize impacts on other coastal users?

1.5 Do existing policies require that port development that is not dependent on a coastal location be located at upland sites?

1.6 Do national and regional authorities provide advice and guidance to port developers to ensure that the project is environmentally, socially, and economically sustainable?

1.7 Do mechanisms exist at the national and regional levels to monitor and evaluate individual port development projects and their cumulative impacts on the environment?

2. National legislation that provides the mandate for port and harbour development should also authorise the port development agencies/authorities to discharge their mandate in an environmentally responsible manner

Port legislation often focuses on port authorities' own sectoral concerns, and even where environmental management responsibilities are addressed, they are often expressed only in general terms. Port legislation should address all stages of development and define a mix of regulatory and non-regulatory approaches including voluntary measures, co-ordinating mechanisms and partnerships to enable the port to meet both national environmental and commercial goals in a balanced way. Port authorities must actively seek to comply with relevant national legislation and regional and international conventions that address sustainable use of the coastal and marine environment.

2.1. Is there an authority or authorities competent and empowered to effectively oversee responsible port and harbour development?
2.2. Is the port and harbour sector adequately regulated and protected by legal instruments such as laws and regulations and 'Codes of Conduct' (soft law)?
2.3. Is the Polluter/User Pays Principle accepted as a principle for national environmental management? Are the costs of water pollution and habitat impacts integrated into the costs of port and harbour operations?
2.4. Are the legal instruments and 'Codes of Conduct' in a form readily understood by those undertaking activities within the port and harbour sector, are they communicated to them and are they enforced?

3. A port or harbour is most successful when it recognises that enhancing environmental performance is a part of its mission and adopts necessary measures within its management and operational policies

Port and harbour authorities must adopt well-defined environmental policy that commits them to a high standard of environmental performance. The highest level of management must be committed to pursue environmental policy and such policy needs must be frequently updated to deal with technological developments and stakeholders interests. The authorities should be willing to undertake the restoration and mitigation measures demanded.

3.1 Does the corporate policy of the port and harbour authority clearly specify its objectives regarding a high level of environmental performance?
3.2 Has the management allocated roles and responsibilities in order to achieve desired environmental standards?
3.3 Is the port authority responsible for restoration activities or for contribution to a restoration fund?
3.4 Has the port authority agreed to compensate for the environmental losses that may result from port construction and operation?

4. The conduct of an environmental impact assessment (EIA) is an essential step in the early planning phase

The EIA process enables the assessment of potential impacts of port and harbour development activities in the early planning phase. Mitigation measures and associated costs can be defined before commitments are made. Early consultation and technical discussions with relevant governmental and non-governmental agencies and other stakeholders should precede the preparation of the EIA. Well-executed cost-benefit analyses of alternative sites and designs are important components of the EIA. Justification for the preferred option should take into consideration biophysical, social and economic

factors and should be consistent with ecological sustainability principles. The precautionary principle should be applied where necessary. An environmental management plan (EMP) that addresses the implementation of the mitigation measures and the monitoring procedures dealing with environmental performance and effectiveness of these measures form key elements of the EIA process.

4.1. Does the existing legislation call for an EIA to be prepared for new port and harbour construction or expansion projects?
4.2. Are there formal opportunities for the local community and other interest groups to express their views on the project proposal?
4.3. Has a detailed assessment of the site according to recognised EIA guidelines been carried out?
4.4. Does the site evaluation survey the existing flora and fauna, endangered/threatened species, and the use of the site by migratory birds or other species during nesting, reproductive, or other critical life stages?
4.5. Is the selection of the preferred option based on a thorough analysis of the biophysical, social and economic factors?
4.6. Does the evaluation also examine the long-term climate record to determine the risk of storms, flooding, storm surges, and droughts?
4.7. Does the EIA consider alternatives which could mitigate adverse and unavoidable environmental and social impacts?
4.8. Has an environmental management plan (EMP) and a monitoring plan been prepared as a component of the EIA process?

5. Planning, site selection and design phases of port and harbour development offer considerable opportunity to minimise negative social and environmental impacts

Optimisation of sound planning, site selection and design processes is essential, as mitigation or restoration during or after construction can be prohibitively expensive. While socio-economic factors are important determinants in site selection, environmental aspects must also be considered. Specific attention should be given to the potential loss of critical habitat, and to morphological changes including coastal erosion and degradation of water quality. Careful site selection may reduce the potentially hazardous environmental impacts and the cost of mitigation and/or restoration, as well as lessen public controversy.

5.1 Do clear standards exist for selection of suitable sites that possess characteristics compatible with long-term sustainable operations and acceptable ecological effects?
5.2 Does the project or the associated reclamation activities lead to loss or degradation of critical habitat?
5.1 Has the developer taken all possible precautions during the design stage, to avoid or mitigate the impacts of sedimentation, aggravated coastal erosion and degradation of water quality?
5.2 Has a thorough assessment of social impacts been carried out?
5.3 Have the local communities and other stakeholders been consulted during the planning phase prior to site selection?

6. Integrating sound environmental management practices into daily operational activities can derive long-term commercial advantages.

The EMP provides the framework for managing or mitigating environmental impacts during the operational phase. Contingency planning that enables an early and effective response to emergencies, accidents or any breakdown in environmental performance is essential. Port and harbour authorities should subscribe the regulations set by regional/international conventions that address marine pollution. Port management should allocate adequate financial resources for environmental management activities and ensure that trained operational staff is provided with well-defined procedures and responsibilities. Environmental management procedures will increase internal costs. However, in the long term, the reduction in environmental hazards will be more cost effective than having to rely upon impact remedial and restoration activities.

6.1 Has the port and harbour authority allocated funds and personnel to implement the EMP and the monitoring plan?
6.2 Has a contingency plan been prepared?
6.3 Has the management taken steps to provide adequate training and guidance to employees responsible for implementing the EMP, the monitoring plan and the contingency plan.
6.4 Has the management acquired the equipment required for the implementation of the contingency plan?
6.5 Is there adequate understanding among the management levels regarding the international and regional agreements and conventions that address marine pollution?

7. Environmentally responsible technology should be adopted during all dredging operations and disposal of dredged material.

By its very nature, the act of both capital and maintenance dredging and relocation of dredging material have an impact on the environment. The use of best/appropriate technology available and the adoption of 'best management practices' and internationally recognised guidelines will significantly limit re-suspension of sediment and minimise habitat loss and degradation. The best available environmentally sound options for disposal of dredged material and where possible, promotion of its 'beneficial use' should be sought. Similar rules should be set for all port operations, including safe vessel handling, once the construction phase has been finished.
In the long run, the operation phase may interfere more with the environment than the initial development. Consultation with relevant stakeholders, especially in the fishery sector, is crucial. Port and harbour authorities must endeavour to regularly monitor the operations carried out by contractors during the construction phase and by port and vessel operators in the operational phase.

7.1. Has a detailed dredging plan/proposal indicating locations of dredging, quantities of material to be dredged, equipment to be used and mode of disposal of dredged material been prepared?
7.2. Are the best available technology to minimise marine impacts being utilised?
7.3. Are internationally recognised guidelines and 'best practices' available being incorporated into the dredging process?
7.4. Have port authorities developed a disposal plan to utilize dredged material in an environmentally sound manner that incorporates, to the extent possible, other public beneficial uses?
7.5. Do the means proposed for disposal of dredging material lead to beneficial uses such as creation of wetland areas?
7.6. Does the port authority attempt to minimize ocean disposal because it transfers sediments out of the near-shore system to an inactive site and may cause adverse environmental impacts?
7.7. If ocean disposal occurs, do the responsible parties understand the oceanography, currents, and benthic environment of the disposal site? Do they possess clear knowledge of the particle size, quantity, and nature of the sediments to be disposed?
7.8. Does the project proponent select disposal sites that are not important for fisheries, recreation, or biological diversity?
7.9. Have all stakeholders who will be affected by the dredging operations been informed of proposed dredging activities and were they consulted prior to preparing the dredging plans?
7.10. Are the dredging activities monitored by the port and harbour authority or an independent entity and any deviations or unexpected impacts addressed in a timely manner?
7.11. Is post dredging monitoring included in the proposal?

8. All coastal engineering structures should be designed such that they do not significantly disrupt the sediment budget or lead to aggravated coastal erosion in adjacent areas.

Construction of maritime structures will inevitably lead to the physical alteration of the coastal zones. However, the design should be guided by the 'design with nature' principle and every endeavour should be made to minimise impacts on the sediment budget. This may limit morphological effects and unwanted coastal erosion. The performance of these structures *vis a vis* the stability of the adjacent

areas must be regularly monitored and port authorities should take the responsibility of dealing with the effects of increased erosion that may result in adjacent areas.

8.1. Are guidelines for construction of maritime engineering structures available and accessible to the developers?
8.2. Does the design and construction methods recognise and respect the dynamic nature of the coastline and coastal processes? Are the designs consistent with recognised guidelines?
8.3. Does the development avoid degradation of the coastal habitats in the area?
8.4. Do the construction of maritime engineering structures and coast erosion management structures avoid increased coastal instability in adjacent areas or unacceptable levels of sediment mobilisation?
8.5. Is the development designed so as to minimise risks from storms and flooding?

9. Regional and international co-operation and strategic partnerships promote improved environmental performance.

Close collaboration among port authorities, supranational port organisations, international dredging organisations and regional and international environmental management institutions will create an environment that enhances capacity for environmentally responsible port and harbour development. Dissemination of information, exchange of experiences and expertise, development of guidelines and best management practices, development of human resources and building of institutional capacity can be achieved more effectively through strong partnerships and collaboration. Regional and international organisations are encouraged to invest in the development and transfer of new technologies. These organisations play a leading role in assisting countries to develop ports and harbours in a manner that meets the objectives of the maritime conventions ratified by these same countries.

9.1 Do the regional and inter-regional organisations assist and support governments in the development of national strategies for sustainable port and harbour development?
9.2 Do regional and inter-regional programmes support the development and application of guidelines, best management practices and 'Codes of Conduct'?
9.3 Do regional and inter-regional organisations promote transfer of environmentally sound technologies, 'Codes of Conduct' and management tools and disseminate information on these to governments and the port and harbour development authorities?
9.4 Do regional and inter-regional organisations facilitate capacity building in sustainable port and harbour development?
9.5 Do regional and inter-regional organisations monitor the trends in port and harbour development and their consistency with regional and international maritime conventions?

10. Sustainable port and harbour development requires a culture of dialogue, consensus building, partnerships and co-operation.

The magnitude of future public and private investments within the port sector requires a broad understanding of all stakeholders involved, including the public, and of the economic and social importance of ports to the community. The community needs to be informed effectively about the environmental impacts associated with port development and the way these projects are managed. Port authorities need to recognise issues of community concern in the earliest stages possible. All stakeholders should be able to contribute to the planning process to limit public concern, controversies and reactions arising afterwards. Hence, the establishment of consultative groups and building partnerships with other stakeholders as part of port planning is crucial.

10.1. Does the port and habour authority schedule meetings with the local community to exchange information?
10.2. Are formal mechanisms available for meaningful and active participation and consultation among of all interested parties in the decisions making process during all stages of planning and development?
10.3. Are there formal and equitable mechanisms for conflict resolution?

10.4. Is there adequate awareness of both public institutions and the general public about port and habour development its potential to contribute to the national economy and potential limitations/possible impacts?

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