



# Integrated Coastal Zone Management in Denmark

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## Abstract

*This paper introduces the concept of Integrated Coastal Zone Management (ICZM) in a definition with relevance for Denmark. Partly influenced by the commitments signed at the Rio Conference the Danish government now deals with the concept of a sustainable development of the coastal areas, considering nature and the environment. The Danish legislation is currently revised working in the thought of sustainability to the object clauses of each Act concerning nature and the environment in the coastal zone.*

## Keywords

*Integrated Coastal Zone Management (ICZM), Agenda 21, Danish*

*legislation, environmental impact assessment (EIA), The Coastal Planning Zone.*

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*Geografisk Tidsskrift, Danish Journal of Geography 98: 31-37.*

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Managing the coastal zone is a topic that has gained more and more attention during the recent years. This is a signal of an incipient understanding of the coastal zone as a very important dynamic area. This awareness has spread to politicians, officials, planners and international aid programmes which is reflected in a separate chapter in Agenda 21 from the UN Conference on the Environment and Development in Rio 1992.

## Agenda 21 and ICZM

In the context of Integrated Coastal Zone Management special interest should be paid to chapter 17; Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources. It is outlined that the marine and coastal environment form an integrated whole that is an essential component of the global life-support system and a positive asset that presents opportunities for sustainable development. It is also stated that the coastal zone with its resources and productive habitats form a basis for settlement and is vital for indigenous

people and local communities as many of the world's poor are crowded in the coastal area. Chapter 17 requires new approaches to integrated management and development on a national, regional and global level. An approach all coastal states committed themselves to, signing the agreement.

The integrated management activities should be put into practice through an appropriate coordinating mechanism such as a high-level policy planning body regarding coastal and marine areas and their resources at both local and national levels. Preparation or updating on coastal profiles and mapping of eroded areas, development patterns and user conflicts and physical processes such as carrying capacity and direction of sediment transport are all useful information to identify critical stretches of coastlines. Contingency plans must exist in case of human induced and natural disasters including likely effects of potential climate change, sea-level rise, degradation and pollution. The coastal human settlements, drinking water and treatment and disposal of sewage must be improved (UNCED, 1992).

The above mentioned parameters are just some few examples of the content of chapter 17. The whole chapter

is very relevant but there is a danger that the text in the western world is perceived as another presentation of the Brundtland Report and the idea of "sustainable development" is a tedious passing remark that is presupposed well known but vaguely defined. It is a big challenge to implement the ambitious prescriptions of Agenda 21, and the connection between environment and development will demand restrictive rules in order to protect already degraded areas. Compared with almost any other natural environment the coastal and marine areas leave a possibility for continuous development and through ICZM the undeveloped countries get a chance to gain sustainable development and economic and social surplus for the people living in the coastal zone and at the same time protect the environmental integrity. It is, however, difficult to convert the agreements from the Rio-conference into action. Many of the world's coastal states do not have the techniques to carry out the environmental progresses and it is a big task to apply the global conscience to national planning, green policy or to the individual household. The perspective is lost unless a centrally defined policy deals with planning, management, sustainability etc.

## Definitions of ICZM

The term Integrated Coastal Zone Management is an extension of Coastal Zone Management (CZM), which describes manipulation of the natural physical coastal development and the legislation, planning and management of the coastal zone with the purpose of preventing exploitation of the resources and to secure a harmonic interaction between nature and society (Bjerregaard & Grolin, 1995).

### *Integration*

The conceptions of integration are widely different. Both horizontal and vertical integration of each single unit at authority level is necessary. *Horizontal integration* is integration between public authorities at the same level. In Denmark this means cooperation between ministries or between separate departments in the regional or municipal administration. *Vertical integration* is integration between separate authority levels within a country. National, regional and local authorities as well as private and public institutions and NGOs must participate in the decision and planning process (Sorensen, 1996). This will secure a wide support to any project in the benefit of widely varied

interests. The precondition for achieving integrated management is *integrated policy* where the constituent elements are brought together and made subject to a single unifying conception (Cicin-Sain, 1993).

Another conception of integration is the intention of *public participation* (Clark, 1996, Thia-Eng, 1993). In countries with no tradition for managing the coastal areas and where the political composition in governmental entities not necessarily reflects the attitude of the local population it is important to educate both decision makers and the local population. Neither in Denmark the relevance of an increased consciousness regarding the complexity of the coastal zone must be underestimated. The aim should be an *inter sectorial integration* – a broad professional composition of the decision-making board in order to obtain a better decision basis.

Finally integration can be a *combination of parts of the legislation* to obtain a possibility to manage the coastal zone as a whole. In that case it could be necessary to gather the management of the coastal zone under one authority. Today the physical elements within the coastal zone of Denmark are covered by different laws managed by different public authorities.

### *The Coastal Zone*

As for integration there are numerous ways of defining the coastal zone. Furthermore, emphasis should be put on the difference between coastal area and coastal zone. A coastal area is any part of land or sea close to the coastline. The coastal zone and thereby ICZM-projects always include all 3 geographical coastal area components: coastal land, the coastline and coastal water (Sorensen, 1996). The coastal land can also be defined as a coastal watershed which includes the catchment area of all water bodies draining into the same marine area.

*According to the Danish Environment Board* a coastal watershed includes both the catchment area, the coastline and the adjacent marine area (Jensen, 1992). From a management point of view one will get the opportunity to plan and administer one naturally connected region including all the components influencing the coastal zone. This is a big advantage in environmental planning as it leaves a possibility of controlling land-based pollution sources. However, it must be considered that neighbouring watersheds have a mutual influence especially in the marine area where the water bodies mingle.

*Within traditional coastal morphology* the coastal zone

is defined as the area from the arbitrary limit "first wave contact with the seabed" to the hinterland which includes all pre Holocene formations and Holocene formations that have not been exposed to marine activity (Nielsen & Nielsen, 1990). This definition can be unpractical or inexact when used in areas where the relative isostatic uplift has been heterogeneous and the limit for the marine transgression during Holocene lies inexpedient far inland. The depth of the seabed influenced by the largest average waves is determined by the dynamic parameters that are decisive for the build-up of the waves. As the dynamic parameters vary so do the distance from the coastline to the depth where the seabed is influenced by the waves. At coastal cliffs the coastal zone would be extremely narrow according to the traditional definition and from an ICZM point of view it would be necessary to include a catchment area adjacent to the coastal cliff if e.g. the groundwater pressure is a contributory factor to cliff erosion and coastal recession.

When applying and practising ICZM the definition of the coastal zone must be flexible and be characterized by both a physical, geographic and administrative delimitation which reflects the dynamic conditions and the different approaches when implementing ICZM. It is necessary to agree on a problem and object oriented definition of the coastal zone for each single ICZM project.

#### *Management*

Managing the resources of the coastal zone involves politics, planning and practise, i.e. managing the legislation, planning the development in the coastal zone and execute different tasks as coastal protection or nature restoration. Coastal resources must be perceived as both raw materials, living resources and scenic values. The raw materials that are extracted from the seabed, the surface, on shore and in the water include everything from fossil fuels over sand to gravel and boulders. The living resources such as fish and seaweed are dependent on each other, on non-polluted water and air and on undisturbed habitats. The coastal scenic values are resources in many contexts. Primarily, the marine and terrestrial landscapes are values in themselves and are as such important resources for tourism. The landscapes are also sources of personal experiences walking along the coastline, studying geological formations or diving in the near shore waters. Furthermore, the undeveloped coastal areas leave space for further planning activities.

#### *ICZM*

The definitions of ICZM are numerous but they all adopt an attitude to the object of creating a sustainable utilization of the coastal resources. A global definition must necessarily be broad. In "Coastal Zone Management Handbook" (Clark, 1996) ICZM is described as a process whereby a governmental intervention can be organized, promoted and made effective through programmes that integrate different economic sectors as well as resource conservation. As opposed to traditional sectoral programmes ICZM creates a framework for broad participation and solution of conflicts between a number of different interests in the coastal zone. A definition aimed at Denmark could be as follows:

*ICZM is the integrated management of the coastal resources and environment based on the physical, socio-economic and political contexts within as well as between the dynamic physical systems which in combination define the coastal zone. An integrated approach demands horizontal as well as vertical coordination between the stakeholders whose activities have a significant impact on the quantity and quality of the resources and environment of the coastal zone. To obtain sustainable development goals for protection of nature and environment must be integrated in economic and technical decision processes as well. ICZM is a process that recognizes the distinct character of the coastal zone as a valuable resource in itself (Bjerregaard & Grolin, 1997).*

The proposed definition of ICZM covers a wide field as it presents the possibility of involving all the physical, socioeconomic and political connections that influence the management of the coastal resources. Through horizontal and vertical integration the definition gives the possibility of a wider professional basis for decision making and of obtaining well considered solutions, allowing the best possible decisions to be implemented. A sustainable development that does not happen on the expense of the nature resources is secured through integration of goals for protecting nature and the environment. The recognition of the distinct character of the coastal zone as a valuable resource in itself is the precondition for conserving a dynamic landscape. The definition of ICZM can also be used in connection with nature restoration projects through removal of existing coast protection works. This can imply a retreat of the coastline followed by a number of conflicts with the house owners whose properties are threatened by

erosion. This kind of nature restoration will also contribute to fulfil the increased wish for more untamed, dynamic nature and larger coherent nature areas. At the same time it will comply with the need for literally authentic nature and lead to greater seasonal variations on the beach, attractive habitats, an enlarged visual experience of the landscape and facilitate passage on the beach.

### A Danish approach to ICZM

During the past 25 years there has been a growing public awareness regarding the necessity of planning under environmental consideration. There is a "mental" and sometimes an economic surplus to protect the natural surroundings. The Danish Country Planning Review for 1996 describes planning of the coastal areas in an EU and national perspective. The interest focuses on scenic, biological and cultural historic diversity. 4 central tendencies are expected to influence the appearance of the landscape:

- \* Increased commercial activity.
- \* Need for technical buildings and infrastructure.
- \* Growth in tourism and outdoor life.
- \* Increased consciousness of natural and cultural preservation.

With the international experiences of coastal planning in mind the Danish government sees the need for ICZM. Furthermore, the history of civilization printed in the landscape must be protected but without turning the surroundings into a museum and a strict border between town and countryside must be maintained. Within the framework of EU the government will work for a European coastal strategy and on a national level take initiative to an account on ICZM in Denmark (Østergård, 1996).

#### *Statutory basis*

The precondition for ICZM is a well-functioning administration. The tripartition of the Danish management structure into state, regions and municipalities is tied together by a strongly regulative legislation in the field of nature and environment and by the possibility of current revisions of existing sets of Acts and management methods.

The history of the legislation concerning nature and the environment is naturally marked by the human need for utilizing the resources, but in the course of time legislation

has become more regulative. As the societal development progressed the utilization became a threat to the natural basis and thereby to the cultural values. The legislative extension has been growing over the past 30 years. The growth has been especially pronounced in the field of planning caused by the need to be able to plan the municipal development and in the field of environment caused by the rising environmental problems.

Since the beginning of the nineties and in particular after the Rio Convention the thought of sustainability has been worked into Danish legislation. This is shown in the object clauses of The Environmental Protection Act, Act on Protection of the Marine Environment, The Nature Protection Act and The Planning Act respectively: "The Act shall contribute to protect nature and environment so that development of the society can happen on a sustainable basis in respect for human living conditions and preservation of animal and plant life" (Miljøministeriet, 1992a, 1993, 1994b, 1994c). The demand of sustainability is also included in The Raw Materials Act through a declaration that the intention of utilizing raw materials happens on basis of a complete weighing of interests and a complete assessment of a number of social considerations (Miljøministeriet, 1992b).

The Coast Protection Act administered by The Ministry of Transport contains on the other hand no object clause neither is the concept of "sustainable development" included. The intention is though nature protection in a wide sense and this demands a general assessment of the relevance and the kind of protection arrangements used. In each case regards must be taken to preservation of landscape elements, to the free development of nature and to the traditional economic interests. Furthermore, the Act is displaced from serving protection of the single estate to proper caring for the coast for the pleasure of many people (Ministry of Transport, 1988). However, the concept of sustainability is shown in the statutory possibility of protecting the coast against inexpedient coastal protection works and removal of existing protection works. Thereby the protection of natural coasts for future generations is ensured.

Figure 1 illustrates the existing laws concerning nature and environment relevant for managing the resources of the sea, coast and hinterland. The figure shows partly the morphological, jurisdictional and management borders, partly the physical extension of each Act and the year of the latest amendments.

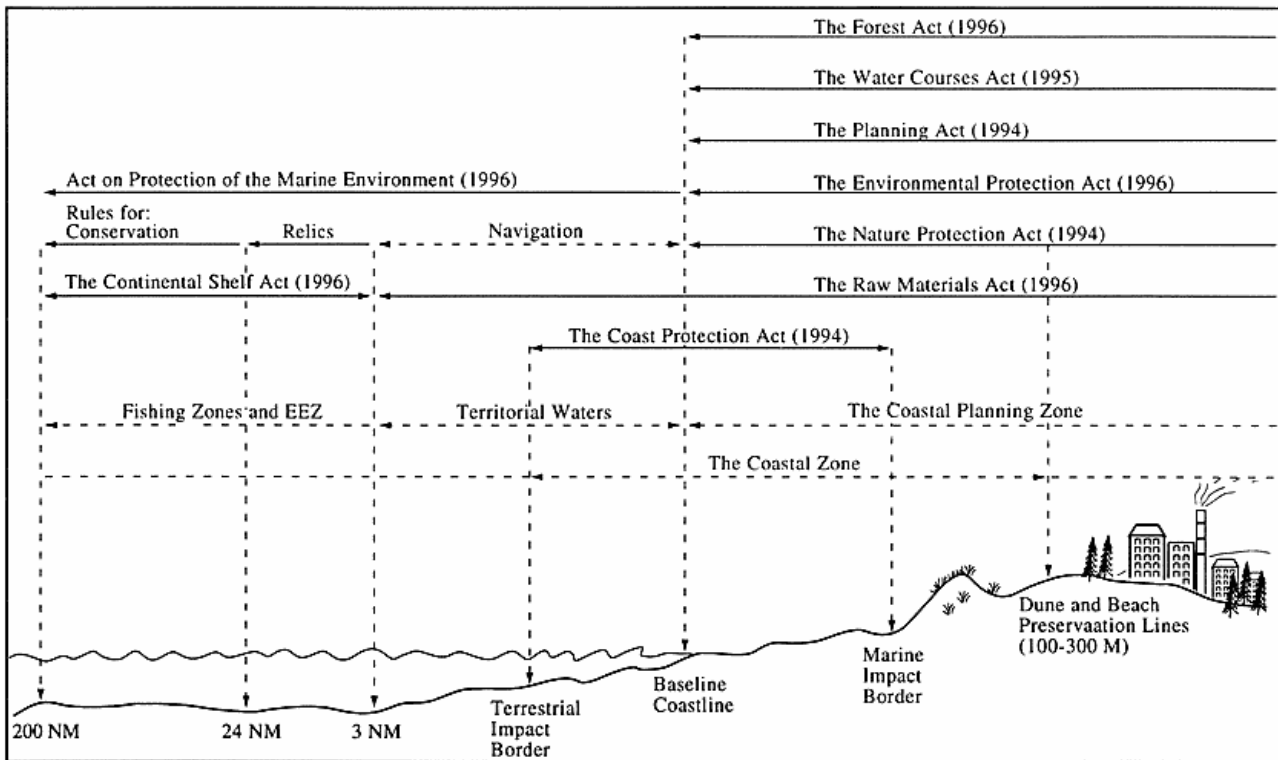


Figure 1: The extension of the existing laws in the field of nature and environment for the sea, coast and hinterland. The years in the brackets indicate the latest amendments.

By incorporating the concept of sustainable exploitation of the resources into Danish legislation Denmark has taken a step towards sustainable development as defined in Agenda 21. The four central social tendencies that presumably have the greatest future influence on landscape and environment are not only tendencies in Denmark but also in the countries with whom Denmark usually compares. A strong legislation in the field of nature and environment and an enhanced recognition of the necessity of protecting natural and cultural values can prevent the most serious consequences of increased commercial activity, the need for technical works and infrastructure and growth in tourism and outdoor life. In a country with an inferior legislation or no legislation regarding the coastal zone the three latter tendencies can have disastrous influence upon the coastal the environment.

*Good rules for managing nature and environment* are not worth much without the possibility of keeping control on the observance of the law. Therefore, all the Acts include provision on who has the obligation to inspect the law observance. The Environmental Protection Act con-

tains, e.g. provision for the local authority keeping control with the industry and the regional authority keeping control with the environmental impact. The Act also contains provision for these authorities' rights to complain about each others' decisions. The rules about access to complain about the decisions taken by the management authorities and the provision for periods of publicity and objection rights are a double securing of partly the control with management authorities and the efficiency of the law, partly the popular influence on the very management process. Already in 1978 The Nature Conservatory Administration invited the Danish population to participate in the planning process and associations like Danish Nature Conservatory Association (DN), Danish Ornithological Society, Greenpeace and many others have confirmed rights to complain, some only under a few Acts and others like DN under the majority of the Acts concerning nature and the environment. Furthermore, DN has secured public influence on legislation since 1911, as the association is entitled to be heard concerning bills.

*According to existing law* environmental impact assess-

ment (EIA) must be conducted for major new projects and for major extensions of existing facilities. A further strengthening of the legislation could produce a provision of conducting EIAs for existing facilities for which EIA was not required at the time of construction, but for which EIA would have been mandatory according to the present Planning Act (Miljøministeriet, 1994c). At the same time the conception of environment could be extended to deal with not only pollution of air, soil and water but also with visual regards and the impact of a construction on the natural development of a dynamic landscape such as the coast. There are several examples of coastal works causing serious environmental consequences like enhanced erosion along a down drift stretch having secured a short coastal stretch without taking the important factor of the littoral drift into account. In connection with coastal protection works and ICZM the EIAs could be extended to include the impact of traditional coastal protection works on the natural processes in the littoral zone and on the scenic values.

All nine Acts represented in figure 1 are strong tools regarding a suitable utilization of the coastal zone resources. Especially the latest amendments to The Planning Act introducing the coastal planning zone (Miljøministeriet, 1994a) must be seen as progress. Through this Act it is taken into consideration to keep the undeveloped coasts free from inexpedient development and from buildings demanding special coastal protection. Today the Coast Protection Act intends to secure the free course of the natural dynamic processes and to protect the coast against inexpedient coastal protection works. To a considerable extent the Act appears as a link in landscape management and there is good correlation between this Act and the activities of The Ministry of Energy and the Environment.

## Concluding remarks

The definition of ICZM is suitable for Denmark because the basic conditions for implementing ICZM are present by virtue of existing legislation and the entire Danish management structure. The integrated approach will not be unfamiliar to neither politicians nor public servants. Danish practice within legislation and management has been marked by a certain form of vertical integration since DN as a public association was entitled to propose bills. There is a statutory possibility of public participation and influence

given by provisions about objection rights in the field of legislation and about objection rights and rights to complain over decisions made by the regional and local councils. The regions, local authorities and the public have political influence on the governmental decisions and thus there is a two-sided communication within the management hierarchy. Horizontal integration is well on the way in many contexts within administration and management.

Defining a Danish approach to ICZM derived the thought of a new demarcation of the coastal zone that could promote integration. With a flexible demarcation considering the local problems and goals of the coastal zone it is possible to manage larger naturally coherent areas without being limited by concrete administrative borders or sectoral management.

The idea of sustainable development is included in eight of the nine existing Acts for nature and the environment in the coastal zone and environmental protection has been part of the decision basis since the establishment of The Ministry of the Environment in 1973. The economic conditions in Denmark allow a sustainable development that does not happen at the expense of the nature resources. The exceptional character of the coastal zone as a valuable resource in itself, is a less tangible size, but the current debate on nature conceptions presumably lead to a new way of thinking.

The highly regulative rules for managing nature and environment combined with the frame of ICZM leave good conditions for ensuring an environmentally adapted development of the coastal zone of Denmark. At the same time the Danish management structure ensures that all administrative levels participate in managing the coastal zone and one could state that ICZM has been practised in Denmark for decades though the term was never applied.

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