



Proceedings

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INTRODUCTION

PACEM IN MARIBUS 2000: THE EUROPEAN CHALLENGE

The International Tribunal for the Law of the Sea and the City and the University of Hamburg hosted the annual International Ocean Institute (IOI) Pacem in Maribus (PIM) conference on December 3-6, 2000. PIM 2000 ushered in the new millennium in which the sustainable use of ocean space and resources will be an increasingly important component of the local, national, regional, and global systems of economic development, the conservation of the environment, and human security.

The purpose of “Pacem in Maribus 2000: The European Challenge” is to reinforce concern for and participation of the European public, governments, private sector, and academia in responsible ocean and coastal management and sustainable development at the global, national, regional, and local levels. The European continent is washed by five regional seas – the Mediterranean, the Black Sea, the Baltic, the North Sea and the Arctic – and one open ocean, the Atlantic. The importance of these waters for the countries of Europe, for their health, economies and security, is enormous. A discussion of the closely interrelated problems of these integrated ocean spaces and of the emerging forms of European ocean governance and coastal management with the global system at the turn of the millennium is therefore of the utmost importance.

The aims of the first Pacem in Maribus conference to be held in Germany are:

- to create new partnerships between IOI and European institution, generating new perspectives and approaches and a new research agenda on, for example,
 - the role of integrated coastal management in job creation and the mitigation of unemployment;
 - the role and responsibility of Europe in the global partnership for tropical and subtropical seas;
 - the integration of risk assessment and risk management in integrated coastal management;
 - the integration of sustainable development and regional security;
- to contribute to the involvement of the European and German private sector in the transfer of socially and environmentally sustainable technologies to developing countries;
- to involve German and European institutions in the global network of the IOI Virtual University; and
- to provide a forum for discussion on the establishment of an IOI Operational Centre in Germany.

The International Tribunal for the Law of the Sea generously hosted Pacem in Maribus 2000 in its new building in Hamburg. It is of profound symbolic value that Pacem in Maribus, “Peace in the Oceans”, was held at the seat of the Tribunal established by the United Nations Convention on the Law of the Sea for the peaceful settlement of disputes and the enhancement of co-operation and peace in the oceans. It was especially fitting as 2000 was the International Year for the Culture of Peace.

ORGANIZING COMMITTEE MEMBERS

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Henning Voscherau
Former Mayor of Hamburg

ACADEMIC CO-ORDINATOR

Dr. Johanna Wesnigk

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Nikolaus Gelpke
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Liz Mohn
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Joern Thiede
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Gerold Wefer
Gerd Winter
Ruediger Wolfrum

OPENING REMARKS

THE SIGNIFICANCE OF OCEAN AND COASTAL MANAGEMENT FOR GERMAN DEVELOPMENT POLICY AND CO-OPERATION

*Dr. Uschi Eid
Parliamentary State Secretary
Federal Ministry for Economic Co-Operation and Development*

Ladies and gentlemen, distinguished participants and guests,

It has been a pleasure to be invited to address the renowned *Pacem in Maribus* conference here in Hamburg. I am delighted to welcome representatives from so many different countries. You have set yourselves an important goal for this conference: to foster sustainable use of the oceans! It is obvious global alliances must be created in order to cope with such a complex issue. Close international co-operation between policymakers, administrators and the various disciplines of science as well as civil society is urgently needed.

We have come together at the headquarters of the International Tribunal for the Law of the Sea. I believe that the venue for the conference has been particularly well chosen. This building of impressive architectural beauty will undoubtedly inspire our discussions. It is also visible evidence of decades of efforts to ensure peaceful, equitable and sustainable use of the oceans through co-operation, legislation and the creation of international institutions. Today, the focus is (1) on the significance of the oceans for food security and (2) on trade in fisheries products. Moreover, the central ecological role of the oceans has thankfully been gaining increased public attention.

Responsible and sustainable ocean and coastal management is an important goal of German development policy. I would like to start with some comments on the significance of oceans and coasts for humanity, then I will touch on the problems from the point of view of a development policymaker. In conclusion, I will describe some contributions made by development co-operation towards solving the problems we are dealing with.

THE SIGNIFICANCE OF OCEANS AND COASTS FOR HUMANITY

The facts speak for themselves: almost half of the Earth's population live within 60 kilometres of the sea. The aspects that seem to be very important in this context are:

FOOD AND INCOME

The significance of fish for people's food security in the developing countries can hardly be overestimated. Some 60 percent of the population of the developing countries satisfy almost half of their need for animal protein through the consumption of fish. In East and South Asia, fish is the main source of protein for over a billion people.

Moreover, fisheries and aquaculture are highly significant in terms of economics and employment. On a global scale, some 300 to 500 million people are directly or indirectly dependent on the fisheries sector for their livelihoods.

Also, fish is one of the most significant export commodities of many developing countries. For Mauritania, for example, it is a matter of survival to preserve its fisheries resources, since the country earns almost 50% of its foreign currency in the fisheries sector. The annual level of developing countries' net exports in this sector worldwide has been some US\$ 11 billion these past few years. This means that after crude oil, fish is the single largest export commodity – a fact we are hardly aware of!

Even for coastal dwellers who live at the subsistence level, collecting shells and crustaceans is often the only possibility of contributing to the survival of their families. This burden lies very often upon women and children.

The significance of fisheries habitat will increase. Serious estimates project only a limited increase in agricultural production will be possible over the next 20 or 30 years. Largely untapped potential exists in aquaculture though.

BIODIVERSITY

Natural habitats in regions where the oceans meet the land and where freshwater meets ocean water are the home of a vast variety of species – animals and plants which cannot survive outside those habitats. Genetic diversity and its related potential are invaluable for the future. This is particularly true for the breeding of new strains or for isolating specific substances, for example for the production of new medicines.

PROTECTION OF HUMAN BEINGS AND CLIMATE

One should not underestimate the significance of the coastline for the protection of people living near by. In view of the growing frequency of natural disasters, it is clear coastal regions afford much protection against storms, tidal waves and erosion. Moreover, often little is known about the significance of the oceans for the protection of the climate: micro-organisms in the sea make a major contribution to the production of oxygen for our atmosphere.

ANALYSIS OF PROBLEMS

Now what are the problems from the point of view of development policy?

POPULATION DENSITY

The potential offered by coastal regions as a place to live is appreciated by the local population. This is why coastal regions are increasingly settled by migrants. Demographic trends show that the population of coastal zones will double over the next 20 to 30 years. This increases competition between users of coastal regions – a potential for conflict emerges which could be underestimated.

OVEREXPLOITATION OF NATURAL RESOURCES

All renewable natural resources are subject to serious overexploitation. As a result, not only are fish stocks affected by dramatic overfishing, but the habitats of other species are under threat as well. For example, mangrove habitats in some places have been converted into shrimp ponds to an irresponsible extent. Habitat destruction is caused, for example, by unrestricted land use for tourism, pond farms, destruction of corals, discharge of polluted water, dumping of waste, and soil pollution.

The consequences are serious: there has been such limited natural reproduction of fish and other consumable organisms that some species are threatened with extinction and fisherfolk fear for their livelihoods. One has to realise that 25 percent of all regions significant for fishery are already overfished. And we all know that the maritime environment is particularly sensitive. It is a tragedy that people

often do not become aware of problems until it is too late. The environment is currently being degraded to such an extent that it becomes almost impossible to rehabilitate it at a later point.

MANAGEMENT DEFICITS

The rapidly advancing degradation of coastal zones as a result of high population density and unbalanced use of resources for the benefit of cheap industrial production methods are signs of significant management deficits. Due to conflicting interests, in some cases it has proved impossible to arrive at a form of integrated coastal zone and resource management that takes account of all users interests.

CONTRIBUTIONS BY GERMAN DEVELOPMENT CO-OPERATION

What is the contribution of German development co-operation to meeting these challenges? We believe that we need to address the manifold problems at different levels: in partner countries or in international institutions, structures and global regimes. Development policy is part of the global structural policy pursued by the Social Democrat/Green federal government.

POLICY FRAMEWORK

It is in this spirit that development policymakers are working to contribute towards shaping the global framework for sustainable development. German input and support in international bodies has helped develop major conventions relating to coastal areas. Chapter 17 of Agenda 21 is of particular relevance in this context. Of the seven programme areas mentioned there, we are especially engaged in

- integrated management of coastal areas,
- environmental protection and protection of biodiversity, and
- strengthening national and international organisations.

Germany signed the Convention on Biological Diversity and has been very active in implementing it. In this context, marine and coastal areas, as well as inland waters, have gained increasing importance. Through a special programme for the implementation of the Convention, we are actively involved in designing measures with which these delicate ecosystems can be protected and used based on the principle of sustainable development.

We have been devoting special attention to designing standards for a development policy for the European Union. Coherence between the economic interests and the development efforts of the respective Member States is urgently needed (pursuant to Article 130 of the EC Treaty in the Maastricht version and Article 178 of the EC Treaty in the Amsterdam version). The European Union is obliged to take account of development policy objectives in all other policy areas which are likely to affect developing countries.

Indeed, there is an urgent need for coherence if we are to reach our objective of using the oceans in a sustainable manner. It is truly ironic that industrialised countries are subsidising their fishery fleets, on employment policy grounds for example, to such an extent that they contradict international efforts for environmental protection and development. Furthermore, coherence is always a matter of political credibility which we need if we want to be successful in our international and bilateral negotiations.

Finally, I believe that it is indispensable for this issue to be given greater attention within the framework of the World Trade Organization. The developing countries only play a marginal role in utilising the natural wealth oceans offer – even though they have the longest coastlines and they urgently

need the income from fisheries or the fish in order to improve the food situation of their people. International waters are largely used by financially powerful companies from Western countries whilst the distortions of competition arising from subsidies are to the detriment of the economic development of countries in Africa, Asia and Latin America.

DEVELOPMENT CO-OPERATION

Aside from designing international legislation, it is indispensable that we support our partner countries in implementing such legislation and in resolving the problems described above. We must enable the countries concerned to monitor compliance with international rules effectively and to meet their international obligations.

This is why German development co-operation has earmarked some DM 40 million over the next three years for development projects that focus on coastal zone management and fisheries. In view of the manifold economic, ecological and social interrelationships, these projects on effective coastal zone management can only be successful if they are based on a holistic approach.

Let me give you two examples of our development co-operation in the field that concerns us here: one project in the Philippines aims at developing consensus between the government and coastal communities on sustainable use and subsequent implementation with the stakeholders. This is an ambitious and innovative endeavour which demonstrates that people are increasingly becoming aware of the complexity of sustainable coastal resource management issues. The idea is to use a neutral mediator to arrive at a viable compromise between commercial and traditional fishery for shared use of fish resources in a large sea area.

Another special concern within our development co-operation programme is the establishment of coastal and marine nature reserves as enclaves where local biodiversity can be preserved. To this end, Germany has a co-operation agreement with Peru to develop the Paracas coastal national park. The focus is not only on providing assistance for administrative and infrastructure development for the park, but on ensuring that the local people can rely on fisheries and tourism for their livelihoods in the long term.

Ladies and gentlemen,

Sustainable use of the oceans is a matter that affects us all. The future of humankind depends on solving the existing problems.

I think the current debate on BSE (bovine spongiform encephalopathy, commonly known as “mad cow disease”) contamination of beef has, with one stroke, made it clear that there is an urgent need for us to re-examine industrial food production, as well as the way we treat nature in general. As a “green” policymaker and a scientist, I feel particularly strong about securing healthy food resources worldwide and protecting our environment in the long term.

In order to succeed in that endeavor, we need global efforts and your creative ideas. I wish you every success for your work these next few days.

INAUGURAL ADDRESS

*Dr. Henning Voscherau
Former Mayor of Hamburg*

Ladies and Gentlemen,

This is the first time an IOI conference on maritime issues of global interest is being held in Hamburg. For the participants — especially for the guests from many nations — the conference goes along with (as I hope) a pleasant and interesting opportunity to visit the Free and Hanseatic City of Hamburg. This traditional citizen's republic is Germany's maritime capital and has been since mediaeval days. Hamburg has traditionally been an international city of trade and commerce, of merchants and mariners, a maritime city. Right here across the river on the island of Finkenwerder, a young writer, Gorch Fock, at the beginning of the 20th century wrote his famous book, *Seefahrt is not: Navigare necesse est*. One of the issues of IOI and Pacem in Maribus. The youngest daughter of one of the greatest novelist of German tongue, Thomas Mann, son of the Hanseatic City of Lubeck, not far from here, the Queen of the Baltic Sea in the days of the Hanseatic League of Northern European Merchant Cities, is among us. Welcome Professor Elisabeth Mann Borgese, who in 1970 initiated the IOI.

The Hanseatic port of Hamburg on the river Elbe has always been Germany's as well as northern and central Europe's gateway to the world. Because of its international perspective, Hamburg and Bremen — more than any other German city, especially much more than Berlin — have recognised the significance of peaceful overseas co-operation as well as the significance of the oceans.

Thus I am proud to support the 28th Pacem in Maribus conference in Hamburg and I should like to extend a very warm welcome to all of you. I do hope you will have a successful conference. I am sure many of you will contribute to the vital issues the workshops will have to deal with. Perhaps I am not the only one present who remembers well the bright eyes and brains of the young students who in June 1996 held another conference in Hamburg, Entering the Maritime Millennium. One of them sent me a very friendly letter on today's occasion — the students' results enclosed. So there is hope, not to mention the unforeseen assistance this young man provided for my preparation of this inaugural address.

I am confident you will find Hamburg an attractive place to hold this conference. As a maritime city, Hamburg has been a turntable of worldwide trade and shipping since the ninth century. Since 1189, when Emperor Frederick Barbarossa granted us the right of free access to the seas, shipping law has been a permanent feature of the jurisdiction of our city state. From time immemorial this law has served as a basis for worldwide trade and shipping contracts. And in the past it was not unusual for foreign powers to ask the Hamburg Senate to act as a court of arbitration in maritime disputes.

This historic reminiscence leads me to the law of the sea and the International Tribunal hosting us today. Due to this maritime tradition of settling maritime disputes, Hamburg seems to have been an appropriate choice when the time came for the international community to decide where the International Tribunal for the Law of the Sea was to have its seat. UN Secretary-General Boutros Boutros-Ghali paid us a compliment only four years ago:

This great city symbolizes humankind's eternal relationship with the sea — as a source of life, as a means of commerce, as the common heritage of all the peoples of the globe.

Naturally any mayor in the world — cameras and microphones on, voters closely watching — would love to hear the Secretary-General make such a favourable comment. So I loved it. But the truth is, that is what the 28th Pacem in Maribus conference and the International Ocean Institute are about: “humankind’s eternal relationship with the sea”, a source of life, means of commerce, common heritage.

Today we are being hosted by the International Tribunal in its magnificent new lodgings. And I should like to take the opportunity to express my gratitude to H. E. President Rao for his official opening address as well as for the hospitality the Court and the honourable judges are offering to us. I trust you all are aware of how happy a maritime city must be to experience these synergies emphasising the importance of the oceans and the maritime sectors of human activities as well as the role of the city.

Nevertheless it took more than two decades of negotiations by some 150 states to cover the new law of the sea in a convention of more than 300 articles. I remember well how difficult a balance it was for the City of Hamburg and the mayor when the German Democratic Republic — of which we were no part — had signed the United Nations convention, of which we approved, whilst the Federal Republic of Germany — our home country — closely watching London and Washington D. C. was hesitating to do so. On the other hand, Hamburg as one of the ten western German federal states was resolved under no circumstances to lose the Tribunal. An awkward position. All of a sudden German unity came about, and in Year One I happened to function as the President of the German Upper House, eventually as Deputy Head of State according to Article 57 of our constitution.

Only after the East-West confrontation subsided did it become possible to establish a universal legal basis in the maritime sector, reduce conflicts, utilise the economic potential of the seas, and preserve the ocean environment. This contribution to establishing the rule of law in international relationships is also a contribution to reconciling the interests of the nations throughout the world. The rule of law is the basis for peace, for *Pax in Maribus*.

The International Tribunal for the Law of the Sea is expected to implement the rule of law in order to peacefully settle conflicts and to provide fair access to marine resources for all members of the international community. This is the preferable option for all parties tied in conflicts. What the Tribunal will need to fulfill the task of safeguarding peace and justice on the seas and oceans is international acceptance. This cannot be achieved over night; it will have to grow slowly. And all parties will be well advised to contribute and be patient.

Here we are attending the 28th IOI conference. It has been 30 years now since the IOI was established as a nongovernmental organisation in 1970. It was felt then that the issues involved needed sustained research and progressive development which could be best achieved by establishing an international ocean institute. The IOI’s task is to promote education, training and research by bringing together specialists involved in all aspects of the oceans. An important challenge, a great idea, a modest start, an enormous outcome. Today we witness the inauguration of another Pacem in Maribus conference focussing on the European challenge. A wide range of vital issues will be covered by experts from all over the world. The IOI has become a global network. Good for *humankind’s common heritage*.

There can be no doubt about the central role of oceans:

- in global economy, including conflicting interests
- as a critical climatic determinant as well as an environmental challenge through pollution
- as a sector in international law and international relations, including peace and war

It is true: Nowadays we live in an age of rapid global upheaval which is completely changing the structures that humans have grown to value and which provided them with a familiar framework and what many — far from all — experienced as security and reliability. It is becoming increasingly impossible to counter international trends and to act regionally or nationally to guarantee control of our global challenges, not to say threats, without global co-operation.

This is the IOI spirit. This is the spirit of the splendid programme IOI has prepared. So let me express my gratitude to those who have worked so hard and done so well for this conference for many a month.

Four workshops will cover the range of issues of global interest or global concern:

1. European Seas
2. Subtropical to Tropical Seas and the Needs of Developing Countries
3. Legal Conflicts and Problems
4. The Emerging Institutional Framework for Ocean Governance

I feel that we can expect a lot, and I am looking forward to the presentation of final results on Wednesday.

As the third millennium is beginning, the thirty percent of the planet Earth consisting of continents and islands is becoming more and more crowded (by perhaps ten billion humans in twenty years time) and covered with mega cities, asphalt and growing deserts. In stark contrast, the oceans are experiencing a decrease in marine life while still covering 70% of the planet's surface and exchanging the same amount of water as they have over the millennia. So the role the oceans must play in ever-more crowded communities in the third millennium is quite clear. They must be accepted as the source of life and the heritage to be protected and preserved. The oceans and their significance for the creation of habitable living conditions on earth over the past thousands of millennia must be a priority in the decision-making process. No other planet in our solar system possesses an ocean and, as a result, the ability to sustain life. The oceans as a coherent system globally distributing water in a constant circle mark earth as the "Blue Planet" — the only one in our solar system, the source of life.

It is IOI's optimism, well, Professor Mann Borgese's optimism, to raise our consciousness and responsibility for humankind's eternal relationship with the seas.

We have to realise, and are well advised to admit, that there is a basic conflict between biology and economy dominating interests, views and discussions. The pros and cons can be discussed, solutions can be found, and the costs can be measured. For example, in order to meet tomorrow's transportation needs, vessels must be capable of being operated not only at high speeds, but they must do so ecologically and economically. This is possible. The consequences are known. The decisions must be made.

Ladies and gentlemen, as I have been in charge of this city, Hamburg, for almost ten years, it is almost obligatory for me to make some final additional remarks on my home town. For half a century, this second largest German city was made painfully aware of the consequences of the division of Europe and the global bloc confrontation. As long as the Berlin Wall existed, we were only half an hour's drive away. Our traditional links with trading partners in Poland, the Czech Republic, the Baltic peoples, Russia and Hungary, had been severed. So we were enthusiastic when the separation of Europe came to an end ten years ago. We know how important it is for East and West to grow closer. We know how necessary it is to integrate the central and eastern European democracies into Europe.

For Hamburg, it is of great significance to see the focus of European Union activities gradually shift from the South to North and East. On the other hand, all European sea ports with access to the North Sea are in competition with each other for the same hinterland and the same products. Therefore individual ports in European countries — obviously developed countries all of them — should not be given an advantage over their competitors by European development programmes. Within Europe, there is no basis to allow individual ports to enhance their standing through subsidised competitiveness, especially as transport directions in Europe for half a century had changed from east-west to north-south due to bloc confrontation, i.e., the Cold War and the Iron Curtain. World politics were an obstacle for Hamburg, Bremen, Lübeck, Rostock, Wismar — and an enormous advantage for Rotterdam, Antwerp, the Rhine/Main/Danube regions. Enough political influence on trade and transport, now we want our chance to show our competence and flexibility through competition!

The central and eastern European countries are re-entering the global economy, global trade and global transportation. They will face stable growth for decades. Hamburg's role as one of the main European maritime centres of international transport and trade will grow as further progress towards closer integration in Europe is made. Every *aquapolis* links the oceans with the needs of humankind onshore. This role will become even more important in the 21st century. That is why we are happy to have *Pacem in Maribus 2000* here in Hamburg — the maritime worldwide family of committed experts facing their personal responsibility for the future of our planet. Again, welcome to you all to Hamburg and fruitful discussions.

PLENARY ADDRESS

NON-EUROPEAN SOURCES OF LAW OF THE SEA

Dr. R. P. Anand

*Professor Emeritus of International Law
Jawaharlal Nehru University, New Delhi*

LAW OF THE SEA: PRODUCT OF THE EUROPEAN CIVILIZATION

There is a widespread belief amongst Western, especially European, scholars that law of the sea, like other rules of inter-State conduct of modern international law, is a product of Western European Christian civilization to which non-European countries have contributed practically little or nothing. It is asserted with a sense of pride that international law is a “product of the conscious activity of the European mind” and “European beliefs” and is based on European State practices which were developed and consolidated during the last three centuries.¹ Thus, relating the story of the development of international law, Professor J. H. W. Verzijl states:

The body of positive international law once called into being by the concordant practice and express agreement of European States, has since the end of the eighteenth century onwards, spread over the rest of the world as a modern *ratio scripta*, to which extra-European States have contributed extraordinarily little. International law as it now stands is essentially the product of the European mind and has practically been ‘received’ ... lock, stock and barrel by American and Asiatic States.²

Relying entirely and almost exclusively on European history and European sources, with rare exceptions,³ most Western scholars affirm or confirm this opinion. As Professor B. V. A. Roling asserts:

There is no doubt about it: the traditional law of nations is a law of European lineage.⁴

Kunz confirms: “Our international law is a law of Christian Europe. It has its roots in the *Republica Christiana* of medieval Europe.”⁵ Practically every study on the history of international law in Europe expresses and confirms this opinion.⁶ In fact it is noted “with a certain amount of amusement” how the Asian States grasp “as the highest and, indeed, as universal values certain fundamental ideas created and elaborated by the West”. This offers curious but clear

[E]vidence of the lasting dependence of non-Western nations in the conduct of their international affairs upon fundamental concepts of the Western world from which their political leaders nevertheless so ardently crave to liberate their States without, however, being able either to derive any different workable principle of international law from data of their own national history or to develop independent legal principles susceptible of replacing the traditional standard principles of existing international law.⁷

Although some of the ancient countries, like China, India, Egypt and Assyria, with quite advanced forms of civilizations, might have had certain generally accepted principles and rules of inter-State conduct, the Western jurists feel that these practices “reveal little that could, even in the broader sense of the word, be considered as international law.”⁸

FREEDOM OF THE SEAS: THE PARAMOUNT PRINCIPLE

The bulk and essence of maritime law during the last two centuries can be summed up in the simple phrase, "Freedom of the Seas". What it meant was that beyond a limited area of territorial sea where the coastal State exercised sovereign jurisdiction, an area which was deemed essential for its security and protection of its other vital interests, the vast areas of the ocean were open and free and could not be appropriated and must not be controlled by any one. In these areas of what were called the 'high seas', all States enjoyed – or at least until recently were supposed to enjoy – as Article 2 of the 1958 Convention on the High Seas declared, freedoms of unobstructed navigation, uncontrolled fishing, the right to lay down and to maintain submarine cables and pipelines, and the freedom to fly over, and such other undefined freedoms as they might like to exercise with due regard to the similar rights and freedoms of others.

History of the law of the sea is to a large extent the story of the development of the freedom of the seas doctrine and the vicissitudes through which it has passed through the centuries. For nearly 200 years, it had been accepted as an undisputed principle, almost a dogma, which no one could dare challenge. Recognised and referred to as *jus cogens*, it was supposed to be in the interests of all mankind. It expressed in a sense the essence and substance of the law of the sea. All other rules relating to inter-State conduct more or less revolved around this doctrine and their validity or otherwise was to be judged and depended on the touchstone of this incontrovertible principle. Thus, even when coastal State's jurisdiction in a part of the sea close to its coastline came to be recognised as territorial sea for the protection of its security and other interests, its limits were always sought to be kept as narrow as absolutely essential to maintain this freedom in wide areas. In any case, beyond the narrow limits of territorial sea, even limited jurisdiction for the protection of coastal fisheries was totally denied until the end of the Second World War. A contiguous zone for the protection of coastal economic, health and financial interests was either refused or merely tolerated, in the name of the freedom of the seas, by the biggest maritime power, Great Britain, which ruled the waves for over 200 years.⁹

ORIGIN OF THE PRINCIPLE

It is generally assumed, without any question, and widely asserted that it was the seventeenth century Dutch jurist, Hugo de Groot or Hugo Grotius, who propounded the doctrine of the freedom of the seas for the first time in the modern period by elaborate argument. Although it is believed that the principle was clearly accepted under Roman law and had been reduced to a legal formula according to which the sea was recognised as *commune omnium*, or common property of all, after the disintegration of the Roman Empire, it had been lost and forgotten through the centuries.¹⁰ The "reawakening" of the principle was brought about by Hugo Grotius. As Meurer put it:

Up to modern times the freedom of the seas slumbered the sleep of the Sleeping Beauty until there appeared from Netherlands the knight whose kiss awakened her once more.¹¹

It is well-known that Grotius enunciated and elaborated his thesis relating to the freedom of the seas in his famous book *Mare liberum* or *Free Seas* published anonymously in 1609.¹² Few works of such small size have gained such great reputation as the *Mare liberum*. It is said to be "the first and the classic exposition of the doctrine of the freedom of the seas".¹³ Grotius wrote this remarkable book, which has earned him the title of the 'founder' or 'father' of international law, in order to defend his country's right to navigate in the Indian Ocean and Eastern seas and to trade with India and the East Indies (Southeast Asian Islands), over which Spain and Portugal asserted a commercial monopoly as well as political domination. In fact, *Mare liberum* was merely one chapter (Chapter XII) of a bigger work, *De Jure Praedae* (*On the Law of Spoils*) which Grotius, as advocate of the Dutch East India Company, had prepared as a legal brief but which he had refrained from publishing.¹⁴

This was a period of keen international commercial rivalry between Spain, Portugal, Holland and England, all whom were struggling to gather the riches of the East. Ever since Rome made Eastern products fashionable and her Egyptian subjects went out to seek them in the Indies, the European world had been possessed of the splendour of the East. Aromatic spices from India and the East Indies were in the greatest demand and yielded the largest profit. The spice trade with the East, especially pepper, then became a great motivating factor of history. As a recent writer points out: "Pepper may not mean much to us, but in that age it ranked with the precious stones. Men risked the perils of the deep and fought and died for pepper."¹⁵ Spain and Portugal, the two Iberian Powers, who were the first to look for a sea route to India and the Spice Islands, claimed a legal title to half the non-Christian world each under a Papal Bull of May 4, 1493, by which Pope Alexander VI divided the world between the two and defined a line of demarcation running 100 leagues west of Azores and Cape Verde Islands and granted to Spain all lands west of it, and to Portugal all lands of its east. By a bilateral treaty of 1494 the two powers fortified their title.¹⁶

ASIAN TRADITIONS IGNORED

It is submitted that the contribution of Asian, African and other extra-European countries towards the development of modern international law, or their attitude, outlook and behaviour toward its rules in their international relations, is more often than not based on ignorance of their history and lack of information or understanding of their cultures and cultural traditions. Europeans generally do not want to look beyond European history, written during the colonial period, to acknowledge that when European adventurers arrived in Asia in the fifteenth century, "they found themselves in the middle of a network of States and inter-State relations based on traditions which were more ancient than their own and in no way inferior to notions of European civilization."¹⁷ These rules of inter-State conduct might have differed, and in fact did differ, from the European State practice; but there is no doubt about their widespread acceptance amongst Asian States. Thanks to their liberal traditions of freedoms of peaceful navigation and international maritime trade, and permission to foreign merchants to establish themselves by their own laws, the Europeans got an easy foothold in Asia.¹⁸ Whether expressed in the form of a doctrine or not, there is no doubt that the unobstructed freedoms of navigation and commercial shipping were accepted by all countries in the Indian Ocean and other Asian seas centuries before history was ever recorded, long before Grotius was ever heard of, or Europe emerged as a formidable force on the international stage. Besides historical records, numerous travelers' memoirs testify to this state of affairs.¹⁹ Freedom of the seas was also a recognised rule in the Rhodian Maritime Code and was unequivocally adopted in Roman law. From the first century A.D., regular maritime commercial relations were established between Rome and several States in India and the Indian Ocean region, and they continued for nearly 300 years.²⁰

On the eve of European penetration into the Indian Ocean, not only was the principle of freedom of the seas and trade well recognised in customary law of Asia, but also in some States this principle was codified and well-publicised. Examples include the maritime codes of Macassar and Malacca, which were compiled at the end of the thirteenth century, based on customary practices.²¹ Resisting the Dutch attempts to monopolise the maritime trade of the Spice Islands, the ruler of Macassar is reported to have said in 1615 that sea was common to all and that "it is a thing unheard of that any one should be forbidden to sail the seas."²²

FREEDOM OF THE SEAS: A CASUALTY IN EUROPE

While the salutary practices of freedoms of navigation and unobstructed maritime trade continued to prevail and prosper in Asia, in Europe the Rhodian and Roman traditions of the freedom of the seas foundered in the turbulent waters of disputes and conflicts of numerous smaller States which emerged from the ruins of Rome, each vying with the other. Maritime commerce died in a "state of wild anarchy" in Europe, and even the memory of Rhodian law did not last beyond the thirteenth cen-

ture. By this time, all European seas came to be more or less appropriated by European States, leading to numerous disputes and almost continuous warfare. Thus, in addition to the wide claims of Spain and Portugal, Venice claimed sovereignty over the Adriatic Sea, Genoa occupied the Liguarian Sea, England dominated the undefined British seas, and Denmark closed the Baltic by closing the Sound and extended control over the northern seas.²³

PORTUGAL DISTURBS PEACEFUL NAVIGATION IN THE INDIAN OCEAN

When the Portuguese arrived in India by the end of the fifteenth century, they found no maritime powers, no warships, and no arms in the sea. The Indian Ocean had never been a theatre of any serious naval conflicts. Asians were not peaceful peoples but felt no need to fight for the sea which was but of limited use for navigation, maritime trade, and catching small quantities of fish. They were essentially land powers. The hub of Asian activities and relations, their struggles and conflicts, related to the vast and fertile land on the largest continent of the world. The absence of armed shipping in the Indian Ocean helped tiny Portugal to control vast areas of the ocean. The Europeans were sea powers trained in the rough waters of the Atlantic and the North Sea, whose challenges hardened them into expert navigators and naval warriors. Portugal sought to apply European custom to control the vast Indian Ocean and to enforce its control by its armed carracks and galleons against the unarmed Indian Ocean ships engaged in peaceful trade. Although Portugal was fairly successful in gaining a share of the Asian spice market and in disturbing peaceful navigation in the Indian Ocean, it could not wipe out the Asian maritime trade.²⁴ But the Portuguese monopoly of the Eastern spice trade and its huge profits aroused the jealousy of other European powers which began to challenge Portugal's authority in the late sixteenth century.

CONTEST OF WITS AND ARMS IN EUROPE

It was to contest the Portuguese monopoly, as we have noted earlier, that Grotius, taking his cue from the Asian maritime practices of free navigation and trade, propounded his doctrine in a brief he prepared for the Dutch East India Company. The company asked Grotius, who was associated with it as a lawyer, to defend the company's capture of a Portuguese vessel laden with Eastern spices in the Straits of Malacca in 1604. Learning as much as he could about India and the East Indies, their traditions of free trade and commerce throughout history, and the Portuguese attempts to stultify the traditional freedom of navigation to these countries, Grotius wrote *De Jure Pradae* in 1605 to defend the action. He tried to "show that war might rightly be waged against, and prize taken from the Portuguese, who had wrongfully tried to exclude the Dutch (and others) from [trade with eastern countries]".²⁵ His greatness lies in keenly observing the maritime customs of Asian countries, presenting them in the form of a doctrine supported by logical arguments, Christian theology, and the authority of the venerable Roman law, and recommending these views to European countries. This fact of history has been generally ignored by historians of international law. There is little doubt, as Professor Alexandrowicz said, "that Grotius either conceived or perfected his doctrine of the freedom of the seas under the influence of the maritime traditions of the East."²⁶

Besides Asian traditions, Grotius relied on logic. He tried to establish two propositions: first, "that which cannot be occupied, or which never has been occupied cannot be the property of any one, because all property has arisen from occupation" and second, "that which has been so constituted by nature that although serving some one person it still suffices for the use of all other persons, is today and ought in perpetuity to remain in the same condition as when it was first created by nature".²⁷ The air belongs to this class of things and so does the sea. Therefore, argued Grotius with the disarming logic of the time: "The seas is common to all because it is so limitless that it cannot become a possession of one, and because it is adapted for the use of all, whether we consider it from the point of view of navigation or of fisheries."²⁸

It must be pointed out, however, that in spite of all this learning and logic, neither Grotius nor Holland were in favour of freedom of the seas as a principle. As the Dutch defeated the Portuguese and seized the profitable trade of the Spice Islands, they sought to create their own monopoly. Grotius conveniently forgot the freedom of the seas principle he had propounded with such fervour and went to England with a Dutch delegation four years later in 1613 to argue in favour of a Dutch monopoly of trade with the Spice Islands. In fact he was surprised to find that his own book, published anonymously, was being quoted by the British against him.²⁹ Successive attempts by each European State to demand freedom of the lucrative spice trade of the East Indies, and later attempts by each of them to try to create a monopoly for itself, along with a similar game being played in the Atlantic, led to a spate of books by numerous scholars in Europe. Most or all of these works were nothing more than apologies by these writers for their countries' policies and interests. In this battle of books and wits, which continued in the din of actual war, it was not Grotius, it must be pointed out, who won, as is generally assumed. The real victor was John Selden, British scholar and statesman, whose *Mare Clausum, sen de Domino Maris Libri Duo* (*The Closed Sea or Two books concerning the Rule over the Sea*) written at the behest of the English Crown, remained the most authoritative work on maritime law in Europe for the next 200 years.³⁰ Although several other publicists countered Selden's arguments, all the European countries continued to follow his prescription in controlling as much ocean as their power would permit. Selden won this protracted "battle" not by the brilliance of his arguments, but by the "louder language" of the powerful British navy.³¹

RESURGENCE OF THE FREEDOM OF THE SEAS

It was only in the late 18th or really early 19th century that freedom of the seas came to be revived under the patronage of Great Britain which had emerged as the greatest power of the world. The needs and demands of the industrial revolution in Europe – larger markets, sources of raw material and surplus capital which could not be invested in Europe – led to huge colonial empires in Asia and Africa. As Europeans got more interested in commercial prosperity and free trade, and ever more Europeans started travelling to these widespread colonies, Selden's *Mare Clausum* became an anachronism. It was more useful for them to have open and free seas in order to exploit vast unexplored areas of the world which no one nation could reach alone. Pretensions to sovereignty over the sea and monopoly of trade slowly died their natural death, and England became not only the strongest champion of the freedom of the seas, but its policeman.³² Grotius, the dejected and rejected man in his lifetime, and a false prophet for 200 years, was acclaimed and proclaimed a hero and his, in some respects illogical, arguments came to be accepted without any questions.

LAW VAGUE AND UNCERTAIN

In any case, the freedom of the seas principle accepted by the Europeans had nothing in common with Asian maritime practices. Unlike Asians, who had maintained these freedoms for centuries for peaceful commercial relations, the chief purpose of their revival in the nineteenth century Europe was joint exploitation of Asia and Africa to satisfy the needs of their industries. It may also be mentioned that but for general agreement on vague freedom of the seas, implying freedom of peaceful navigation with a few agreed "rules of the road" which benefitted all Europeans, there was little agreement on other rules. Freedom of fisheries, which England would come to accept only after three wars with Holland and other conflicts with neighbours, continued to be a subject of serious disputes among Europeans. There was no agreement on a uniform limit of territorial sea, or freedom of navigation through the maritime belt or straits, especially for warships. The same was true of the contiguous zone and England, ever since the repeal of its Hovering Act in 1876, continued to question the legality of such jurisdiction exercised by other States.³³ Moreover, a large part of the law of the sea relating to war, contraband, blockade, and rights of neutrals was always at the mercy of belligerents which stretched their rights according to their free will and contingencies of war. Thus, during the two World Wars, the belligerents outstretched their authority over the sea on the basis of controver-

sial doctrines they propounded like “ultimate enemy destination” and “long distance blockades”, and enforced them over the strong protest of the neutrals through navicerts systems of their own.³⁴ Thus it is important to note that, apart from a few general principles, much of the maritime law, as it developed in the nineteenth and the first half of the twentieth centuries, was controversial, uncertain, and in several respects nothing more than a panorama of conflicting rules.

LEGAL VACUUM

Even more important is the fact that, beyond a limited maritime belt, the vast areas of the ocean – more than 70 per cent of the globe – remained a legal vacuum, an area of “no law” beyond what are referred to as a few “rules of the road”. Freedom of the seas meant essentially non-regulation and laissez faire which was in the interests of the big maritime powers. This law, or rather lack of law under the freedom of the seas doctrine, was often used in the nineteenth century by European powers to threaten small States, to get concessions from them, or simply to subjugate them.³⁵ Even later, it gave them a license to use the freedom in furtherance of their immediate interests – whether for navigation, fisheries or military maneuvers – irrespective of the rights of others. The protracted and sometimes bitter fishery disputes between smaller European countries – Holland, Denmark, Norway and Iceland – on the one hand, and Great Britain, on the other, numerous such disputes on the American continent, and almost continuous protests by neutral States against violation of their freedoms of navigation and trade by belligerent maritime powers, were constant reminders of the dissatisfaction of the smaller coastal States. The situation became even more serious during and after the Second World War when the maritime powers took the liberty to further stretch this freedom and enclose even wider areas of the ocean either for defeating the enemy, or for conducting nuclear and missile tests, threatening the life and liberty of all peaceful users of the seas. Protests by smaller States to such uses of the sea were almost always rejected on the ground that what was not prohibited in law was permitted, and that these were “reasonable” measures of security and self-defense.³⁶

Most of the rules of modern maritime law were based on the practice of a few dominant maritime powers. Many a time their interest differed and their practices were not uniform. The situation was tolerated not only because of the over-bearing influence of the European maritime powers, especially Great Britain, along with France, Germany, and Russia, as well as extra-European powers like the United States and Japan, which were all helped by this undefined and wide freedom of the seas, but also because the sea was of only limited importance and use. But the law even for these limited purposes was imprecise and not beyond doubt. An attempt was made to codify the law under the auspices of the League of Nations in 1930, but it failed because the big maritime powers, especially Great Britain, insisted on a narrow three-mile limit of the territorial sea, and the smaller States were deeply concerned about protecting their fisheries and other coastal interests in wider zones.³⁷

POST-1945 ERA: A NEW WORLD

By the end of World War II, the whole balance of forces had changed. The West European powers, which had dominated the world scene for nearly 300 years, were no longer at the center of the world stage. Out of the ruins of the world holocaust emerged the United States and the Soviet Union with enough strength to dominate the world and to challenge each other seriously. The world, divided into two power blocs, plunged into a bitter Cold War that affected all aspects of international relations and law.

With the weakening of Europe, colonialism collapsed and there emerged numerous Asian and African States which for a long time had no status and no role in the formulation of international law. Comprising a majority of the new extended world society, the Asian-African States, along with the thus far equally neglected and disgruntled Latin American States – the so-called Third World as they came to be called – acquired a new influence in the divided post-war world society. Non-aligned to

any power bloc as most of these countries were, they aligned themselves to take concerted action and to play an important role in international legal and political structures in pursuance of their interests.

There was another development. So far, the uses of the sea were few and the coastal States were mostly concerned about their security, protection of their near-shore areas for fisheries, and their commercial fleets. The tremendous advances in marine technology after World War II revealed a new world with nine times as much vegetation available in the sea as was cultivated on land. Even more important, it came to be found that natural resources and minerals in quantities beyond anyone's imagination were present not only in the water of the sea but also on the ocean floor and in the underlying layers. By 1945, geologists had confirmed that huge quantities of sorely needed oil and gas resources lay buried under the seabed off the shores of various countries, outside the territorial sea, and technology was making them accessible. These invaluable resources could not be left there or risked being exploited by distant water States, as had been the case with fisheries for centuries.

The development of technology also revolutionised fishing mechanics. Significant technological breakthroughs in the ability to detect, concentrate, and harvest fish in the high seas increased the capacity of a few technologically-advanced countries to indulge in overfishing, threatening entire fishery resources near the coasts of other States. The need to protect coastal resources – both living and non-living – had become all the more evident.

FREEDOM OF THE SEAS NOT IMMUTABLE

Law could not remain unaffected by all these changes. Unlimited freedom of the seas, which had served the interests of a few maritime powers in an age with limited uses of the sea, could no longer remain unchallenged or unchanged. As Professor Gidel said as early as 1950:

The expression 'freedom of the high seas' is in reality a purely negative, worn-out concept, nothing more; it has no meaning for us, except as the anti-thesis of another, a positive concept, which has long since disappeared.

The idea of the freedom of the high seas is, paradoxically, a survival of the idea – long since dead – that the high seas are subject to dominion and sovereignty, just like any territorial dominion.³⁸

Europe had largely lost its control and hold over the law of the sea. It was no longer a law to be made by and for the European countries. Once it came to be realised that the sea was much more than a navigation route or a storehouse of fisheries which could be freely exploited under the old freedom of the seas doctrine, the old law lost its charm and sanctity. Most of the initiative and calls for change in the law came from extra-European countries. The first and most important challenge to the traditional freedom of the seas doctrine in the period following World War II came from the United States which had emerged as the strongest maritime power after the war. The twin proclamations by President Harry Truman on September 28, 1945, referred to developments in technology as necessitating the extension of US coastal jurisdiction to establish conservation zones in contiguous high seas areas to protect fisheries and the right to exclusive exploitation of the mineral resources of the continental shelf.³⁹ In both proclamations, the littoral State extended its limited jurisdiction to areas of the high seas close to its coasts, without any claim to an extension of territorial waters, and specifically declared unaffected the high seas character of the areas and the right to free and unimpeded navigation in those waters. In spite of this disclaimer, the Truman Proclamations were certainly novel claims that modified, if not grossly violated, the freedom of the seas doctrine.

The United States' proclamations led to numerous claims by other States not only for continental shelf jurisdiction but also for protection of their fisheries. By 1958, nearly a score of countries had made such continental shelf claims. Some Latin American countries went even further. Argentine, Chile, Peru, Ecuador, Costa Rica, El Salvador, and Honduras all extended their jurisdiction or sovereignty to 200 miles to protect their fisheries from depredations by outsiders. Practically every proclamation claiming special rights to the continental shelf or fisheries contained the statement that freedom of the high seas was fully recognised and maintained. But as the 1950 UN Memorandum on the Regime of the High Seas suggested, these disclaimers could not be taken seriously.⁴⁰

CONFLICTING AND DIVERSE CLAIMS

There was a lot of confusion during this period about the legal validity or otherwise of all these claims about continental shelf and fisheries jurisdiction. The confusion was confounded by widening claims relating to the territorial sea. By 1958, at least 27 of the 73 independent coastal States claimed specific breadths of territorial sea in excess of the so-called 'traditional' three-mile limit. These claims ranged between 5, 6, 12 and 200 miles. Six others, while rejecting the three-mile rule, did not specify their limits.⁴¹

Some countries sought to achieve the same purpose without extending their territorial waters or fisheries jurisdiction by adopting straight baselines for measuring the territorial sea joining outermost islands, islets, or rocks off their coasts. Thus, Norway essentially extended its territorial seas by redrawing its baselines and enclosing vast bodies of waters, large and small bays, and countless arms of the sea making them internal waters subject to the absolute sovereignty of Norway. This method for protection of coastal fisheries from outsiders was upheld by the International Court of Justice in the Anglo-Norwegian Fisheries case in 1951.⁴²

UN EFFORTS TO CODIFY THE LAW

The divergent standpoints adopted by different States since the Second World War on the territorial sea, fisheries jurisdiction, continental shelf, and other issues of the law of the sea made the already ambiguous and uncertain situation "a confused medley of conflicting solutions."⁴³ To bring order in this confusing situation, the United Nations organised two conferences in 1958 and 1960 to develop and codify the law in a systematic manner. Four conventions⁴⁴ were concluded in 1958 which, on the whole, reasserted the traditional freedoms of the sea and accepted coastal States' sovereign jurisdiction over its continental shelf and exclusive right to exploit its resources up to a depth of 200 meters or beyond that limit to wherever the depth of the superjacent waters admitted of exploitation of the natural resources. Although coastal States were permitted to extend maritime zones and adopt fish conservation measures over adjacent waters, no agreement could be reached about the extent of territorial sea or fisheries jurisdiction, and the agreement on the definition of continental shelf was vague and controversial. Another attempt was made in 1960 to reach agreement on the territorial sea, but it also failed.⁴⁵

Many coastal States still wished, and some claimed, wider territorial sea, but were unable to move the entrenched powers or successfully challenge their historic 'rights' and change the traditional law. During the two conferences, there was a continuous struggle between numerically strong but poor, newly-independent Asian-African nations and their allies in Latin America, supported by the Soviet group, on the one hand, and politically-dominating, rich, satisfied, European and North American maritime powers, and some other small Asian-African countries under their influence, on the other.⁴⁶ While the maritime powers recounted and reassured the virtues of the freedom of the seas as a "time honoured" principle, the dissatisfied States of the Third World thought that it was a "time-worn" old doctrine which could still serve and be useful but only if modified and adapted according to the needs of the changed international society. Rejecting the three-mile rule for territorial sea as a "fallen idol", the new members of the international community said that "agreement among maritime pow-

ers alone was not law” and that “rules should be based on general State practice, not on that of a handful of States that had repeatedly been challenged and now finally rejected.”⁴⁷ The developing countries did not like this, the Western powers were still strong enough to enforce the traditional law of *laissez faire* which favoured them.

RENEWED CHALLENGE TO THE FREEDOM OF THE SEAS

In a sense the 1958 Conventions had become outmoded by the time they were written. Since then the pressure to change the old freedom of the seas increased even more with a further widening of international society. Moreover, technology soon made it feasible to exploit the vast resources of the seabed and ocean floor, especially oil and gas, at depths beyond the geological continental shelf. Indeed, exploitation became possible at any depth, and countries started stretching their continental shelf jurisdiction to include the whole continental margin extending to a depth of 2,500 metres. It also came to be known that beyond the continental margin, generally referred as the deep seabed, there lay extensive deposits of manganese nodules containing manganese, nickel, copper and cobalt, all metals essential for industrial economies.

In 1967, a perceptive representative of a very small country, Arvid Pardo of Malta, informed the UN General Assembly about the inadequacies of the current international law and freedom of the seas, which could and would encourage appropriation of vast areas of the sea which were suddenly found to contain untold wealth by those who had the technological competence to exploit them. To avoid a potentially disastrous scramble for sovereign rights over the seabed, he suggested the creation of an effective international regime for the seabed and ocean floor beyond a clearly defined national jurisdiction. Further, he suggested acceptance of that area as a “common heritage of mankind” that would not be “subject to national appropriation in any manner whatsoever, to be used and exploited for exclusive benefit of mankind as a whole.”⁴⁸

Pardo’s essentially internationalist approach was heralded by many as an idea whose time had come. The General Assembly not only accepted Pardo’s suggestion but established a Seabed Committee to prepare for a third UN Conference on the Law of the Sea. In 1970, the General Assembly unanimously adopted a Declaration of Principles Governing the Seabed and Ocean Floor. The Assembly declared that the seabed beyond the limits of national jurisdiction was not subject to national appropriation or sovereignty but was “the common heritage of mankind” and must be exploited for the benefit of humanity as a whole, “taking into particular consideration the interests and needs of the developing countries.”⁴⁹

Although the maritime powers sometimes denied the legal force of these declarations of the General Assembly, there were clear indications that the new majority had started asserting itself. At the third UN Conference, organised to regulate new uses of the sea for the vastly extended international society, the new States were determined to play a more vigorous role. Over the objections of “old guards” and defenders of the traditional law, who preferred a conference only for formulation of law for the exploitation of the seabed beyond the limits of national jurisdiction, these States wanted a comprehensive conference to review the whole international law of the sea. They wanted to be able to “analyze, question and remold, destroy if need be, and create a new equitable, and rational regime for the world’s ocean and deep ocean”.⁵⁰

FURTHER EROSION OF THE FREEDOM OF THE SEAS

In the meantime, the trend to curb the freedom of the seas by extending coastal State jurisdiction for the protection of security and economic interests of the coastal States continued or even increased after 1960. By the end of 1973, nearly 35 percent of the ocean, an area equal to the land mass of the planet, was claimed by coastal States. Deploring this trend, some well-meaning jurists regretfully felt that the era of *mare liberum* “may now be drawing to a close.”⁵¹ But others, like Sir Hersch Lauterpacht,

pointed out “in so far as the original conception of the freedom of the seas, as it came to full fruition in the nineteenth century, acquired a rigidity impervious to needs of the international community and to a regime of an effective order on the high seas, ‘the loss of paramountcy’ provides no occasion for anxiety.”⁵²

THIRD UN CONFERENCE ON THE LAW OF THE SEA

At the third UN Conference on the Law of the Sea, which met at its substantive session in Caracas, Venezuela in 1974, the new majority of the developing countries made it clear that it was only the strong maritime powers “that profited from these undefined freedoms” of the traditional law.⁵³ The continuing *laissez faire* on the high seas had ceased to serve the interest of international justice.⁵⁴ In seeking to establish a new legal order, the developing countries said, they would be “seeking not charity but justice based on the equality of rights of sovereign countries with respect to the sea.”⁵⁵ Only a new international law could establish this new order because “between the strong and the weak, it is freedom which oppresses and law which protects.”⁵⁶ The developing countries, in short, were determined, as the President of Venezuela said in opening the conference, that the sea could not be permitted to “be used in such a way that a few countries benefited from it while the rest lived in poverty, as had been done with the riches of the land.”⁵⁷

On April 30, 1982, after nine years of intense, arduous, sometimes bitter, and protracted negotiations, the UN Conference adopted “a comprehensive constitution for oceans”,⁵⁸ a convention that was said to be the most significant international agreement since the Charter of the United Nations. Without going into the details of this convention it may be pointed out there was an agreement on a wide range of issues. For the first time in history there emerged a consensus in favour of agreed limits of 12 nautical miles for the territorial sea, 24 miles for the contiguous zone, a new exclusive economic zone (EEZ) extending up to 200 miles, and a legal continental shelf extending to the end of the continental margin up to a depth of 2,500 metres or even beyond. An almost “revolutionary” effect of the acceptance of coastal States’ jurisdiction over a 200-mile EEZ has been the “elimination of freedom of fishing and the substitution of coastal State sovereign rights over the exploration, exploitation, conservation, and management of living resources”.⁵⁹ Moreover, the seabed beyond the limits of national jurisdiction came to be reaffirmed and accepted as the “common heritage of mankind”. Although the exact meaning and content of “common heritage” might be somewhat vague, like numerous other concepts of international law, an international machinery for the exploitation of the oceans’ resources has come to be devised and accepted by an overwhelming majority of States.

While in the beginning some of the Western powers, led by the United States, refused to sign the 1982 Convention, and Chapter XI of the Convention relating to exploitation of the deep seabed resources had to be modified to accommodate their interests by an agreement concluded in 1994, practically all States have come around to accepting it in its modified form.⁶⁰ The basic premise of the consensus reached at the third UN Conference on the Law of the Sea is clear and beyond doubt, namely, in the future, the sea must be used for the benefit of all and not merely for the interests of a few great powers.

For the first time in centuries, freedom of the seas has lost its charm and stranglehold. It has come to be modified and adapted to fulfil new needs of the new international society. Although navigation is vitally important, the sea is not merely a navigation route, as it has been for centuries. It is a new area of wealth, still largely unexplored, which will be the scene of the next adventure and expansion of humanity. While Europe is still extremely important, international law is no longer confined to Europe and must, therefore, serve the interests of the worldwide community of States. Freedom of the seas will still be a relevant concept, but this freedom will not be unlimited. It will be the same kind of freedom that individuals enjoy in a national society, namely, freedom under generally-agreed and widely-accepted legal principles as adopted by the worldwide community of States.

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PLENARY ADDRESS

MARINE BIODIVERSITY - AN ULTIMATE GIFT

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INTRODUCTION

Biodiversity can mean many different things, depending on the people who use the term. However, a useful definition is “biodiversity is defined as the collection of genomes, species, communities, and ecosystems in space and time.” In the marine realm it starts from ice-algae assemblages over phyto- and zooplankton down to benthic assemblages. Biodiversity research is, for example, used for conservation: if you do not know species, assemblages and communities of a certain area, you cannot protect them. Moreover large-scale patterns of biodiversity underpin theoretical ecology and paleoecology. Biodiversity in general is composed of various levels, namely ecological diversity, genetic diversity, and organismal biodiversity. The population is the fundamental linking unit between these components.

Several different biological disciplines are involved in biodiversity research: **Evolutionary biology** provides explanations of the origin of biodiversity and processes, like speciation and extinction, by which it is continuing to change. Whereas **biological systematics** focuses on similarities and differences based on evolution, **ecology** deals with structural and functional relationships between organisms and the biotic and abiotic environments in which they occur. It also provides a classification of the different types of habitat. **Genetics** tries to understand the heredity basis of variation and evolutionary change at all levels, and finally **population biology** collects information about the genetic structure, spatial, age, and size structure of the individuals of a population, as well as the population dynamics (Heywood 1995).

Taxonomy is the basis of all biological disciplines. Taxonomy is a reference system for biology. The fundamental step in any biodiversity research must be the accurate recognition and classification of intraspecific variation, both of species and also of assemblages. Such information is essential for identifying patterns of biodiversity and for understanding how these patterns change over time and space. However, taxonomists are also a *vanishing species*, and in the future only a very small number of people will be able to accurately identify species. Moreover, for these identifications we will depend on museums’ extensive reference collections.

With reference to biodiversity, Wilson’s illustrations are well known. In these illustrations, the size of the animals stands for the species richness of that taxon. Referring to this, in 1991, Norman Platnick wrote, “speaking of biodiversity is essentially equivalent to speaking about arthropods (e.g., insects, spiders, crustaceans). In terms of numbers of species, other animal and plant groups are just a gloss on the arthropod theme.” However, this image refers to terrestrial biotopes. If the marine realm is considered, we have to keep in mind that roughly more than three quarters of the Earth is ocean. Of this, far less than ten percent are coastal or shelf areas, while more than 90 percent of the oceans are deep sea. This means that we probably will deal with a tremendous number of species here, especially among the smaller invertebrates.

If we look at some conservative estimations of biodiversity in textbooks, we realise, for example, molluscs are very speciose with more than 50,000 species. However, arthropods have the highest species richness with more than a million species.

On land, insects are the dominating taxon; in the ocean it is crustaceans. I myself work with peracarid crustaceans which are characterised by the possession of a brood pouch, i.e., these animals exhibit brood protection. I will introduce some of species to you.

During the last years, many publications have dealt with estimations of species richness within the various taxa and also for all species, and estimations varied between 10,000 and one hundred million species worldwide. The estimations for arthropods are always highest. However, with regard to these estimations, we must keep in mind that several marine biota are not yet well explored. A few years ago, scientists using a cave camera discovered a tremendous diversity and biomass of species living in the caves of rocks and corals of the Red Sea. The polar seas and ice biota still need more scientific attention, and the deep-sea floors are only explored periodically. In the past, only a few scientific expeditions were devoted to exploration of the life of deep-sea organisms due to logistic problems, high expenses and long wire time on board vessels.

In several classic 1960s studies, H. A. Sanders found that marine biodiversity is higher (for many taxa and areas) in the deep sea than on the shelf or on the continental slope. A number of hypotheses have been used to explain this high deep-sea species diversity. These include, for example, the stability-time hypothesis (maintenance of environmental stability characterises the deep sea and leads to the development of a highly-diverse community) and the biological disturbance theory describing processes of contemporaneous disequilibria (meaning, for example, habitat change or heterogeneity as well as biological disturbance in terms of inter- and intra-specific interactions leads to faunal diversification). Predation and competition are also disequilibrium explanations of high species diversity, which might be as important as dietary specialisation or food availability due to productivity in general.

Productivity is directly dependent on solar energy. This is, of course, much lower at the poles than in the tropics (due to the angle of light penetration and also the size of the area that is reached by this energy). However, in the tropics, vast areas are oligotrophic, while polar areas are more eutrophic (even if only in short seasonal bursts). Cold currents and areas of upwelling promote high productivity in polar regions.

Whatever the true cause, there is no doubt that a latitudinal gradient in species diversity exists in many deep-sea taxa. Poore and Wilson (1993) calculated the expected numbers of all species from both literature data and their own samples, and found that species numbers differed with latitude from the tropics to the poles, especially in the northern hemisphere. This hypothesis was also supported by Rex et al. (1993) on the basis of epibenthic sledge samples from several locations in the Atlantic Ocean (depths between 500 and 4,000 metres). However, it should be noted that their southernmost sample was taken in the deep Argentine basin, at only 40°S. In these studies, a latitudinal gradient was shown for Isopoda, Gastropoda, and Bivalvia, with all three taxa demonstrating lower species numbers in higher latitudes, especially close to 80°N. Thus species diversity tends to increase with decreasing latitude.

We also have to keep in mind that there are significant differences in species diversity between ocean basins. Although a latitudinal gradient can be shown in all oceans (especially in the north), the Indo-West Pacific has a prominent peak of shallow water diversity, especially in the species associated with coral reef habitats. This is due to the great habitat heterogeneity of the coral reef areas which allows a higher number of species to co-exist. For example, worldwide records for the species rich-

ness of bivalvia show that it is higher in the tropics than at the poles. If we look at longitudinal and latitudinal patterns in diversity, we realise that it is highest in the tropics, especially the Indo-Pacific area. High diversity could also be related to geological age, as the Pacific is the oldest of the oceans.

In Mesozoic and Cenozoic eras, quite a number of bivalve taxa radiated. Interestingly, the highest diversification was observed in the phylogenetically youngest clades.

Concerning the above discussed latitudinal gradients, one has to remember that the Southern Ocean is of demonstrably greater antiquity than the Arctic Ocean. Arctic Ocean marine fauna is probably much younger as it comprises only few endemic species. The Antarctic, in contrast, bears a high percentage (up to 90 percent) of endemic species for many taxa (e.g., for sponges, some taxa of the peracarid crustaceans, and fish). In the Arctic Ocean, perennial sea ice cover was established only between 2.0 and 0.7 million years ago, meaning that “modern Arctic biogeography is very largely the product of late Neogene and Quaternary events” (Crame 1997). In comparison, in the Antarctic, extensive coastal glaciation can be traced back at least 35-40 million years (Clarke and Crame 1992). So we can also postulate a close correlation between species richness, speciation rate and geological (i.e., evolutionary time). Since the establishment of the Antarctic circumpolar current, and later the glaciation in the northern hemisphere, the polar regions have played a crucial role in the formation of large-scale diversity patterns.

Sepkoski (1997) illustrated the variation of biodiversity at generic and family levels through geological time. The fossil record allows us to distinguish periods of origination and extinction. In general, mass extinction events are followed by evolutionary diversification. The Cambrian explosion of biodiversity was followed by a tremendous decline in diversity due to the mass extinction at the end of the Paleozoic, and a steady increase in diversity in modern times, followed by another extinction and rapid diversification event between the Cretaceous and Tertiary (K/T-mass extinction).

Considering all these above mentioned aspects, marine biodiversity obviously depends on a variety of factors. Among the most important of these are the number of individuals in a certain habitat, the size of this habitat or ecosystem, and the size of the animals themselves. Moreover, depth, productivity, sedimentology and hydrography, and also intra- and inter-specific relations of species have an influence on biodiversity, as much as habitat heterogeneity has. Habitat heterogeneity can be strikingly different, for example, between the Arctic and Antarctic, as the Southern Ocean is characterised by huge amounts of sessile suspension-feeding organisms, these are far less numerous in the Arctic Ocean.

With regard to the Antarctic we must realise that most of the Southern Ocean is deep sea and is largely unknown. Most of our knowledge of Antarctic organisms, however, is based on the investigation of shelf animals, like gigantism, longevity, slow growth, etc. Usually isopod crustaceans of the suborder Asellota increase in importance and species numbers with depths worldwide. The fact that few species are reported for the deep sea in the Southern Ocean is most probably due to the fact that this area is almost unknown (Brandt 2000). In order to slightly compensate for this shortcoming, a series of ANDEEP expeditions with RV *Polarstern* is planned to investigate the Antarctic deep sea. These investigations will also help us to understand the composition of the Antarctic deep-sea fauna and to gain arguments for the conservation of this area with regard to the Antarctic Treaty. The expedition will also contribute to the “Millennium Assessment of Biodiversity”.

Though long-term changes in biodiversity are not necessarily a disaster, as illustrated by Sepkoski, some workers have estimated, conservatively, that almost 25% of the total world primary productivity, is lost by a single species – humans. For this reason, more effort has to be made to conserve marine biodiversity and biodiversity in general.

Much of the total diversity of marine life is still unknown, and many species might vanish before we get to know them. Therefore we have to try to conserve both the species and their environments, and avoid habitat destruction, fragmentation and degradation. Moreover, some of these species might provide sources of drugs and other products, and we might come to depend on them one day. Introductions of ecologically-potent species may cause local extinctions and a homogenisation of the world marine biota. We must avoid this. We need laws (and many are already in place) to protect both biodiversity and species' habitats.

Finally, in order to fulfil these conservation aims, we urgently need more taxonomists and more financial support for biodiversity research projects. Many scientists already see the urgent need of international co-operation in this field in order to approach the goals of the Systematics Agenda 2000 and the Millennium Biodiversity Assessment.

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PLENARY ADDRESS

MARINE ENVIRONMENT PROTECTION – THE BALTIC SEA EXAMPLE

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INTRODUCTION

The year 2000 is very appropriate, as the beginning of a new millennium, to discuss the status of marine environment co-operation in the Baltic Sea area. Twenty years ago, in 1980, the Convention on the Protection of the Marine Environment of the Baltic Sea area, the so-called Helsinki Convention, which was already adopted by the Baltic Sea States in 1974, entered into force. Since the 1970s, the Helsinki Convention has become the regulatory framework for an intensive co-operation to protect the Baltic Sea environment. At the beginning of 2000, a revised Helsinki Convention entered into force.

As the current Chairman of the Helsinki Commission and involved in this co-operation for 20 years now, I appreciate having this opportunity to inform you about the work of the Commission, to discuss whether or not this co-operation is a success, and how it might serve as an example for other marine areas. I will start by describing the ecological conditions and problems of the Baltic Sea. I will then deal with the Convention itself. After that I will concentrate on the process of co-operation including present activities, main goals and priorities.

ECOLOGICAL CONDITIONS AND PROBLEMS

The Baltic Sea is a very sensitive marine area due to natural conditions. It is a very shallow sea with an average depth of only 55 metres. The Baltic Sea is a brackish water area receiving a large supply of fresh water from numerous rivers. Refreshment of waters of the Baltic Sea is achieved only through their exchange with saline water inflows from the North Sea through very narrow channels. The processes of exchange are irregular and depend mainly on meteorological conditions. It is estimated that 25 to 30 years are needed to entirely exchange its waters. Pollutants therefore remain in the sea for a long time. As a saline boundary layer is formed between the upper water layer and the deeper parts, the water in the deepest parts is only renewed very irregularly by inflows of sufficiently high salinity. When this does not occur, widespread areas of deep bottom water become “dead” as hydrogen sulphide concentrations build up.

Nine countries share the coastline of the Baltic Sea. The coastal zone is inhabited by some 16 million people. In the whole catchment area, however, the population is about 85 million. Most of the countries in the catchment area have highly developed agricultural and industrial activities. Thus the Baltic Sea is subject to contamination from human activities by a substantial population. Polluting substances enter the Baltic Sea ecosystem via a number of pathways, *inter alia*, riverine run off, atmospheric deposition, direct discharges from land, and activities at sea. The largest quantities come from land-based sources including cities and industrial areas and from the agrarian areas.

These anthropogenic inputs consist of nutrients, heavy metals and organic substances including hydrocarbons and oil. Nutrients, namely, nitrogen and phosphorus, are the inputs of greatest concern with respect to eutrophication in the Baltic Sea, resulting in increased oxygen consumption and ultimately the formation of the toxic hydrogen sulphide. During the mid-1990s, a decrease of nutrients has been observed, but recent measurements do not show a continuation of this improvement. Traces of mercury, cadmium, zinc, copper, and lead have also been observed, but show no significant difference to levels found in the open North Sea and the Northeast Atlantic. In some areas, a decrease of concentration values was observed, however, there is an upward trend in other parts.

In the 1970s, concentrations of toxic organic contaminants such as the pesticide DDT and polychlorinated biphenyls (PCBs) were particularly high at the top of the food chain. Other examples of harmful substances detected in the Baltic Sea are halogenated paraffins, polyaromatic hydrocarbons (PAHs), PCT and pesticides. Concentrations of DDT and some other organic contaminants have since declined. However, due to the lack of long-term observations, it is still very difficult to identify significant trends, especially with regard to the “new contaminants” which are identified as potentially harmful to the marine environment.

The main sources of oil pollution in the Baltic Sea are emissions from land-based sources, shipping and offshore activities. Land-based sources are by far the largest contributor to oil inputs. However the pollution caused by accidental and, above all, illegal oil spills through shipping and offshore activities is also a serious threat.

THE HELSINKI CONVENTION

The deterioration of the marine environment of the Baltic Sea has been a cause of growing concern since the late 1960s. The signing of the Helsinki Convention in March 1974 by the coastal States of the Baltic Sea area marked an important political milestone in international ecopolitics. All sources of pollution were, for the first time for a sea area, subject to regulation under one convention. This convention carried even greater weight as marine environment protection was one of the first areas in which the Baltic States showed any willingness to co-operate during the Cold War.

The Helsinki Convention was revised in 1992 in light of political changes, as well as developments in international environmental law, the law of the sea and experience. After ratification by the now nine Baltic Sea coastal States and the European Commission, the new Convention entered into force on 18 January 2000. The Convention is in line with Section XII of the 1982 United Nations Convention on the Law of the Sea (UNCLOS) which obliges States to co-operate in formulating and elaborating international rules consistent with UNCLOS for the protection and preservation of the marine environment.

The purpose of the 1992 Helsinki Convention is two-fold. First, in 38 articles and seven annexes it obliges Contracting Parties to undertake appropriate national implementation measures. Second, it creates the legal basis for close and permanent co-operation, in particular through the international Baltic Marine Environment Protection Commission (Helsinki Commission). The Convention covers the whole of the Baltic Sea area, including internal waters. Where land-based inputs are concerned, necessary measures are to be taken in the whole of the catchment area.

FUNDAMENTAL PRINCIPLES AND OBLIGATIONS

The Convention establishes fundamental ecopolitical principles which go beyond UNCLOS. The precautionary principle has to be applied so that preventive measures must be taken when there is reason to assume that substances introduced in the marine environment may create hazards, even when there is no conclusive evidence. To prevent and eliminate pollution of the Baltic Sea, the Contracting Parties shall promote the use of best environment practice and best available technology

(criteria are provided in Annex II). Contracting Parties are further obliged to apply the polluter pays principle. They shall ensure that measurements and calculations of inputs are carried out in a scientifically appropriate manner to assess the state of the marine environment. Good neighbourly, international co-operation is established with regard to environmental impact assessments (EIA). If an EIA is required by international or supranational law, the Convention creates notification and consultation obligations.

The Convention states a general obligation for Contracting Parties to prevent and eliminate pollution caused by harmful substances by all sources. That means all substances which, if introduced into the sea, are liable to cause pollution. Contracting Parties have to prohibit the discharge of DDT, PCBs and PCT. They shall endeavour to minimise, whenever possible to ban, those pesticides which are classed as hazardous substances.

In addition to these fundamental obligations, the Convention regulates preventive measures for the different sources of pollution.

POLLUTION FROM LAND-BASED SOURCES

To combat, prevent and eliminate pollution from land-based sources, best environmental practices and best available technology are to be used. The Contracting Parties shall co-operate in the development and adoption of specific programmes, guidelines, standards or regulations concerning emissions and inputs to water and air, environmental quality and products containing harmful substances and materials. The procedures and measures, described in Annex III, cover municipal sewage water and industrial waste water as well as pollution from fish farming and from diffuse sources, including agriculture. A prior special permit is required when harmful substances from point sources are to be introduced into the Baltic Sea area. In case of inputs from a watercourse flowing through the territories of two or more Contracting Parties or forming a boundary between them, they shall jointly take appropriate measures. On 1 July 2000, additional regulations to prevent pollution from agriculture, which were agreed on in 1998, entered into force. They establish basic principles as a minimum basis for national legislation to reduce adverse environmental effects.

POLLUTION FROM SHIPS

For the prevention of pollution from ships, regulations only at a regional level are inadequate due to the international nature of shipping. Such regulations, therefore, have primarily been provided by the International Maritime Organisation (IMO), the main instrument being MARPOL 73/78. Considering this, the Helsinki Commission obliges the Contracting Parties to apply MARPOL 73/78 and to co-operate within the IMO to promote the development of additional international rules. Furthermore, they have to co-operate in the effective and harmonised implementation of rules adopted by IMO. This includes the investigation of violations of anti-pollution regulations. As corresponding MARPOL regulations have not yet entered into force, the Helsinki Convention still contains restrictions for the discharge of sewage from ships (Annex IV). To prevent illegal discharges, the Contracting Parties are obliged to provide reception facilities in ports and to apply uniform requirements. They shall also take special measures to reduce harmful effects caused by pleasure craft activities. On 1 July 2000, additional regulations entered into force requiring pleasure craft, fishing and working vessels to comply with the sewage discharge restrictions. Moreover, all ships are now obliged to deliver their wastes to a reception facility before leaving port.

WASTE DISPOSAL AT SEA

The Convention prohibits both incineration and dumping at sea. Exemptions are possible for dumping dredged materials in compliance with guidelines following international standards and limit values (Annex V).

OFFSHORE ACTIVITIES

The Convention obliges Contracting Parties to undertake all measures to prevent pollution of the marine environment from the exploration or exploitation of the seabed and the subsoil thereof. Adequate preparedness must be ensured for immediate response to pollution incidents. The measures, set out in detail in Annex VI, include the application of the principles of best available technology and best environmental practice; EIAs and follow-up studies on the effects of offshore activities; restrictions to the use of oil-based drilling muds; and prohibition of the discharge of drilling muds and cuttings. Other regulations concern reporting procedures, contingency planning and the exchange of information. In the light of discussions in other marine areas, it is remarkable that Contracting Parties have to ensure that abandoned, disused offshore units are entirely removed and brought ashore under the responsibility of the owner.

COMBATting MARINE POLLUTION INCIDENTS

The Convention lays the basis for effective co-operation to combat pollution incidents. In case of an incident in the territory or adjacent maritime area of a Contracting Party, such Contracting Parties whose interest could be affected have to be notified without delay and, whenever necessary, consultations should take place. Individually or jointly, the Contracting Parties have to take all appropriate measures to maintain an adequate ability to respond to pollution incidents. Detailed principles for the co-operation are regulated in Annex VII and include provision of adequate equipment, ships and manpower; regular surveillance outside the coastline, including airborne surveillance; national contingency plans; and bilateral or multilateral plans for response measures. Ships have to report pollution events and must have an oil pollution emergency plan on board. Mechanical means are to be used in any response to a pollution incident. Chemical agents may only be used in exceptional cases and after authorisation by the appropriate national authority. When responding to a pollution incident at sea, a Contracting Party may request assistance from other Contracting Parties, but must bear the costs of the action.

NATURE CONSERVATION AND BIODIVERSITY

The 1992 Helsinki Convention provides an important innovation for international environmental law: the protection of the marine environment is not only a matter of reduction of inputs, it includes nature conservation and biodiversity. Contracting Parties shall individually and jointly take all appropriate measures to conserve natural habitats and biological diversity. They further undertake to ensure sustainable use of natural resources within the Baltic Sea area. This regulation provides a conceptual basis for concrete, well-defined measures through appropriate guidelines and criteria.

REPORTING AND EXCHANGE OF INFORMATION

The Convention requires the Contracting Parties to report regularly to the Commission on the legal and other measures taken to implement the Convention's provisions and the Recommendations adopted thereunder. Binding reporting provisions under international law are a valuable instrument for monitoring implementation of the Convention and the Commission's decisions.

In the interest of openness, the Contracting Parties shall also ensure that information is made available to the public on the state of the Baltic Sea, measures taken or planned, permits issued, as well as the results of water sampling and water quality objectives.

CO-OPERATION

This very brief overview shows that environment protection cannot be gained only by establishing regulations which have to be implemented and applied nationally by the Contracting Parties. Ongoing, close co-operation is also required to elaborate more detailed guidelines, standards and meas-

ures as well as new regulations. For these purposes, the Helsinki Commission has been established under the Convention. The Commission consists of representatives of all Contracting Parties. It holds meetings at least once a year. The chairmanship is given for two years to each Contracting Party in alphabetical order. The duties of the Commission are to continuously observe the implementation of the Convention, to make recommendations on measures relating to the purposes of the Convention, to define criteria and objectives, and to promote close co-operation with other bodies. The Commission is supported by a permanent Secretariat located in Helsinki, consisting of the Executive Secretary as the chief official, additional Secretaries and the administration staff. The Commission's budget is financed from contributions by the Contracting Parties.

The work of the Commission is prepared by subordinate expert bodies, the organisation of which has changed several times since the late 1970s. The Commission mainly takes decisions through Recommendations which have to be adopted unanimously. Although the Recommendations are legally characterised as soft law, there is a common understanding that through the requirement for unanimous acceptance of decisions, Contracting Parties declare their firm political will to apply the Recommendations. Since 1980, the Commission has adopted more than 200 Recommendations on measures covering all aspects of the Convention.

In addition to the regular Commission work, the co-operation has been enhanced by ministerial meetings and conferences. In 1988, the responsible ministers of the environment passed a Declaration on the Protection of the Marine Environment of the Baltic Sea area calling for a 50 percent reduction in the total discharges of the most harmful substances and nutrients. In 1990, a conference at the prime ministerial level concluded the Baltic Sea Declaration which sets out principles and priority actions. Following this conference, the ministers, in 1992, decided on a Baltic Sea Joint Comprehensive Environmental Action Programme to drastically reduce emissions and restore the ecological balance. The Programme requires investment in the order of 18 billion ECU over a 20-year period. It has become one of the cornerstones of environment co-operation in the region.

Ministerial meetings in 1994 and 1998 gave new incentives for the Commission's work. In 1998, ministers adopted additional regulations for agriculture and a Baltic Strategy for Port Reception Facilities. Further, they decided on a strategy to phase-out hazardous substances by the year 2020.

In 1999, an extraordinary ministerial meeting refocused the widespread activities of the Commission and the number of subordinate bodies, leading to a new organisational structure and the redefinition of its goals and priorities. The work of the Commission is now supported by five subordinate groups (HELCOM STRATEGY, HELCOM MONAS, HELCOM LAND, HELCOM SEA, HELCOM HABITAT) and the Programme Implementation Task Force (HELCOM PITF). As necessary, the activities of the groups may be assisted by projects. To steer, co-ordinate and accelerate the work, regular heads of delegation meetings are to be held between the annual Commission meetings.

PRESENT ACTIVITIES, GOALS AND PRIORITIES

Following well-defined goals and priorities, the activities of the Helsinki Commission and the newly-established groups will focus on the following:

REVIEW AND ELABORATION OF ADDITIONAL RECOMMENDATIONS

Many measures agreed on by Recommendations have to be seen as only a first step. This requires review of earlier decisions aiming at implementing more stringent measures for the Baltic Sea, if necessary. Considering the European enlargement process and the work going on in other international environmental organisations, existing and new Recommendations have to be harmonised with regulations within EU and other relevant international bodies. At the same time, specific Baltic Sea requirements have to be safeguarded.

IMPLEMENTATION

The success of the work of the Commission does not depend on the elaboration of protective measures only, but on the efficient implementation of the Convention itself and the Recommendations by the Contracting Parties. More than in the past, the Commission has to monitor and assess the implementation process. A first step is the request for more detailed reporting on implementation by the Contracting Parties.

As concerns the efficient implementation of protection measures, the Joint Comprehensive Environment Action Programme plays an outstanding role. This task is co-ordinated and assisted by HELCOM PITF. Particular attention is given to investment activities to reduce pollution from point and non-point sources in the whole catchment area.

PRIVATE/PUBLIC PARTNERSHIPS

As the implementation of many protection measures depends on investment, financial funding capacity becomes an important strategic issue. This means improving the involvement and support from the business community and financial institutions in both the private and the public sectors. This is another issue currently under consideration within the HELCOM STRATEGY Group.

SUSTAINABLE DEVELOPMENT

In the light of the achievements of the Rio Conference, the concept of sustainable development becomes increasingly important for environment protection strategies. Though sustainable development is not expressly highlighted as a fundamental principle in the Convention, it may already be identified as a basis for numerous activities. The HELCOM STRATEGY Group is working on a Recommendation to be adopted at the Commission meeting in 2001 operationalising the concept of sustainable development within areas of key importance.

ENVIRONMENTAL STATUS

A pre-condition for efficient protection measures is a good knowledge of the environmental situation. For this reason, the Convention obliges Contracting Parties to closely co-operate in the scientific and technological fields. At a very early stage, HELCOM established scientific monitoring programmes and started to elaborate regular quality status assessments. This was accompanied by pollution load compilations. As a consequence, the HELCOM MONAS Group is entrusted with the task of identifying and quantifying the anthropogenic discharges and activities, their effects in the Baltic Sea area, and the changes in the marine environment. The results will serve as a sound basis for the evaluation of the need for additional measures.

LAND-BASED POLLUTION

The HELCOM LAND Group will prepare measures to reduce pollution from land-based sources. The group will identify current and emerging issues related to point and diffuse sources of land-based pollution, propose actions, and promote investment activities. Recent priority areas are eutrophication, especially the contribution of agriculture, the phasing out of hazardous substances, and relevant issues from the land transport sector.

SEA-BASED POLLUTION

The task of the HELCOM SEA Group is to identify current and emerging sea-based sources of pollution and to propose actions to limit emissions and discharges. This group also has to ensure a swift national and transnational response to marine pollution incidents. Their main priorities cover issues from the maritime transport sector, including the implementation of the Baltic Strategy on Port Reception Facilities as a prerequisite to eliminating illegal discharges.

NATURE CONSERVATION

The HELCOM HABITAT Group deals with nature conservation measures that aim to conserve natural habitats and marine and coastal biodiversity and protect ecological processes. The Group's work also focuses on the promotion of ecosystem approaches for the sustainable use and management of coastal and marine natural resources. This includes the promotion and development of coastal zone management plans. One of the unresolved priority issues dealt with by this Group is the environmental impacts of fishery management and practices.

CONCLUSIONS

What lessons can we draw from the Baltic Sea area? Can HELCOM serve as an example for other marine areas? The Helsinki Commission, based on the Helsinki Convention as a modern legal instrument, has developed an efficient and close network for environment co-operation within in the Baltic Sea region. It covers all aspects, starting from monitoring and assessing the marine environment, to elaborating protective measures for all relevant issues and focussing on implementation including far-reaching investment programmes. Whereas marine environment protection in the traditional sense was mainly understood as combatting and reducing pollution, HELCOM has widened the scope by incorporating nature conservation issues, coastal zone management and impacts from fishery. Their work is increasingly guided by the concept of sustainable development and is becoming part of the Agenda 21 activities.

However, a co-operation network is not an end in itself. The outcome is decisive. The environmental situation of the Baltic Sea is no longer deteriorating, but has improved in some fields. That is an encouraging result confirming that the endeavours already made are not in vain. But by no means is this work going to be finalised in the near future. There still remains a heavy work load, including further reduction measures with regard to eutrophication, coastal zone management, more effective implementation of agreed-on measures and, above all, the fulfilment of the Joint Comprehensive Environment Action Programme.

All in all, co-operation in the Baltic Sea area can serve as an example for environment protection in other marine areas. However, this does not mean that the Baltic Sea States reciprocally cannot benefit from experience gained in other parts of the world. Marine protection is a global issue where regional approaches, hopefully, will complement other efforts to conserve the world's largest ecosystems as a common heritage of mankind.

PLENARY ADDRESS**CAPACITY BUILDING IN MARINE SCIENCE – A REVIEW****Gotthilf Hempel**Professor Emeritus and Scientific Advisor to the Bremen Senate***WHAT KINDS OF SCIENCE CAPACITY ARE NEEDED?**

Research in the open ocean is the key to understanding and predicting global climate. Studies of the continental slopes and of the deep sea bed become increasingly important in view of the potential exploitation of those areas. Nevertheless, in the years to come, much of ocean science will be directed towards coastal zones in tropical and subtropical areas which are especially affected by global change and direct human activities. Sustainable exploitation and protection of coastal zones are challenges for the scientific community, and they require the formation of high quality research capacity, particularly in developing countries. In addition, those countries should be offered the opportunity to take part in open ocean and deep sea research.

Coastal zone management problems can only be solved by an integrated approach, bringing together disparate disciplines from both the natural and social sciences. Therefore we should try to foster links between new communities of expertise. Cross-disciplinary thinking by imaginative and innovative scientists will reveal new links between natural phenomena and human activities and will produce blue-prints for new scientific approaches. New careers will emerge for which the right kind of training will be needed.

Developing dialogues between scientists, politicians, and other stakeholders is required. There is an emerging trend whereby scientists learn with the local and regional communities, rather than only learning and talking about them. Furthermore, the flow of experience and ideas is not uni-directional, from developed to developing countries, but goes in both directions when dealing with fisheries and the marine environment. There is a need for more public awareness about the oceans in all sectors and levels of society, ranging from user groups such as fishers to policy makers and legislators. Various new communication technologies, including the Internet, should be implemented and exploited in new ways.

CAPACITY BUILDING IN TROPICAL/SUBTROPICAL REGIONS

Over the years, a substantial research and teaching capacity in marine science has been built in several developing and newly-developed countries. Nevertheless, in the majority of developing countries, marine science capacity and public awareness of environmental problems are limited in comparison to their national needs and interests as well as their obligations for compliance with international conventions dealing with climate change and environmental protection.

* At present the Intergovernmental Oceanographic Commission of UNESCO (IOC), the Scientific Committee on Oceanic Research (SCOR) and the Scientific Committee on Problems of the Environment (SCOPE) are preparing an assessment of trends on ocean research and on the future of ocean science and ocean needs in 2020. The following text is based on a draft chapter of the assessment by M. Fortes and G. Hempel on capacity building. The chapter was prepared with the help of several experts including E. Marone and M. Hungspreugs who have also contributed to Workshop 2 of Pacem in Maribus 2000.

Over the years, several means of capacity building have been developed (Table 1). In the early years, the provision of advisors and of instruments and platforms were in the foreground of assistance programmes. In recent years, training and communication have become the focus of partnerships.

The curricula of most universities in Europe and North America are not tailored to the specific needs of postgraduate students from developing countries. However, in recent years, several universities have developed international curricula in marine science that emphasise the problems of coastal management in tropical and subtropical countries. Ideally, those curricula are carried out jointly with tropical universities. A trend is emerging in which postgraduate education abroad is carried out in co-operation with the students' home universities with course requirements being fulfilled at an academic institution in a developed country and the thesis being based on research topics and material especially relevant to the home country.

A viable academic infrastructure is the backbone of sustainable capacity building. Not every university, not even every nation among the developing countries, can run a high quality university curriculum in marine science. Therefore nationwide and regional agreements should be reached on the formation of national and regional centres of excellence in marine science teaching.

Table 1: Elements of Assistance in Capacity Building in Marine Science

Training

- overseas fellowships
- fellowships in the region
- advanced specialised training courses
- training on the job

Support

- advisors
- instruments
- research vessels (including maintenance and running costs)
- literature

Communication

- regional and global meetings and workshops
- electronic information and communication systems
- scientific journals

Institutional Infrastructure

- universities
- research institutes
- national and regional organisations

Joint Research Projects

- joint cruises
- joint shore-based projects

Various concepts are used to develop regional graduate education programmes by building on the human and material capacities of existing institutions. In essence centres of excellence with visiting professors from abroad will keep students in the region and reduce the "brain drain". Such centres

will create and enhance conditions which will encourage aspiring young scientists to study at home or to return home from studies abroad and to remain in their home countries where they can take the lead in the research needed to find specific solutions to local and regional problems. The success of this strategy largely depends on the continuity by which marine science infrastructure is maintained in the tropical country once it has been established by national efforts and foreign support.

One of the most successful ways of disseminating information to a large number of people simultaneously is through distance learning. The development of Internet-based courses leading to a masters degree in marine science makes high quality education readily available at relatively low cost to large numbers of students who currently have little or no access to the requisite staff or training materials. The concept of the IOI Virtual University is highly attractive in this respect. In addition, the Internet offers unprecedented access to a world of information hitherto largely unavailable to developing country scientists. It helps to overcome some of the financial and logistic constraints in terms of access to scientific literature and teaching tools. Provision of a sound information base for local and regional planning in coastal zones requires, among other things, creating a network of specialists trained in the use of data acquired by remote sensing from space satellites. The provision of computer hardware and software will also assist in removing the problems of access to data bases. In addition, there is a need to encourage developing countries to get their largely analogue data records out of scattered files, to make them digitised and to put them onto the world wide web in forms suitable for analysis using modern methods and for exchange with scientists in the region and abroad. In general, there is a growing interest in advanced training courses and workshops dealing with modern methodologies and new approaches in many fields of marine sciences, particularly in ecosystems analysis.

An enormous amount of information is hidden in local journals, reports and archives. The scientists who produce this information will never receive international recognition for themselves and their findings if they are not able to publish their research in the more widely-read international journals. Scientists from non-English speaking countries and less advanced laboratories find it very hard to get their papers internationally published and thus to have their work globally acknowledged. It is not only a language problem but a question of learning how to organise the analysis and to present data and to write a good scientific paper. Participation in joint research projects is presumably the best way to break down these language and publication barriers. Solving this problem will be a slow process. It will require a strong will on the side of scientists in developing countries, as well as patient assistance on the part of editors and referees of international journals which are the fora, i.e. meeting places, of the global science community.

In addition to publications, regional meetings are essential for the development of co-operation in research and monitoring, and also for the exchange of information and data. Participation in those regional meetings is particularly important for young scientists at the start of their scientific career. They benefit from their contact with both junior and senior scientists from within and outside the region.

Libraries suffer all over the world, particularly in developing countries, from the high cost of scientific literature. Donor organisations should be prepared to earmark substantial funds for the libraries of their partner institutions. The shift towards electronic publication will help developing countries to catch up wherever those means become easily accessible. However, this is not the complete answer to the needs of libraries, particularly when it comes to back issues and monographs.

The United Nations organisations, the European Union and regional organisations in Southeast Asia, Oceania, Africa and South America and others are now working toward the establishment of networks of regional co-operation and communication. National co-ordination bodies should bridge the gaps between the various scientific, industrial and military user groups interested in the sea and its

resources. They should also foster public awareness of marine science and marine affairs. While in most tropical regions new science and technical capacity has to be created, the situation is different in Eastern Europe. There famous marine science institutions of the former Soviet Union are in a very fragile state. Retaining and reforming viable scientific infrastructure and manpower in those regions is of similar importance as the formation of new science capacity in other parts of the world.

FROM ASSISTANCE TO PARTNERSHIP

Most attractive to scientific institutions in the recipient as well as in the donor countries are combined training and research projects aimed at a better understanding local ecosystems and resources and their management. A number of criteria for the success of those projects are given in Table 2.

The majority of partnership projects are bilateral. However, multilateral programmes have become increasingly important. The large marine ecosystem projects in, e.g., the Gulf of Mexico, Gulf of Guinea, Benguela Region, Yellow Sea, South China Sea and Gulf of Bengal, are opening up a new era of regional co-operation with strong elements of capacity building and creation of public awareness.

Training obligations should be an integral part of all international research and monitoring programmes and agreements from the earliest stages of programme planning, not a mere afterthought or add-on activity. In the Global Ocean Observing Systems (GOOS), it is not enough to provide means for monitoring installations, etc., without also mobilising scientific and technical manpower. Exploration of the deep sea and the deep continental slope is another field in which participation by developing countries depends largely on the build-up of human and technical capacity.

Table 2: Criteria of Partnership Projects as Tools for Capacity Building in Marine Science

The project shall be generated in the region with mutually beneficial objectives to be stated by all partners

- Scientifically attractive – mostly multidisciplinary, including social sciences
- Relevance to the development of the host country in the framework of national obligations
- Strengthening scientific capacity in the host country and the region, particularly by on-the-job training and other means of advanced and specialised training built in and around the joint research projects
- Project planning and execution jointly by all partners, making full use of the existing competence in the host country
- Long-term commitments with financial contributions by all partners
- Full integration in the scientific structure of the host country and its universities and research and development organisations, connections to regional centres of excellence and training centres and networks
- Strengthening of public awareness in marine affairs
- Links to regional and global programmes
- Unrestricted data exchange and joint publications, mostly in international journals

SUMMARY

Nations must develop their own clearly-stated priorities and strategies in marine research. Once this first step has been achieved, bilateral, multilateral, regional and international co-operation becomes

much more feasible because it is grounded in well-defined objectives for each of the partners. This requires the development of public and political awareness and active interest in marine environmental issues by appropriate means (e.g., teaching, media). Regional conditions and specific local problems must be recognised and play an important role in capacity building. Skills in both science and applied aspects need to be developed and may require different training. The standards of training and teaching must be enhanced by making optimal use of electronically-based methods. Traditional classroom approaches should be supported and sustained by world wide web based tuition networks etc. to help the students on a long-term basis.

The scientific community is beginning to recognise the value of partnerships of all kinds in the quest for understanding and finding solutions to problems in the marine environment and its sustainable development. These new partnerships involve collaboration in research between scientists in all countries whatever their state of development. Only when opportunities are equal can all members of a partnership equally benefit from their collaboration. The privileged have an inherent obligation to assist those who do not have access to the same resources. This assistance, whether at an individual, community or national level, involves more truly joint research projects, commitments to teaching and graduate student research in academic institutions in developing countries, help in overcoming the obstacles to publication and to electronic communication, enhancing the research capabilities of institutions in developing countries, and above all, ensuring that developing countries' scientific communities are nurtured rather than drained of their best talent.

PLENARY ADDRESS

THE INTERNATIONAL OCEAN INSTITUTE VIRTUAL UNIVERSITY: VISION AND MISSION

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Chair, Pacem in Maribus 2000*

INTRODUCTION: THE VISION

The imperative to develop an interdisciplinary and integrated culture of knowledge which is inclusive and accessible to all is the principal challenge faced by traditional forms of research and education. Nowhere is this challenge more evident than in the realm of ocean affairs where education, research, management and exploitation of the oceans are pursued at all geopolitical scales and where knowledge must be truly interdisciplinary and integrated.

The International Ocean Institute's (IOI) vision is to confront these traditional challenges to education through the establishment of an internationally recognised interdisciplinary program of study which will not only serve to facilitate the integration of ocean knowledge, but will also allow access to any student anywhere in the world. The aim of this program is to create a global culture of ocean knowledge capable of addressing ocean issues as a whole.

To realise this vision, a new concept of a "virtual university" has been developed: the IOI Virtual University (IOIVU). The IOIVU is constituted as:

A network of education, training and research centres of expertise in ocean, coastal and marine-related affairs and governance, joined together in a partnership to provide for an interdisciplinary and comprehensive coverage of the subject areas.

The institutional arrangement is without precedent.

THE MISSION

The mission of the IOIVU is based on that of the IOI, which is:

To enhance the abilities of developing countries to develop and govern their own marine and coastal resources and environments sustainably, for the benefit of their peoples, in harmony with related international conventions and agreements.

The IOIVU is a part of the IOI. It is incorporated through belonging to the IOI. In accordance with the Statutes of the IOI as an educational institution, the IOIVU is incorporated as an educational institution.

The purpose of the IOIVU is:

- to contribute to the sharing of knowledge as a Common Heritage of Mankind, with special consideration for the needs of developing countries;

- to contribute to the enhancement of interdisciplinary learning;
- to contribute to the merging of the information revolution and the emerging century of the ocean;
- to facilitate and provide a mechanism for students and professionals in developing countries to obtain post-graduate level education as well as advanced training, research, experience, upgrading and supplementing of previous education and work experience.

This is to be achieved through the consolidation, optimisation, and full utilisation of the unique structure and accumulated global experience in education, research, capacity building and training of the IOI network, in partnership with the host institutions of the operational centres and other interested partners.

The main elements of the structure are:

- Board of Governors
- Chancellor
- Academic Council
- Rector
- Faculty
- Registrar

The University is governed by a charter and the statutes of the IOI. The terms of reference for the functions of the Board of Governors, the Chancellor, the Academic Council, the Rector, and the Registrar are indicated in the charter. It is important to note that the “Virtual University” concept does not just mean “to go Internet”, rather it is a structure by which the educational activities and programmes of the IOI network of operational centres and of their prestigious host institutions can be combined with activities of other recognised centers of academic excellence to provide a truly international and interdisciplinary education curriculum. In this sense, there will be no building of a university campus, but rather the networking and development of educational activities and programmes as they are delivered worldwide using the most advance distance-learning technologies combined with traditional teacher-student classes in existing university campuses.

THE CURRICULUM

The IOIVU curriculum will be interdisciplinary and respond to the IOIVU mission statement and purposes. The initial curriculum structure is specified as:

- A. Master’s degree programme in Ocean Affairs and the Law of the Sea
- B. Advanced training programmes in specific subjects, through existing or new courses of the IOI network and/or host institutions of the operational centres. Successful completion of training programmes will result in certification and credits towards the Master’s degree.
- C. Upgrading and supplementary education programmes through specialised short courses with certification and examination for credit towards the Master’s degree as an option.

The Master’s degree programme comprises a number of post-graduate courses and the preparation, submission and acceptance of a thesis on the basis of a research project. This should take in all two years of devoted study.

The degree will require five or six post-graduate courses of a nominal study time of one semester (about 15 weeks). It is suggested that two of these courses be mandatory core courses which all the students will have to take. The other courses can be selected from the available courses. The selection will depend upon which main specialisation or employment area the student is choosing (such as ocean governance; coastal area management; research and marine affairs). Full-time students would take two courses per semester, whereas part-time students may take only one per semester. We are assuming two semesters per year.

In addition students should take several optional shorter courses catering for specifics. The selection of these will depend upon the educational background and work experience of the student, as well as the main focus or specialisation the student has chosen. These shorter courses can also be taken as professional development courses.

The research project leading to a thesis preparation would be carried out through an internship period at one of the IOI operational centres or its host institution, depending upon the specifics of agreements, choices etc. Nominally this should be a period of 4-5 months, depending upon conditions. However, if the situation of employment or other aspects of the student so require the period could be adjusted to about two months, it being understood that the remaining work would be carried out at the home base of the student, with the time being made available as required.

Alternatively, the IOIVU could offer a research project to be carried out at the home base of the student leading to a mini-thesis. This option would however then require that the student takes six graduate courses, rather than five. Another option which can be offered is that the research project is dropped and the student obtains a post-graduate diploma after having taken the required six graduate courses and the optional shorter courses.

The online core courses should cover topics about which anyone involved in ocean management should have knowledge. Topics that have been identified include:

- integrated coastal area management
- coastal and oceanic ecosystems and processes
- introduction to living marine resources
- ocean governance and law of the sea: the UNCLOS-UNCED process
- integrated pollution and risk management
- public-private partnerships in ocean management
- spatial information management
- integrated maritime compliance and enforcement
- environmental and resource economics
- coastal community development and sustainability

The on-line preparation of these courses will be done in phases over a period of about two years.

THE ADMINISTRATION

In the development phase the IOI mechanisms will also function for the IOIVU. The initial operational phase of the Virtual University may start in the fall/winter of 2001 or 2002. This will depend upon our ability to raise funds required for preparing the core courses for on-line delivery, and the functioning of the structure components of the VU. The full structure will be put in place gradually, but it is envisaged that the functions of the Rector and the Registrar will be operational initially.

PLENARY ADDRESS**THE DEEP SEA FLOOR – NEW DISCOVERIES AND VISIONS**

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with contributions from

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INTRODUCTION

I want to take you on an excursion into the largely unknown part of our earth, the deep abyss. In this short talk I will highlight a few aspects of this interesting and very large component of Earth. Three arguments can be made as to why the deep sea deserves our attention:

- The deep sea floor is less known than any other ecosystem on Earth.
- Major new discoveries are made—even today.
- The deep sea floor is one of our last unexploited resources.

However, we need new tools to access and to understand this ecosystem.

The deep sea floor is less known than any other ecosystem on Earth. The deep sea floor and the continental slopes deeper than 200 m are a vast expanse covering 65% of the surface of the globe. It is the largest ecosystem, and it is also the least known. If all benthic investigations in the North Atlantic are put together, the size of the sampled area covers less than a few football fields. So we draw our knowledge from a very small and not very representative set of samples, and we base far-reaching economic and political decisions on scant data. It is also rarely recognised how close the links between land, surface water and deep sea are and that there are a number of direct links. Therefore, the processes occurring in the deep sea are not cut off from the life at the surface.

While the last new discoveries of unknown lands were made at the beginning of the 20th century in Antarctica, major new discoveries in the deep sea are made even today. Most of the interesting recent findings are made along the continental slopes, like the gas hydrate deposits and cold water corals. The reasons for this are the physical gradients at the continental slopes which provide in various ways the basis for life.

In many ways, the deep sea is similar to the desert. Life in the desert is limited by the supply of water; life in the deep sea is limited by the supply of food. However, the desert can bloom when it rains, and an abundant plant life develops for a short time. This is also true for the deep sea. Under certain circumstances, when sufficient food is available, abundant life with very special life forms can develop in the deep sea.

FAUNA AT GAS HYDRATES

Photographs of the normal deep sea floor do not show many signs of life; you have to scan many pictures before larger animal can be seen. Most organisms are very small (bacteria and meiofauna),

they live within the sediment and are the main actors processing the organic material in the deep sea. However, life in the deep sea can also look quite different. Pictures show the rich fauna at a deposit of gas hydrates. Such surprising observations have been made only in recent years, and they are evidence of alternative supplies of food and energy in the deep sea.

The methane trapped in gas hydrates is not only a potential energy source for humans, but also an energy source for life in the deep sea. Certain types of bacteria can oxidise methane and gain energy to produce biomass from this process. Mats of such bacteria (*Beggiatoa*) cover the sediment. Gas bubbles rise in the background. Some bacteria are living as symbionts within larger animals, e.g., the white mussel *Calyptogena*, and are supplying them with the necessary food. Large numbers of egg clutches of the snail *Buccinum* are probably feeding as predators on other organisms. The methane deposits in the sea are not only interesting as a potential energy source or greenhouse gas, but they are also the basis for an abundant life in an otherwise barren environment. The investigation of these communities, from bacteria to large animals, promises many more new discoveries, some of which are of potential interest for biotechnology.

GASHYDRATES: ENERGY FROM THE DEEP SEA

Methane gas is trapped under high pressure and low temperature in a cage of water molecules forming an ice-like substance called gas hydrate. One dm³ of gas hydrate contains 36 litres of methane gas. When the hydrate is retrieved from the sea floor, the pressure decreases and the temperature rises which destabilises the gas hydrate, releasing methane. The research vessel *Sonne* has investigated the gas hydrate deposits off the coast of Oregon in about 700–800 m depth. The existence of gas hydrates has been known for quite a while; what is new is the discovery of how much methane is bound in marine storage of gas hydrates and that such a rich life is supported by these hydrates.

In total in marine sediments and in permafrost soils, it is estimated that more gigatonnes of methane are locked in gas hydrates worldwide than in all known resources of oil and coal. Gas hydrates are a potential energy source but they are difficult to mine and, hence, exploitation is not expected in the short term. Secondly, gas hydrates are very unstable and may, under changed environmental conditions, very suddenly release large amounts of methane into the atmosphere. Methane is a greenhouse gas and, hence, such releases may have climatic impacts.

The instability of gas hydrates was demonstrated by an experiment on *Sonne* with a piece sampled from 700 m depth. The gas hydrated piece was held in the manipulator arm of a remotely operated vehicle (ROV). It remained stable and of similar size in the deep part of the water column. When the ROV ascended and the critical depth was exceeded, the piece of hydrate turned into gas bubbles and disappeared.

In some locations, the gas hydrates are deposited in the sediment so closely to their stability limit that even the tides (i.e., slightly changing water pressure) can release methane. Gas bubbles can be detected by sonar rising through the water column and can be seen bubbling up at the sea surface.

COLD WATER CORALS (LOPHELIA)

Cold water corals called *Lophelia* are found along most European continental slopes. These corals live in the dark and cold. Unlike tropical corals, they do not contain algal symbionts for their nutrition, but they filter small organic particles from the water column. They provide shelter for many other animals and are an oasis of life in the otherwise rather poor surroundings. They are mainly found on the continental slopes where internal waves break providing the high currents which transport particles towards the corals.

These corals have been found in many locations around Europe. In other parts of the world they have also been discovered. However, we simply did not have enough surveys to investigate the continental slopes around Third World countries to know how widespread they really are.

Trawling for deep water fish is now extending to 1,000 m, and these corals are sustaining extensive damage. This has reached such a level that protective measures in the deep sea are now being discussed.

One of the most exciting discoveries was that living bacteria exist in sediments several hundred metres below the sea floor. They have been isolated from the rest of the living world for a few million years. We still do not know how deep this deep biosphere extends into the depth. One estimate is that one third of the world's biomass is contained in this totally unexplored ecosystem. Since these bacteria have been able to develop without links to the surface of the ocean, people expect that many new discoveries can be made here which may be of use for biotechnology.

THE DEEP SEA FLOOR

The deep sea floor is one of our last unexploited ecosystems. It is a vast area and it harbours living and non-living resources. There are numerous potential uses, but their feasibility, both in respect to economic gain and to environmental impact, are generally poorly known.

TRASH

The deep sea is by no means free of human impact. Anywhere in the world's ocean, rubbish is found in trawls. For example, a can found in the harvest from a trawl in 4,100 m in a remote area of the Arabian Sea had a clearly visible date stamp on the bottom of 1974! The can looks nearly new.

OIL DRILLING IN DEEP WATER

One of the major industrial uses of the deep ocean is drilling for oil. As the shallow resources are already to a large extent exploited, the attention turns to the deeper-lying oil fields. Drilling progressed down the continental slopes. At present, the deepest commercially exploited fields are the Roncador and Marlin oil fields off Brazil in ca. 1,500 m water depth. This is not the limit, and oil fields in 2,000 m are being explored. This advance has been made possible by new technologies such as tension leg platforms.

At the sea floor, a host of remotely operated instruments are docked and linked to the central unit covering several hundred metres of sea floor. Such hi-tech instrumentation in the deep sea relies critically on high precision forecasts of currents, in particular of deep sea "stroms" which are sudden high speed currents. Another danger is slope instability, i.e. when sections of the continental slope become unstable and slide into the deep sea. From the past, gigantic floods of sediment are known which have created tsunami waves altering large portions of the European coast. This event was eleven thousand years ago, but smaller events have occurred since and there is no safeguard against slope instability.

TOOLS TO ACCESS THE DEEP SEA FLOOR

We need new tools to access and to understand this largest ecosystem on Earth. The major problem is that the deep sea is very inaccessible for observation. Most instruments do not function under the high pressure in the deep sea. Automatic registration of a few variables is now possible but suffers from the limitation of power supply. While in the last decade major progress has been made in global observations via satellites, similar progress was not possible in the deep sea. Hence, all our observations are still based on "snap shots". It is fair to say that the key to the deep sea lies with technological advances.

At present measurement in the deep sea can be made by lander systems. This measuring system is lowered from the ship on a glass fibre cable and drifts across the sea floor while observing the bottom with a camera. The pictures are transmitted to the ship. Once the right position is found, the lander is released from the launching unit. When settled on the sea bed it carries out the measurements autonomously for a time. It returns to the surface with the stored data when it receives an acoustic command to drop its ballast weights. These systems can only operate for a limited period of time.

Other systems are moored at the sea floor for long periods of time and transmit their data via a surface buoy and satellite to the home laboratory. Their problem is mainly a limited power supply.

Remotely operated vehicles (called ROV) are a more sophisticated and also a much more costly way to gain access to the sea floor. ROV are lowered to the sea floor connected by an umbilical cable to the ship. It can then be steered from the ship. There are a number of cameras to observe the sea floor, and mechanical arms are available to collect specific samples or to carry out simple experiments. Kaiko, the deepest diving ROV, can go to even the deep trenches in 10 km depth. Ropos can dive to 6,000 m.

There are more technical possibilities to access the deep sea, one of the most promising is to use deep sea cables to which monitoring units are connected. This way power supply and data transmission are provided by the cable and long-term monitoring would be possible.

SUMMARY

The deep sea is an integral part of the Earth and it harbours a number of resources which we are just beginning to recognise. Human pressure on the deep sea will inevitably increase. Our understanding of the processes in the deep sea and of its life forms is still rudimentary. We need new technology and visions to access and monitor this highly inaccessible ecosystem.

These are just a few glimpses of the possibilities and problems of observing the deep sea. It has some resemblance to space exploration, both in respect to the inaccessibility of its object of study and in respect to the high costs. However, development of such technologies is the key to gaining access to the deep sea and its secrets. It is my conviction that we need to make greater efforts to understand the deep sea. This is not because of curiosity, but because the deep sea harbours many promises and challenges for our future. Human pressure on the deep sea will inevitably increase and we need to make sure that we manage and protect the largest ecosystem on Earth wisely.

PLENARY ADDRESS**EUROPEAN OCEAN POLICY FOR THE TWENTY-FIRST CENTURY**

*Prof. Ruud F. M. Lubbers
Former Prime Minister of The Netherlands*

Ladies and Gentlemen,

Thank you for the invitation to address the plenary today. Unfortunately, prior commitments prevented me from joining you earlier. As from 1 January 2001 I am assuming new responsibilities which make this a busy time for me. However, I am delighted to be here this morning with my friends, especially Elisabeth Mann Borgese.

Pacem in Maribus is well known in the Netherlands and is an initiative that I am well-acquainted with. I enjoyed listening to the wonderful speech earlier today about history in relation to law from the non-European perspective; the speech was refreshing. Normally Europeans claim the enlightenment to be part of their history, but it is useful to know that there are other origins of our wisdom, and maybe our failures as well.

My comments today will be on a more personal note.

First, when I left office as a Prime Minister in 1994, stepping down to give democracy a chance, I asked myself, What do I want to do with my life? I started to study a bit. I did some lecturing. In my lectures I did not like to use anecdotes from the past and instead talked more about the present and the future. In my studies I came across a new word, “globalisation”, which began to be used very often at the end of the 1980s and early 1990s. I developed an academic course and conceptualised the idea of globalisation. What was it all about? In doing this, I came across a second word, known somewhat longer, that I knew that from my friend Gro Harlem Brundtland, “sustainable development”. I lectured about the facts of globalisation and the normative approach as it is written in sustainable development. In so doing, I very quickly came across studies related to the oceans.

Oceans provide a very intense example of what is happening in both of these areas.

There is — I would say famous — history, from Grotius all the way to Arvid Pardo that lead to the law of the sea. Initially I saw this in terms of diplomacy and legal experts.

The law of the sea is important in itself (I was involved myself as a Prime Minister), but for me it went further. When I came across the fact that the human interface with the oceans was becoming more intense, it was as if the oceans were *the* example of the problems described by the Club of Rome in 1970. The problematic was the success of economy and technologies spreading around the globe, the so-called ecological footprint, were putting pressure on global resources. Economy and technology were so successful that they became the problem.

Where do we see it especially? In the region where the ocean meets terrestrial areas. It is in this zone that we find the mega-cities and their associated problems, for example, sewage, where we see the need for coastal management, and where we see the enormous pressure offshore activities such as

tourism and exploring and exploiting oil and gas put on ocean resources. And at the same time, we face the problem of fisheries sustainability as fishing efforts intensify. Where do we have to limit ourselves?

I joined a team, the Independent World Commission on the Oceans, to undertake a study of the oceans. There I had the privilege to meet Elisabeth Mann Borgese. Later, I had the privilege to work a little bit with her on her wonderful book “ The Oceanic Circle”, which I presented at the Pacem in Maribus conference in Halifax.

I learned from her. I saw how devoted she was to the oceans and one of the reasons I am here this morning is, to be frank, because of her.

Returning to the issues mentioned earlier, oceans provide *the* example of the new global situation, that is, how to relate to each other and how to live in harmony with nature.

To find a good approach and to achieve sustainability, we must start with the human in the centre. We have to realise that it is about people, and people working together, to find a way forward now. We cannot leave these tasks only to the traditional concept of the nation-state. Although democracies are important, we must find new ways of working together. It is clear to me that this will require enormous regional co-operation and technical assistance.

It came together, and increasingly during my courses with students, when they asked me for examples, I started to talk about the oceans. I said, the oceans are *the* example when we talk sustainability and what it means — community sustainability, sustainability in an ecological sense, as well as social sustainability. In order for sustainability to be fair, all those concepts must come into play.

I was very grateful that I left politics and met with young people to study and work in teams and had the opportunity to do some thinking on how to go on from here. In those days, I learned about the International Ocean Institute which was focussing on that segment as it had for a very long time. I say segment because for me it is part of global governance. I want to congratulate the International Ocean Institute on its proud history as well as its new initiatives, including the Virtual University.

Of course the story did not end with the law of the sea. We had Chapter 17 in Rio and its follow-up, the United Nations Commission on Sustainable Development. This was followed by the United Nations ICPOLOS (now known as the Consultative Process). This initiative of the General Assembly establishes an open-ended informal consultative process in order to facilitate an integrated approach to ocean issues. Finally, those who are engaged in the oceans, have found a way to convince the UN that it has to be involved in a more permanent, strong and strategic way. We have had the first meeting [May 2000], a successful one. I think the Consultative Process has put the problem of oceans governance – if you like Pacem in Maribus – in terms of sustainability on the map for those who are responsible. This is good.

As I have already mentioned, we must not forget that co-operation of people across borders is crucial. This meeting is an example of such co-operation. However, we must continue this co-operation by initiating practical initiatives.

I would like to say a few words about another connection I have as International President of the World Wildlife Fund (WWF). WWF did not initially deal with ocean and maritime affairs. It was primarily concerned with terrestrial issues such as threatened and endangered species and, later, with biodiversity as a broad concept. Eventually WWF became involved in maritime issues, a few examples of which I will mention here. First, the issue of maritime stewardship. What is maritime

stewardship? In short, it is certification of fishing. WWF is endeavouring to find a way to partner with transnational companies, in this case Unilever, to find a system to convince those involved in fisheries to adopt sustainable practices.

Of course we still need the efforts of governments to achieve sustainable fisheries. However, at the same time, we want to partner with companies because we think modern governance is no longer just a question of governments and laws and regulations (you might call this “traditional governance”). We also need what I call “new governance”, interaction between non-governmental organisations (NGOs), civil society groups, to put pressure on transnational companies to behave better, to do better, and to start to internalise societal values in their mission statements. We need the media and NGOs to put that pressure on companies.

This process has started and companies are starting to behave better. Why? Because they are more ethical than their fathers and grandfathers in business? I don't think so. It is more because they are intelligent and they understand that the intensity of their operations and activities invite them to take responsibility themselves. Also, because they are so global today, these transnational companies have begun to understand the need to live in harmony with nature. They have to do something.

While the Club of Rome effort 30 years ago was primarily an academic effort, it is starting to be incorporated into business life today. It is not only about selling or producing something, it is about human resources. Those expanding companies need people to work for them. These companies invite the best graduates from universities to work for them. But those young people don't want to work for companies that are embroiled in scandals for damaging nature. They do not like the companies that put a heavy footprint on earth. Now the young people are partners in the process of governance. Once again, the NGOs, together with the media, also play a role in raising the awareness of young people to these problems.

These young people are often members of NGOs, or what I call “e-mailing societies”. What is an NGO? I think it is best to say an NGO is an e-mailing society. This might sound a little bit strange. You think of course, no, an NGO is for this or that purpose. This is true. But what connects them? Their main characteristic is that they are so easily linked via e-mail to each other, exchanging information, making people more aware and, based on this, they can develop action plans.

Of course, young people address these issues as well as politicians, but they are a little bit more cynical about politicians these days. And we must be frank, I was myself a politician and am aware of how difficult it is for a politician to do their job today. Normally your tasks are based on the capacity, the possibilities and the problems of your country. That's logical. Today, however, many governance issues, sustainability problems, cannot be solved within one country.

Even the answers are not easily defined if you only start from your own country. What is the level of your development? What financial resources do you have available? What is the level of education your population?

What we know, working together at the seashore, is that we must work together transnationally and not only as governments. This is difficult for ministers and parliaments. The primary issues is one of objectives. To what level of standards can we politicians hope to harmonise? There are also the needs of the outside world as well. The more mature economies with the higher standards seek to bring them to the world. This is only doable and fair when there is also an increase of technical assistance and financial flows.

In a way you can see this world, now I am talking as a professor of globalisation, through two paradigms: first, globalisation — the simple the triumph of money. Essentially, these people go for profits and will bring down other standards. They will go to countries and pursue opportunities to increase their profits. This might lead to a race to the bottom, like a trip into the Bermuda triangle.

But we have another reality, another paradigm, which is true as well. Many people around the globe simply cannot accept globalisation and are trying to do better. They try to build up human resources, to increase awareness, to live in harmony with nature, and to inform each other on ways to take action. We try to do it better. This is what I call the new governance trend. The stronger it is, assisted by people who are motivated, such as the International Ocean Institute, the more successful they will be. In this paradigm, we search for better standards and we convey the best practices around the globe. For example, we start to convince people that the business of fishing cannot be about money in the short term, the immediate profits.

Instead, we say the bottom-line is sustainability. Of course, we find very strange anomalies when we start this process. For example, in Europe, we currently have fisheries subsidies of 1.4 billion Euro, in a very disguised way. Most of the time it is denied that they exist, but we know they are there. These subsidies lead to over-fishing and blurring of the whole system. This is but one example. We know the realities of this intense interface in the Mediterranean and other parts of Europe, but it is also found around the globe.

My point here is that we have to go on with our efforts, encouraging governments to do better. It is a precious thing to have democracies and nation-states with their own responsibilities. It is important to capitalise on the potential of the UN-system. (I'll be a part of that myself.) At the same time, I draw your attention to the need to partner with peoples institutions. As a WWF-person, talking about the maritime stewardship and other maritime initiatives, I stress this point. Another thing we are doing there is a new initiative, it's what we call the coral web.

It was an interesting experience for me being in these two worlds, the ocean and the terrestrial. I will give you one example. You are all aware of the Global Ocean Observing System (GOOS). If I was your host at WWF's offices in Washington, I would take you to the fifth floor where they have these fantastic maps about the hundred eco-regions in the world showing their biodiversity. The GOOS teams are very motivated because they found that global information systems let them look into the reality of nature and translate that into what are really our treasures, namely biodiversity.

I have the impression that technology is often seen only as something which helps business to grow. This is not the full truth. Technology can be used for other purposes such as GOOS. I see an amount of enormous interest, attention, awareness, admiration even, in many young people who say we want to defend the treasures of this world. They mean this in terms of terrestrial eco-regions as well as the oceans. We can use technology for this connecting. In the IOI we are talking about establishing a virtual university. We'll find out that this is key for young people to connect, to defend their values in terms of nature, with technological possibilities to do their work better. It is a thrilling experience.

I told you a few things about my WWF experience as well as in relation to my professorship on globalisation and sustainable development. I am Honorary Chair of the Institute for Globalization and Sustainable Development at Tilburg University. For me, this is not something totally separate from my friends in *Pacem in Maribus*.

I am glad that in my own country, the Netherlands, these issues are being developed further too. In earlier books by Professor Mann Borgese you could read about the coastal management systems of the Dutch. This is on-going, but what is more interesting today may be the new wave that is coming

in this country. Using the concept of exclusive economic zones, which you all know well, we are now entering into dynamic partnering efforts with other countries, for example, South Africa, Brazil, and Indonesia, to see how we can connect our insights and capabilities as well as money. But again, these initiatives involve not only government, but business and civil society institutions.

I do hope as we are talking here about the European challenge, that we will find ways and means to make the young people of Europe more active. We need indeed virtual universities and the wonderful institutes of the IOI throughout the world related to the oceans. I could imagine another initiative in the heart of Europe itself, a partnership between Maastricht University and the Aachen University, both near Brussels.

For those who are involved in the governance of Europe, it is important to understand that despite our knowledge of the oceans and sustainable uses of the ocean, and to make use of the wonderful treaties related to the oceans, we will have to go one step further and invite business and NGOs to partner with us. An additional IOI institute here could be a very good thing.

In closing, I must confess that I fell in love with this work on the oceans, but now I must limit myself. I want to thank you again. I do hope that this conference, this meeting of experts and those who really are motivated in this work, will be successful. It is very important work.

I believe that the interface of the ocean and humankind might teach us a lot and is an enormous responsibility to guide global humanity to truth and dignity, to a decent life.

I leave the scene of the oceans and academia to become United Nations High Commissioner for Refugees. I do so on purpose at the end of my life in public service. It has been wonderful. I was in business for ten years, in politics of a nation and Europe for more than 20 years and spent six years in academia and with non-governmental organisations and young people. Now I will go to work for refugees.

I think it is worthwhile because as people talk about the potential of this era of globalisation, there are also shadows. The lack of equity, greed, poverty, not living in harmony with nature, and finally, the dark side of people in most difficult situations as an outcome of de-colonisation and, later, the end of the Cold War, place millions of people in very difficult situations. A challenge to humankind is how to relate to that.

I am going to serve refugees. It is the last phase in my working life. But I will not forget the oceans. Not at all. Thank you.

PLENARY ADDRESS

OCEAN GOVERNANCE AND GLOBAL DEVELOPMENT IN THE NEW MILLENNIUM

Elisabeth Mann Borgese
Professor, Dalhousie University, Canada
Honorary Chair, Pacem in Maribus 2000

INTRODUCTION

Now we are really about to “usher in” a new millennium, and this may really be a good moment to take stock of what we have achieved in the one that is coming to its end, and what is awaiting us in the next.

Really? Come to think of it, the fish could not care less. Our boundaries in time have no more meaning to them than our boundaries in space. To myriads of living beings, including some millions of human beings outside of our Judeo-Christian culture, this solemn crossing of a boundary in time makes no sense whatsoever; not even our computers have reacted with the shock we had expected and for the unnecessary mitigation of which we had spent millions of dollars. For the great ocean, a so-called millennium is just a fleeting moment in time.

I mention this only because it is such a vivid illustration of the self-illusion, the irreality of so much of what we are doing with so much passion and conviction, inflicting suffering and death on other human beings who may be living in other self-illusions, other irrealities!

Be that as it may, millennium or no millennium, I think we all share the feeling, real or unreal, that, during the past decades many fundamental changes have taken place. Many new problems have arisen, most of them anthropogenic. We have killed many forests to produce the paper on which to spill gallons of ink to print out the laws, rules, regulations, codes, declarations, and conventions to solve the problems we have created. We all share the feeling that the time has come to put more effort into implementing and enforcing this legislative inheritance.

If it was difficult enough to make and agree on the laws and regulations, it may turn out to be even more difficult to implement and enforce them. The way from paper to reality may be long and arduous, and it will be up to the next generation, to many of you participants here, to pursue it. In the process you will also undoubtedly continue to adapt the laws and regulations themselves as new scientific discoveries and technological and economic developments may require.

What we, the outgoing generation, can do is to project a picture or model that appears to emerge from the rules and regulations and the vast literature surrounding them, which our generation has put into place. This picture will also reflect the major events and trends of this past century.

If change is to be peaceful, as we hope it will be, this picture may still be useful, even if you will change it, because peaceful change is a process that will balance continuity and change.

TWENTIETH CENTURY TRENDS

So, let us start with the general trends we can distil from the events of the twentieth century, and especially its second half, the post-World War II period, because the world after World War II appears to be remarkably different from the world before. If I had to list ten points, they would be the following:

1. **The rise of environmental consciousness.** A changing perception of the relations between humans and the rest of nature; emergence of a new philosophical paradigm: less dominated by Western thinking; less individualistic, more community-centred.
2. **Transformation of the “scientific paradigm”** from specialised and sectoral to interdisciplinary and integrative; from certainty and predictability to uncertainty and chaos.
3. **Explosive technological development** giving rise to a new phase of the industrial revolution, based on high tech (miniaturisation, robotisation, recycling, new materials, genetic engineering, bio-industrial processes, etc.).
4. Giving rise, at the same time, to **an arms race** that has led itself *ad absurdum*; to transcendence of the traditional concept of warfare; to alternative, pervasive forms of violence; to a new comprehensive concept of human security.
5. **Transition from an economy based on industrial production to an economic based on services** (the “service economy” now accounts for over 60 percent of global GNP): from wealth creation based on resources and capital to wealth creation based on the development of human resources.
6. **Decolonisation and new emphasis on human rights** (in spite of the horrendous violations that have taken place, or perhaps because of them).
7. **Economic and political decentralisation:** the end of the centrally planned economies.
8. **Growing ambiguities of the market-based economy:** unprecedented generation of wealth together with abysmal poverty; the growing chasm between the few rich and the many poor; inability of the market economy to cope with poverty as well as environmental degradation.
9. **“Globalisation”** – mostly detrimental, dehumanising trends (economic anarchy, the Coca-Cola culture, organised crime) while the humanising aspects (the globalisation of law and governance) is moving much slower.
10. **Transformation of the concept of “sovereignty”** in an interdependent world.

The institutional framework we want to project for the successful implementation and enforcement of the legal inheritance we are bequeathing to you would have to respond to these ongoing trends. And I think they do.

OPPORTUNITIES TO ADVANCE OCEAN GOVERNANCE

Two more preliminary points: Obviously there is not just one solution to our problems. There are trillions of solutions. The number of virtual scenarios is in fact infinite. This may be one of the reasons why many people, even though their critique of the present situation may be perfect, do not dare, nevertheless, to put forward concrete proposals.

We here want to focus on one, even though we know that there are trillions, but that one, we want to make concrete.

My second point is that the next two years offer rather extraordinary opportunities to advance new, concrete proposals and to get them into the fora of Realpolitik. I am thinking of three such forthcom-

ing opportunities. The first is the Intergovernmental Review of the Global Plan of Action (GPA) on land-based sources of pollution which will take place in Canada in 2001. This will be a particularly suitable forum for advancing the “revitalisation of the Regional Seas Programme”, that is, to contribute to the development of the regional component of ocean governance, which is of vital importance to the whole architecture. Many, if not most, of the problems of ocean governance will have to be dealt with at the regional level.

The emphasis of this Review Conference will be on implementation and enforcement. The implementation of the GPA obviously is a major, if not *the* major component of action for sustainable development in accordance with Agenda 21. This review conference should make an important contribution to the second major event, scheduled for 2002, and that is “Rio+10”, an assessment of ten years of activities since the great Earth Summit in Rio de Janeiro in 1992. This, again, will be an opportunity, not only for retrospection, but for the introduction of new ideas and approaches towards realisation, implementation and development during the coming decades.

The third new opportunity during the coming years is at the level of the United Nations General Assembly. The General Assembly is playing an increasingly important role in assessing and developing ocean policy and integrating the various convention regimes that have been emerging to deal with ocean affairs. While the 1982 United Nations Law of the Sea Convention remains the fundamental legal framework for all uses of the seas and oceans, the “Rio process” has, over the past decade, produced a whole slew of conventions, agreements and programmes, each of which has an important ocean dimension. Now all of them must be read together, and their implementation must be integrated into a consistent whole.

This is a great and difficult task, to which the General Assembly, until now, simply was unable to devote sufficient time. With the establishment of the so-called “Consultative Process” (UNICPOLOS) this year, the situation has been greatly improved. Rather than just one day, the General Assembly, through this “process”, has a whole week every year to devote to these issues and to examine them in some depth.

The issues to be examined in the next years are piracy and armed robbery at sea, especially at the regional level, and science and technology co-operation and transfer. Both of these issues have fundamental implications for the integration of sustainable development and regional security (suppression of piracy and armed robbery) and the integration of economic and environmental concerns in the co-operation and transfer, or joint development, of environmentally and socially sustainable technology. So here too are opportunities for the introduction of innovative proposals. I am pleased to report that the International Ocean Institute has done and is doing a lot of work on exactly these issues and intends to make its contributions to all three of these new and inter-related fora.

Let me now use the remaining time to sketch the institutional model I see emerging against the background of the broader geopolitical developments as I see them – using the ten points I made as a checklist.

AN EMERGING INSTITUTIONAL MODEL

At the local level, a form of “community-based co-management” is emerging in many parts of the world. This system is based on two principles: horizontal integration, involving all “stake-holders” in decision making; and vertical integration, generating fora for joint decision making between local communities and national governments. This reflects the first point on my checklist: the new emphasis on decentralisation and community empowerment. The very concept of the common heritage of mankind, with its emphasis on the common interest which is fundamental to the new law of the sea, accords with this line of new thinking.

At the national level, trans-sectoral, inter-ministerial, interdisciplinary mechanisms are emerging for the making of integrated oceans policy. Legislation to provide a legal basis for co-management, regulation and standard-setting, through co-management, as well as enforcement, whether national or regional, are likely to remain the responsibility of States.

The revitalisation of the Regional Seas Programme and the other forthcoming events and ongoing trends I have already mentioned serve to strengthen, at the regional and global levels, the integrative, trans-sectoral, interdisciplinary and comprehensive developments that are emerging at the local and national levels. The whole system has to evolve together to function as a consistent and coherent system.

Returning now to my “checklist”.

The transformation of the “scientific paradigm” has profound implications for ocean and coastal management and governance. It is the recognition of uncertainty that forces us to adopt the precautionary principle; it is the complexity of interdisciplinarity that necessitates integrated ocean and coastal management at all levels – local, national, regional and global.

Regarding the explosive technological developments we have witnessed, marine technology has been greatly affected by it. Marine technology, largely is high tech, information and knowledge based. Current efforts to effect what used to be called “technology transfer” through joint undertakings in research and development fully respond to this new challenge.

Transition from a production-based to a service-based economic system: It has not yet been noticed much in the literature, but in ocean economics – even more so than in the rest of the economic system – we are seeing a shift from “resources” to “services”. Ocean economics has always focussed on living and non-living resources. In financial terms, the most important factor was offshore hydrocarbons. Today, the figures for offshore oil and gas are simply dwarfed by the figures emerging for marine-based services: the largest of which, accounting for many trillions of dollars, are sea-borne trade, ocean-dependent tourism including cruise shipping, and sea-floor fibre optic cables. There are half a million miles of these cables on the seabed today, and they generate revenues of one trillion dollars a year, and this is a rapid-growth sector. So the shift from resources to services has been rather dramatic. And not included here are the oceans so-called eco-systems services which have been estimated (Costanza et al.) at \$21 trillion dollars a year!

As to the impact of high tech on the arms race and on the new concept of security, it was clear when the Agenda for Peace was first published in 1995 that marine policy and ocean governance could play a lead role in its implementation, even though the Agenda practically ignored the marine dimension. The new emphasis on implementation, compliance enforcement, suppression of piracy, armed robbery and other crimes at sea should, and probably will, trigger new approaches to the integration of sustainable development and regional security.

Market failure is more pervasive in ocean economics than in other parts of the economic system. There is no time to deal here with the reasons for this, but the fact is some of our basic terrestrial concepts, for example, sovereignty and “ownership”, simply are not applicable to the ocean medium. The ocean by its very nature forces us to think differently. Physically, the world ocean is the great equaliser. It moderates temperatures. As we all know, temperature differences are much harsher inland than in coastal areas. I believe, in economic and social terms, the ocean will have an equalising function. Based on the principle of the common heritage of mankind, ocean governance, as we envisage it today, will contribute to economic decolonisation and, by the empowerment of local communities, enhance a new form of community-based democracy, strengthen human rights and provide a counterforce against the negative aspects of globalisation.

This is as far into the future as our present imagination can go. We can see that what we are trying to build is interacting properly with broader ongoing trends and developments. These are impacting on the emerging form of ocean governance while, in many ways, ocean governance is the lead actor in these trends and development. We can at least begin, we have indeed begun, to build our scenario on the foundation of existing institutions. No doubt the architectural design will change as we go along. That is up to you, the next generation, in the new millennium whatever that means!

I conclude by wishing you the best of luck, with all my heart. The only advice I have is: Try to keep moving forward, not backward, because that doesn't work!

PLENARY ADDRESS

ISSUES IMPACTING TROPICAL SEAS, WITH SPECIFIC REFERENCE TO SMALL ISLAND DEVELOPING STATES: OPPORTUNITIES FOR EUROPEAN CO-OPERATION

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INTRODUCTION

The Small Island Developing States (SIDS) are among the most fragile and vulnerable nations in the world. The SIDS of the tropical Pacific Islands (PacificSIDS), which we will highlight in this presentation, comprise some 22 self-governing nations scattered over 30 million square kilometres of ocean and include a population of approximately 6.0 million people. While most of these nations are now independent, European countries helped shape many of them during colonial times, and continue to play an important role as donors in the marine sector. The sustainable development of marine resources, as embodied in the post-UNCED and post-Barbados era, will be achieved by PacificSIDS only through continued assistance from developed nations. This assistance needs to be transformed from neo-colonial into new post-colonial partnerships.

We will identify some of the important issues facing the South Pacific island nations, the institutional arrangements that are in place to address them, and strategies that need to be adopted. In particular, the role that the International Ocean Institute has played and can play will be discussed in the context of the “European Challenge” that is the theme of this conference.

EUROPE AND THE PACIFIC ISLANDS

In 1975, the European Community signed an overall convention called the Lomé Convention, with a group of independent African, Caribbean and Pacific (ACP) countries. Under Lomé, the eight participating States in the South Pacific were comprised of Fiji, Tonga, Samoa, Papua New Guinea, Solomon Islands, Tuvalu, Kiribati and Vanuatu. These eight states, along with overseas countries and territories (OCTs) of France and the United Kingdom (New Caledonia, French Polynesia, Wallis and Futuna and Pitcairn) are entitled to a number of trade and aid advantages in their relations with the now 15 member state European Union (EU) (European Commission 2000).

After many years of discussion and negotiation, a new Partnership Agreement to succeed Lomé was signed in June 2000 in Cotonou, Benin. This agreement, known as the Cotonou Agreement, will govern the trade, aid and political relationship between all ACP states and the European Union for the next 20 years. Signatories to the new agreement include all existing Pacific ACP member states and the remaining six Forum Island Countries, namely, Cook Islands, Federated States of Micronesia, Palau, Niue, Nauru, and the Republic of the Marshall Islands.

EU member states contribute to the European Development Fund (EDF) on a five-yearly basis, commencing in 1958. There have been eight successive EDFs; these have been linked to the Lomé Conventions, the most recent of which was divided into two separate financial protocols that ran for a

ten-year period from 1990. Over the past 20 years, the EU has transferred some EUR1,362.5 million to the Pacific ACP countries and OCTs. This aid totals some 23% of all assistance received by the South Pacific independent countries. Other major donors are Australia, Japan and New Zealand. Four Pacific ACP countries have permanent ambassadors in Brussels: Fiji, Papua New Guinea, Samoa and the Solomon Islands. The European Commission maintains two delegations and four offices in the Pacific ACP countries and one office in the OCTs.

European assistance is in two principal categories: national (to Pacific ACP states) and regional (to South Pacific Regional organisations). Table 1 sets out the level of national assistance (European Commission 2000).

Table 1: Levels of National Assistance

Pacific ACP State	Total Aid (million EUR)
Fiji	221.9
Kiribati	37.36
Papua New Guinea	673.9
Samoa	84.44
Solomon Islands	178.50
Tonga	49.61
Tuvalu	11.70
Vanuatu	69.79

Pacific ACP States have benefited in the areas of trade, energy, natural resources, human resources development, and capital funding towards infrastructure projects. Since 1990, EDF-financed regional programmes have been co-ordinated through the South Pacific Forum Secretariat. The Secretary General of the Forum Secretariat is the Regional Authorising Officer (RAO). National programmes are co-ordinated by the individual countries concerned.

Regional co-operation began in 1975 under Lomé I. From the beginning, aid to fisheries has been significant, with a total of 11.9 million EUR to date. A smaller amount (5 million EUR) has been in support of non-living (mineral) resources. Regional organisations benefiting from the marine resources sector have been the Forum Fisheries Agency (FFA) and the Secretariat of the Pacific Community (SPC). Lomé I and II helped build the FFA's headquarters in Solomon Islands, while Lomé III funded a regional marine resource development programme. This programme supported the regional tuna fisheries information service, the building of a conference facility at the FFA, and provision of assistance in the delimitation of maritime zones for Member States.

Under the same programme, SPC received support for its tuna tagging project. Under Lomé IV, SPC's work on study of tuna stocks is being deepened and widened in order to consolidate the stock assessment of individual tuna species.

With respect to non-living marine resources, the EU has supported the South Pacific Applied Geoscience Commission (SOPAC) through technical assistance and equipment. This includes support of seabed mapping and mineral prospecting.

Under the 8th EDF, regional support is expected to include:

- Euro 2 million towards the establishment of a marine training institute in the Solomon Islands
- Euro 10.5 million to fund SPC in its efforts to develop a knowledge base for managing Pacific Island fisheries ecosystems

- Approximately Euro 3 million to allow SOPAC to undertake coastal mapping studies through geographic information systems (GIS) in an effort to improve the management of aggregates, potable water supplies, and hazard mitigation in the South Pacific

ISSUES

The following is a brief discussion of marine sector issues pertaining to the PacificSIDS. These issues are in part identified under previous or existing EU aid programmes, but they also serve to point out existing gaps.

National integrated coastal management (ICM) plans are urgently needed for all PacificSIDS. Strategies for the development of such plans have received wide attention in recent years through the UN system and through many regional organisations. The difficulty with such plans is that they cut across the traditionally vertically structured decision-making procedures within governments, and require a re-arrangement of priorities and funding where, in the past, departmental budgets and programmes had been jealously guarded. The lack of such plans has allowed uncontrolled or poorly planned coastal development and land-based practices that are contrary to sustainable development and that ignore the integrated nature of coastal and nearshore systems. Many of the traditional resource owners in PacificSIDS have used an integrated approach to resource management in the past, but much of this knowledge is being lost with the breakdown of traditional lifestyles, the trend towards urban drift and the introduction of the cash economy. What is needed is a marrying of traditional practices with Western-style government and legal systems. Several nations have the technology for the development of ICM plans (such as GIS, digitised low level and satellite images) but need the necessary expertise and human resources, as well as appropriate political will, to develop and implement plans. Most nations lack, however, appropriate legislation that would enable them to enact regulations required for ICM, and this needs to be developed.

Waste disposal technology is needed in all PacificSIDS; the disposal of all types of waste is a problem of nightmare proportions in atoll countries. This issue received a high profile during the Barbados meetings, where it was stressed that the technology needs to be *appropriate* to SIDS. While there are no ready or simple solutions, they must be found if these small nations are not going to be buried in their own wastes within the next twenty years. A separate issue is the interest in a number of developed nations in using isolated islands as dumping grounds for dangerous wastes, or the use of remote islands as nuclear testing sites or for missile target practice. Fortunately these practices are now largely discontinued, or are viewed negatively by SIDS. They have left, however, a legacy of long-term damage to fragile island systems and the displacement of entire populations. In a recent review the South Pacific Regional Environment Programme (SPREP), under a project funded by the EU, showed that there are a number of dangerous waste disposal sites in PacificSIDS. Waste disposal at sea is a related issue in PacificSIDS, and is being addressed on a regional scale through the PacPOL programme in SPREP, funded by Canada under the Canada-South Pacific Ocean Development Program – Phase II.

Environmental deterioration is a serious issue in PacificSIDS, especially in sites close to urban or industrial centres. Issues include destruction of coastal habitat (such as mangroves) for development purposes; cultivation of marginal lands; agricultural run-off of pesticides and herbicides; clear cutting forestry practices that result in increased sediment loading on reefs and lagoons; mining and the disposal of mine tailings; industry such as sugar refining, paint manufacturing and other practices where toxic wastes are discharged into rivers or coastal areas; tourism development close to important reef and lagoon systems, resulting in damage to the ecosystem and the disposal of human waste; and over-population. Population growth in some PacificSIDS is as high as 4.5% per annum, and in many is higher than 2% per annum. This population growth is bringing increased pressure to bear on coastal ecosystems.

The securing of potable water supplies is a universal problem in PacificSIDS, but is especially acute in atoll countries that rely on a finite lens of water beneath the atoll. Factors in atolls that affect water security include over-population, inappropriate disposal of wastes which in turn contaminate the water lens, prolonged droughts (not unusual on atolls) and sea-level rise, which results in salt-water incursion into the water lens. The use of desalination is not a real option because of the prohibitive costs involved, while the piping and treatment of drinking water is a daunting task on atolls, where communities are often widely separated. Even on the large island states, treatment of water is minimal or absent in many instances. For some islands, it is likely that they will become uninhabitable in the future because of a lack of potable water.

Food security through sustainable fisheries is of paramount importance to PacificSIDS, where the per-capita consumption of fish is among the highest in the world. For most of the smallest nations, fish offer the only real possibility of a secure food supply, hence the need for a sustainable fishery. Approximately 80% of the catch in PacificSIDS are made in the subsistence sector. The coastal fisheries of most PacificSIDS are already stressed or over-fished, destructive fishing practices (such as dynamite and poisoning) are employed, and several important species such as giant clams have become extinct in recent years. Issues already identified here all mitigate against the possibility of a sustainable fishery for the future. While appropriate legislation and regulations exist for the commercial fishery in most PacificSIDS, there are few regulations for the subsistence fishery, and it is therefore largely unmanaged. The indigenous peoples practised conservation in their fishery in the past, but this traditional knowledge is becoming lost; there is an urgent need to develop appropriate co-management strategies (i.e., between the resource owners, government and the scientific community) if food security is to be maintained in the future.

Climate change and sea level rise will likely seriously affect all PacificSIDS, especially atolls, which might become uninhabitable within the next forty years. While PacificSIDS feel largely powerless to do much about these global issues, they have become a powerful lobby group. Those countries that have ratified the United Nations Framework Convention on Climate Change (seven of the PacificSIDS) are actively involved in the development of national action plans for mitigation of climate change events, co-ordinated through the Pacific Islands Climate Change Assistance Programme (PICCAP), under SPREP. There is an urgent need to upgrade skills in areas that relate to climate change mitigation and adaptation, and to build mitigation and adaptation measures into long-range planning within governments. An example of the vulnerability of PacificSIDS to climate change was the massive coral bleaching which occurred in Fiji from February–April 2000. This was caused by a sea surface temperature of up to 31.5°C and very calm conditions. The impact of this serious event is still under investigation, but it could have long-term effects on the dive tourism industry and the fishery.

Ocean law and policy and boundary delimitation issues are very important for PacificSIDS, yet there is a dearth of expertise in these areas. Governments are therefore dependent on the import of such expertise from elsewhere to meet their obligations under UNCLOS.

Human resources development (HRD) and capacity building are over-arching needs to all of the above. With their small populations and low participation rate in tertiary education (less than 1% of the population), HRD and capacity building are inadequate in all PacificSIDS, and there is an urgent need for HRD development and capacity building in all sectors of society. A fault of many earlier aid projects was the lack of parallel HRD within the recipient communities with the result that activities were unsustainable once the donors pulled out. Recent changes in donor strategies are improving this situation, but HRD remains the greatest challenge to sustainable development of the marine sector in PacificSIDS.

INSTITUTIONAL ARRANGEMENTS

Institutional arrangements in response to global initiatives in the Pacific Islands were addressed in detail in South and Veitayaki (1999). Annex 1 provides a summary of the inter-governmental organisations of the Pacific region. Regional co-operation has been a significant feature of the region since the establishment of the South Pacific Commission in 1947; a total of eight inter-governmental bodies now operate under the general guidance of the Council of Regional Organisations of the Pacific (CROP) (Secretariat of the Pacific Community, SPC; Forum Fisheries Agency, FFA; South Pacific Regional Environment Programme, SPREP; South Pacific Applied Geoscience Commission, SOPAC; Forum Secretariat; the University of the South Pacific, USP; South Pacific Tourism Organisation, SPTO; and the Pacific Islands Development Programme, PIDP). These bodies have individual work programmes determined by their member countries, and cover the areas of fisheries, non-living resources, environment, economics, social issues, trade, tourism, and education and training among others. They have been instrumental in creating a regional approach from the post-war period of decolonisation, to the current neo-colonial era. A Marine Sector Working Group reports to CROP, and includes representatives of all of the regional organisations.

From an analysis of the responses of the Pacific Islands region to agreements and conventions pertinent to the oceans, South and Veitayaki (1999) concluded that while regionalism is still intact and functioning, the regional bodies are facing new challenges brought about by changes in the world order and economy, and by the responsibilities imposed on their member nations through UNCLOS, UNCED (Agenda 21, Chapter 17) and the Declaration of Barbados. Specifically, they face financial and organisational pressures as their traditional donors restructure their funding priorities. The nation members of these organisations have maintained their political identity, and rely on regional bodies to assist in areas where they lack the capacity. The difficulty is that while they are party to the post-UNCED agreements and conventions, they lack the human resources and technical skills required for their implementation. At the same time, while they universally subscribe to the concept of sustainable development, it is highly unlikely that this will be achieved without the development of long-term partnerships with developed nations.

Strengthening links between environment and integrated development will be essential as decisions about resource allocation in the short term are expected to be made on a sector-by-sector basis. There is an ongoing need to build upon efforts to integrate environment and development within Pacific Island countries. Efforts to implement economic and public sector reform, along with the work of the CROP, provide opportunities to do this. Ideally, this integration would continue to promote a holistic approach to island development, include explicit links between health, population and the environment, and make most effective use of the capacity within countries and regionally.

STRATEGIES

The need for human resources development and capacity building emerges as the paramount need for PacificSIDS in the near future. The (IV) Declaration of Barbados states:

To enhance their national capacities and self-reliance, Small Island Developing States, with the assistance and support of the international community, should actively promote human resources development programmes including education, training and skill development. Their institutional and administrative capacity to implement the programme of action must be strengthened at all levels by supportive partnerships and co-operation, including technical assistance, the further development of legislation and mechanisms for information sharing.

To a degree, the South Pacific regional agencies are indeed engaged in various HRD-related programmes, with the co-operation and assistance of the international community and in the spirit of

the Declaration of Barbados. We would like to highlight the role that is played by the University of the South Pacific, the premier tertiary institution in the region and the home of IOI-Pacific Islands. Since 1993, the USP has established a region-wide Marine Studies Programme and the IOI Operational Centre for the Pacific Islands. Both of these initiatives have addressed regional HRD needs.

Training programmes provided by IOI-Pacific Islands have included professional courses in coastal fisheries, resource and environmental economics, taxonomy of selected marine groups such as sponges and corals, leadership seminars, and marine awareness workshops in Fiji and Samoa (South 1999; Veitayaki and South 2000).

IOI-Pacific Islands has facilitated partnerships with UN training programmes. These have included the formation of a curriculum development unit under the UN/DOALOS TRAIN-SEA-COAST Programme (South 1998), and the development of a Certificate Programme in Climate Change Vulnerability and Adaptation under the UNITAR CC:TRAIN Programme, in co-operation with the International Global Change Institute (University of Waikato, New Zealand) and SPREP (Nunn and Tuqiri 1999).

The USP has given priority to the development of the Marine Studies Programme (MSP), which now includes BA, BSc, MA, MSc and PhD degrees in marine affairs and marine science. A total of over 100 undergraduate and 50 post-graduate students are now enrolled. The Government of Canada, through the Canada-South Pacific Ocean Development Program Phases I and II, has been a major partner in the development of the MSP. Development of new programmes in post-harvest fisheries, ocean law and policy, and aquaculture is currently under way, and the programme is now housed in world-class facilities funded by a generous grant from the Government of Japan.

While the IOI-PI and MSP have given priority to the development of partnerships and networks to strengthen education, training and research activities, few partnerships with European institutions have been developed.

The need for technology transfer has been identified here. The Declaration of Barbados identifies this need in Part Two (III, 1.):

The international community should co-operate with small island developing States in the implementation of the Programme of Action for Sustainable Development of Small Island Developing States by providing effective means, including adequate, predictable new and additional financial resources in accordance with chapter 33 of Agenda 21; **facilitating the transfer of environmentally sound technology**, including on concessional and preferential terms as mutually agreed, taking into account the need to protect intellectual property rights as well as the special needs of developing countries; and promoting fair, equitable and non-discriminatory trading arrangements and a supportive international economic system. [emphasis added]

The Independent World Commission on the Oceans (IWCO), in which the IOI played a key role, at its meetings in Rio de Janeiro in July 1996, recognised that while technology is absolutely necessary for exploiting marine resources, there is a big gap between North and South. It was suggested that this gap should be closed at the earliest opportunity, otherwise there is a danger of sustainability not being achieved. The IWCO identified the following actions, among others:

1. Build up science and technology capacity in developing countries through both South-South and North-South co-operation.
2. Review the entire system of technology transfer and capital movement and thereafter draw up an international action programme.

3. Developed countries to provide technology and capital to developing countries in the fields of aquaculture, mariculture, ocean energy, and underwater mineral resources.
4. Use biotechnology for maintaining biodiversity and sustainability of fisheries.
5. Undertake ocean research after pooling resources to avoid duplication.

Mechanisms for implementing these ideas already exist in the IOI's global network and were proposed by the IWCO.

IOI-Pacific Islands has also proposed that such mechanisms would be much easier and more efficient to implement if there were a single recognised marine technology centre for the Pacific Islands. This would be in keeping with provisions under UNCLOS and UNCED, and under the Regional Seas Programme. The University of the South Pacific has been proposed as a potential centre.

The degradation of coral reefs throughout the tropical regions of the world has been highlighted (Wilkinson 2000). The IOI global network encompasses seven centres or affiliates which are located in important coral reef regions in developing countries. IOI-Pacific Islands now co-ordinates the Node for the Southwest Pacific under the Global Coral Reef Monitoring Network (GCRMN) (South and Skelton 2000), with financial support from a number of donors, including the IOI. IOI was represented at the November 2000 meeting of the International Coral Reef Initiative Council meetings in Bali, Indonesia. Of various resolutions approved at that meeting, the following is most relevant here.

Resolution of funding of the ICRI Program and Agenda (in part):

Recalling that coral reefs and related ecosystems are the basis of the social and economic well-being of many of the world's financially poorest communities in Small Island developing states and coastal areas of tropical developing countries.

ICRI CPC calls upon the European community and its member states, and the private sector, through their international co-operation programs to support the implementation of the ICRI Framework for Action.

RECOMMENDATIONS

The theme of this conference, *The European Challenge*, presents an appropriate opportunity to consider the strengthening of European partnerships within the tropical seas. As described here, there has been a long-standing and well-funded support through the EU to the ACP Pacific States and OTCs. A substantive component of the funding has been in the marine resources sector; this has focussed heavily on the very important tuna fishery and much less on coastal ecosystems. Several of the issues identified here have received rather less aid, either through national or regional programmes. The concept of a regional centre for marine technology, which has been raised in a number of contexts and fora, has not been followed up.

This conference is serving as a launching pad for the establishment of a new IOI Centre in Germany. Our recommendations are therefore directed to the new IOI-Germany who would be the first EU member of the IOI family, and who would be in an ideal situation to work with those centres located in tropical seas (IOI-Pacific Islands, IOI-India, IOI-Senegal) in the development of partnerships with the EU.

It is recommended that:

1. Strengthening of existing and development of new partnerships be explored with European organisations and institutions, with specific reference to the tropical seas and coral reefs in

developing countries. These partnerships should focus on human resources development and technology transfer.

2. Consideration be given to the establishment of the University of the South Pacific as a marine technology centre for the South Pacific Islands, in collaboration with its partner organisations under the Council of Regional Organisations for the Pacific.
3. These new partnerships be facilitated through the IOI network.
4. IOI Germany be considered as an appropriate conduit between the EU and those IOI Centres in the tropical seas.

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ANNEX 1: INTER-GOVERNMENTAL ORGANISATIONS IN THE PACIFIC REGION¹

The **South Pacific Forum** is comprised of all 16 independent and self-governing nations of the Pacific Islands region, whose Heads of Government meet annually. Its secretariat (ForSec) executes the requirements of the Heads of Government expressed at the annual meetings. The Secretary-General of ForSec provides the permanent Chair of CROP and the Division of Development and Economic Policy serves as CROP's secretariat; ForSec thus provides the lead co-ordination role in the region.

ForSec's mission is to enhance the economic and social well-being of the people of the Pacific Islands, in support of the efforts of national governments. Its responsibility is to facilitate, develop and maintain co-operation and consultation between and among its members on issues such as trade, economic development, transport, energy, telecommunications and other related matters. It seeks to support its members in pursuing their objectives through multilateral fora.

ForSec is assessing developments in the Asia-Pacific Economic Co-operation (APEC) process and represents its members on the Pacific Economic Co-operation Council (PECC). It maintains a direct practical role with key regional donors, including the European Union (EU).

The **Secretariat of the Pacific Community (SPC)**, with 27 members, is one of the major general development agencies in the region. Under its apolitical mandate, it provides advisory, consultative and training services to governments on scientific, economic, social, environmental, health, agricultural, rural development, community health, education, demographic, and cultural matters. Its broad marine experience ranges from village-level and coastal projects such as transfer of appropriate boat-building technology, subsistence and artisanal fisheries research and development, coastal fishery stock assessment and protection, all through its Coastal Fisheries Programme, to scientific research on oceanic fisheries, especially tuna and billfish, in its Oceanic Fisheries Programme. The latter prepares an annual report on the status of tuna stocks, monitors and compiles regional tuna fishery statistics, and is studying the dynamics of the Warm Pool of the Western Pacific, a large marine ecosystem (LME) that encompasses much of the region. The SPC works closely with the Forum Fisheries Agency (FFA) in this area.

The **Forum Fisheries Agency (FFA)** was established following the Forum Fisheries Convention (FFC) in 1979, and serves as the FFC's secretariat. The FFA developed from the consideration that a regional approach would be an effective way for Pacific Island countries to capitalise on opportunities created in the mid-1970s by the Third United Nations Conference on the Law of the Sea. UNCLOS III dramatically altered international thinking on ownership, management and use of ocean resources. FFA's 16 members include 14 Pacific Island nations, Australia and New Zealand but, purposely, no distant water fishing nations (DWFNs). For fisheries issues, this difference between FFA and SPC in eligibility for membership is an important distinction. FFA's objective is to assist members with sustainable development and management of their fisheries and related activities. FFA advises members on, e.g., maritime boundary delimitation, legal, technical and economic issues, monitoring and surveillance of foreign fishing activity, human resource and institutional strengthening, applied fisheries research, policy assessments, and representation at international fisheries meetings. FFA is developing opportunities to increase member country involvement in existing foreign-based operations.

The **South Pacific Applied Geoscience Commission's (SOPAC)** overall mandate is to assist its members in assessment, exploration and development of their nearshore and offshore mineral and other marine non-living resource potential. Its work also includes baseline data for coastal engineering and development, hazard evaluation, assistance and training for local hydrography, and "lands and survey"-type activities. SOPAC advises Pacific Island states on environmental effects of physical modifications to the coast. SOPAC has regional responsibility for the water and sanitation sector; it co-ordinates with SPC on health-related issues and SPREP on pollution issues.

The **University of the South Pacific (USP)** was created by royal charter. It is governed by the University Council comprising representatives from its twelve member countries. USP provides tertiary education, undertakes scholarly and applied research, and is closely involved on educational matters with the Pacific Island governments, in most of whose countries it has a branch. In the marine sector, USP features a Marine Studies Institute and Programme and co-operative projects with other regional intergovernmental agencies such as FFA and SOPAC. Environmental and pollution monitoring and environmental impact assessments are significant activities of the Institute of Applied Science. The International Ocean Institute undertakes training for regional personnel in marine and coastal management issues.

The **South Pacific Tourism Organisation (SPTO)** is jointly owned by its 12 member countries. Its role is to work with national tourist offices, international airlines and tour operators to increase visitor arrivals in the region, to market and promote tourism, and to help the private sector enhance the quality of their products and services through a variety of programmes on training, tourism awareness and preservation of the environment. TCSP's other services include production and distribution of South Pacific travel manuals and guides in English, French and German to the travel industry worldwide, organising regional participation at international travel exhibitions, maintaining an Internet site (SPICE), and the collection and dissemination of tourism statistics, sector reviews, environmental guidelines, and visitor surveys to the region.

The **Pacific Islands Development Programme (PIDP)** has 22 members. It draws academic resources from regional and international organisations to plan and conduct projects mainly concerned with private sector development, senior-level private and public sector management training, formulation of national development policies and strategies, and publication of research results on these topics.

The **South Pacific Regional Environment Programme (SPREP)** is the regional technical and co-ordinating body responsible for environmental matters in the Pacific region. Its membership comprises 26 Pacific Island States, territories and metropolitan countries, all of whom have agreed that their mission in this organisation, facilitated by its secretariat, is to promote co-operation in the South Pacific region and to provide assistance in order to protect and improve its environment and to ensure sustainable development for present and future generations. SPREP shall achieve these purposes through the Action Plan adopted from time to time by the SPREP meeting. The Action Plan sets out the strategies and objectives of SPREP. The Action Plan for 1997-2000 was adopted at the Ninth SPREP meeting in November 1996. Its principal goal over the four-year period is to build national capacity in environmental and resource management through support to government agencies, communities, non-governmental organisations, and the private sector. SPREP also serves as the secretariat for the Apia and Nouméa Conventions. It will also serve as the secretariat for the Waigani Convention when it enters into force.

NOTES

¹ Derived from information provided by Amelia Kinahoi Siamomua, Development Co-operation Adviser, Forum Secretariat, Suva, Fiji.

PLENARY ADDRESS

FROM THE RHODIAN SEA LAW TO UNCLOS III

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HISTORICAL DEVELOPMENT OF THE LAW OF THE SEA

Ancient and medieval law of the sea contained little or no rules that would be considered public international law from today's viewpoint. The important and often cited collections of the law of the sea, the Lex Rhodia, the Rôles d'Oleron or the Visby Rules (to name only a few), were primarily concerned with the legal regulation of sea trade. They thus constituted mainly what today would be called rules of maritime law. Those rules emanated from the customs of seafaring merchants and others who participated in maritime trade, filling the gap left by a lack of state-sponsored legislation. Nevertheless, such rules managed to gain widespread acceptance over the centuries. Already the Roman Empire basically only incorporated the law of the sea that had been developed since about 800 BC on the island of Rhodes into its own set of laws. The Lex Rhodia influenced the development of maritime law during the Middle Ages. Some rules from the Lex Rhodia, such as the rules concerning general average (*große Haverei*), can still be found in many jurisdiction's maritime law.

The fact that all known law of the sea of Antiquity and the early Middle Ages contained only private law could be taken as an indication that the States at the time were not especially interested in extending their jurisdiction over the seas. Instead, the sea was left to merchants and their trade. However, it remains doubtful if this general behaviour amounted to a freedom of the seas in a legal sense as it is difficult to trace whether the States considered themselves obliged to respect this freedom. Although, for example, Roman law contained rules according to which the sea was to be considered as free and not capable of being appropriated by anyone, the Romans also considered themselves to be masters of the whole Mediterranean. In the Roman conception, this sea was *mare nostrum*. It has to be asked, however, if this idea was more than the taking over of a policing responsibility by the Roman Empire, as it did in Pompeius' successful fight against piracy in 67 BC.

CHALLENGING THE FREEDOM OF THE SEAS

Real challenges to the freedom of the seas – irrespective of whether it was a legal or only a factual one – unfolded with the rise of new seafaring powers in the Middle Ages. Venice being of paramount influence in the south, the Hanseatic League, Denmark and Sweden in the north, tried to establish a position of predominance in their respective seas. The Age of Discoveries saw the rise of other countries to sea power: Spain and Portugal came first, later followed by the Dutch and the English. While earlier quests for sea dominance were aimed at sea areas close by (like the Adriatic Sea in the Venetian case), now the sea powers were struggling for global dominance. Thus, Portugal and Spain divided the Atlantic Ocean between themselves in the 1494 Treaty of Tordesillas. This soon met with opposition from other seafaring nations which realised the potential of overseas trade and the effect the dominance of one or two powers over the oceans could have upon it.

The English and the Dutch extended their overseas operations, getting into conflict with one another and with the Iberian powers. The English case also shows how much the position of States on the question of the freedom of the seas depended upon their maritime interests. As long as England opposed foreign efforts to achieve sea dominance, it was a fervent advocate of the freedom of the

seas. However, as England developed into the pre-eminent sea power, its attitude changed. The acquisition of sovereignty over the sea was now considered possible with the consequence that the sovereign could exclude others from the use of the sea. In this situation the Dutch authorities published in 1609 the book *Mare liberum* which had been written a few years earlier by the Dutch lawyer Hugo Grotius. Grotius argued that the sea was not capable of being subjected to the sovereignty of any State. The book provoked England to publish in 1635 a counter-study by John Selden with the title *Mare clausum* in which Grotius' views were opposed. After having reached a pre-dominant position at sea, England lost its interest in safeguarding the concept of *Mare clausum*. In times of increasing trade it considered it beneficial to its interests if the use of the sea was as unrestricted as possible. By supporting the freedom of the seas again it promoted the general acceptance of this principle at the dawn of the 19th century.

EXPANSION OF COASTAL STATES' CLAIMS

With the recognition of the freedom of the seas, coastal States – seeking protection of their territory – started to claim territorial waters around their coastlines which were to be under their sovereignty. This marked the beginning of a process that led to the establishment of an abundance of zones covering wide parts of the sea today. These zones provide for preferential or exclusive coastal State rights or even full sovereignty in the respective areas. Thus, with the general recognition of the freedom of the high seas, a connected process started that widely reduced the areas to which that principle applied.

The history of the law of the sea in the 20th century, especially after World War II, saw an immense acceleration of this process. It has been described as “terraneisation” of the oceans as sea areas were now more and more subjected to similar regimes as State territories. The discovery of vast reserves of natural resources in the seabed and the increasing importance of fisheries led to the seas being perceived mainly as a supplier of resources. Thus, States wanted to gain exclusive rights over as much of the resource-rich areas as possible. The proclamations of continental shelves by a number of States from 1945 onwards were only the beginning. The 1958 Geneva Conventions on the Law of the Sea did not effectively slow down the process of coastal States' rights being constantly extended seawards. The “creeping jurisdiction” had just begun. There were calls for exclusive fishery zones, and the seaward limits of the continental shelves were extended further and further.

THE 1982 UNITED NATIONS CONVENTION ON THE LAW OF THE SEA AND BEYOND

These tendencies, together with the idea of establishing a New International Economic Order that should lead to a more equitable global distribution of wealth, were the incentives for convoking a further international conference, the Third UN Conference on the Law of the Sea (UNCLOS III). One of the aims of UNCLOS III was to find a compromise between the interests of individual States on the one hand and those of the world community as a whole on the other. The deep-sea bed was declared the “common heritage of mankind”, even before the conference had started, and once again the validity of the freedom of the high seas was emphasised. Since that time, the concept of “common heritage” – which basically accords rights and responsibilities in respect of certain resources or areas to the world community as such – has found acceptance in fields outside the law of the sea.

The outcome of UNCLOS III, the 1982 UN Convention on the Law of the Sea, considerably extended the rights of coastal States to the detriment of the global commons although their legal position in theory was reinforced. On the other hand, the 1982 Convention also signified a remarkable development of the law of the sea, with the introduction of a sophisticated system for the settlement of disputes and the establishment of the first international court dealing exclusively with law of the sea matters, the International Tribunal for the Law of the Sea. Of further importance are the provisions of the 1982 Convention enabling an improved protection of the marine environment.

Due to the fact that some major industrial powers had strong reservations about some rules contained in the 1982 Convention, especially the deep-sea bed regime, it was only in 1994 that the Convention reached the necessary number of signatories for its entry into force. This was mainly achieved by the Agreement on the Implementation of Part XI of the 1982 Law of the Sea Convention. The Agreement brought considerable changes to this regime by favouring a free market approach, thus facilitating accession of industrial countries to the 1982 Convention.

In 1995, an additional agreement implementing the 1982 Convention was concluded, the Straddling Stocks Agreement. Its aim was to overcome problems with the management of fish stocks that cross borders of jurisdiction. The 1982 Convention had left many of the related problems unsolved. Although their regulation was necessary in order to assure the sustainable development of such fish stocks, the Straddling Stocks Agreement meant a further increase of coastal States rights in relation to fisheries, one of the uses guaranteed, in principle, to all States by the freedom of the high seas.

WORKSHOP 1: EUROPEAN SEAS

*Convenor: Prof. Peter Ehlers
Provocateur: Prof. Hans von Storch
Rapporteur: Dr. Jürgen Schulz-Ohlberg
Report of Workshop 1: Florian Wegelein*

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CONCLUSIONS

INTRODUCTION

Workshop No. 1 convened under the chairmanship of Prof. Dr. P. Ehlers, President of the Federal Maritime and Hydrographic Agency. The sixteen lectures and discussions touched on a variety of issues and aspects of the European Seas in the areas of sustainable use of the oceans and the marine environment.

Dr. Dik Tromp, Senior Advisor at UNEP, reported on the role of EuroGOOS (European branch of the Global Ocean Observing System) in providing ocean data for forecasts, numerical computer models and management decisions in real time as a supplement to data sets of intermittent scientific research cruises and experiments. As a collaboration of sixteen countries, EuroGOOS focuses on Europe's regional and shelf sea areas and adjacent zones in the Atlantic and Arctic Ocean using *in situ* instrumentation, floats, and ships, as well as space observation systems.

Dr. Klaus-Günther Barthel, officer at the DG Research of the EU-Commission, examined the economic implications of marine scientific research. Different programmes of the European Commission ensure and enhance marine research with a view to its significance for the European industry, for the solution of societal problems, and for the scientific community as a whole. Programmes in operational oceanography, biotechnology, instrumentation, and fisheries/aquaculture receive special attention. The EU strategy of creating a European Research Area to foster links between research, policy making and society emphasises marine research topics with a view to the application of the precautionary principle and sustainable development.

Prof. Dr. Gerold Wefer, University of Bremen, Geological Sciences, expanded on the necessity for an integrated marine science plan for Europe.

Dr. Christian Stienen provided an overview of the historic development and present state of German marine science. He also reviewed an new integrated marine research programme scheduled to be launched in 2001/2002 with, among others, a focus on the oceans' role in climate variability and biodiversity.

Dr. Arne Nielsen, Royal Danish Administration of Navigation and Hydrography, proposed the introduction of a European marine information highway to enable sustainable use of the seas. He pointed out that while political issues may pose difficulties, copyright, pricing and liability must not be underestimated as barriers to free access to hydrographic data sets. He called for broader co-operation between European hydrographic services and commercial manufacturers and distributors.

Prof. Dr. Hartmut Grassl, Max Planck Institute for Meteorology and Climate Research, described the rather particular climate situation in northern Europe. This example served as the basis for a discussion of various ocean/atmosphere models for accelerated global warming.

Prof. Dr. Roland Salchow, Federal Maritime and Hydrographic Agency, reported on the findings of the OSPAR Commission for the Northeast Atlantic. The Commission reports that pollution has, but for a few exceptions, not increased during the last five years. The report identifies hazardous substances and harvesting of fish stocks outside the biological safe limit as important issues for future action.

Prof. Vladimir Efimov, Marine Hydrophysical Institute, Ukraine, contributed an account of the current environmental status of the Black Sea and emphasised its importance for the riparian countries as well as for other regions. He suggested the Black Sea may serve as a "laboratory" basin for anthropogenic impacts on the environment and climate. In view of environmental changes in this region, he calls for an effective environmental management regime.

Dr. Francesco Civili, Regional Seas Programme of UNEP, provided an overall picture of the Mediterranean Sea's environmental status. He outlined the responses to the various pressures, especially to land-based activities under the 1996 Barcelona Convention and the 1997 Strategic Action Programme stressing the Global Environment Facility's role in the process.

Dr. Ulrich Kremser, Helsinki Commission (HELCOM), recounted ten years of co-operation under the Joint Environment Action Programme for the Baltic Sea and recapitulated the achievements of the concerned governments and organisations in implementing the Programme's long-term series of coordinated actions. He sees applied research and public awareness as the focus of HelCom's work and concludes that adjustments to changes in policy, economy and the environment, as well as the identification of obstacles and the definition of activities, remain the major challenges facing the Commission.

Dr. Fritz Holzwarth, Federal Ministry of the Environment, outlined key aspects of German marine environmental protection policy. He suggested the core issues are the oceans' importance to the global climate process and the world food supply. He identified land-based sources of pollution as well as illegal disposals, marine accidents, non-indigenous species, and over-fishing as the main risks facing the world's oceans. While, according to him, an international global marine conservation policy is emerging, European conservation policy is non-existent, thus Germany's objectives may be best pursued by regional co-operation.

Prof. Dr. Gerd Hubold, Federal Research Centre of Fisheries, commented on the European fishing industry, whose existence is threatened by a deteriorating environment and over-capacity. In order to preserve the fisheries as a socio-economic factor, he proposed a change from the traditional "maximum yield" approach to a model where the fishing industry becomes responsible for sustainable management under the control of the public sector.

Stefano Belfiore, Centre for the Study of Marine Policy, University of Delaware, provided an overview of the International Oceanographic Commission/International Geographic Union's Oceans 21 programme. Oceans 21 aims to implement an interdisciplinary approach of natural and social sciences to contribute to the conceptual and technical background of integrated coastal management. By way of *Dossiers*, the programme will supply educational tools on various issues of integrated coastal management.

Prof. Yang Jinsen, China Institute for Marine Affairs, outlined the Chinese approach of ecological-economic management of the coastal zone. Severe environmental damage, the decline of marine fishery resources, and population pressure in coastal areas makes for a special situation in China which may be remedied by a property right system in accordance with the capital theory of ecological resources. Regionalisation and systematisation, plus ecologically-sound industrial development, are further aspects of this model.

Dr. Joachim Schwarz, Hamburg Ship Model Basin, described the International Northern Sea Route Project which explored the economic feasibility of the Northern Sea route as an alternative to the traditional trading routes between Europe and Asia.

Prof. Michael Orren, Consultant Geographer, Ireland, gave an overview of Ireland's geographic characteristics in relation to the sea and its national organisations concerned with matters of the sea.

PRESENTATION SUMMARIES

EUROPE AND THE OCEAN

A European Approach to Ocean Observation

Dr. Dik Tromp

Senior Advisor

United Nations Environmental Programme

Europe needs ocean data, and interpretations and forecasts based on ocean data, to meet numerous practical objectives. The Global Ocean Observing System (GOOS) has been under development since the Second World Climate Conference in 1990, and is now in the early stages of implementation.

Within GOOS, European national agencies have established EuroGOOS to gather ocean data in an operational mode, supplementing existing programmes of data gathering in the scientific research mode where data are gathered through discontinuous cruises and experiments. Europe needs operational ocean data, often gathered and processed in real time, to run numerical computer models, and to provide forecasts and management information.

These information products provide socio-economic benefits on all time scales, from hours to decades, and can be applied in numerous sectors of activities such as coastal protection, fisheries, pollution control, flood prevention, navigational safety, and offshore oil and gas production. Physical and bio-ecological models also provide the basis for environmental management, and help to forecast the mechanisms and effects of climate change and global warming.

EuroGOOS Members from 16 countries collaborate to use *in situ* instrumentation, sub-surface profiling floats, ship-borne instruments, and observations from space in a long-term programme of sustained observation and modelling. All data can be exchanged between Member Agencies in real time within the terms of the EuroGOOS data policy.

EuroGOOS focusses its efforts by having specialist Task Teams working in each of the regional and shelf sea areas, with additional zones of activity dedicated to Atlantic and Arctic observations and modelling.

Is Marine Science an Economic Factor in Europe?

Dr. Klaus-Günther Barthel

European Commission

DG Research

Research in Europe is funded by a multitude of institutions, both directly by research performers including industry, and indirectly through research grants and contracts awarded by public and private bodies. By specifically supporting international collaboration, the European Commission contributes ca. five percent of the annual spending on research in Europe. This research is directed to increasing the competitiveness of European industry, to solving societal problems of a European nature, and to creating a coherent, mobile and highly skilled community of European researchers.

Within the current Fifth Framework Programme, support to marine research is provided in the Quality of Life Programme (fisheries, biotechnology), the Competitive and Sustainable Growth Programme (exploration and transport technologies), and the Environment and Sustainable Development Programme (research technologies, forecasting, global change, ecosystems).

Although there is a clear increase in participation of small and medium enterprises in European marine research projects from the Fourth to the Fifth Framework Programme, participation of industry is still relatively low. Topics of particular interest for industry are operational oceanography, biotechnology, instrumentation, and fisheries/aquaculture. The establishment of a common market in Europe was an important prerequisite to allowing development of competitive technological products. Participation in European research projects helps to establish a Europe-wide marketing strategy.

The development of an EU strategy for creating a European Research Area (ERA) in the coming years aims, *inter alia*, at strengthening the link between research activities, policy making and the needs of society. This will reflect positively on the development of industry-relevant marine research topics in the upcoming Sixth Framework Programme. Further, it will generate the necessary background knowledge for the application of the precautionary principle and the sustainable development approach in environmental research.

The European Science Plan

Prof. Gerold Wefer

Geological Sciences

University of Bremen

Public awareness of the oceans, of their importance to mankind, and of the complex issues raised by their exploitation and protection, appears to be increasing in Europe.

In this context, the European Science Foundation (ESF) Marine Board is developing a vision on marine science for the next decade. This vision integrates all relevant dimensions of the natural and social sciences and the concerns of all end users of European Seas, and takes into account that marine research is a major component in the understanding of the earth system. Accordingly, the ESF Marine Board has embarked on preparing a marine science plan for Europe, the main objective of which is to guide European and national decision makers in formulating their priorities. As a first step, this report outlines a new strategic context to prioritise and co-ordinate future European research in the marine environment and the most important research, technology and development issues of relevance to Europe. The second stage of the work, a full-scale Marine Science Plan, will be produced after extensive consultation with all interested parties.

At the EurOCEAN 2000 Conference, 29 August - 2 September 2000, Hamburg, two sessions organised by the ESF Marine Board were dedicated to discussing the strategic and scientific issues of a marine science plan for Europe. Participants fully endorsed its concept and challenges posed in the plan.

The key drivers for marine science and technology are the political and socio-economic concerns related to the sustainable exploitation of marine resources and the dominant role of the ocean in climate change. Additional impetus is provided by the ocean being the ultimate frontier of the planet earth and by promising technological developments.

The plan identifies eight thematic scientific challenges for priority action:

- sustainable exploitation of living and non-living resources
- understanding and predicting the role of the ocean in climate variability
- understanding and managing the diversity of European coastal systems
- forecasting oceans and the state of ecosystems

- quantifying the role of the ocean in global carbon dynamics
- marine ecosystem health and biodiversity
- dynamics of the ocean crust and sea floor processes
- new technology opportunities

In considering these major scientific challenges, we will take into account several strategic issues:

- The need to link national and European programmes: this should be considered in the framework of the initiatives of the ESF, the emerging European Research Area, and the forthcoming European Union enlargement.
- The regional dimension of European marine research, imposed by the diversity of European seas, and its potential for integration in global programmes: this offers the possibility of dealing with a variety of “case study areas” and bringing together different disciplines.
- The planet earth as a “system” in which oceans, atmosphere and land surface are in constant interaction: this implies an integration of marine science in the larger context of global environment change and sustainable development.
- The requirement for long-term observations to track climate change and enable operational forecasts of the marine environment, and the resulting need for commitments over appropriate time scales: co-ordination and long-term commitments will have to be developed between ministries and agencies with responsibilities in marine affairs.
- The interdisciplinarity of marine science, associating natural and socio-economic disciplines, as well as academia and industry.
- The need for an ethical framework to guide sustainable exploitation and experimentation in the ocean.

The Member Organisations of the ESF Marine Board are dedicated to fostering the implementation of the Marine Science Plan presently under development. However, this also requires special efforts at the European level in the spirit of the European Research Area. This implies that marine research should be an integral element in the Sixth Framework Programme.

German Marine Science – A Case Study

Dr. Christian Stienen

Ministry for Education and Research
Germany

Marine research must be independent and autonomous if it is to be able to obtain results which, in the final analysis, will help to achieve more sustainable use of marine resources and better protection of the oceans.

International marine science has reached a point where many issues can only be tackled through joint international efforts. In the future, collection of data will be operationalised using special observing systems. Implementing such systems will far exceed the financial possibilities of any individual country.

Since there will be only a slight increase in research funds over the next few years, it is necessary to intensify co-operation by agreeing upon an European Science Plan. We must also make better use of and selectively develop European marine research infrastructure.

In addition to its participation in European and international research programmes, Germany will, in the next decade, expand co-operation with numerous countries in Asia and South America. We will conduct joint research projects in the coastal zone of these countries. Under the new German marine research programme, we will invite young scientists from these countries to Germany for training as part of international co-operation in marine science as stipulated in Part XIII of the United Nations Convention on the Law of the Sea.

North Atlantic and European Climate

Prof. Hartmut Grassl

Max Planck Institute for Meteorology and Climate Research

Europe experiences, especially in the northwestern part, strong above average warmth due to the deep convection in the ocean around Greenland. This advantageous situation has often been interrupted in climate history, the last such event being the so-called Younger Dryas period 12,000 to 11,500 years ago.

Coupled ocean/atmosphere models indicate a weakening of the North Atlantic Deep Water formation. A recent higher resolution study shows, however, a feedback related to El Niño events that might reduce the threat of rapid climate change in the European sector during an accelerated global warming caused by the burning of fossil fuels worldwide.

THE MARINE ENVIRONMENT IN EUROPE

The Quality Status of the Northeast Atlantic

Dr. Roland Salchow

Germany

Since the 1970s, the Oslo-Paris Convention, now the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), sets the international framework for marine environmental politics for the northeast Atlantic (including the North Sea). The convention was signed by twelve European governments and the European Union. It aims to *prevent and eliminate pollution* by providing assessments of the quality status of the marine environment. After six years of work, the first convention-wide Quality Status Report (QSR) was launched in June 2000. This QSR is the first international attempt to document such a comprehensive inventory of physical conditions, human activities at sea and on land, and chemical and biological effects in the marine environment for such a large area.

The central message of the QSR on the actual status, after decades of rising contamination, is the *worsening trends in the pollution have been reversed*. Many significant sources of pollution have been stopped. Fisheries management systems have been established. Ten years ago, incineration and dumping at sea were terminated – now we see the positive results of measures taken on land by both OSPAR and the European Union (EU).

However, the picture is not *all* positive. In spite of the reversed trend, the marine environment is still threatened and action must be taken to address these adverse impacts. Fisheries activities continue to affect fragile ecosystems. Many contaminant concentrations are too high, particularly in coastal regions. The QSR identified the following pressures on the marine environment:

1. The most important issues are **fisheries** and **hazardous substances** (as endocrine disrupters).

2. Other general important issues are **marine biodiversity and ecosystems, radioactive substances, eutrophication, oil spills, and discharges of ballast water** from shipping.
3. Other issues of significance in specific regions include **hazardous substances** (organochlorine pesticides and PCBs) in the North Sea; **offshore activities and mariculture** in the North Sea and Celtic Sea; and the impacts of **coastal development** along the Celtic and Irish Seas, Bay of Biscay and Iberian coasts.

OSPAR and the EU have begun deliberations over phasing out hazardous substances over a 20-year period (according to an OSPAR decision in 1998). QSRs serve as an interface between science (assessment) and politics (measures).

The Development of the Black Sea Area

Prof. Vladimir Efimov

Ukraine

The Black Sea is extremely important to the six riparian countries and for about 150 million people living in its catchment basin. However, the Black Sea is among the most contaminated basins of the world's oceans. The environmental crisis in the Black Sea results from anthropogenic causes and is manifested by the dramatic changes in its ecosystem and resources. The oil pollution burden in the Sea will only increase.

The Black Sea is of global interest as it serves as a natural warning for other regions of the world. It is also a suitable "laboratory" basin for studying the impacts of anthropogenic, geophysical and climatic problems in the marine environment.

During the last five to seven years, several regional environmental/oceanographic programmes have been established in the region, including the Black Sea Environmental Program, the Environmental Programme for the Danube River Basin, the Azov Sea Project, Tracer Applications, the Co-operative Marine Science Programme for the Black Sea, the Black Sea Regional Programme, Black Sea Regional Programme (IOC), the NATO TU-Black Sea Project, and the NATO TU-WAVES Project. A new programme, the Black Sea Ecosystem Processes and Forecasting/Operational Database Management System, combines the efforts of scientists and institutes from the six riparian countries. As these and other studies show, the Black Sea needs increased vigilance and effective environmental management due to the current environmental and climate changes. These programmes and others provide us with a new understanding and perception of the environmental characteristics of the Sea. They also provide us with the possibility of collecting interdisciplinary data and will serve as a baseline for future activities.

The Mediterranean Marine Environment: State, Pressures and Measures Taken by the Mediterranean Action Plan

Dr. Francesco Civili

Mediterranean Sea Regional Seas Programme

United Nations Environment Programme

There is a wealth of diverse data on the state of the extremely complex marine and coastal environment of the Mediterranean basin. This presentation will provide an overall picture of the state of the Mediterranean marine environment, highlighting the problems, their sources and the measures taken by the Mediterranean Action Plan to rectify these issues.

The overall state of the open waters of the Mediterranean, based on the information available to date, is considered to be generally good. Marine ecosystems still seem to function well, and the Mediterra-

nean Sea is still characterised by a high diversity of marine species. Closer to land, natural characteristics such as circulation patterns, combined with pressures deriving from coastal anthropogenic activities create, in several cases, adverse local environmental impacts which could be persistent.

In contrast to the general state of the open sea, only a limited area of the coastal zone still remains unaltered. Incidents of localised eutrophication phenomena, heavy metal pollution, microbiological contamination, oil spills, and introduction of non-indigenous species are mainly the results of pressures from intensive human activity coupled with rapid population growth and/or urbanisation in many parts of the region.

Land-based activities represent the main source of pollution into the Mediterranean Sea, possibly as high as 80%, although many uncertainties remain regarding the respective contribution of each specific land-based source, the different fluxes (rivers, atmosphere, non-point sources, etc.) as well as the fate of the contaminants they generate. The intensity of demographic pressure, the nature and intensity of development activities, and the state and type of industry and agriculture are some of the factors contributing to each country's unique pollution problems. It is possible to identify municipal and industrial wastewater, urban solid waste, agricultural runoff, hazardous wastes and atmospheric deposition, as the main land-based sources of degradation of the Mediterranean marine environment.

In 1996, the riparian States of the Mediterranean Sea and Contracting Parties to the Barcelona Convention signed a revised Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities (LBS Protocol). Under the LBS Protocol, the Contracting Parties agree to take measures to prevent the degradation of the Mediterranean Sea area caused by land-based sources and activities within their territories, including discharges from rivers, outfalls and coastal establishments. Priority is given to the phasing-out of inputs of substances that are toxic, persistent and liable to bioaccumulate.

One of the major breakthroughs initiated by the adoption of the LBS Protocol is the commitment by the Contracting Parties to prepare and adopt a Strategic Action Programme (SAP) of national and regional activities for the elimination of pollution from land-based sources.

The Strategic Action Programme was signed by the Contracting Parties in 1997 and is the basis for the implementation of the LBS Protocol by the Mediterranean Action Plan over the next 25 years. The SAP sets out a timetable for reaching specified targets and for implementing the strategies and measures proposed for key issues. The SAP aims to assist the Contracting Parties to strengthen the legal, technical and administrative basis for the implementation of the LBS Protocol. This will involve the incorporation of clean production, and the application of best available environmentally-sound techniques and best environmental practices.

The activities scheduled for the biennium 2000-2001 establish the infrastructure for the implementation of the SAP and provide the tools necessary for initiating the priorities established under the LBS Protocol. These activities include the preparation of seven regional guidelines, a regional strategy for the management of hazardous wastes, seven capacity-building activities, a regional workshop on public participation, and the preparation of national activities in five priority areas for action. Implementation of the national action programmes (NAP) represents the operational long-term result of the Strategic Action Programme, as the NAPs are supposed to reach the SAP targets by using the recommendations for all the individual activities identified in the SAP.

The Joint Environment Action Programme for the Baltic Sea

Dr. Ulrich Kremser

Helsinki Commission

Ten years ago, the Cold War terminated and the atmosphere in the Baltic Sea Region changed towards co-operation. The riparian States took the chance to restore the Baltic Sea to a sound ecological balance by developing an action programme, the Joint Comprehensive Environmental Action Programme (JCP). The strategic approach of the JCP is based on identifying significant pollution sources ("hot spots") within the entire catchment area of the Baltic Sea and on implementing measures to decisively reduce emissions and discharges of nutrients and harmful substances affecting the Sea. The JCP stresses the need for a long-term series of co-ordinated actions by each concerned government covering all key sectors, such as environmental policy, institutional strengthening, investment activities, and public awareness. The focus, however, is on investment activities to upgrade and reconstruct industries, as well as on reduction of pollution from agricultural sources. The investments needed for prevention and curative actions, as estimated in 1991/92, amount to 18 billion ECU.

A Programme Implementation Task Force (PITF) was established in 1992 to initiate and co-ordinate implementation of the JCP. Members are the Contracting Parties to the Helsinki Commission (HELCOM), other countries in the catchment area of the Baltic Sea, the International Baltic Sea Fishery Commission, as well as six international financial institutions (IFIs). Other institutions and organisations contribute as observers.

Remarkable progress has been made in implementing the Programme. The success is partly reflected by the deletion of nineteen hot spots (out of 132) from the original list of hot spots and by the decisive reduction of emissions and discharges of nitrogen, phosphorus and other substances into Baltic Sea waters. An additional seven applications for deletion of hot spots are to be checked against compliance with the technical standards in the near future. These achievements are primarily based on a broad partnership between governments, IFIs, non-governmental organisations and others, and on the ability to adjust the Programme and working methods of HELCOM and the PITF to changes in policy, the economy, and the environment.

Key Aspects of German Marine Environmental Protection Policy

Dr. Fritz Holzwarth

Ministry for Environment

Germany

Humankind has exploited the oceans in an erroneous belief in the inexhaustibility of their resources and their boundless capacity for regeneration. This belief translates into great risks and substantial adverse consequences for the marine environment. Yet we cannot deny the outstanding importance of the oceans for global equilibrium.

Oceans are of central importance in the global climate process. Oceans are one of the most important sources of protein yet world fish stocks are in an alarming state. Risks to the marine environment include a wide range of activities such as illegal disposal from shipping, marine accidents, anti-fouling agents such as TBT, accidental introduction of foreign organisms, oil inputs from offshore platforms, worldwide overcapacity in fishing, negative impacts of fishing on species and habitats, and transport of persistent substances such as PCBs to remote polar regions.

Marine conservation policy has increasingly been pursued on a global scale. The United Nations Informal Consultative Process on the Law of the Sea (UNICPOLOS) aims to improve links between existing structures and organisations, promote co-operation and establish networks. In Europe, ma-

rine conservation policy is pursued through regional co-operation (e.g., Northeast Atlantic, North Sea, Baltic Sea and the Mediterranean). European Union directives are important where they have an impact on the protection of the marine environment.

In Germany, marine environmental protection objectives cannot be met through national efforts alone, but only through intensive regional and international co-operation, primarily through regional and international conventions. For Germany, regional co-operation is the most effective means of achieving its objectives in marine environmental protection policy. Priority issues for Germany, and the region, are the impact of dangerous substances, offshore platforms, shipping, and fisheries in the marine environment.

SUSTAINABLE USE OF THE SEAS

Towards a European Marine Information Highway

Dr. Arne Nielsen

Royal Danish Administration of Navigation and Hydrography

Over the past ten years, it has become common knowledge that the wealth of information contained within nautical charts is of value not only to mariners, but also to many other users in marine industries including coastal zone managers, the offshore industry, and manufacturers of equipment. Government agencies dealing with physical planning and environmental issues are also users of hydrographic information.

The growing demand for high-resolution hydrographic data sets from these new user groups is a challenge for hydrographic offices. Hydrographic offices have learned that there is an established demand for the type of data held in their databases. In distributing this data, hydrographic offices must resolve emerging problems related to copyright and pricing. Awareness of the value of these databases has grown in line with the development of the electronic navigational chart, including the electronic chart and information system, the so-called ECDIS. Meeting these challenge will require broad co-operation between European hydrographic offices and commercial distributors.

On example of such co-operation is the Marine Information Service Database (MISD) project, a joint Norwegian, Icelandic, Danish and United Kingdom enterprise initiated by the Norwegian Hydrographic Service. All hydrographic offices in the countries around the North Sea have responded positively to an invitation to participate in the project. The MISD project serves professional mariners and fishermen, as well as user groups not familiar with the use of an electronic chart system. MISD will provide access to hydrographic data sets so that these data sets may be integrated into geographical information systems.

Fisheries and Sustainability

Prof. Dr. Gerd Hubold

Sea Fishery Institute

Federal Research Center of Fishery

Hamburg, Germany

By the turn of the 20th/21st century, a worldwide over-capacity of high technology fishing equipment is threatening the sustainable use of wild-living fish stocks in the oceans. At the same time, anthropogenic impacts deteriorate the marine environment and imminent climatic change may alter the biological processes in marine ecosystems to an unknown extent.

In the face of this two-fold challenge, the fishing industry, fisheries science, and fisheries managers have to depart from the traditional single-species “maximum yield” approach. An ecologically and socio-economically oriented “network for responsible fishing” with revised tasks for the stakeholders must be developed. New approaches to fisheries management have to consider models of resource privatisation by leasing or licensing schemes.

Under such schemes, the fishing industry should be responsible for the sustainable management of their exploited fish stocks and the maintenance of the ecosystems on which they depend, according to the standards set and supervised by society. Public responsibility could then be focussed on the strategic research and monitoring necessary to define and control the ecological and economic threshold criteria for sustainable use of marine ecosystems.

The IOC/IGU Oceans 21 Programme

Stefano Belfiore

Center for the Study of Marine Policy
Graduate College of Marine Studies
University of Delaware

Oceans 21 is a co-operative project between the International Geographical Union (IGU) and the Intergovernmental Oceanographic Commission (IOC) to promote interdisciplinary co-operation between geography and marine sciences. In this perspective, geography is intended as a discipline bridging natural and social sciences and can be imagined as a four-co-ordinate epistemological matrix incorporating: (1) the subject areas, selected and identified in accordance with the goal of knowledge, (2) the geographical parts of the ocean to which the subject areas are referred, (3) the geographical scales on which research is conducted, and (4) the timing scale to which the processes are referred.

Oceans 21 aims at implementing a complexity-based interdisciplinary approach described as the integration of disciplines on mutual conceptual and logical basis. It is concerned with research, education, and training. The programme is divided in five major areas:

1. Achieving interdisciplinary in integrated coastal management (ICM) research
2. Marine scientific and technological information systems for ICM
3. Methodology development in support to ICM
4. Coastal monitoring systems
5. Training, education and mutual assistance in marine science for ICM

The main outcomes of *Oceans 21* will consist of systems of knowledge for decision makers, managers and planners; conceptual, methodological and technical backgrounds on integrated coastal management; and professional skills for decision makers, managers and planners.

Oceans 21 will generate scientific events, educational and training courses, books (manuals and proceedings), journals, websites, distance learning systems, and CD-ROMs and diskettes. In order to mobilise scientific efforts worldwide, *Oceans 21* will convene a series of *Dossiers* dealing with general and special issues to complement these educational tools. These events and materials will address such ICM issues as coastal erosion management, occupation of the littoral for transportation and reutilisation of abandoned port and industrial areas, coastal fisheries and aquaculture, and coastal tourism.

Ocean Ecological-Economic Management of the Coastal Zone

Prof. Yang Jinsen

China Institute for Marine Affairs

The ecological-economic management model for the coastal zone has several features including:

- Establishment of a new principle of marine policy to deal with international ocean affairs.
- Adoption of positive measures to establish a system of integrated management for marine and coastal zone.
- Participation positively in regional ocean co-operation.
- Establishment by all coastal countries of their own system of integrated coastal zone management and related rules of law.

The Northern Seaway: Chance or Threat?

Dr. Joachim Schwarz

Ice Engineering

Hamburg Ship Model Basin

Over the past ten years, the International Northern Sea Route Project (INSROP), an international group of scientists and engineers from Norway, Russia and Japan, has worked together examining the Northern Sea Route from the ecological point of view.

In 1994, a study on the technical and environmental feasibility of the Northern Sea Route for the German Ministry of Transport concluded that sea transport between Europe and Japan is technically possible, but not yet economical by Western standards. Research and development could, however, change this situation.

A group of European companies and research institutions, mainly from Finland, Russia and Germany, carried out an European Union-sponsored voyage (ARCDEV, Arctic Demonstration and Exploratory Voyage) with the ice-breaking oil tanker UIKKO and two Russian icebreakers. UIKKO carried gas condensate from the Ob estuary to Western Europe. As a result of this voyage, several research tasks were defined to improve the technical and economical transport system in the western Russian Arctic as part of the Northern Sea Route.

CONCLUSIONS

The following conclusions served partly as a basis for the "Hamburg Declaration".

1. The ocean is of paramount importance for Europe:
 - The climate in Europe is strongly influenced by the North Atlantic Ocean.
 - The use of living and non-living marine resources is an important factor in the European economy, i.e., fisheries, marine biotechnology and offshore activities.
 - Maritime transport is indispensable for trade and commerce within Europe, but also between Europe and other parts of the world.
 - The protection of the marine environment is one of the major issues of European ecopolitics.
2. As a result, it is necessary to improve our knowledge of the seas and to learn more about the nature and resources of the oceans and coastal areas, including its geological, physical, chemical and biological processes and aspects. This requires intensive marine scientific research programmes as

well as adequate oceanographic operational services. To achieve this aim the following activities and efforts have to be intensified:

- 2.1 Europe has to implement monitoring of the formation of North Atlantic deep water in a joint effort in order to be able to speak about changes to European climate in a warming world.
 - 2.2 Climate protection, i.e., dampening the anthropogenic climate change rate, is especially important for Europe.
 - 2.3 A European Marine Science Plan, as under development by the European Science Foundation Marine Board, is strongly supported. This Plan seeks to integrate all relevant dimensions of the natural and social sciences and the concerns of all end-users of European Seas, at the same time taking into account that marine research is a major component in understanding the earth system. Communication and co-operation between major international programmes should be enhanced, e.g., under the auspices of the Marine Board of the European Science Foundation.
 - 2.4 Marine research has a clear potential to support industry, mostly small- and medium-sized enterprises, which specialise in the sustainable use of the seas; a common European market and research collaboration is the prerequisite for worldwide activities and competitiveness of such businesses.
 - 2.5 Advances in marine management are conditional upon improved integrated observing systems based upon the use of ocean observing satellites, in situ instrumentation, computer modelling, and data access. Maximum support should be given to the observing programmes in the Atlantic and European coastal seas which are being developed by International Oceanographic Commission (IOC), United Nations Environment Programme (UNEP), the Food and Agriculture Organisation (FAO), World Meteorological Organisation (WMO), International Council of Scientific Unions, International Council for the Exploration of the Sea (ICES), Helsinki Commission (HELCOM), and OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic Council), especially the Global Ocean Observing System (GOOS).
 - 2.6 Europe needs GOOS for operational ocean data, often gathered and processed in real time, in order to run numerical computer models and to provide forecasts and to manage information. These information products provide socio-economic benefits on time scales ranging from hours to decades and can be applied in sectors such as coastal protection, fisheries, pollution control, flood prevention, navigational safety, and offshore oil and gas production. Physical and bio-ecological models will also provide the basis for environmental management, and help to forecast the mechanisms and effects of climate change and global warming.
 - 2.7 EuroGOOS, established by European national agencies, will enhance the implementation of GOOS for European Seas. Such an approach may also serve as an example for other parts of the world.
 - 2.8 The well-established scientific infrastructure provided by the countries co-operating in ICES to conduct co-ordinated marine research in European and North Atlantic waters provides regular high-level scientific management advice on fisheries and environmental matters. Such organisations must be strengthened and developed in other European areas such as the Mediterranean Sea.
3. Due to dense population levels and highly-developed industrial and agricultural activities, the marine environment of the European Seas is particularly threatened. Large marine areas continue to be contaminated by inputs of harmful substances and nutrients from land-based sources, offshore activities and shipping. Substantial efforts are still needed to conserve European marine ecosystems. These efforts include the following:

- 3.1 The close co-operation of riparian States through regional marine environment commissions established by marine environment protection conventions, e.g., Helsinki, OSPAR and Barcelona, has to be continued and intensified. The commissions in existence may serve as an example for marine areas worldwide.
 - 3.2 Regular assessments of the quality status of marine areas (such as for the Northeast Atlantic and the Baltic Sea) , including pollution load compilations and status reports, are needed for all marine areas. They provide a sound basis for evaluating the need for protective measures.
 - 3.3 Regulations to eliminate pollution from all sources are needed for all marine areas. Existing regulations need to be reviewed regularly. The goal of phasing out hazardous substances, as agreed on for several marine areas, should be accepted as a worldwide principle.
 - 3.4 Marine environmental protection measures should not only deal with pollution, but include the issues of nature conservation, coastal zone management and fishery impacts.
 - 3.5 Additional efforts are necessary to ascertain effective implementation of internationally-agreed regulations and measures. Their implementation has to be monitored by the responsible international marine environment commission.
 - 3.6 Environmental action programmes are an appropriate means to strengthen the legal, technical, administrative, and financial basis for implementing protection measures. This includes the development of investment programmes. The programmes developed for the Baltic Sea and for the Mediterranean Sea may serve as example for other marine areas. To strengthen the investment capacity, involvement and support from the business communities and financial institutions has to be improved.
 - 3.7 The Black Sea, which is among the most contaminated basins of the world's oceans, needs increased vigilance and effective environmental management.
4. Sustainability has to become the guiding principle for any use of the seas.
 - 4.1 Implementation of this principle will require better information and establishing marine geographical information services to compile all available data.
 - 4.2 The sustainable use of coastal and marine resources requires an integrated coastal zone management with a complexity-based inter-disciplinary approach. All coastal States should establish an integrated coastal zone management system to achieve this goal. Programmes such as *Oceans 21*, consisting of systems of knowledge for decision makers, managers and planners; conceptual, methodological and technical backgrounds on integrated coastal management; and professional skills for decision makers, managers and planners, are also needed.
 - 4.3 The following actions are recommended to observe the principle of sustainability with regard to fishery practices and management:
 - create a "Network for Sustainable Fishing" with revised responsibilities for the stakeholders
 - establish efficient mechanisms of co-management within the fishing industry, including privatised applied research and management structures
 - develop public strategic research and monitoring of the fisheries and ecosystems for the definition of environmental standards for sustainable and ecosystem-friendly fishing
 - create a system of "results control" and a legal basis for draconian measures to control fisheries in case of infractions (e.g., withdraw licenses, closed areas for fishing)
 - design a strategic plan for the use of the seas to mediate conflicts between fishery and other users, including public interests such as environmental protection and research.
 - 4.4 New demands for maritime transportation such as the Northern Sea Route require thorough research and development activities to avoid additional risks to the marine environment.

WORKSHOP 2: SUBTROPICAL AND TROPICAL SEAS WITH PARTICULAR CONSIDERATION FOR THE NEEDS OF DEVELOPING COUNTRIES

Convenor: Prof. Gotthilf Hempel

Rapporteur: Dr. Mark Wunsch

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Dr. M. Orren (Ireland)

DISCUSSION SUMMARY AND CONCLUSIONS

INTRODUCTION

For the first time, Pacem in Maribus is focussing on Europe, European waters and European issues. Europe, however, is challenged by finding a new way of dealing with the outside World – particularly those tropical and subtropical areas where most people live near the coast. We have to learn what their problems are, what they expect from Europe for the solving those problems, and what they might offer in exchange in terms of experience, research opportunities and resources.

Workshop 2 will deal with these themes. I volunteered to chair this workshop. Why me? For 45 years I struggled for international co-operation and for re-opening German science to the world. I have witnessed the disastrous effects of scientific isolation in Germany since 1933 and during and after the War. I worked for UNESCO and FAO in the 1960s and subsequently in various European and global fora. Many of my graduate students come from tropical and subtropical countries and several of my German students went to those regions during and after their thesis work. Towards the end of my career, I established the Center for Marine Tropical Ecology in Bremen, geared towards partnership and capacity building in various parts of the World.

Workshop 2 focuses on three topics:

1. Exploration, exploitation, and governance in tropical/subtropical seas and coastal regions, with case studies from different parts of the world.
2. Capacity building needs in developing countries.
3. What can industrialised countries, particularly those in Europe, do to meet these needs?

The contributions in this workshop on coastal zone management cover several regions. Those presentations on the Black Sea and Caspian Sea deal with some of the worst cases of mismanagement of marine ecosystems. The marine environment has deteriorated despite international conventions, resolutions and meetings dealing with these ecosystems, and there is no shortage of scientific institutes in the region. Governance structures, however, are poor and the older well-known research stations in these regions require outside support in order to monitor the state of the marine environment, to provide meaningful policy advice, and to enhance public awareness.

In the Middle East, coastal zone problems in the Eastern Mediterranean, Red Sea, Persian Gulf, and Arabian Sea vary, but overfishing, localised pollution and the destruction of coral reefs and other nearshore habitat are common to most areas. The growing demand for fresh water is also a widespread issue in these arid coastal areas.

The problems of Southeast Asia are exemplified by Indonesia which has the world's longest tropical coastline facing both the Pacific and Indian Oceans. Here, safeguarding the extremely high marine biodiversity and protecting the coral reefs and other marine coastal habitats are national issues of great international concern.

The South Pacific Islands have vast areas of exclusive economic zones (EEZ), particularly when one considers "sea per capita". For these islands, the sea is their most important gift, risk and obligation. Here, global ocean phenomena such as sea level change and global warming with its local consequences, e.g., coral bleaching, are important issues.

To live with the sea and not against it, is a challenge facing coastal communities worldwide, particularly where coastal populations are increasing along with demands for marine resources and commodities. Examples for the combination of top-down and bottom-up approaches are given for the Wider Caribbean. There, the long-term vision and planning is well advanced, and governments pro-

vide frameworks of laws and regulations on the principles and orientation as they are phrased by scientists. Within those frameworks, the communities and stakeholders develop local policies. Enforcement seems to be the bottleneck in this process.

In Eastern Africa, with its emphasis on artisanal fisheries, marine resource exploitation is growing with increasing population. Again the question arises, to what extent can and should traditional methods of resource management be restored in the interest of sustainability? Global market forces and global climate change are major factors which work against sustainability in coastal zone management in many (most?) parts of the world. Population growth is a natural and socio-economic phenomenon which seems to make sustainability of man's marine affairs a pious wish. While traditional forms of resource and habitat management are still applicable in many well-confined communities, new scientifically designed and controlled regulatory systems have to be developed and enforced when it comes to offshore resources and straddling fish stocks.

Today, capacity building, particularly in developing countries, focusses on training scientists and technicians, communications, and joint research projects. Activities such as donations of instruments and vessels are not as high on the agenda as before. The presentations prepared for Workshop 2 of PIM 2000 reflect major steps forward in training, education and mutual assistance (TEMA), particularly moves to increase South-South co-operation, North-South partnerships and interdisciplinarity. Regional training is developing partly in combination with regional centres of excellence in marine research. Universities in various European countries offer training tailored to the needs of tropical countries, mostly in co-operation with local universities. European students mix with tropical students in those programmes and thereby develop equity and mutual understanding. Teaching networks are under preparation, applying *inter alia*, distant electronic teaching. Partnership projects combining research and teaching meet the interests of scientists and students in both the South and the North. Interdisciplinarity has become reality in many projects related to marine science and development. Most modern marine science training programmes and complex partnership projects force or persuade natural and social scientists into dialogues and co-operation. They bring social scientists, lawyers and economists "down to earth", i.e., the natural scientists set out the potential and limits of marine resources and systems, while the social scientists tell the naturalists about the socio-economic framework required for sustainable management regimes.

In most European countries, funding of aid programmes for developing countries is very limited. The share given to marine activities, and to marine science in particular, is deplorably small, even in donor countries with a high marine research potential. When competing for funds within a country, TEMA is not often recognised as a priority unless strong arguments are put forward. The justification for national efforts to be put into TEMA goes far beyond economic interests and the legal obligations under Agenda 21 multinational contracts and conventions. Scientific problems of global concern cannot be tackled in temperate waters alone; worldwide research requires the full participation of scientists of both tropical and subtropical countries. Partnership on an equal footing will help to overcome the current hesitation of tropical countries to grant permits to foreign research vessels and to foreign research groups which wish to collect data and specimens in tropical and sub-tropical EEZs. The distrust regarding data abuse and "bio-piracy" is deep-rooted in many places. It is detrimental, not only to global marine science and ocean monitoring in general, but to the development of science in the country itself. The key message to take home from this workshop is: The partnership of European marine scientists and institutes with their counterparts in tropical and subtropical regions is scientifically, politically and economically rewarding as well as a great personal experience.

PRESENTATION SUMMARIES

EXPLORATION, EXPLOITATION AND GOVERNANCE IN (SUB-)TROPICAL SEAS AND COASTAL REGIONS

The Tropical Seas of Indonesia and their Roles in Global Ocean Matters

Prof. I. Soesilo

Director General for Sea Research and Exploration
Indonesia

The Republic of Indonesia is the largest archipelagic nation in the world with a total of 17,508 islands, an overall sea area of 5.8 million square kilometres, and a coastline of 81,000 kilometres. It is strategically located between the Indian and Pacific Oceans, and between the continents of Asia and Australia. The strategic location of Indonesia has meant various sectors are interested in the role of Indonesian seas in global ocean matters. Indonesia itself is developing its marine resources and reorienting its vision to a maritime one.

This presentation will focus the role of the tropical seas of Indonesia in several areas: sea lanes within the Indonesian archipelago, sea-air interaction in this region and its contribution to global climate change, marine biodiversity in the Indonesian archipelago, and geotectonic patterns of the Indonesian seas. The paper concludes with an assessment of Indonesia's contribution to global ocean matters based on these unique assets.

Evolution of Management Approaches and their Environmental Impact. A Case Study from the Black Sea: Crimea Coast

Dr. V. Radchenko

Institute of Biology of the Southern Seas
Ukraine

The Ukrainian Black Sea coast extends from the Danube delta in the west, to the Kerch in the east, with a length of 1,802 km. In the past, management models combining political, economical and cultural conditions and social priorities were applied in the coastal zone. These models have had an impact on the marine environment, as has the modernisation of society. Three management models are proposed for this region: pre-industrial, industrial and post-industrial.

The Crimea may be the best example to illustrate these management models. This region has gone through these stages and is now in the late industrial stage of modernisation. This historical review highlights the reasons for and consequences of applying the management models in each period.

When discussing models of management in retrospective, it is clear that this region has never been managed scientifically as is common in the late industrial stage, i.e., with a high level of investment, proper engineering of lands and waters, encouraging public awareness to encourage recovery. Pre-industrial models of management, as well as early industrial models, were implemented in the Crimea on the basis of social priorities that range from primitive economics to giving priority to industrial and defence objectives. When preparing models of management for the Crimea, it is necessary to take into account that late industrial models of management are not acceptable for the region due to the absence of underlying social priorities. Only early industrial models of management are acceptable as they emphasise social aspects.

Integrated coastal zone management (ICZM) implementation for Crimea and Ukraine is first and foremost a social task, then it is a political and decision-making issue, and finally, it is a purely scientific problem to draft the coastal environment status reports and to identify appropriate remediation

measures. Models of management for this region must focus on *social aspects of management*, i.e., achieving long-term changes in public opinion and preparing to accept measures that lead to sustainable socio-economic development.

Fundamental Landmarks for the Formulation and the Implementation of an ICZM Plan in the Wider Caribbean

Dr. A. Gutierrez
IOI-Costa Rica

Representatives of 15 countries in the Spanish speaking wider Caribbean, as well as Peru and Ecuador, have worked towards drafting a “Comparative analysis of the institutional framework for ICZM for Latin America”. In this project, we have taken into account the ideas developed by the Centre for the Study of Marine Policy, University of Delaware.

IOI-Costa Rica has proposed a general institutional framework to activate a national and regional process, that overcomes the classic and simplistic “bottom-up” or “top-down” schemes. This framework implements a feedback mechanism that takes into account all the key actors that must participate in order to guarantee the sustainability of the integrated coastal management in the region.

The Eastern African Coastal Zone, Challenges Facing Their Planning, Utilisation and Management

Prof. K. Kairu
IOI-Eastern Africa
Marine and Fisheries Research Institute
Mombasa, Kenya

The coastal zone of Eastern Africa and its island states covers a vast area of remarkable physical, ecological and human diversity. Unique coastal habitats support rich biodiversity. Rare fauna and flora occur on some islands and in the open ocean. Rapid population growth associated with increased migration to the coastal zone, low incomes, increasing dependence on marine and coastal resources, and lack of adequate planning have resulted in increasing environmental degradation and resource depletion in the coastal zone. Physical changes, shrinking natural habitats, ecosystem damage, and threats to biodiversity have been documented. Coastal erosion is widespread, and attempts at stabilising shorelines have resulted in further environmental degradation.

Increasingly, countries of the region have recognised the need to adopt integrated coastal zone management to ensure better management of the coastal zone and its resources. This initiative is, however, dogged by inadequate understanding of the resources, limited financial resources, and increasing dependence on marine resources. Adoption of an ICZM framework can only be achieved after a large-scale survey of the physical environment, the socio-economic dimensions, and biological processes of the marine and coastal zones. This paper outlines the nature and diversity of the coastal zone of the West Indian Ocean region, and its diversity in resources and their utilisation. It summarises the current development trends and challenges to sound planning and management, and the need to initiate concerted action to address the main issues of concern.

Cooperation in Marine Research as an Enabling Act Aimed at Poverty Reduction

Prof. G. Kullenberg
IOI-Malta

In my brief statement I will focus on the need for research co-operation. Enhanced research co-operation is necessary to:

- reduce poverty through coastal and marine resources development
- respond to the need for implementation of UNCLOS and UNCED agreements and conventions
- include social and economical aspects in the research programmes

Co-operative actions can include capacity building; institution building is a particularly good example and we can draw examples of IOI activities in this context. Regional co-operation is also a good approach for establishing systematic ocean and coastal area observations and ensuring use of such data for the benefit of society as a whole.

Hot Issues For Coastal Zone Management in the Middle East

Dr. Ahmad H. Abu Hilal

UNESCO-Cousteau Chair of Environment and Sustainable Development

Dean of Scientific Research

University of Bahrain

State of Bahrain

The States bordering the semi-enclosed Mediterranean Sea, Red Sea and Gulf of Aqaba, and the Arabian Gulf are of great strategic, economic and ecological importance not only to this region, but also the world as a whole. The Red Sea and the Gulf of Aqaba host unique marine ecosystems and coral communities of international significance. The Mediterranean is an important maritime route bridging the East and the West. The Arabian Gulf and riparian States lie on great wealth and are an important source of energy worldwide. During the last three decades, the Middle East countries have witnessed a substantial increase in economic growth, development and population expansion. The region has also experienced conflicts, hostile actions and even wars. Together, these events and activities have had an adverse impact on the environment of these seas. The seas have experienced an increased deterioration of their coral reefs, marine ecosystems and adjacent desert ecosystems. Addressing environmental threats and preventing further damage while promoting sustainable development will require suitable action plans at both the national and regional levels. These plans should provide the basis for a comprehensive legal and institutional framework for management of the coastal zone of the Middle East countries, as well as addressing related issues such as air, land, and water pollution, and conservation of natural resources.

This paper presents information about three workshops concerning the marine resources and ecosystems of the Mediterranean Sea, Red Sea and Gulf of Aqaba, and the Gulf of Arabia respectively. The workshop findings highlight issues of common concern as well as issues specific to each region and those common to the Middle East countries and Europe. It is clear that the countries of the region need and seek the support of developed countries to initiate, establish and implement integrated coastal zone management plans.

A Profile of Indian Fisheries and the Regulatory and Infrastructure Needs for the Optimal Exploitation of the Multispecies Fisheries Resources of the Tropical Waters

Dr. B. Meenakumari

Central Institute of Fisheries Technology

Cochin, India

Indian fisheries have changed substantially since independence. Commercial fishing is supported by 2,39,000 mechanised, motorised and non-mechanised craft. The marine sector lands 2.8 million tonnes annually. The use of improved watercraft and gear revolutionised fishing activity and slowly lead to overexploitation and near stagnation of catch levels. This has led to a decline in the stocks of certain species of fish and shellfish. Presently, the trend is to replace traditional fishing gear with ring seines,

encircling gill nets and trammel nets. The by-catch of large quantities of juveniles and commercially uneconomic species that are discarded into the sea is also a problem. Measures have to be taken based on the best scientific evidence to ensure long-term sustainable fishery resources in order to achieve the objective of optimum utilisation for future generation.

The developed countries of Europe can establish mechanisms for co-operation and co-ordination in developing resource conservation and management measures. Several planned management measures can be identified. A healthy fishery requires support through modern fishing harbours, mechanisation of fishing craft to extend the area of operation to deeper waters, and modern fishing methods. The catch must be despatched from the landing site within a minimum time after auction for packing and inspection for sanitary and other controls. This can be effected by introducing a uniform refrigeration chain system from harvesting to marketing. To extend the shelf life of fishes and avoid wastage, India needs to have a sufficient number of ice plants and cold storage units. Marine fisheries in India will play a crucial role in augmenting food supplies in the coming years in both the domestic and export markets. Finally, manpower planning and training of personnel for all the fisheries developmental activities is required to ensure the smooth functioning of schemes put in place to increase fish production in India.

The Problem of Protecting the Biodiversity of the Caspian Sea under Intensive Oil Exploration and Exploitation

Prof. Dr. V. Zaitsev

Astrakhan State Technical University
Russia

The Caspian sea can be characterised as an unique hugh lake with a salinity of approximately 12–13 percent. The large number of endemic marine species typical of the Caspian Sea is a result of its relative isolation. The Sea is of regional and international importance. Regionally, the Caspian Sea has had a significant role in the littoral states' economy, particularly through its fisheries. Internationally, the Caspian Sea's unique flora and fauna enhances global biodiversity and provides important habitat for migratory birds.

This paper explores the geographical and hydrological changes that created its marine environment and affected the adaptation of its marine resources. It examines the potential impacts of expanded exploration and exploitation of hydrocarbons on this unique marine environment, particularly its fisheries.

THE NEEDS AND MEANS FOR CAPACITY BUILDING

Ocean Governance through Education and Awareness: Interfacing Science and Law

Dr. S. Shastri

Scarborough Centre for Coastal Studies
University of Hull

This presentation looks at the subject through some of the keywords that are contained within the title. Laws are not made in isolation: they are always influenced by a variety of externalities. In the present context, there is increasing evidence that the evolution of contemporary law is influenced by science more than anything else. However, science must be taken in its meaning in the broadest sense to cover both natural and social sciences.

Some examples of how advances in scientific frontiers have resulted in rapid development of law are cited and explained: examples abound in the area of environment in general and the marine environment in particular. But law making is one thing, making sure that the law is implemented is quite another. Despite the golden rule “don’t make a law you can not implement”, examples of laws that simply will not work abound!

This leads us to the other aspect of this presentation, namely, implementation. *‘Wissen ist Macht’* is all very well: it probably refers to the knowledge (science) that creates the power (law). How can this knowledge be used to empower the people? That is the question we need to ask ourselves and seek the answer to.

New Undergraduate Course on Marine Sciences, Designed to Meet Brazilian (and Probably Other Developing Countries) Needs

Prof. Dr. Eduardo Marone and Paulo da Cunha Lana
Center for Marine Studies (CEM-UFPR)
Brazil

The Center for Marine Studies has offered undergraduate studies in the field of Marine Sciences since March 2000. Students entering the programme are expected to develop a strong background either in the basic research areas of oceanographic sciences (e.g., biology, chemistry, physics, and geology) or in coastal management. Besides forming good oceanographers, the programme intends to prepare youth for the so-called “useful” science and, in particular, to address coastal zone issues.

The virtual absence of well-formed specialists in this area, expressed by the lack of qualified personnel in the local and even federal Brazilian administration, was one of the main reasons for the programme’s creation. The academic programme, which takes about 4.5 years, is developed around a modular structure. It is designed to provide a basic understanding of the field of oceanography and is followed by more specialised courses leading to two majors (Marine Research and Coastal Management) in addition to the Bachelor in Marine Sciences degree. The programme is co-sponsored by 20 departments from the natural to the social sciences which should ensure an inter- and multidisciplinary approach.

The academic programme is presented in a concentrated way with students dedicating one to four weeks to each course, one at a time. All the core courses are offered at Pontal do Sul (Paraná State, SE Brazil), a small seaside resort 120 km from Curitiba. The student body is limited to 25–30 scholars per year in order to encourage faculty-student interaction. The programme is free – there are no tuition or any other fees but students have to cover their basic living costs. Students come from throughout Brazil, although most of them are from the Paraná region.

This novel pedagogic structure allows for the gathering of highly qualified specialists, either Brazilian or foreigners, to present short concentrated courses as permanent or provisional faculty staff. This arrangement meets one of the main educational problems of developing countries, the absence of specialists and their uneven geographical distribution. Despite the novelty of its pedagogic approaches, the success of such an educational model could be jeopardised by the lack of long-term financial support, a prerequisite to having well-qualified visiting professors and to maintaining both research and educational activities in marine sciences.

The Need for Regional Graduate Schools of Oceanography in Developing Countries

Professor Dr. M. Hungspreugs

Department of Marine Science

Chulalongkorn University

Bangkok, Thailand

Global environmental problems require an understanding of global oceans and climatic processes as well as detailed knowledge on regional and local scales. For the developing countries where problems are increasing, there is a lack of expertise in the ocean sciences. The search for solutions needs to be addressed through effective partnerships between scientists in both developed and developing countries. So far, few effective partnerships exist, especially in the physical ocean sciences.

Enhancement of educational and research opportunities in the home countries would help to raise ocean science graduate degrees to higher standards of quality. A few marine science institutions and some sea-going training vessels exist in the region of Southeast Asia, some of which require upgrading. Regional graduate schools on the model of the University of Concepcion in Chile are needed. At this university, international scholars of high calibre are financially supported by several United Nations and foreign institutions.

SCOR/IOC and the Rockefeller Foundation initiated a five-day team residency at Bellagio Study Centre in Italy in 1998. Ten ocean educators met to draft a plan on this issue. More recently, the Twenty-fifth SCOR General Assembly in Washington endorsed further steps to support the original plan.

Future Collaboration between the European Union and the Pacific Islands

J. Veitayaki

IOI-Pacific Islands

Fiji

The issues affecting tropical seas, with specific reference to Pacific Small Island Developing States (PacificSIDS) are addressed in this presentation. The concept of sustainable development as embodied in the post-UNCED and post-Barbados era is integral to national and regional policies in the marine sector in PacificSIDS. Given the constraints faced by PacificSIDS, however, it is unlikely that sustainability will be achieved without long-term partnerships with developed nations.

Important needs include national integrated coastal management plans (currently lacking in most PacificSIDS); appropriate technology for the disposal of wastes originating from land-based sources and at sea; appropriate technology and policies to deal with environmental deterioration originating from urbanisation, agriculture, forestry, mining, tourism and over-population; securing potable water supplies, especially in atoll countries; food security through sustainable fisheries; strategies to deal with climate change and sea-level rise; and resources to deal with ocean law and policy, marine science and marine technology.

Human resources development and capacity building are over-arching needs. Institutional arrangements in the PacificSIDS provide an excellent model for regional co-operation. The nations are, however, under increasing pressure to provide the human resources and technical skills required for their compliance with global conventions and agreements to which they are party.

The European Community has a long history of assistance to PacificSIDS in the marine sector, through the Lomé Convention and the European Development Fund (EDF), contributing some 23% of all assistance received. Strategies to improve European assistance to PacificSIDS should include the development of workable institutional partnerships and linkages focussed, for example, on human

resources development (training, tertiary education, research) and on technology transfer, especially in the areas of waste disposal, marine pollution and communications, all areas where European nations have outstanding expertise. The establishment of IOI-Germany would provide a useful conduit between the European Union and the International Oceans Institute concerning tropical seas.

International Development of Marine Sciences in the Black Sea Area

Prof. Alexandru S. Bologa

National Institute for Marine Research and Development "Grigore Antipa"

IOI-Black Sea

Romania

The ecological condition of the whole Black Sea, especially its north-western sector situated under the direct influence of the freshwater input from the Danube, Dniepr, Dniestr, Bug, etc., is very serious. An imminent collapse of this continental brackish water sea is more and more evident. The severe ecological modifications occurring in the benthic and pelagic sub-ecosystems are a direct result of the increased pollution caused by the overflow of the human activity products (agriculture, industry, chemistry, transports, etc.) into the sea and have led to a massive decrease of the vegetal and animal resources, including the commercial fish populations and catches.

The Black Sea risks becoming a dead sea if concrete steps and interventions are not taken by all the riparian countries and relevant international bodies. Since 1990, considerable progress has been made through regional and international co-operative initiatives related to Black Sea research, monitoring and management programmes and projects. This paper reviews co-operative initiatives demonstrated through:

- research programmes/projects,
- management and monitoring programmes,
- organisations,
- conferences/symposia/workshops/round tables/training courses,
- publications,
- bibliographies/data bases/web sites, and
- conventions/declarations/agreements.

Possible Role of IOI Western Africa as Co-facilitator of National and Regional ICAM Schemes

Dr. O. Oyewo

IOI-Western Africa

Nigerian Institute of Oceanography and Marine Research (NIOMR)

Industrialisation is described as a necessary response to meet the needs of the world's increasing population and the demands for more food, goods and services. However, if it is not properly managed, industrialisation can have grave ecological and socio-economic impacts. Therefore, government intervention is obligatory. The issues involved are complex, multi-faceted and multidisciplinary, making an integrated approach compelling. This presentation examines various institutional, legal and socio-political frameworks available for addressing related issues. It identifies the responsibilities of relevant bodies and institutions, and sets out a role for the IOI Western Africa Operational Centre in environmental management.

THE RESPONSE OF INDUSTRIALISED COUNTRIES**Technology Transfer of Traditional Japanese Fishing Gear to Costa Rica: Framework and Comment on a Case Study at Himi City**

Prof. Tsutomu Fuse

IOI Japan

Yokohama City University

In 2000, a three-year project commenced at Himi City, Japan and Nicoya Bay, Costa Rica. Himi City, formerly one of the largest fishing areas in Japan, experienced a declining and aging fishery. For over five hundred years, the fishing population's fixed net fishing gear has been recognised as being environmentally sound and community oriented. In contrast, Nicoya Bay, Costa Rica, has a fishing industry that has not developed sufficiently.

This case study examines the Himi City model as a mutually beneficial transfer of technology between a sub-tropical country and a Northern country.

Reef Research and Reef Management – Global Responsibility and Partnership

Prof. C. Dullo

GEOMAR

Kiel, Germany

Traditional reefs have been investigated from scientists coming from countries having a long tradition in research and academic teaching. In the 18th and 19th century, reef studies commenced with a focus on the taxonomy of reef-building and reef-dwelling organisms. Today, reef researchers are mainly scientists from biology or natural sciences.

Geologists stepped into the reef research business at the end of the 19th century when studying reefs as a modern analogy for huge carbonate build ups occurring in mountain ranges. With the onset of the 20th century, reef scientists shifted from pure descriptive to process-oriented investigations. The major research target became the quantification of processes and enfluxed balances between the various reef settings. Despite the modern approaches achieved in recent decades, the number of reef researchers remains small.

Ireland: Sentinel of the Western Approaches to Europe

Professor Michael Orren

Barna, Galway, Ireland

Retired Professor of Oceanography

National University of Ireland, Galway

Ireland, the first European landfall for very many trans-Atlantic ships and aircraft, shelters the Irish Sea situated between Ireland and the United Kingdom. Ireland ratified the 1982 UNCLOS Convention in June 1996 and lays claim to 15% of the total European seabed area, amounting to ten times its land area. With no land bridges to continental Europe, Ireland is dependent on the sea for 90% of its import and export trade. Co-ordination of marine research and development rests with the National Marine Institute of 1991. Coastal zone management problems in Ireland will be discussed and remedies suggested.

DISCUSSION SUMMARY AND CONCLUSIONS

Workshop 2 dealt with coastal zone management and capacity building in tropical countries, both with a plea for a new North-South partnership. For its own development, Europe has been depending to a great extent on the resources from tropical countries. In general, Europeans feel a responsibility to assist tropical and subtropical countries in establishing new management approaches towards the sustainable use of their coastal and marine resources. Southern countries are welcoming this support and are interested in the exchange of knowledge as a two-way road.

However, three major problems have to be overcome to guarantee the success of this process. The first, and by far most difficult, is overpopulation and steep population growth, especially in coastal areas. The other issues are of a different nature. They are lack of awareness and environmental concern in marine affairs, and little interest in the personal and financial engagement for assistance in research, especially in marine and maritime sciences. It is a great challenge for the relationship between Europe and the countries of the tropics and subtropics to fight these problems through joint efforts.

Overpopulation

The pressure by human activities on the oceans and their coasts is increasing and is largely related to population growth and mobility, particularly in low latitude countries. People tend to migrate to the coastal areas and to concentrate in big coastal cities ('mega-cities'). Despite all other important and burning matters, the main challenge for the 21st century will be the battle against steep population growth. Related to population growth is increasing poverty levels. Many of the problems in the coastal zone arise from the desperate daily demand for food (overfishing, cutting mangroves, etc.). Alternative sources of income need to be developed in an environmentally sustainable way. Those problems have to be tackled seriously, otherwise other problems related to the ocean and its coasts cannot be solved and promising activities and improvements will fail.

Exploration, Exploitation and Governance

The management of fisheries is a common concern of many countries. It has to be based on knowledge about the dynamics of the resources in a varying environment and under the pressure of fishing. Many fish stocks are over-exploited already, especially in those countries that need fish as their major source of protein. In many places, inshore/nearshore fish stocks have crashed, and the continuing pressure does not allow them to recover. Community-based ownership of nearshore resources and habitats needs to be developed and implemented as has been shown successfully in, for example, the Philippines and Kenya. Implementation can be a problem wherever the responsibility for the ocean is spread out over several ministries.

Public Awareness

Several speakers recognised the need for public engagement in environmental matters. Public pressure is needed to promote political action towards sustainable development. Therefore it is essential to raise public awareness of the problems at all levels, from children, parents, and teachers to politicians and decision-makers on local, regional and international levels. However, to achieve this objective, tremendous efforts must be undertaken. Practical examples (Black Sea) showed clearly that people may need to be shown that they can participate in the process, that they can have an influence, and their personal engagement is needed to improve their own situation. A new way of thinking is needed that overcomes short-term interest policies and concentrates on long-term visions.

An 'Ocean News Agency', consisting of a journalism department and a sales office, was proposed. The agency would gather, digest and distribute news and information concerning the oceanic space and work. Participants thought this agency would foster general interest in the ocean and improve the quality of available information.

In many developing countries, peoples' lives are focussed on daily survival and 'Mother Nature' is not respected as the source of life and food as it used to be in traditional cultures. Major efforts need to be undertaken to improve the understanding of the natural environment in order to achieve a wide-spread support for nature conservation. In some cultures, the sea is perceived as something evil, mysterious and dangerous. Hence people do not care about polluting the sea. These views need to be converted into a positive image of the sea as a source of life and livelihoods on which conservation and management efforts can be built.

Nature Conservation

Southeast Asia is regarded as the centre of marine biodiversity – a centre at risk. Of the Indonesian coral reefs, only 6% are in pristine condition and more than 60% are severely damaged. The loss of healthy ecosystems and the short-term exploitation and degradation of the environment implies long-term problems for people relying on these resources for their livelihoods. Beside the local and regional impacts, the global dimension of massive environmental pollution has become visible: The effect of global climate change caused by burning fossil fuels and the release of climate-relevant gases (mainly by the developed countries). In 1998, coral reefs in shallow waters were affected by the rise of ocean surface temperatures far beyond their normal average. Coral bleaching was observed in over 40 countries and reported again in 2000 in Fiji. However, although it is a global phenomenon, it is caused by local activities and has to be tackled at all levels – from modifying individual behaviour to international agreements – with a strong focus on immediate implementation.

Partnerships

The need for regional co-operation and partnership for coastal zone management has been recognised and multinational initiatives have been started, for example, in the Spanish-speaking countries of the Wider Caribbean. In other regions, new ways of thinking still need to be developed to come to a shared long-term vision. All stakeholders and disciplines (science, traditional thinking, industry, politics, etc.) need to be involved in this process from the beginning to ensure broad support and understanding for the objectives as well as their implementation in daily life. To be successful and become sustainable, many coastal projects need to be community driven, involving as many stakeholders as possible. People should be trained to identify their needs, their problems, to find solutions, and to pursue these solutions. Foreign partners should facilitate this process but must avoid imposing their concepts.

The Small Island Developing States (SIDS)

SIDS are facing a multitude of severe problems, many of which are related to their small size and limited resources. The danger of a global sea level rise puts the existence of many islands at risk. Those built only on coral sand are likely to drown, especially if the degradation of the surrounding coral reefs, which protect them from storms and waves, continues. The rapidly growing populations increase the need for food and drinking water. Both demands are hard to meet as fish stocks have been overexploited frequently and desalination plants are too costly to run.

Several of these islands suffer from different kinds of dangerous (toxic) wastes that they accepted together with payments from developed countries. Here, technical and financial help is needed to

limit long-term damages. At the same time, waste exports to SIDS should be banned internationally. In SIDS, interaction of people with the sea is immense. Therefore they call for assistance in building the capacity for sustainable management of their resources. Several promising traditional management modes (e.g., 'tamu', Fiji) need to be studied and possibly revived.

Sustainable Development/Risk Management

The key objective of all activities – economy, science or legislation – must be sustainable development. One aspect of sustainable development in fishery-dominated areas is the need for economic diversity, i.e. alternative sources of income (eco-tourism, fish-processing, solar-driven desalination plants, etc.). In this context, risk management is particularly important and offers general economic back-up for enterprises. This instrument, however, is still largely unknown and needs to be promoted. Many promising (small-scale) enterprises fail because they lack the financial strength to survive environmental disasters, e.g., a bad harvest, flood or storm. If these risks could be covered through insurance, people could be motivated to find new livelihoods as has been shown by the IOI project in Indian villages. The same principle may be applied at the community level, where, for example, villages could cover the risk of larger development projects. However, care must be taken that environmental risks are not traded in merely for the coverage of financial risks. The development of risk management strategies and products requires a dialogue between the insurance industry, governments and entrepreneurs.

Implementation

“Never make laws that you cannot implement”. This phrase describes the dilemma in many countries or regions: Often reasonable legislation and procedures to protect the natural environment are in place but enforcement is lacking. Two main reasons may account for this. One is nicely summed up in the following phrase: “If you want to do something for the people, make sure they want it!” This calls for a bottom-up approach to drafting the laws, one that includes all levels and stakeholder groups in society. The need for more public awareness also plays an important role. The second reason is lack of resources for practical implementation of laws. Guarding sea areas is very costly, especially since the respective areas can be huge (e.g., SIDS, Indonesia). Patrol boats or ships are required which are expensive to run. International and regional co-operation can be beneficial in this respect, e.g., assistance with surveying planes from the navy or the introduction of a satellite-tracking system of fishing vessels. Countries could substantially limit their losses through poaching activities through such implementation of measures.

In some countries, there is a competition in responsibility for the sea: Ministries of commerce, defense, environment, fisheries, science etc., may act more like rivals than partners, hampering the implementation or making of laws.

Science

Science is the backbone of a successful management strategy. Fundamental data are needed to understand complex problems and to find solutions. Researchers from the different disciplines should make joint efforts to exchange their specific knowledge and to integrate their results into multidisciplinary concepts. These then need to be discussed with economists and politicians.

Joint regional research and training centres should be promoted and could link communities of expertise in the region and on the international level.

In addition, scientists are encouraged to form partnerships, i.e., with schools and school clubs, to disseminate their results and to create awareness. At the same time they may learn more about the desires and fears of the public, and also about traditional knowledge on population control and environmental management. Examples from Fiji and Ukraine show that principles hundreds to thousands of years old were very effective and sustainable but got lost over the last 200 years of “Northern” influence. Much can be learnt from those traditions even when dealing with today’s problems.

Although not always immediately evident, research on local ecosystems (e.g., coral reefs) can have implications for the understanding of the global climate and should be given special attention.

Capacity Building

Capacity building includes the formation of human scientific capacity and of necessary technical and organisational infrastructure. It is the key for successful development of the sciences. Training should take place at all levels, including technical personnel, students and researchers. These activities can be quite expensive and require a long-term commitment to ensure their success. The training programmes need to be backed up by sufficient employment opportunities in order to keep the knowledge active and alive. Universities and research institutions have already developed international courses for coastal zone management. They need to be adapted to the needs and challenges in the South.

Researchers, technicians, etc. need to meet international standards in order to find excellent partners abroad and to compete with other countries. International master courses in Western countries are important for capacity building as they expose students to the international scientific community and their standards. Alternatives would be regional graduate schools that invite international scientists for periods of teaching.

Project partners, as well as external experts, must evaluate joint projects and try to identify strong and weak points in order to learn and improve present as well as future projects.

Guidelines for the development of training and education programmes have been redefined over the years and are known as ‘TEMA’ (Training, Education and Mutual Assistance – see introduction to Workshop 2). TEMA is one of the cornerstones of all UNESCO programmes in marine sciences.

One of the new approaches in scientific training is the IOI’s Virtual University that will use the Internet for distance learning and teaching correspondence with the students. It can be cost-effective and is very flexible concerning learning times. It provides up-to-date technical information.

‘Brain Drain’

The danger of ‘brain drain’ is high: Once a person obtains a PhD, it is not very easy to keep them in their developing home country, e.g., living conditions in the West appear too attractive to them. In order to prevent the loss of this well-trained person to her/his country, all efforts must be undertaken to offer the graduates appropriate jobs in their home regions. They should be able to make full use of their expertise and strengthen local expertise. Two instruments to achieve this goal are:

1. The projects of the students should be related to their home countries. They would study abroad but would carry out their research project at home.
2. Funding should not stop at the time of graduation, but should be available for follow-up work and exchange (mobility funds) to keep the respective researcher in close contact with the international scientific community.

Technology Transfer

The developed countries are requested to transfer specific knowledge and technology to help solve environmental problems. Technical solutions always must be adequate for the users, and they must be obtained through training as well as long-term technical support.

Special efforts are required to connect developing countries to modern communication and information networks as a prerequisite for their development.

Conclusion

Although agreed upon publicly, very few developed countries transfer their promised one percent of national gross domestic product as aid to developing countries. At the same time, marine activities and scientific capacity building are ranked low in the priority lists of assistance programmes. Both issues must be changed in order to benefit the welfare of coastal regions and their people.

WORKSHOP 3: LEGAL CONFLICTS AND PROBLEMS

Convenor: Prof. Dr. Dr. h.c. Rüdiger Wolfrum

INTRODUCTION

PRESENTATION SUMMARIES

The Development of Environmental Standards for the Baltic Sea

Uwe Jenisch

The Development of Environmental Standards for the North-East Atlantic, including the North Sea

[No summary available]

Wolf Heintschel von Heinegg

The Protection of the Marine Environment against the Impacts of Deep Seabed Mining:

An Assessment of the New Mining Code of the International Seabed Authority

[No summary available]

Michael Bothe

The Interaction between the Convention on Biological Diversity and the UN Convention on the

Law of the Sea [No summary available]

Nele Matz

The Introduction of Alien or New Species into the Marine Environment: A Challenge for Standard

Setting and Enforcement

Markus Böckenförde

Monitoring Compliance and Enforcement of Compliance through the OSPAR-Commission

[No summary available]

Rainer Lagoni

Port State Control: An Assessment of European Practice

Doris König

Monitoring, Compliance and Enforcement of Compliance through the Helsinki Commission

[No summary available]

Malgosia Fitzmaurice-Lachs

The Flagging-Out of Fishing Vessels: A Critical Assessment of its Impact on the Enforcement of

Regulations concerning Fishing and of the Responses thereto [No summary available]

Alexander Yankov

INTRODUCTION

The International Tribunal for the Law of the Sea, the host of *Pacem in Maribus 2000*, is part of the most comprehensive and most binding system for the peaceful settlement of disputes ever designed and accepted by the international community. This workshop began with a brief overview of cases of dispute settlement within the whole system, comprising, besides the Tribunal, the International Court of Justice, as well as arbitral tribunals and tribunals for special arbitration.

The Workshop tried to envision the kind of conflicts likely to arise in the new century and the kind of solutions that could be considered. For instance, boundary conflicts are likely to continue in the next century, but perhaps the concept of freezing overlapping claims to jurisdiction and establishing joint development zones could be strengthened. Environmental conflicts are likely to increase, posing new challenges to the development of national and international environmental law. The question has been raised whether it would be useful to establish a special court or tribunal for international environmental law; but since a very large part of the cases will be ocean-related, the UNCLOS III system, including regional arrangements, might be adequate.

The workshop also considered gaps or loopholes in the UNCLOS III system for the peaceful settlement of disputes. For instance, the protection of biodiversity in international waters appears to have been given inadequate consideration; a protocol on rights and responsibilities with regard to archaeological objects, or offshore hydrocarbon exploration and production may be needed. The Workshop also discussed the possibility of eliminating one or the other of the "exceptions" to binding dispute settlement under Section 2 of Part XV of the Law of the Convention in the next century, as "globalisation," in one form or another, and interdependence will grow even more pervasive and the emphasis on State sovereignty will decrease.

PRESENTATION SUMMARIES

The Development of Environmental Standards for the Baltic Sea

Uwe Jenisch

Member of the board of Ostseeinstitut für Seerecht und Umweltrecht (OSU)
Rostock University

The Baltic Sea, as a regional sea, is governed by the Helsinki Convention of 1974/92. As a general rule, regional standards must conform to the 1982 United Nations Convention on the Law of the Sea. The LOS Convention allows for the establishment of regional rules and standards by competent international organisations such as the Helsinki Commission (HELCOM) or the International Maritime Organisation (IMO).

The Helsinki Convention covers all sources of marine pollution. It works through five working groups and subordinate bodies. The margin for standards is largely set by a few environmental principles, on the one hand, and direct bans on certain pollution sources, on the other. Standards are set by way of unanimous recommendations. To date, more than 170 have been issued. The list of updated recommendation is available on the Internet.

As recommendations are not legally binding on the Contracting States, States have to implement them within their national legislation. This involves various national water laws and environmental regulations at the State, regional and municipal levels. The Baltic Sea States have to report on their jurisdictional efforts. Non-observance can lead to criticism from other Contracting States.

Finally, the new system of reception of ship-generated wastes is analysed in more detail as one example of setting environmental standards.

The Introduction of Alien or New Species into the Marine Environment: A Challenge for Standard Setting and Enforcement

Markus Böckenförde
Heidelberg, Germany

Art. 196 (1) of the United Nations Convention on the Law of the Sea (UNCLOS), which addresses the introduction of alien or new species into the marine environment, may be interpreted in a way that alien species are regarded as a form of pollution. Such a classification raises the question of the role assigned to humans with respect to the (marine) environment. It highlights the bizarre position of humans, who are living in a world dominated by their impacts, and who attempt to oppose themselves to the course of nature within their standard setting mechanisms.

The introduction of alien species has caused devastating effects to health, wealth and the environment around the globe. While the consequences of the intentional introduction of alien species seems to be somehow measurable, the accidental introduction as a by-product of international trade is extremely difficult to manage. Effective and safe control mechanisms are still to be elaborated; at present, no legally-binding instrument on an international level has been adopted, although some voluntary guidelines in place may have evolved a binding character for UNCLOS-members. Currently, a self-standing international convention "for the control and management of ships' ballast water and sediments" is under negotiation. The planned date of adoption is between 2002 and 2003.

Port State Control: An Assessment of European Practice

Prof. Dr. Doris König
Bucerius Law School
Hochschule für Rechtswissenschaft
Hamburg, Germany

Despite an increasing number of inspections and several improvements in respect of the inspection procedure, there are still two key areas of concern in today's shipping operations: 1) lack of maintenance leading to structural safety deficiencies and 2) poor operational standards.

To prevent the loss of lives at sea and danger to the marine and coastal environment, *more stringent rules and the effective enforcement of these rules are needed*:

1. The EC Commission must use all legal means including infringement procedures to force certain EU Member States to fulfil their inspection obligations.
2. Both the quantity and the quality of inspections must be improved. First steps in this direction are the so-called Concentrated Inspection Campaigns under the Paris Memorandum of Understanding and the Commission proposal in respect of an obligation to inspect high-risk ships in European ports.
3. It has become known that a large number of detainable deficiencies fell within the responsibility of classification societies. This indicates a need for more stringent qualitative criteria and stricter control of classification societies by the flag States (in co-operation with the Commission).
4. The sanction of banning manifestly substandard ships from European ports seems to be promising because of its economic consequences for the ship's owners or operators.
5. In the long run, it might be prudent to build up a *European structure for maritime safety* to support the action of Member States and the Commission in applying and monitoring EC legislation and in evaluating the effectiveness of the measures already in place.

WORKSHOP 4: THE EMERGING INSTITUTIONAL FRAMEWORK FOR OCEAN GOVERNANCE

Convenor: Dr. Joseph Warioba (Tanzania)

Rapporteur: Sunil M Shastri (India)

INTRODUCTION

BRIEF: THE EMERGING INSTITUTIONAL FRAMEWORK FOR OCEAN GOVERNANCE

PRESENTATION SUMMARIES

Awni Benham (Switzerland)

Mao Bin (China)

Elisabeth Mann Borgese (Canada)

Sunil M. Shastri (United Kingdom)

CONCLUSIONS

INTRODUCTION

There is general agreement today that a system of ocean governance is needed for the effective implementation of the Law of the Sea Convention in conjunction with the ocean-related parts of the UNCED and post-UNCED conventions, agreements and programmes. There is general agreement that such a system must be comprehensive and interdisciplinary; comprising all major uses of the seas and oceans as well as coastal management, and including the governmental as well as the nongovernmental sector; that it must be consistent, that is, there must be proper linkages between local, national, regional and global decision-making; and that it must be participatory, that is, bottom-up rather than top-down. Bits and pieces of such a system are in fact emerging at each level, from local co-management arrangements to new forms of inter-ministerial co-operation at the national level, to attempts to revitalise regional seas programmes, to the establishment of the “open-ended working group” to improve the ways in which the General Assembly of the United Nations can deal with ocean affairs. This workshop examined several these bits and pieces of the emerging system of ocean governance, identifying gaps and suggesting improvements, linkages and harmonisation.

BRIEF: THE EMERGING INSTITUTIONAL FRAMEWORK FOR OCEAN GOVERNANCE

1. With regard to ocean affairs, it appears that the second half of the twentieth century has been the time for the making of laws, conventions, regulations, agreements and programmes. This process has been extremely complex and comprises at this time the United Nations Convention on the Law of the Sea (UNCLOS, 1982) as well as the ocean-related parts of the output and follow-up of the United Nations Conference on Environment and Development (UNCED, 1992), together with a host of conventions and programmes adopted by the Specialised Agencies and Programmes of the United Nations, above all the United Nations Environment Programme (UNEP), the International Maritime Organisation (IMO), the Intergovernmental Oceanographic Commission (UNESCO/IOC) and the Food and Agriculture Organisation (FAO), but including also the United Nations Industrial Development Organisation (UNIDO) the International Atomic Energy Agency (IAEA), the International Labour Organisation (ILO), the World Meteorological Organisation (WMO), and the World Health Organisation (WHO).
2. The process of law making will undoubtedly continue during the first half of the 21st century and after, as rules, regulations, laws, and programmes, both nationally and internationally, will have to be adapted to changing scientific, technological, economic, and political circumstances. But a consensus seems to be emerging that the main emphasis during the coming decades will be on *consolidation, implementation and enforcement* of the vast juridical legacy of the past decades.
3. Consolidation, implementation, and enforcement require an *institutional* framework. This cannot be created *ex novo* but must be built on *existing institutions* at the local, national, regional, and global levels. This will also require education, training and increased public awareness about the international framework and how to use it. Civil society, including NGOs, will be important players in these efforts.
4. Europe has a major role to play regionally, with regard to the regional seas washing its shores (Mediterranean including the Black Sea, Baltic Sea, North Sea, and Arctic Ocean), as well as globally (UN General Assembly, specialised agencies and programmes). This, indeed, is part of “the European challenge.”
5. The guidelines for the building of this institutional framework are given by the Law of the Sea Convention itself, by the Report of the World Commission on Environment and Development, *Our Common Future* (1987), by Agenda 21 (1992) and, in bits and pieces, by the whole output of the UNCED process.
6. Principle 25 of the Rio Declaration (1992) upholds that “peace, development and environmental protection are *interdependent and indivisible*.” Peace and human security must be founded on

- sustainable development; sustainable development must be founded on peace and human security. Both human security and sustainable development must be based on *equity: the eradication of poverty*. The convergent evolution of both the concepts of security and sustainable development now requires an examination of its institutional implications.
7. The UNCED process, especially in Agenda 21, contributes further specifications: The institutional framework must be (1) comprehensive, (2) consistent; (3) trans-sectoral or multi-disciplinary, and (4) participational, bottom-up rather than top-down.
 8. "Comprehensive" means that it must reach from the local level of the coastal community through the levels of provincial and national governance to regional and global levels of international organisation. "Consistent" means that regulation and decision-making processes and mechanisms at all levels of governance must be compatible. "Trans-sectoral" or "multi-disciplinary" means that activities in ocean space cannot be considered separately, sector by sector, but must be seen in their interaction, which may be positive or negative. As *Our Common Future* stated, boundaries are becoming transparent between levels of governance as well as between departments and disciplines. "Participational" means that regulation must not be imposed by central or federal governments, then to be ignored or flouted by local communities whose livelihood depends on the ocean, but that these communities must be involved in the making of regulation and its management.
 9. Institutional arrangements, based on these four principles, will vary from community to community, from country to country, depending on existing local infrastructure, level of economic and technological development, resource base, cultural tradition, etc. However, this appears to be the general direction of the evolution of ocean governance or coastal and ocean management.
 10. At the local level, a form of "community-based co-management" is emerging in many parts of the world. This system is based on two principles: *horizontal integration*, involving all "stakeholders" in decision-making, and *vertical integration*, generating fora for joint decision-making between local communities and national governments. Issues related to resource management and integrated coastal management can be dealt with most efficiently at the local level.
 11. At the national level, trans-sectoral, interministerial, interdisciplinary mechanisms are emerging for the making of integrated oceans policy. Legislation to provide a legal basis for co-management; regulation and standard-setting, through co-management, as well as enforcement, whether national or regional, are likely to remain the responsibility of States.
 12. At the regional level, a process of revitalisation of the Regional Seas Programme has been triggered by the requirements of the implementation of the Global Programme of Action for the Protection of the Marine Environment from Landbased Activities. The emerging, comprehensive institutional framework could be utilised for the implementation of the whole range of UNCLOS/UNCED and post-UNCED conventions, agreements, and programmes in their interactions at the regional level and for the integration of sustainable development and regional security. Problems of technology co-operation and transfer, marine scientific research, fisheries, in particular straddling stocks and the suppression of illegal, unregulated, unreported fishing (IUUF) and other crimes at sea, monitoring, compliance enforcement, are all dealt with most effectively at the regional level.
 13. At the global level, the recent establishment by the General Assembly of the United Nations of the "Informal Consultative Process on Oceans and the Law of the Sea" (UNICPOLOS) should enhance the capability of the General Assembly to formulate an integrated oceans policy, harmonise and streamline the activities of the specialised agencies, deal with inter-regional issues, and resolve problems arising from overlaps and interactions between different convention regimes (Law of the Sea, Biodiversity, Climate Change, Agenda 21, etc.).
 14. The next two years offer a unique opportunity to further develop this emerging institutional framework. An intergovernmental review of the Global Programme of Action for the Protec-

tion of the Marine Environment from Land-based Activities is scheduled for 2001. "Rio plus ten" in 2002 will review the implementation of the UNCED process and assess progress towards the implementation of sustainable development. These 2001 and 2002 events are closely interrelated. Intensive preparations are underway at global, regional and national levels. A series of regional intergovernmental workshops have been initiated – sometimes with overlapping responsibilities.

15. Non-governmental organisations are also contributing to this process through seminars, discussions, reviews and assessments. The output of this Pacem in Maribus workshop is intended as a contribution to these intergovernmental initiatives. This workshop attempts to provide "a vision of the whole," especially at the regional level, to enhance the process of "revitalising the Regional Seas Programme" which in turn could make an important contribution to the further development of national institutional infrastructure as well as to the evolution of UNICPOLOS.

PRESENTATION SUMMARIES

AWNI BEHNAM

This paper points out that the forces of globalisation, in general, have had a mixed impact and, in particular, have led to the marginalisation of the developing countries. It emphasises that the framework for governance must aim at the promotion of equity, social values and protection of the environment. In the use of the oceans, the full force and impact of globalisation is most visible in the maritime transport sector. Under the current framework, brute economic power, the mastery of technology, coupled with the legal fiction of flag territory at sea, have had a devastating impact. The lacunae in the existing international governance of the oceans is the genuine link and the consequence the flags of convenience (FoC) have on maritime trade, the ocean environment, and the welfare of seafarers. The current unacceptable situation that exists in maritime transport is the direct result of the fact that FoC states do not and can not exercise their duties and responsibilities. FoC states simply do not fulfil their obligations under the Law of the Sea. Port State Control alone cannot deal with this. The international governance framework should be strengthened by making maritime crimes extraditable and by promoting coherence among all institutions involved with the oceans. Bringing economic and commercial behaviour under scrutiny and promoting vigorous approaches to regional co-operation and co-ordination are necessary. Finally, the paper points out that the silence of the oceans in the 1990s has been broken with the welcome establishment of the UNICPOLOS, which may evolve into an "Oceans Senate" in the future.

MAO BIN

China successfully concluded a demonstration programme of integrated coastal zone management in Xiamen with Global Environment Facility assistance. As a result, sustainable development of both economic and social development has been realised in Xiamen. The success of the programme is due to: integration of the central government and local government with more responsibilities being allocated to the local government; integration among different agencies; encouraging wide public participation through public education and learning; participation of scientists in the government decision-making process; and necessary institution making arrangements.

China has been conducting a second demonstration programme of ICZM in other sites in three provinces on the northern coast of the South China Sea. Both top-down and bottom-up approaches are adopted in accordance with the local conditions. The Chinese government has recognised that ICZM is a new endeavour. Thus despite their predominant centrally-controlled approach to policy making, in this particular instance, they have given special empowerment at the local level both to make decisions and to implement them.

ELISABETH MANN BORGESE

The second half of the twentieth century has been the time for making laws, conventions, regulations, agreements and programmes. This process promises to continue further into the foreseeable future, taking into account contemporary circumstances. It is suggested that consolidation and implementation should be done using existing institutions. The “European challenge” is to have a significant role in defining the emerging responsibilities Europe must assume in the region. The guidelines for this institution building come from UNCLOS, WCED and UNCED. These processes will ensure that the framework is comprehensive, consistent, trans-sectoral and participative. Mechanisms are suggested at local, national, regional and global levels. The next two years will offer an unique opportunity to develop this emerging institutional framework.

SUNIL M SHASTRI

Laws are not made in isolation: they are always influenced by a variety of externalities. In the present context, there is increasing evidence that the evolution of contemporary law is influenced by science more than anything else. However, science must be taken in its meaning in the broadest sense to cover both natural and social sciences.

Some examples of how advances in scientific frontiers have resulted in rapid development of law are cited and explained: examples abound in the area of environment in general and the marine environment in particular. But law making is one thing, making sure that the law is implemented is quite another. Despite the golden rule “don’t make a law you can not implement”, examples of laws that simply will not work abound!

This leads us to the other aspect of this presentation, namely, implementation. *‘Wissen ist Macht’* is all very well: it probably refers to the knowledge (science) that creates the power (law). How can this knowledge be used to empower the people? That is the question we need to ask ourselves and seek the answer to. One clear answer is through education and awareness, and through inculcation of a “marine culture” in the psyche of all elements of civil society.

CONCLUSIONS

“We don’t see change when it is happening; we only see it after it has happened”

Bertrand Russell

This panel examined issues relating to the brief including, *inter alia*, the local, national, regional and global aspects of the institutional framework. Discussions also focussed on the four paper presentations.

EMERGING ROLE OF THE CIVIL SOCIETY

- Since the 1970s, there is clear evidence that the civil society has come a long way
- This is evident not only in law making but also in institution building
- For example, local communities are represented on the Mediterranean Commission and have voting rights

“FROM THE BARRICADES TO THE HOUSE OF LORDS”

- UNCLOS and UNCED are two powerful processes that have the potential to create a new world order

- UNICPOLOS provides us with an unique opportunity to wrest the best from these two processes

OCEANS “SENATE” OR “FORUM”

- This suggestion comes from the heart; it needs some work by the mind
- The UN Trusteeship Council which has fulfilled its mandate may be able to take on that role
- An idea (again, by Arvid Pardo) whose time has come
- Something that is achievable through UNICPOLOS

POINTS OF DISCUSSION

- Laws and codes should encapsulate people’s aspirations, particularly young people
- There is a desperate need to harmonise national legislation with international legislation
- A democratic and deliberative track to law making and institution building needs to be explored

EMERGING TRENDS

- Co-management (Gandhian philosophy and economics)
- Self-regulation (e.g., the Marine Stewardship Council)
- Revival of self-management
- Universal acceptance of the “*sic utere tuo et alienum non laedas*” principle
- Ecosystems approach in policy making

THE ROLE OF EDUCATION AND AWARENESS

- Creates a more responsible civil society
- Inculcation of a “marine culture” in the psyche of all concerned
- Thought and action (as well as legislation and implementation) based on strong sciences (both natural and social)

“We shall conserve what we love, love what we understand, understand what we are taught”

POINTS TO PONDER

- Globalisation has wiped out the entire commercial shipping fleet from Africa but has not made a dent in the eradication of malaria
- We (e.g., the Chinese) know what to do, how to do it and where to do it, but we don’t have the resources. Why don’t they (e.g., the European Union) help us?
- Does globalisation have a human face (wiping out Third World debt is but one example)?
- Most of humanity is disenfranchised in the contemporary international system.
- *Pacta sunt servanda*

“The international regime for the peaceful uses of the ocean space shall provide a pattern for the future framework of international organisations.”

Elisabeth Mann Borgese (1968)
Principle 17, *The Ocean Regime*

CLOSING REMARKS

Dr. H. Schunck

Director General, Federal Ministry for Education and Research, Germany

*Dear Prof. Mann Borgese
Distinguished Participants
Ladies and Gentlemen,*

It is a pleasure and an honour for me to convey to you the greetings of my minister, Mrs. Edelgard Bulmahn, and of Parliamentary State Secretary Wolf-Michael Catenhusen and to speak to you here, at the seat of the International Tribunal for the Law of the Sea.

The choice of venue for the International Ocean Institute's 28th *Pacem in Maribus* Conference indicates both recognition and obligation. It is a *recognition* of the importance of the work of the International Ocean Institute for the peaceful approaches to the ocean and all plants, animals and resources in the water and under the sea floor. And it is an *obligation* because the Tribunal is the most visible sign of the will of the international community not only to provide international law as a basis for the peaceful uses of the oceans, but also to implement such law whenever necessary. The Convention on the Law of the Sea, which established the Tribunal, provides the framework for access to and use of the oceans by the international community without placing too strict limits on the freedom of the seas.

As has been stated several times during this conference, almost 400 years ago, the Dutch statesman Hugo Grotius published a paper entitled *Mare liberum*, the freedom of the seas, in which he defended free access to the oceans – a boundless space at that time – for all nations. This formed one of the most important starting points of modern international law, although his point of view was hardly recognised during his lifetime. Roughly 350 years later, Arvid Pardo, in some respects a modern Hugo Grotius, became a highly acknowledged man for adding a new dimension to the idea of the freedom of the oceans when he introduced the idea of the oceans as a common heritage of mankind.

From ancient times on until today, the sea has been a space of communication, trade and migration of ideas and people, not a barrier separating people. This can easily be exemplified from the North Sea to Polynesia. And remember that in Roman times the Mediterranean was just called *mare nostrum*. Today one of the most successful alliances which has promised and kept peace and freedom for its nations is centred around and named after the North Atlantic.

We depend on the freedom and well-being of the oceans in many ways. It was a long and difficult way to the conclusion of the Convention on the Law of the Sea which guarantees the freedom of the seas – not however the boundless freedom of exploitation and pollution rather a freedom involving responsible and sustainable use and protection. Thus the ideas of freedom and heritage have been brought together.

Such freedom undoubtedly involves the obligation to live and work together in peace. This is not always easy to achieve but it can sometimes be achieved starting at the working level, as it were, in particular as regards the scientific exploration of the seas.

In recent years, the German Federal Ministry of Education and Research supported an international research project involving participation by researchers from different countries. That is nothing unusual today. What is unusual is the region where research activities were conducted and the list of countries to which the participating scientists belong: German researchers co-operated with scientists from Israel, Palestine, Jordan and Egypt. This very successful Red Sea Project, proposed and conducted by Prof. Hempel, is coming to an end this month. Unfortunately, as you all know, political events in the Middle East have arisen again so that the final conference scheduled to take place in Aqaba cannot be held at present.

Let me make another point concerning the freedom of the seas. As I said, freedom can only develop in times of peace; freedom and truth are the first victims of conflict. But even in times of peace, freedom can only be achieved and maintained to everybody's satisfaction if the claims of all stakeholders are openly discussed. For example, the constitutional freedom of research in Germany is limited by the environmental protection protocol for the Antarctic. In Germany, we are currently in the process of trying to balance interests. The question is: What should be the consequences of our discovery that marine mammals may be impaired by sound waves emitted by research instruments for exploring the sea floor? I am sure we will find a compromise. What is important is that all sides are willing to compromise and respect the other's rights.

Ladies and gentlemen, during the four days of the Pacem in Maribus 2000, participants have addressed a great number of topics in intensive talks, discussions and negotiations. As we have just heard, you have been successful in doing so and have adopted conclusions and recommendations which will improve your work and influence our work in Germany. Among the very valuable results you have reached I would like to mention just two as most important for us in the federal offices in Germany: First, I agree with you that the recently established Informal Consultative Process on Oceans and the Law of the Sea, UNICPOLOS, will very soon be an important new and internationally acknowledged forum to integrate the often very diverse national and regional ocean policies. And second, we all shall improve our efforts to implement the extensively discussed and widely agreed scientific plans. I feel that the time is ripe to take another step forward by integrating natural and social sciences for a better understanding of the earth's system and its vulnerability to human activities. We will need the results of those scientific efforts tomorrow rather than next week.

Ladies and gentlemen, I would like to thank all of you for your efforts and commitment and I wish you every success in your future work. Maybe, some day, our common goal will be to achieve peace on Earth by securing the freedom of the seas, or in Latin: *per pacem in maribus ad pacem in mundi*.

Verehrte Frau Professor Mann-Borgese, erlauben Sie mir noch einige persönliche Worte. Pacem in maribus – Frieden auf den Meeren. Frieden, so bin ich überzeugt, ist ein Schlüsselwort, ein Leitmotiv literarischer, philosophischer, wissenschaftlicher und praktischer Arbeit Ihrer Familie. Ich will, um dies anzudeuten, nur an zwei Werke erinnern, vielleicht auch, weil diese mich besonders beeindruckt haben.

Da ist einmal der Wallenstein Ihres Bruders Golo. Eine Spiegelung unseres eigenen zerrissenen 20. Jahrhunderts in die Zeit der großen Religionskriege. Wir erleben den Feldherren Wallenstein, der scheitert, wo er versucht, die Friedenssehnsucht der geschundenen Länder des Reiches zu erfüllen.

Und zum anderen der große Roman Ihres Onkels Heinrich über den französischen König Henri IV. Auch hier die Vision des Friedens, des 'großen Plans' als Ende der Religionskriege Frankreichs und als neue Ordnung für Europa. Hugo Grotius taucht auf als Berater des Königs und eine lüb'sche Delegation macht eine lange Reise nach Paris, um die Ernsthaftigkeit des königlichen Plans zu erkunden. Auch Heinrich scheitert, wir wissen es, er wird ermordet – wie Wallenstein.

Sie haben eben dieses Thema des Friedens auf Ihre unverwechselbare Art aufgegriffen als Erfahrung Ihres Lebens. Ich darf uns allen wünschen, dass Sie nachhaltigen Erfolg haben.

Dear Mrs. Mann Borgese, you chose Hamburg as the venue for this conference. Hamburg is not only a beautiful old city which, more than many other cities, depends on the ocean and its resources. Hamburg is a Hanseatic city like Lübeck, which – for many people in Germany and the world – is inseparably linked with the name of your father's family.

Ladies and gentlemen, I would like to close Pacem in Maribus 2000 by quoting the inscription on the Holstentor in Lübeck, which dates back to the time of the Hanse and still may serve as a principle for us to follow today: *concordia domis, foris pax* – harmony within, peace without.

THE HAMBURG DECLARATION ON THE OCEAN

THE EUROPEAN CHALLENGE

PREAMBLE

- Believing* that the Twenty-first Century, driven by environmental, economic, and technological imperatives, will be the Century of the Ocean: the challenge is to strengthen and focus European ocean policies, programmes and related institutions, and to mobilise the great scientific and technological potential of Europe for these purposes;
- Convinced* that the seas surrounding the European continent are of vital importance for the climate, the economic well-being of the European people and the European Continent: the challenge is to improve their management and governance;
- Aware* that the ocean links the industrialised people of the “North” and the people of the developing countries of the “South”; that it washes the shores of the free-market countries of the “West” and those of the countries emerging from centrally planned economies of the “East”: the challenge is to bridge these gaps, to enable all countries to fully participate in the global efforts needed to restore the human environment and enhance sustainable development;
- Noting* that the United Nations Convention on the Law of the Sea based on the Principle Common Heritage of Mankind, which entered into force in 1994, together with the Conventions and Agreements emanating from the United Nations Conference on Environment and Development, 1992, provide a comprehensive international framework for ocean governance;
- Noting also* that Principle 25 of the Rio Declaration (1992) upholds that “Peace, development and environmental protection are interdependent and indivisible”; that peace and human security must be founded on sustainable development; that sustainable development must be founded on peace and human security; and that both human security and sustainable development must be based on equity: the challenge is that the convergent evolution of both the concepts of security and sustainable development now requires an examination of the institutional implications regarding the ocean;
- Acknowledging* that the main emphasis during the coming decades will be on consolidation, implementation and enforcement of the vast juridical legacy of the past decades, and that this consolidation, implementation, and enforcement will require an institutional framework, which cannot be created *ex novo* but must be built on existing institutions, at the local, national, regional, and global level: the challenge is to enhance education, training, and increase public awareness about, and participation in, ocean governance and sustainable development of marine and coastal living and non-living resources and ocean services so as to help ensure maintenance of a healthy ocean for the well-being of all people and of the biosphere. Civil society, including NGOs, will be important players in these efforts;
- To contribute* to the ongoing process of consolidation, implementation and enforcement, *Pacem in Maribus 2000*, meeting at the International Tribunal for the Law of the Sea in the Free and Hanseatic City of Hamburg, offers the following conclusions and recommendations.

CONCLUSIONS AND RECOMMENDATIONS

LEVELS OF GOVERNANCE

1. The institutional framework must be (1) comprehensive; (2) consistent; (3) trans-sectoral or multi-disciplinary, (4) participational, bottom-up rather than top-down, (5) intergenerational. “Comprehensive” means that it must reach from the local level of the coastal community through the levels of provincial and national governance to regional and global levels of international organisation. “Consistent” means that regulation and decision-making processes and mechanisms at all levels of governance must be compatible. “Trans-sectoral” or “multi-disciplinary” means that activities in ocean space cannot be considered separately, sector by sector, but must be seen in their interaction; “participational” means that regulation must not be imposed by central or federal governments, then to be ignored or flouted by local communities whose livelihood depends on the ocean, but that these communities must be involved in the making of regulation and its management. “Intergenerational” refers to capacity of responding to changes and realities of progress.
2. Institutional arrangements, based on these four principles, will vary from community to community, from country to country, depending on existing local infrastructure, level of economic and technological development, resource base, cultural tradition, etc. but this appears to be the general direction of the evolution of ocean governance and coastal and ocean management.
3. Issues related to resource management and integrated coastal management should be dealt with by including the local level. At the local level, a form of “community-based co-management” is emerging in many parts of the world. This approach is based on two principles: horizontal integration, involving all “stake-holders” in decision-making; and vertical integration, generating fora for joint decision-making between local communities and national governments.
4. At the national level, trans-sectoral, inter-ministerial, interdisciplinary mechanisms are emerging for the making of integrated oceans policy. Legislation to provide a legal basis for co-management; regulation and standard - setting, through co-management, as well as enforcement, whether national or regional, are likely to remain the responsibility of States. PIM 2000 recommends this emerging model with a view to its implementation at national level.
5. At the regional level, a process of “revitalisation of the Regional Seas Programme” has been triggered by the requirements of the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities. The emerging, comprehensive institutional framework should be utilised for the implementation of the whole range of aspects UNCLOS/UNCED and post-UNCED Conventions, Agreements, and Programmes in their interactions at the regional level and for the integration of sustainable development and regional security. Problems of technology co-operation and transfer, marine scientific research, fisheries, in particular straddling stocks and the suppression of Illegal, Unregulated, Unreported Fishing (IUUF) and other crimes at sea, monitoring, compliance enforcement, should all be dealt with at the regional level. In this context the role of regional commissions for sustainable development should be further enhanced.
6. At the global level, the recent establishment, by the General Assembly, of the United Nations, of the “Informal Consultative Process on Oceans and the Law of the Sea” (UNICPOLOS) should enhance the capability of the General Assembly to formulate an integrated oceans policy, harmonise and streamline the activities of the Specialised Agencies, deal with inter-regional issues, and resolve problems arising from overlaps and interactions between different Convention regimes such as Law of the Sea, Biodiversity, Climate Change, Agenda 21. Pacem in Maribus 2000 recommends that in the process of an emerging and changing Europe facing possible revisions of its institutional system, the oceans are considered as a whole and are given a specific, appropriate place within a new order for Europe. A strengthened Europe should continue and improve supporting developing countries.

LAW

7. The application of the rule of law in maritime affairs should be strengthened in particular by making more frequent use of the mechanisms for the peaceful settlement of disputes.
8. International environmental law has developed as far as its scope and its intensity are concerned. Nevertheless, the existing codes cannot be considered to be complete to collectively protect the marine environment. Additional rules are needed to protect against new environmental threats, such as the introduction of alien species, or to respond to new social or other developments, such as the flagging out of fishing vessels with the intention to circumvent restrictive fishing regulation. Any development in this respect will have to be in due regard with the freedom of the sea as enshrined in UNCLOS, in particular the freedom of navigation. Apart from that, the increasing number of environmental instruments and mechanisms makes the development of some co-ordination mechanisms mandatory. New conventions should provide transparency of procedures for the implementation of the respective obligations, including a strengthening of NGO involvement.
9. The international community should concentrate on the development of new enforcement mechanisms ensuring compliance. The traditional confrontational mechanisms should be supplemented by ones based upon a non-confrontational approach. Among the traditional mechanisms of enforcement, in particular, the port state control system should be further refined and strengthened.

SCIENCE

10. The upcoming national and European Marine Science Plans aim at the integration of all relevant dimensions of the natural and social sciences and the concerns of all end-users of European Seas. They will take into account that a free and independent marine research is of fundamental importance for the understanding of the earth system. *Pacem in Maribus 2000* wishes to express its strong support for the immediate implementation of science plans.
11. Advances in marine management are conditional upon improved integrated observing systems based upon the use of ocean observing satellites, in situ instrumentation, computer modelling, and data access. Maximum support should be given to the observing programmes in the Atlantic and European coastal seas which are being developed by IOC, UNEP, FAO, WMO, IMO, ICSU, ICES, HELCOM, and OSPAR, especially the Global Ocean Observing System, and its regional component, EuroGOOS. The well established scientific infrastructure provided by the countries co-operating in the "International Council for the Exploration of the Sea" (ICES) to conduct co-ordinated marine research in European and North Atlantic waters which results in regular high level scientific management-advice on fisheries and environmental matters must be strengthened and should be developed into other European areas such as the Mediterranean Sea.

ENVIRONMENT PROTECTION AND SUSTAINABLE DEVELOPMENT

12. The close co-operation of riparian States through the regional Marine Environment Commissions or Commissions on Sustainable Development on the basis of instruments such as the Helsinki, OSPAR, and Barcelona Conventions, should be continued and intensified. Such Commissions may serve as examples for other marine areas world wide.
13. Environmental action programmes should be adjusted to specific problems in the region. They should address inter-sectoral issues related to policy, laws and regulations, institutional strengthening and human capacity building, investment activities, as well as public awareness, and education. The implementation should be based on broad partnerships including governments

and state authorities at different levels, international financial institutions, the private sector, and NGOs, as well as take into account the importance of rising public awareness.

14. Pacem in Maribus 2000 recommends the introduction of measures to ensure that fishing is carried out sustainably, in order to conserve biodiversity and that overcapacity in fisheries be reduced.

TECHNOLOGY

15. For the enhancement of technology co-operation and transfer, marine scientific research and capacity building, Pacem in Maribus 2000 recommends implementation of Articles 276 and 277 of the Law of the Sea Convention. States are called upon to strengthen their capabilities in marine scientific research including training. Emphasis should be placed upon developing systems of joint ventures involving developing and developed countries as equal partners. It also recommends participation of European universities and technical institutions in the 101 Virtual University (IOIVU) which is to initiate activities in 2001 with the capacity to grant an internationally recognised Master's Degree in Ocean Affairs and Law of the Sea to students anywhere in the world.

TRANSPORT

16. Marine transport is fundamental for trade and commerce within Europe as well as between Europe and other parts of the world. Globalisation has profoundly transformed the shipping industry and the economics of shipping. The efficient implementation and enforcement of international regulations and standards is of outstanding importance for the safety of human lives, the well-being of seamen, the participation of developing countries, the conservation of the marine environment and its resources, and regional security. Pacem in Maribus 2000 recommends, through UNICPOLOS, that competent organisations such as UNCTAD should analyse these developments in terms of the economic, commercial and legal aspects of maritime transport and report on them as appropriate. Particular attention should be paid to the issues of the effective exercise of jurisdiction and control including the need for elaboration of an international instrument relating to extradition in maritime crimes, fraud, piracy and for the protection of seafarers against abuse and violence.

RISK REDUCTION

17. To reduce vulnerability and integrate risk assessment and risk management into integrated coastal management, Pacem in Maribus 2000 recommends the establishment of local micro-mutual insurance schemes to be added to the micro loan systems which are essential for the enhancement of sustainable development, especially among poor coastal communities. A pilot programme should be established within the framework of the IOI sustainable livelihoods and eco-villages programme.

PUBLIC AWARENESS

18. Because public awareness and the involvement of civil society are powerful driving forces in the strengthening of institutional frameworks for ocean governance, PIM 2000 recommends that top priority must be placed by ocean and marine-related groups on creating awareness at all levels and within all elements of civil society of the status of and issues affecting the ocean and coastal environment. NGOs, involved in the promotion of sustainable development of ocean and coastal areas, should take an active role and be encouraged to create a "marine culture" at all levels and within all elements of civil society, which will positively contribute, ultimately, to the role and effectiveness of institutional frameworks for ocean governance.

19. To increase public awareness about ocean governance and sustainable development of marine and coastal living and non-living resources and other human activities in the ocean space, Pacem in Maribus 2000 recommends to explore the feasibility of establishing a ocean news agency. The IOI Network of Operational Centres can provide support for such an agency and facilitate its global outreach.

CAPACITY BUILDING

20. The contributions of most European countries to assist developing countries does not reach the marks originally envisaged. All should follow the example of Scandinavian countries and the Netherlands. Countries with extensive experience in ocean affairs should concentrate on these fields. Scientific capacity building and project-oriented training should find priorities in assistance programmes.
21. Innovative methods are needed to generate new and additional funding for the effective implementation of the Conventions, Agreements and Plans of Action for the sustainable development of marine resources. This includes the development of investment programmes. The programmes developed for the Baltic Sea and for the Mediterranean Sea may serve as examples for other marine areas to strengthen the financial funding capacity for investments. The involvement of, and support from, the business communities and financial institutions have to be improved.
22. Capacity building is a process of exchange of knowledge and know how in order to develop a marine science and technology capability that provides the countries with independent marine science and hence advice to governments on coastal zone management (CZM) and on ocean issues. Marine capacity building is a long term process which involves developing and developed countries alike and should be developed through partnerships. Governments, scientific and international organisations including NGOs, the private sector, and donor organisations should join forces in capacity building.
23. Approaches should be tailored to specific national and regional needs. Some of the best instruments for capacity building are activities in which scientists, technicians, and users work closely together in the execution of projects and programmes. Creation of awareness in the minds of the public and policy makers are essential for raising national and international support for the development and maintenance of scientific capacity.

ENFORCEMENT

24. For the enforcement of fisheries regulations, the effective implementation of the Straddling Stocks Agreement, the suppression of IUUF and other crimes at sea; for disaster mitigation and humanitarian assistance; for multi-purpose monitoring and compliance enforcement and to enhance the integration of sustainable development and regional security, Pacem in Maribus 2000 recommends that studies should be undertaken on regional co-operation among coast guards and navies for integrated surveillance, enforcement and control.

CALL FOR ACTION

25. The next two years offer a unique opportunity to further develop this emerging institutional framework. An intergovernmental review of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities is scheduled for 2001. "Rio+10" in 2002 will review the implementation of the UNCED process and assess progress towards the implementation of sustainable development. These 2001 and 2002 events are closely interrelated. Pacem in Maribus 2000 has attempted to provide "a vision of the whole", especially at the regional level, so as to stimulate the required strengthening and focussing process, as well

as give support to the “revitalising the Regional Seas Programme”. This could further develop this emerging institutional framework and initiate a concrete plan of action that emphasises consolidation, implementation, enforcement, and awareness creation. In addition it will make an important contribution to strengthening the UNICPOLOS and transforming it into a fully representative forum for the oceans. *Pacem in Maribus 2000* encourages all the participants to make full use of these opportunities.

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