Turkish J. Mar. Sci.2: 185-192 (1996)

THE MARINE COASTAL ZONE MANAGEMENT AND SCIENTIFIC RESEARCH PRIORITIES

TÜRKİYE'DE KIYI ALANLARININ YÖNETİMİ VE BİLİMSEL ARAŞTIRMA ÖNCELİKLERİ

ALTAN ACARA [1,2]

(1) University of Istanbul, Institute of Marine Sciences and Management, Istanbul, Turkey.

(2) Scientific and Technical Research Council of Turkey, Ankara, TURKEY

Keywords: Marine coastal zone, management, research priorities

Abstract

The Turkish coastal zone where the edge of the seaward continental shelf lies at about the 200 m. depth contour constituting a small portion of the sea that over 90 percent of the catch are taken, human activities are often concentrated, often least able to assimilate those activities and where adverse effects are most apparent.

The coastal zones contribute wealth to the Turkish economy about $ 1.3 billion sea food industry, about $ 4.0 billion marine transportation industry and about $ 4.0 billion tourism industry which totals $ 9.3 billion annually.

There is often a conflict of uses within the coastal zone where one use might have an adverse impact on another actual or potential use.

The coastal zone is a system made interlinked social and natural components and processes needs an action plan for its best use, implementation and enforcement by a administrative arrangement.

In Turkey, the National Marine Science and Technology Research and Development Programme for the coastal zone consists eight sections.

They are marine science, environmental management, science and engineering, marine technology, fisheries and aquaculture, monitoring and information, related other research activities, and international relations.

Introduction

The marine coastal zone management means organized way to solve problem relating to the human activities in the natural environment.

Human activities are often concentrated in coastal regions which are often least able to assimilate those activities and where adverse effects are most apparent (Caddy, 1993; Stanners and Bourdeau, 1995).

Therefore, the most of the marine pollution problems lie in the coastal zone where sewage and industrial wastes are discharged and various developments are changing the configuration of the coastline (Waldichuk, 1974).

Coastal zones are relatively fragile, ecosystems and disordered urbanization and development of infrastructure, alone or in combination with uncoordinated industrial, tourism, fishing, aquaculture and agricultural activities can lead to rapid degradation of coastal habits and resources (Odum, 1971).

There is no common or unique definition of what constitutes a coastal zone, but rather a number of complementary definitions, each serving a different purpose. Although it is generally understood what is meant by "the coastal zone" it is difficult to place precise boundaries around it, either landward or seaward. In general, the edge of the continental shelf at around the 200 m. depth counter is regarded as the limit (Stanners and Bourdeau, 1995).

The overall goals to integrated coastal zone management need to promote sustainable use and respect the precautionary principles. These principles are the determining human desires for using the coastal zone based on the carrying capacity to meet these desires (Acara and Okuş,1996).

Piority issues and responsible authorities therefore be clearly defined within each coastal area, identifying those which would give relatively immediate environmental and economic returns and provide the best value for money (Gulland 1983).

The coastal zone management program provide a watershed basin frame work that brings together those government agencies with the authorities necessary to address land use planning, development and restoration issues from an ecosystem perspective. This approach is the most significant benefit to maintain the coastal ecosystem biodiversity and long-term productivity for sustained use.

Being the interface between sea and land (or between salt water and fresh water), the coastal zone acts as a very important buffer influencing the fate of riverine contaminants and direct discharges as they are transported from land-based sources to the sea.

Marine coastal zones of Turkey

The Turkish marine coastline is approximately 8333 km long including islands. This enormous length which includes the Black Sea, the Sea of Marmara, the Aegean and the Mediterranean Seas covers a large variety of geomorphological features, including rocks, cliffs, shingly sandy and muddy shores.

The length of the coastal zone is 1695 km for the Black Sea, 927 km for the Sea of Marmara and 2805 km for the Aegean Sea, 1839 km for the Mediterranean Sea and 1067 km for the islands.

The salinity and temperature also show large variability. The salinity ranges from almost zero in many river mouths and estuaries with large fresh water input up to sea values of approximately 38 per thousand or even higher in saline Mediterranean lagoons.

Because of the extreme conditions prevailing along the coastal through strong winds, chemical composition of the water, there' is a clear zonation of biotopes form the sea landwards and along the Turkish coastline.

This combination helps to create a large variety coastal biotops, including seabed communities of macroalgal and sea grasses, mud flats, saltmarches, dune scrubs and natural dune woodlands.

In Turkey, the coastal resources have in estimable value to the ecological base as well as to the economy. While one can not put a price tag on these natural resources the results from several studies of economic values indicate the potential wealth from the coastal areas. This include a $ 1.3 billion sea food industry, a $ 4.0 billion marine transportation industry, in addition to these recreational swimming fishing and beach attendance activities involving well over million participants contribute about $ 4.0 billion annually (Acara and Okuş, 1996).

Today, over 47 percent of the total population in winter, 60 percent in summer live about 10 percent of the land are difined as "Coastal Zone" and the coastal recreation and tourism are growing at impressive rates in many coastal areas, especially in the western and southern parts, but this growth is given indications that the declining environmental quality conditions in Turkey.

One has estimated that the value of undeveloped coastal wetland is $ 83.000 an acre. Prevention is far cheaper than restoration after resources have been demaged (Ketchum, 1972, Stanners and Bourdeau, 1995).

Goals and strategies for the coastal zone management in Turkey

Coastal zone is effected by navigators, harbors and marinas, tourism and aquaculture activities. There is often a conflict of uses within the coastal zone in where one use might have an adverse impact on another actual or potential use.

For to be successful to the goals and strategies for the coastal zone management three basic elements are identified. The first is an understanding of the coastal zone as a system made interlinked components and processes, the second is to make a plan for its best use and third is the implementation and enforcement of the plan.

National activities in the coastal zone

In Turkey the general objective of the National Marine Science and Technology Research and Development Programme is to contribute to establishing a scientific and technological basis for the exploration, management and protection of the Turkish coastal waters and the seas.

The National Work Programme consists eight sections.

1. Marine science

The focus in oceanography is on the study of marine processes and fluxes. Problem oriented research are considered, but priority will be given to projects dealing with the processes and their interactions and variability in space and time and with comprehensive studies of complete systems. A multidisciplinary approach is given piority since this contributes to a better understanding of marine systems and provides data for numerical models.

Physical and biogeochemical properties of the ecosystems, data collections, interactions, processes and cycles, ecosystem modeling, atmosphere-sea, land-sea interaction, sedimentation, climatology and paleoclimatology of the oceans the geology, geophysics, tectonic and mineral resources of the basins are the preferred research tasks.

2. Environmental management

Environmental protection, physical, chemical properties and assimilative capacity of the receiving body, environmental risk assessment, and water resources management of the basins are considered important research tasks.

In addition, the coordination of subprojects with the assistance of ad-hoc committee of experts including related international agencies or programmes.

3. Science and engineering

The main objectives are to gain a better understanding of coastal physical processes and morphodynamics, and to promote the application of modern principles in coastal engineering and management.

To improve understanding of, and develop models describing as reliably as possible, the processes associated with the formation of waves and biological processes affecting sediment behavior stability and transport and their modeling and to improve wind-wave models based on integration of hydrodynamic and meteorological models.

The aim of these activities is to encourage collaboration and exchange of information and results between the national coastal authorities on one hand and practicing engineers and researchers on the other.

4. Marine technology

The objective is to encourage the development of existing and new instruments required by marine science and to promote enabling technologies necessary for the advancement of marine science and related future industrial developments. To develop instrumentation's and technologies for measurements, observations and experiments, under normal and severe environmental conditions, in the coastal zone, on and within the seabed, and in the deep sea.

5. Fisheries and aquaculture

The optimization studies are considered important issue for the fisheries conducted in the Turkish Coasts that will provide the sustainable development of the living resources.

The studies are considered important work tasks on the subject of aquaculture to able increase the abundance of the living resources other important topic.

A continued loss of atmospheric ozone will affect and reduce stocks of plankton algae and. zooplankton. They are the basis of marine food chain. This expected to cause a reduction in the stock of edible fish twice as large. Related these subjects research programmes are considered preferred research tasks in Turkey.

The results show that some of the commercial stocks are considered over exploited (Acara,1992).

The increasing demand on living resources is growing recognition of the potential of mariculture with a certain limitations in the coastal regions of Turkey.

The abundance of coastal dependent species of fish and shellfish have been reduced to low levels by over fishing, habitat loss certain extend, flow alterations and pollution in some areas. The mariculture has the potential to supplement fish catches and help offset the declining stocks of some fish species. However, mariculture can lead to euthrophication caused by discharges of fish food materials and fish excrement's from fish farms (Acara and Okuş, 1996).

In addition, the lagoons as a semi closed basins for the mariculture activities indicate that they are productive areas for fisheries and aquaculture, these im pc; tant locations can control organic fish farm wastes (Acara and Gözenalp, 1959, Uyguner and Gözenalp,1959, Acara and Okuş, 1996).

6. Monitoring and information

In Turkey, monitoring and oceanographic data collection is coordinated by the Earth, Marine Atmospheric and Environmental Sciences Research Group of the Scientific and Technical Research Council of Turkey. These coordinated project activities carried out through the Marine Sciences Research Institutions of the Universities in the Mediterrenean Sea, Aegean Sea, the Sea of Marmara and in the Black Sea.

In this programme there are three groups of stations. They are; (1) the stations affected from land sources (2) sea shore stations and (3) off shore stations.

In each station twenty two different physical, chemical and biological parameters are measured at the standard depths systematically and seasonally each year.

The monitoring and data collection are being carried out by the coordinated administrative structures of the Earth, Marine Atmospheric and Environmental Sciences Research Group of the Scientific and Technical Council of Turkey. This Group is coordinating the activities for the development of the methodology for data collection in order to establish a monitoring network and create data bank for the oceanographic parameters, fauna, flora and the natural environment.

The aim of this projected information system is to monitor and the present stage of the environment and natural resources and take necessary measures for the correction and enhancement of the marine environment in the Turkish Seas.

Further, the correct and instance information systems are considered the important tool for the environmental assessment for the marine environment.

7. Other research activities

In addition, the mission oriented research activities are carried out by the marine sciences institutions of the universities and ministries. These research programmes are on (1) monitoring of pollution, (2) monitoring of the impact of pollution of fauna, flora and marine resources, (3) study of ecological changes, (4) protection of some rare species, (5) stock assessment and (6) aquaculture.

8. International relations

Two most important issues for the Turkey are the Barsalona and Odessa Conventions on the protection of the Mediterrenean and Black Seas against pollution respectively. Through these Conventions the Coastal States have been committed to conserve, enhance the marine environment and its living resources of the both seas.

Some of the other brief overview of international activities of Turkey which are taken place is in; ICSEM, IOC, DSDP, EUROMAR and POEM.

Conclusions

1.In conclusion, the management plans need to be designed to solve coastal problems through the achievement of a set of stated sustainability goals which should include the usefulness of the coastal zone to the human being taking into account its use as habitat for plants and animals as well. This goal must be the end product of the research activities in the coastal zone.

2. In the coastal zone of Turkey, the scale of environmental problems has not been fully quantified or understood. It needs to undertake detailed quality and status assessments of the problems.

3. Piority problems and their actions then need to be identified. These are impacts on human health, economic value of resources under threat, the risk or the stage of marine ecosystem to irreversible change or damage.

4. The main objectives of the research activities are to gain a better understanding of coastal physical, chemical, biological and morphodynamics processes to promote the application of modern principles in coastal engineering and management. In addition, to improve understanding of and develop models describing as reliably as possible, the processes associated with the formation of waves and biological processes in the coastal zones including sediment behavior, stability and transport, modeling and to improve wind-wave models based on integration of hydrodynamic and meteorological models.

5. Improvements of the environmental quality or coastal areas are important tasks.

6. The aim of these activities is to encourage collaboration and exchange of information and results between the national coastal authorities on one hand and practicing engineering and researchers on the other.

7. International collaboration and agreement on the research activities are necessary for . the Mediterrenean region

8.Determine human desires for using the coastal zone, together with its carrying capacity and various uses capacities.

9. The eliminating conflicts between uses and capacities in the coastal zones for example the conflict between the tourism and aquaculture activities in the coastal regions of the Mediterrenean and Aegean Seas in Turkey.

10. The preparation and implementation of an action plan for the coastal zone on short and long terms is an important goal.

11. Establishment an effective coastal zone management unit for the ecological and administrative purposes. Without appropriate administrative arrangements and finance there is little possibility of achieving any desired goal on the coastal zone.

Özet

Yaklaşık 200 m derinlikte kıta sahanlığı sınırına kadar olan Türk sahil bölgesi, balıkçılığın yaklaşık % 90 lık kısmını oluşturan tüm deniz alanının çok küçük bir kısmını oluşturmakta, insan faaliyetleri yoğunlaşmakta, bu faaliyetler en az düzeyde asimile edilebilmekte ve genelde ters etkileri daha belirgin olarak ortaya çıkmaktadır.

Türk sahil bölgesi Türkiye ekonomisine 1.3 milyar dolarlık deniz ürünleri, 4.0 milyar dolarlık deniz taşımacılığı ve yaklaşık 4.0 milyar dolarlık turizm endüstrisi ile yıllık toplam 9.3 milyarlık bir katkı sağlamaktadır.

Genellikle kıyı bölgelerinin gerçek ve potansiyel kullanımda tres etkiler ortaya çıkmaktadır.

Kıyı bölgeleri sosyal ve doğal unsurların birbirine bağlantısı ile oluşan bir sistem olup yönetim düzenlemeleri ile yürütme ve uygulamaların ihtiyaca göre en iyi kullanımı sağlanır.

Türkiye'de kıyı bölgesi Ulusal deniz bilimleri ve teknoloji araştırma ve geliştirme programı sekiz bölümden oluşmaktadır.

Bunlar: deniz bilimleri, çevre yönetimi, bilim ve teknoloji, balıkçılık ve yetiştiricilik, izleme ile verileri ilgili diğer araştırma faaliyetleri ve uluslararası ilişkiler.

References

Acara, A., Gözenalp, F. (1959). The Northern Lagoons of the Sea of Marmara, *Proc. Gen. Fish Coun. Medit.*, 5: 235-239.

Acara, A. (1992). Fisheries Economics, 1985-91, Production, Price Variation, State Planning Organization, Ankara, (Turkish).

Acara, A. (1995). Fisheries Economics, Production, Price Variation, State Planning Organization, Ankara, (Turkish).

Acara, A., Okuş, (1996). The Coastal Productivity and Mariculture Activities in Turkey, *J. Mar. Sci.* 2: 185-192.

Caddy, J.F. (1993). Toward a Comparative Evaluation of Human Impacts on Fishery Ecosystems of Enclosed and Semi-Enclosed Seas, *Reviews in Fisheries Science* 1 (1): 57-95.

Gulland, J.A. (1983). World Resources of Fisheries and their Management, *Marine Ecology* 5 (2): 839-1061.

Ketchum, B.H. (1972). The Water's Edge: Critical Problems of the Coastal Zone. MIT Press, Cambridge, Massachusetts.

Odum, E.P. (1971). Fundamentals of Ecology, W.B. Saunders Company, London.

Stanners, D., Bourdeau, P. (1995). Europe's Environment, p.1-676.

Uyguner, B. and Gözenalp, F. (1959). Turkish Coastal Lagoons. *Proc. Gen. Fish Coun. Medit.*5: 241-246.

Waldichuk, M. (1974). Coastal Marine Pollution and Fish, Ocean Management, 2, 1-60, Elsevier Scientific Publishing Company, Amsterdam.

Received 1.8.1996
Accepted 20.8.1996