

**INSURANCE INDUSTRY AND
WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT
JOHANNESBURG, 2002**

*Integrating the Insurance Industry into Integrated Coastal Management
(A Concept Paper)*

1. Purpose

The purpose of this project is to bring a concrete proposal to the World Summit on Sustainable Development, Johannesburg, 2002, which would greatly enhance the image of the insurance industry and expand the limits of "insurability" in the world's most populated and vulnerable areas, and, at the same time, make a major contribution to the reduction of poverty and the enhancement of livelihoods in coastal areas. The project, to be conducted by the International Ocean Institute in cooperation with the Insurance Industry, should run for 5 years. The estimated over-all cost is US\$5 million, to be shared by the Insurance Industry and an international donor like the GEF. The IOI will contribute its unique infrastructure, consisting of 17 Operational Centres in all parts of the world and their accumulated experience in working with coastal communities.

2. Background

This is to be a continuation of the project initiated in 1999 by the International Ocean Institute in cooperation with the Swiss Re, Zurich. The culmination of that project was a workshop in Bermuda (February 2000) attended by experts in the insurance business as well as in coastal management. The result of the discussions was that insurers and coastal managers have a common interest in coastal areas. That common interest is *Risk Reduction*. The tangible output was a comprehensive report, a

training module in risk assessment and disaster response for coastal communities, already tested and evaluated in IOI training programmes, as well as a series of case studies by several of the Operational Centres.

A large majority of the growing human population lives in the coastal zone, which thus is becoming the most densely populated zone on the planet. It also happens to be the planet's most vulnerable zone, prone to natural disasters such as floods and tsunamis, aggravated by climate change and sea-level rise, and by man-made causes, such as pollution (effects on public health) and erosion, or lack of building codes and of response capacity.

The coastal manager has a mandate of poverty reduction and livelihood improvement in coastal zones.(Agenda 21). Risk assessment, disaster preparedness and mitigation through response capacity are an essential element in the fulfilment of this mandate.

The insurance industry, faced with mounting difficulties arising from the hugeness of financial losses caused by natural or man-made disasters and the *erosion* of "insurability," has a stake in expanding "insurability" through risk reduction in the world's most densely populated areas. *The integration of the insurance industry into integrated coastal management would serve this common purpose.*

(For all the foregoing, see *Geneva Association Information Newsletter: Risk Management*, 28, November 2000, p. 19)

3. The Insurance Industry: New thinking

The insurance industry's expansion targets are of two types, strongly interrelated. The first is geographic expansion. The recent first CEO insurance summit in Asia is an example (GAIN, *General Information*, 168, June, 2001, p. 1) The second is maintaining or shifting the boundary between the

State's responsibility versus the private industry in the management of risks.

What are the limits of insurability and how can we move them....the basic question is defining what the state should or must still do and where insurance can provide superior solutions. In reality, if something is insurable, it can be organized pretty easily in the private market very efficiently. If it is not insurable, we encounter a real problem. Either the activity becomes a business risk where other mechanisms apply or we have to find a solution beyond that. *There are possibilities of creating partnerships between private insurance and public institutions at the local as well as international level in insuring economic, environmental, legal and social catastrophes. The development of new solutions has only begun in this area.*

(*General Information*, 168, June 2001, p.10; also *General Information*, 167, p. 8, "Some additional Potential Research Topics" State versus private management of insurance type of risk" This is an ongoing and fundamentally important problem).

This question of defining the boundary between State and private sector becomes particularly important as the industry expands from the industrialized to the developing countries where the area of "un-insurability" is huge. According to the OCDE, from 1990 to 1998 some 94 % of the world's major natural disasters and over 97 % of the deaths connected with natural disasters occurred in developing countries. (*Risk Management*, 29, May 2001, p.3)

Many tools exist and are used to predict the occurrence of catastrophes, or work out which areas are most at risk. New advances in information technology offer an opportunity to estimate more accurately the probabilities and the potential losses of future disasters. The development of faster and more powerful computers and improved data on hazards, properties and people at risk enable one to examine extremely complex phenomena...However, not all those tools are applied. It is not always that simple to collect the data needed and to share information between the concerned parties. There is a financial limit to what can be done in poor countries. Corporations do not necessarily have a real commercial incentive to implement or diffuse their techniques in catastrophe prone areas. *This is undeniably calling for a greater partnership between both the private and the public sector. (Ibid.)*

It is estimated that by 2025 more than 5.5 billion people worldwide will live in cities and a large proportion of them close to regions with seismic hazards, *a majority of them in coastal Megacities.*

It is statistically clear

that powerful earthquakes and other natural catastrophes will assault several large urban areas. Governments and decision makers should keep the awful events of recent days in mind and wake up to the seriousness of the situation. Without a real effort from stakeholders to set up efficient operational catastrophic risk management programs, it seems unfortunately inevitable that the worst is to come. (*Ibid.*, p.4)

The insurance industry is fully aware of the challenges and opportunities that lie ahead and ready to formulate new responses.

A problem on this scale demands a new level of response from the industry. Insurers have gained great skill in understanding natural hazards and developing practical techniques to handle their economic effects. Often they are not applied because circumstances are not conducive to a purely commercial insurance system — the risks may be too large or the economic base may be too small, for instance. *By collaborating with other stakeholders, it may be possible for insurers to provide services in a hybrid system, with benefits for planning and post-event recovery. Of course, financial systems need to be integrated with local cultures — a good example is Grameen Banking in Bangla Desh, which has given communities the framework to control their own development.... To date this avenue has not been explored thoroughly. Innovation will be needed to develop new sources of funds to finance the growing scale of risks.... (Insurance Economics, 43, January 2001, p. 19)*

The key-words are:

- expanding insurability through risk reduction, including in densely populated urban zones in vulnerable, disaster-prone areas, such as coastal Megacities;

- new forms of cooperation between public and private sector;
- stakeholder cooperation;
- integration with local cultures.

4. *Climate Change..*

The involvement of the insurance industry with climate change is obvious.

The Insurance Industry is most concerned about the dramatic increases in claims resulting from weather-related catastrophes and man-induced natural disasters, experienced over the past decade. Over the past 10 years, a dramatic increase in the number of disasters as well as in damage caused could be observed. The continued dramatic long-term incline of insured losses in 1998 led to a loss of at least 15 billion US\$, while the total economic loss was over 90 billion US\$ (source: Munich Re). In order to get an impression on the severity and magnitude of the problem, one might wish to note that a weather event in the order of Hurricane Andrew (1992) hitting the US three times within one year, could destroy the US Insurance Sector and lead to unforeseeable economic losses. An increase of only 10% of a windstorm's wind gust speed of about 200km/h will lead to an increase of insured losses of over 150 %.

(UNEP, "The Role of the Financial Services Sector in the implementation of the GPA with particular reference to the Insurance Industry.")

This has led to the cooperation between the Insurance Industry and UNEP. In the autumn 1999, UNEP's Co-ordination Office for the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) commissioned the Gerling Sustainable Development Project (GSDP) to prepare a consolidated sector view on the role of the financial services providers in implementing the GPA and in recommending possible synergies and linkages in order to help UNEP carrying out its mandate and develop new and innovative private-public partnerships. This is excellent work. It remains, however, at the level of *research*. It addresses general environmental problems, and is not specifically involved with the problems of *coastal management*. It

inserts itself into UNEP's ongoing "Insurance Industry Initiative" which, in 1995 released a *Statement of Environmental Commitment by the Insurance*, which points in the same promising directions.:

The insurance industry recognizes that economic development needs to be compatible with human welfare and a healthy environment. To ignore this is to risk increasing social, environmental and financial costs.

We are committed to work together to address key issues such as pollution reduction, the efficient use of resources, and climate change. We endeavour to identify realistic, sustainable solutions... (UNEP, loc.cit.)

On the level of *Research*, finally, one should mention also a project, conducted jointly by the Insurance Industry and the Bermuda Biological Station — the same that hosted the IOI/Swiss Re seminar in February 2000. This cooperative project between scientists and insurance companies to study the frequency, predictability, and impact of volcanic sea floor activities and tsunamis on coastal areas is of direct relevance to the project proposed by this concept paper.

The present proposal is to build on all this work and transcend the stage of research and declarations and to engage in practical action in determined sites in the coastal area..

5. Integrated Coastal Management

Literally millions of pages have been written by academics globally on the concept of "integrated coastal management." The concept, applied in the United States internally ever since the 'Seventies, is a logical consequence of the recognition, enshrined in the Preamble to the United Nations Convention on the Law of the Sea, 1982, that "the problems of ocean space are closely interrelated and need to be considered as a whole." The concept's institutional implications were further developed in the Brundtland Report of 1987, and embodied in a detailed programme of action, Agenda 21, by the

Earth Summit on Environment and Development (UNCED) 1992.

Integrated coastal management must be seen as a flexible system, adaptable to differences in culture and stage of development. Beneath all differences, however, it has three principal universal features: (1) It requires *horizontal integration*, that is, *the participation of all major stakeholders in decision making and planning*, at the local, national, regional and global levels. These stakeholders are both governmental, including coastal municipalities, and nongovernmental, including fishermen's cooperatives and fishing corporations, offshore oil and ocean mining companies; the shipping industry, the harbour masters, tourist organizations, coastal engineers, scientific organizations, coastguards, nongovernmental organizations, including environmentalist organizations, consumers, etc. These must be associated in *Councils*, assisting the municipal authorities in planning, implementing, and enforcing coastal management decisions. *This project proposes that the insurance industry as a major stakeholder must be included in this horizontal integration.* (2) *Vertical integration*, i.e., there must be fora where local communities and national authorities can cooperate in making decisions on regulations which are the responsibility of the State. (3) the system thus functions, not in a top-down paradigm, but in a flexible mixed bottom-up and top-down mode. Regulation is largely self-regulation; enforcement is largely self-enforcement. Having to deal with activities in vast ocean spaces, this is probably the only mode that will work.

To build, in practice, an integrated coastal management system is an immensely complex task. Often the advocates of the theory themselves find it difficult to transcend the horizon of their own academic sector. Scientists tend to limit their "integrative" thinking to science; environmentalists, to the protection of the environment, fishers, to their own industry. In more general terms, it is extremely difficult to achieve genuine integration so long as one has to work within the constraints of a sectoralized

institutional framework, whether in government, in academia, or in industry.

Encouraging progress has been made, nevertheless, in all parts of the world, and there are numerous interesting examples, in countries as diverse as Canada and the Caribbean, South Africa and China.

There is a global consensus that integrated coastal management is the fundamental, necessary tool for the realization of sustainable development, based on the precautionary principle. Insurance economics as a whole is based on the precautionary principle and coastal managers have a lot to learn from this experience.

The World Summit on Sustainable Development in Johannesburg next year thus is bound to boost the implementation of integrated coastal management. Concrete pilot projects, defining and implementing structures and functions, will enhance the success of this great endeavour. *This is the time for the insurance industry to apply its new and innovative thinking concretely, building on what has already been agreed and achieved.*

6. The Project

(a) Site selection

We propose to conduct 4 or 5 pilot projects, also for the reason of comparison, in Asia, Africa, and Latin America, in sites where IOI Operational Centres have already initiated work with coastal communities and where “stakeholder participation” in coastal management has already been or is being established. These sites could be selected in South Africa, Kenya, Costa Rica, Thailand, China, India or the South Pacific. One small island developing State (SIDS) and one coastal Megacity should be included. This might be Yokohama, where IOI Japan is located and an interesting, decentralized

disaster management system already exists. A team leader will be selected for each site

(b) Preparatory phase

- After the site and team leader selection, the first task will be to identify a local NGO (where this has not already been done);
- two special training courses for this NGO will be prepared: One on integrated coastal management, one on risk assessment, disaster prevention, response, mitigation, etc. These courses can be adapted from existing IOI courses.
- Local national and municipal legislation on coastal management, law of the sea, Biodiversity, Climate, GPA, and Agenda 21, etc. will have to be collated

This preparatory phase is expected to last 6 months.

(c) Innovation

- Next we will have to determine the structure and function of the stakeholder Council or Commission or whatever name the local municipality wishes to give to this body. This will probably vary from country to country. Work with local communities is slow and requires the building of a relationship of trust through a number of projects.

Duration: 2 years

(d) Selection of Insurance partner

- The next task will be to recognize the insurance industry as a legitimate *major stakeholder*,

with the right and duty to participate in this Council and to start negotiations with the appropriate local or regional company.

- During this phase the Industry's contribution to integrated coastal management should be defined. It will have a number of components: basically: Risk assessment and management; training; and introduction of mini-mutual insurance schemes. These contributions might be articulated as follows, taking into consideration the need for flexibility and adaptation to specific local circumstances:
 - (i) Introduction of new advances in information technology offering an opportunity to estimate more accurately the probabilities and the potential losses of properties and people at risk and enhancing the analysis of extremely complex phenomena. Introducing meteorological models for hurricanes and floods and geodesy techniques for earthquakes as well as skills in understanding natural hazards and developing modern risk valuation techniques, as a basis for the introduction of mitigation measures and the development of risk transfer systems.
 - (ii) Training of local scientists in the use of these new technologies.
 - (iii) participation in zoning, infrastructure construction, standard setting, the drafting, implementation and enforcement of building codes;
 - (iv) Risk assessment of coastal engineering projects;
 - (v) community training in disaster response;
 - (vi) Directing the introduction of *mini-mutual insurance schemes*, to complement the *mini-loan schemes* (Grameen banking) which IOI has already introduced

in some of its “eco-villages”)

Duration: 1 year. It should be noted that these activities are and must be *an essential part of integrated coastal management, including the reduction of poverty and the enhancement of livelihoods. The participation of the Insurance Industry as a major stakeholder in planning and decision making for these activities will greatly increase the chances of success while laying the ground for the commercial expansion of the Industry.*

(e) *Implementation*

- The final 18 months of the project would be the initial period of implementation, after which the system should have been internalized and be self-supporting.
- Considering the need for *vertical integration*, it should be noted that the Insurance Industry, as a *major stakeholder in integrated coastal management*, is entitled, at the regional level, to participate in the process of *revitalization of the Regional Seas Programme*, which faces a number of important risk management problems.
- At the global level the Industry is entitled to participate in the UN Commission on Sustainable Development as well as in the Consultative Process of the General Assembly. This might open quite a few avenues for the expansion of the Industry.
- Following the recommendation of its Consultative Process, the General Assembly will decide this year to act on the implementation of Articles 276 and 277 of the Law of the Sea Convention which mandate the establishment of regional “Centres” (or in today’s context: “systems,” or “virtual centres”) for technology development and transfer. “Risk assessment of new technological developments” is one of the focal interests of the Insurance Industry.

Participation of the Insurance Industry in the establishment of these “Regional Centres” thus should be built in from the very beginning.

- Globally, the shipping industry is facing increasing risks from piracy and armed robbery at sea linked to criminal syndicates. These risks are magnified by what might be termed “the twilight of flag-State control.” The globalization of the industry together with the relentless growth of tonnage registered under “flags of convenience,” where the State of registry has no control whatsoever over the ships sailing under its flag, are making reliance on “flag state control” obsolete.. What will take its place is not at all clear. But the insurance industry should play a major role in dealing with the risks involved

7. Conclusion

Thus one can envisage a new role — and new markets — for the Insurance Industry, from the grass roots level to that of the United Nations in this century which may well be the Century of the Ocean. Johannesburg, 2002 will be a landmark in this development A significant contribution to this event will ensure a major role throughout the system during the coming decades.

Oceans and the Service Economy

Integrating the Insurance Industry into Integrated Coastal Management

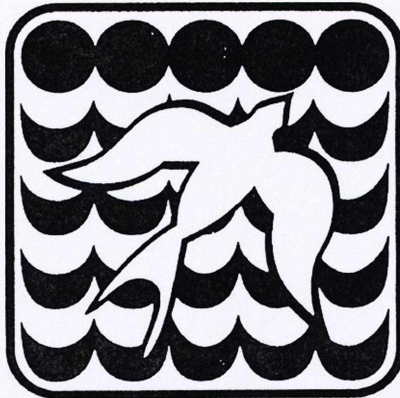


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INTRODUCTION

In the first chapter of this monograph we have tried to indicate the particular applicability of the theory and practice of the service economy to the economics of the ocean.

First of all, and unbeknownst to most, there has been a significant shift from *resources* to *services* in ocean economics. In trying to assess the economic value of the oceans, environmental and resource economists have traditionally stressed the importance of ocean *resources*, both living and nonliving. *Services* were hardly mentioned, while in reality, the *services*, in particular sea-borne trade and ocean-related tourism, had long since begun to dwarf the value of the *resources*. It is only during the last few years that the expression “ocean goods and services” has begun to appear in the literature – especially since Robert Costanza and his team highlighted the concept of the ocean’s “ecological services.”

We have tried to show, furthermore, how the peculiar nature of the ocean environment confirms all the premises of the service economy. The non-applicability of the concept of “ownership” in the Roman-Law sense implies a new concept of “value” which converges with the concept of “utilization value” as developed by Orio Giarini. Things that do not have a (static) “exchange value” but, instead, a (dynamic) “utilization value,” enhanced by services, need not be owned. They can be leased or co-managed. The issue of “ownership” becomes fairly irrelevant.

Globally, there is a need to integrate factors, which can be expressed in terms of dollars and cents, and others, which cannot be expressed in such terms: Monetarizable and non-monetarizable factors. In ocean economics this is more striking than in other sectors of the economy. What is particularly striking is that the non-monetarizable factors are bigger by orders of magnitude than the monetarized ones.

These two peculiarities of ocean economics take it beyond the market-driven economics of the industrial revolution.

Add to this that *uncertainty*, whether based on lack of scientific knowledge or

inherent in the complexity of the system, is far greater in dealing with the oceans than in other sectors of science and economics. *Uncertainty* generates *risk*, and the *greater the uncertainty, the greater the risk*. In environmental law this has given rise to the *precautionary principle*, which, however, has remained poorly defined and, therefore, difficult to apply. The insurance industry, instead, is based on risk management and survives on the practical application of the precautionary principle. Ocean and coastal managers indeed have much to learn from the insurance industry in this respect.

In Chapter 2, we tried to develop a few more thoughts on the mutual relationship between the Service Economy and ocean economics. Our analysis is based, on the one hand, on our own work on what is now generally called "ocean governance," and, on the other, on Orio Giarini's brilliant paper, "Basic Features of Services and Some Fundamentals of the (New) Service Economy," reprinted in *Progres*, Geneva Association Information Newsletter, Nr. 33, June 2001.

In Chapter 3, finally, we have proposed the notion that, if the *expansion of insurability* is one of the crucial problems of the industry, and of contemporary economics in general, then *the future of the insurance industry lies in the ocean and coastal area* – were it only for the reason that the vast majority of the world's population – 60 percent today; 80 percent in another fifty years – lives in the coastal area. This area, with the greatest population density on the planet, is, at the same time, the area most exposed to risk, whether commercial, pure, or moral, whether natural or man-made. Cooperation between the ocean and coastal manager and the insurance industry is becoming an absolute necessity. Not that we expect the industry to move in and insure the uninsurable; what we propose, instead, is its *participation, as a major stakeholder, in integrated ocean and coastal management: contributing its special skills in risk assessment, risk management, disaster preparedness and response. Risk reduction and the expansion of insurability in the ocean and coastal zone are the common interest of the ocean and coastal manager and the insurance industry, and it is important that the industry should integrate itself right from the beginning in the emerging system of governance*. We have based our proposal exclusively on the new thinking within the industry itself, such as we could cull it from the Geneva Association's excellent information newsletters.

Chapter 1:

The Economics of the Common Heritage

Introduction

Economic theory is in a state of effervescence, in our age of transition, just as most other theories. Some of the major factors of change that should be mentioned are: technological advances, the emergence of a new science paradigm, the increasing discrepancy between political space (the nation state) and economic space (the world, due to globalization of productive and financial systems), the general move away from narrow specialization towards comprehensive and systemic approaches, the growing importance of environmental and social impacts. These – and other – factors are transcending traditional economic theory, no matter whether market-based or socialist. Both Adam Smith and Karl Marx, after all, must be seen today not as prophets of universal truths but as products of a specific time – the first industrial revolution and the rise of European imperialism – and a specific culture, that is, European culture. That time is definitely over, and the domination of European cultural values is coming to an end with the demise of the European empires.

Human activities, all (or most) of which have economic implications extend today to land, sea, air, and outer space and, logically, the new economic thinking should extend to all these spaces. While the theory and practice of the *Service Economy* – now responsible for about three quarters of the global economy – is, so to speak, spatially disembodied, the other most advanced branches of the new economic thinking, *Resource Economics* and *Environmental Economics* – are still in the grip of a traditional land-centred orientation: Their data and case studies focus on agriculture, mining, forestry, including tropical forests.

It is the thesis of this chapter that (a) a very large part of the *resources, goods and*

services in the next century will be ocean-dependent; and (b) that the particular nature of the ocean environment magnifies the issues challenging contemporary economic thinking in general. It is quite possible, therefore, that radical innovation in economic thinking will come from "ocean economics" rather than from land-oriented resource or environmental economics. This becomes quite plausible if one thinks that in other (though obviously related) sectors of new thinking, such as international law and governance, the marine sector has played a leading role, just because the ocean is a medium so different from land that it forces us to think differently.

This chapter will begin with a brief assessment of the oceans resource potential for the next century; it will then describe some of the issues humankind has to face in the use and management of these resources, and, lastly, the paper will attempt to distil some guidelines for "ocean economics" in the next century.

I. The Economy of the Ocean

In other places¹ we have attempted a rough evaluation of the economic potential of ocean-dependent and ocean-related goods and services which we think is somewhat higher than had generally been assumed.² *As of today*, the total value of revenues generated by these goods and services appears to be of the order of some eight trillion dollars per year. By far the largest factors are international sea-borne trade which accounts for over five trillion dollars per year, electronic communication moving through sea-bed fibre-optic cables, accounting

¹ Mann Borgese, 1996 and 1998.

² See also *Ocean & Coastal Policy Network News*, published at the University of Delaware by Biliiana-Cicin-Sin and Robert Knecht. NOAA has commissioned a four-year study to calculate the contribution of the marine sector to the US economy. See also "Resources of the Sea, *Sea Technology*, October 1998; and *The Ocean, Our Future*. Report by the Independent World Commission on the Ocean, 1998.

for about \$1 trillion annually, and tourism, including cruise ship tourism, globally the fastest growing sector of the economy which accounts for almost half a trillion dollars. At present, a new type of cruise ship is under construction, which will accommodate as many as 65,000 or even 100,000 passengers: floating cities, bound to give to this revenue figure a considerable boost.

The offshore hydrocarbon industry is presently worth about 138 billion dollars and is penetrating deeper and deeper into ocean space. It is indeed likely that oil and, particularly, gas, will be explored in the international sea-bed area. The development of new technologies, converging with that of deep-sea mineral exploration technologies, is encouraging joint, multipurpose exploration, implying innovation in the structure of the industry. Oil companies, in the next century, may also be involved in the exploration and exploitation of methane hydrates, of which enormous reservoirs have been discovered in recent years, both in the permafrost zones of the Arctic and Antarctic and on the deep sea-bed. A consensus has developed that the amount of methane held in the form of gas hydrates worldwide is 10^{15} to 10^{17} cubic metres, and this contains a mass of organic carbon that is perhaps a factor of two larger than that in all known fossil-fuel deposits (coal, oil, and natural gas). The methane is contained in the hydrate itself and even more methane is trapped beneath the Hydrate Stability Zone at water depths between 500 and 4,000 metres and temperatures between 2.5°C and 25°C . The United States as well as Japan and some other countries have important national programmes for the exploration of this newly discovered resource.

Also to be added in the next century, is renewable energy extracted from ocean currents, tides and waves or thermal gradients (OTEC: Ocean Thermal Energy Conversion, i.e., powering turbines with low-pressure vapour generated by reaction between cold bottom and sun-heated surface waters) or saline gradients (osmotic pressure generated by reaction of saline and fresh water through membranes). It would be fanciful to attach dollar figures to these future developments, but it has been estimated that the market for OTEC alone, in the Pacific and Caribbean, will be worth \$18.5 billion a year by the year 2015.

Minerals and metals, such as those to be extracted from the famous manganese nodules of the deep sea-bed, went through a period of depression in the evaluations of industries and governments. While technologies are available to lift them from a depth of 5,000 metres and to extract the useful metals they contain – nickel, copper, cobalt and

manganese – the process was deemed to be uneconomical and beset with environmental hazards. Production costs were thought to be too high in comparison with those of terrestrial resources, which, besides, are overabundant and under-utilized. There have been structural changes in the demand for these commodities, due to technological advances in recycling, new materials, miniaturization and automation. Or, in broader terms, the shift from economies led by industrial production to the service economy.

Just recently, however, the prospects for ocean mining have brightened again: by the spirit of enterprise of one company, Nautilus, which, in 1996, obtained a licence for the exploration of Sea-floor Massive Sulphides (SMS) from the Government of Papua New Guinea. Some metals will always be needed, even if less than assumed during the years of Malthusian panic about running out of resources. Whatever metals will be needed will possibly be mined from the oceans rather than from land. Sea-bed mining, and, eventually, on-site processing, if properly regulated and conducted, would relieve the pressure of competing land uses, terrestrial habitat destruction and high costs of transportation and infrastructure.

A lot, however, remains to be explored and studied if sea-bed mining is not to do more harm than good. It is also interesting to note that these industries may simply never mature in the context of the presently prevailing market economy. Quite simply, their development is not market-driven.

Living resources presently account for less than \$200 billion per annum, but it is well known that fisheries, in most parts of the world are in dire straits. Subsidies far exceed revenues at the global level; and overfishing, pollution and habitat destruction threaten most commercially fished species. The only growth sectors are aquaculture and the so-called “genetic resources,” i.e., micro-organisms which abound in the oceans and sea-beds.

Aquaculture, presently contributing about 15-20 percent to the global fish and seaweed production and growing at a rate of 6-8 percent annually, is beginning to cause serious problems of pollution of soils, ground waters and coastal seas as well as social problems in coastal communities. There is obviously nothing wrong with aquaculture as such. Just as agriculture began to replace an economy based on hunting and gathering some ten thousand years ago, aquaculture might eventually replace the hunting and gathering in ocean space which technological development and industrialization have made unsustainable. There is

nothing wrong with aquaculture: there is, however, something wrong with the economic system that is driving it, on the basis of the obsolete “bottom line” principle of maximizing short-term financial profits of large, often multinational companies, instead of improving the nutrition and enhancing job creation in local communities; and ignoring the social and environmental needs of contemporary society.

Many of the ocean’s “genetic resources” have unique qualities, such as the heat- and pressure-resistance of the thermophile bacteria of the deep sea-bed, which make them extremely useful for certain bio-industrial and pharmaceutical processes. The revenues generated by these resources alone have been estimated at about \$3 billion annually and they are growing rapidly. Applications for the bioremediation of hazardous waste, or bio-mining applications, are examples of industrial uses on the drawing boards for this new century. Already today, however, they pose serious economic, social, ethical and medical challenges such as the patenting of living organisms or the impact of genetic engineering on food production. In this whole area, too, we seem to have reached a limit foreboding systems breakdown – or a threshold towards systems transformation.

Obviously not included in the \$8 trillion value of ocean-based or ocean-dependent or -related goods and services are the ocean’s so-called “eco-system services,” which indeed are hard to quantify and express in monetary terms. What is the value of the ocean as an essential component of the earth’s life-supporting system? Some economists have made interesting attempts to put \$-signs on these services. A group led by Robert Costanza has come up with the figure of some \$30 trillion for 17 categories of “goods and services” – including protection against storms and floods, nitrogen fixation, or plant-derived pharmaceuticals – provided by 16 specialized “biomes,” such as oceans, estuaries, tropical forests, etc. The calculation was based on a “witches’ brew” of market prices, people’s estimated willingness to pay, and the cost of replacing services. Considering the enormity of the ocean and coastal system, and the intensity of its interaction with the atmosphere, weather and climate, it is not surprising that \$21 trillion of that amount was estimated to be contributed by the ocean system.

Whatever the merit of these calculations, it is clear that the economic value of the ocean is enormous – a lead sector in global economics.

II. Resource Use and Management Issues

Ocean economics can rely on the "market" only to a limited extent. The greater part of ocean economics is based on a non-property and non-sovereignty reality. Ocean economics must incorporate the economics of resources which are the common heritage of mankind and must be managed but cannot be appropriated. The cultural, ethical as well as institutional implications of this, need much further study. The oceans have not only a "resource value" which can be quantified in monetary terms; they have much more important values of a different kind, very difficult or impossible to quantify. The oceans are part of our life support system and ocean economics will have to recognize the vast preponderance of the non-quantifiable components of the system.

1. Ownership

A very large portion of economic activities take place, or depend on, areas beyond national jurisdiction, where the closely interrelated concepts of "sovereignty" and "property" or "ownership" are not applicable. Our traditional economic systems, however, whether market-based or centrally planned, are based on the concept of "property" or "ownership," in the Roman-law sense.

Since the days of Hugo Grotius, the concept of the "freedom of the high seas" has become an intrinsic part of Western culture. (In other cultures, the concept goes back to time immemorial.) What it meant was that the oceans were too immense to be "owned" by anybody and that concepts of "sovereignty" and "ownership" did not apply. Fish, deemed to be inexhaustible, were considered as a "common property resource." In our time the traditional system of "freedom to fish" in the "global commons" has been eroded by overfishing, pollution and habitat destruction. As we pass from a phase of economics of abundance to one of scarcity, two new options appear to be open. One, much taunted in some parts of European-based cultures, is to introduce a system of "ownership" into the world's fisheries. For example, this may take the form of "Individual Transferable Quotas" (ITQ) as

implemented in, *inter alia*, New Zealand, Iceland and (partly) in Canada. This form of “privatization of fisheries” means that individual fishers or fishing companies are allocated “quotas,” which in many ways, become their “private property.” That is, they may exploit this property at their convenience throughout the seasons. They are also free to sell their quotas or licenses, if they so wish and to whomever they wish to sell them.

This system is dear to large industrial companies and strong distant-water fishing states, claiming that it has reduced the entry of “too many fishers chasing too few fish.” It can be, and has been criticized on several levels. A reduction in the number of fishers is one thing; a reduction of fishing capacity and effort is quite another. The reduction in the number of fishers simply indicates that the poor individual artisanal subsistence fisher, unable to resist the pressure of the large industrial company, sells his ITQ to the big company and joins the ranks of the unemployed or the migration to shanty town. Fishing capacity and effort, far from being reduced, is simply concentrated in the hands of fewer and bigger fishing companies, thus reinforcing the market-driven trend to make the rich richer and the poor poorer. Far from offering solutions to the problems of overfishing, pollution and habitat destruction, the abolition of the “common property resource” principle, the “privatization” of fisheries and the introduction of “ownership” as basis for an efficient market economy thus opens a slew of ethical and social problems. As one witness during the ITQ hearings in Canada put it:

If the vision of fisheries is one of privatization and more control of fisheries resources residing in fewer hands, then the approach of ITQs succeeds. If the goal is to provide a few individuals and companies with exclusive rights of harvest to what is a common resource, ITQs succeed. If the objective is to maximize profits and minimize the benefits to the public from these profits and marginalize coastal communities, then ITQs succeed.³

If undesirable from an ethical and social perspective, it may also be unrealistic from a strictly economic perspective.

Thus, Dasgupta, a universally highly regarded resource economist, rigorously rejects

³ Cliff Atleo, Member of the Nuuchah-nlth Tribal Council quoted in: Canada. Privatization and Quota Licensing in Canada's Fisheries: Report of the Standing Senate Committee on Fisheries. First Session, Thirty-Sixth Parliament, December 1998.

the thesis that the establishment of “property rights” would be a feasible solution:

A precondition for the establishment of a market is the existence and enforcement of property rights... Now in many cases of externalities it may be impossible, or at any rate difficult, to define property rights, let alone establishing them legally and then enforcing them.⁴

He further points out:

Now, there are many circumstances in which market solutions do not sustain an efficient allocation of resources. Many such situations can be described by saying that certain essential markets do not exist. Sometimes they just happen not to exist for accidental or historical reasons; sometimes there are logical reasons why they cannot exist; sometimes the nature of the physical situation keeps them from existing, or makes them function wrongly if they do exist. It happens that industries producing (or using) renewable and non-renewable resources are especially vulnerable to these difficulties. We then need to see how one might best analyze such situations.⁵

If neither the “freedom to fish” nor the “privatization of the fishery” can solve our problem, the alternative is to extend the principle of the *Common Heritage of Mankind*, applicable under international law at present to the mineral resources of the international seabed area, to the ocean’s living resources.

The 1982 United Nations Convention on the Law of the Sea declares these resources to be the Common Heritage of Mankind, which means – as spelled out in Articles 137, 140, 141, 145 of that Convention – they cannot be appropriated, they must be managed by an international Authority *for the benefit of humankind as a whole*, including future generations, and they are reserved exclusively for peaceful purposes. This concept, introduced by the late Arvid Pardo of Malta, thus establishes the basis for an economic system of *non-ownership*, including an ethical dimension (*equity: benefit for humanity as a whole with particular consideration for the needs of the poor*); an environmental dimension conservation (rights of future generations); and a peace-building dimension (reservation for peaceful purposes). Such a system, replacing the Roman-Law concept of “ownership” with that of “non-ownership, based on “stewardship,” more familiar to non-Western cultures, could be

⁴ P.S. Dasupta and G.M.Heal, *Economic Theory and Exhaustible Resources*. Cambridge: Cambridge University Press, 1979.

⁵ *Ibid.*

important for the building of bridges between Western and non-Western cultures – including economic theory and practice – now that the domination of Western cultural values is coming to its end.

The extension of the application of the Common Heritage concept to the living resources of the sea was already foreseen in Arvid Pardo's 1971 proposal for an Ocean Space Draft Treaty⁶ "which is based on a unitary approach to the problems of ocean space as a whole" and considers all ocean resources as Common Heritage of Mankind. During UNCLOS III it was the Delegation of the Holy Sea that proposed application of the Common Heritage principle to the living resources. Professor Shigeru Oda of the Delegation of Japan – now Judge on the International Court of Justice – made the same proposal. It was resoundingly rejected by fishing States and companies.

When the collapse of the world's fisheries appeared ineluctable, something was done which, for all practical purposes, even without using the name, moved the fishing industry from a "freedom to fish" regime to a Common Heritage Regime. That was the *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks* (Straddling Stocks Agreement) of 1995. Under this Agreement, fish must be fished *sustainably*, i.e., they must be conserved for future generations. They must be *managed* on the basis of international agreements – relying mostly on regional fishery organizations – for the benefit of mankind as a whole, on the basis of *equity*, and with due consideration of the needs of coastal States. "Reservation for peaceful purposes" is missing from the specifications of this new fishing regime, but since the Convention itself (Article 88) declares the High Seas, (including the Exclusive Economic Zones) to be reserved for peaceful purposes, it is implicit, although hardly of practical importance, for how could one use fish for purposes of war in any case? What is particularly interesting is the provision requiring "compatibility" between conservation standards and measures in the high seas and those in the EEZ of adjacent coastal States, it being understood that, in the absence of such compatibility, it would be impossible to conserve these resources

⁶ Draft Ocean Space Treaty, Document A/Ac.138/53.

either in the EEZ or on the high seas.

Ratification and implementation of the Agreement are moving slowly, resisted both by the high-seas fishing States, unwilling to renounce their “freedom to fish,” and coastal States, wary of encroachment on their sovereign rights over the natural resources in their EEZ.

Innovation always meets with resistance, but the crisis of the world fishing industry, induced by the “freedom to fish,” and the ineffectiveness and inequity of introducing an “ownership” regime into the system and “privatizing” the living resources of the sea make the introduction of a Common Heritage regime inevitable.

The concept of “ownership” in the Roman-Law sense (*ius utendi et abutendi*, the right to use and abuse or misuse) is on its way out in any case. Already James Burnham’s *The Managerial Revolution* (1941!) elucidated the essential hollowness of the concept in our time, for what mattered in the modern economy was *management*, not *ownership*, according to his theory. Another important contribution to the further erosion of the importance of “ownership” comes from the emerging Service Economy in the industrialized countries. Its most authoritative spokesman, perhaps, is Italian economist Orio Giarini.⁷

The Service Economy has its origin in the shift, during the second half of the twentieth century, from the production of materials to the production of services as the main factor in the creation of real wealth. Not only has there been substantial growth in the traditional “service sector” (or “third sector”), comprising health, education, banking, tourism, etc., but in the industrial production sector itself, service has assumed an unprecedented importance. Research and Development account today for about 50 percent of any high-tech industrial enterprise; planning, maintenance, storage, quality control; marketing; training and re-training; waste management; recycling; and disposal make up the rest. Some industrial companies, including, e.g., Schindler, the elevator manufacturer, have recently forecast that within the next ten years, manufacturing activities will be reduced to 8 per cent of employment!⁸ Taking into account these two components, the growth in the “third

⁷ E.g., Orio Giarini. “The Modern Economy as a Service Economy: The Production of Utilization Value,” in Paul Ekins and Manfred Max-Nef (eds.) *Real Life Economics: Understanding Wealth Creation*. London: Routledge, 1992.

⁸ Progres Newsletter 29, July 1999. Geneva: International Association for the Study of Insurance Economics.

sector” of the economy, and the growth of the service sector within the industrial enterprise, it is not surprising that Service accounts for 80 percent of the global GNP today.

In the service economy the value of a product is not its “exchange value,” i.e. the price at which it is sold on the market; its real value is its “utilization value,” that is, the length of its useful life, which is extended through repair, reconditioning, re-use, and recycling – through ongoing cooperation between the producer and the consumer (“prosumer”).

Goods which have a “utilization value” rather than an “exchange value” as in classical economics, need not be “owned.” They can be, and often are, leased and managed, in this cooperative relationship prolonging their useful life. “Ownership” does not have the same importance it had in classical economics.

Thus, if we are moving in this new century, towards an economic system that abandons the Roman-Law concept of “ownership” and replaces it with some form of “non-ownership,” whether in the form of “trusteeship” or “stewardship” or otherwise, then “ocean economics,” confronted with a huge sector in which “ownership” is simply not applicable, may well be the lead sector in the development of the new system.

2. Quantifiability

Classical economics comprises only what can be *quantified* and expressed in terms of dollars and cents, or as Giarini put it, what can be “monetarized.” This gives a limited and distorted view of the real wealth of people, of nations, of the world. For real wealth consists of far more than what can be quantified and expressed in monetary terms. It includes environmental resources (air, water, solar energy, *inter alia*); it includes unpaid work (e.g., household and child rearing work); as well as cultural and ethical values: the sum, in other words, of natural and man-made goods and services monetarized or not monetarized, what Giarini calls “Dowry and Patrimony”

At the same time, real wealth consists of *less* than indicated by money-making. Very destructive activities are making heaps of money: money is made by polluting industries, or by industries that repair pollution damage, but really do not add anything to real wealth creation. Enormous amounts of money are also made by the drug industry – illegally – or the

weapons industry – legally – both of which have the same effect of destroying people. Instead of being added to the money value of real wealth, they obviously should be deducted from it (“deducted value.”).

Economics thus is faced with the problem of summing quantifiable and non-quantifiable factors – factors preceded by \$signs +/- factors without \$signs, and it should be noted that the proportion between these two categories, which may affect also the way of dealing with them, has been changing throughout history. In pre-modern times, and still today in low-income strata as well as in so-called “primitive” economies, the non-monetarized sector, outside the “market” tends to be to much larger. Mutual aid in services, unpaid care for the old, unpaid food production for the household, home building, are all outside the “market.” During the last 300 years, in conjunction with the rise of the nation state, trade, competition, and colonialism, money assumed an unprecedented importance and became the only measure of economic value. This historical linkage may have interesting implications. It may lead us to consider modern economics as an “economics of war.” The growing importance of the “industrial/military” complex for both economics and war may reinforce this view.

Assuming that future historians will see the modern era ended with the end of World War II and consider the era in which we are living as post-modern, it may be fair to say that in this post-modern era, particularly under the impact of the rise of environmental awareness, the non-quantifiable sector has gained considerably in importance. The problem of adding “apples” and “oranges” thus becomes more complex.

There are two ways of dealing with the problem. Environmental economics is struggling to quantify and monetarize the value of environmental goods and services and force them into the market system – both on the value added and the deducted value side. The results are sometimes somewhat bizarre. Take the example of the “tradable emission permits.” You “quantify” a company's or a country's right to pollute and assign it a “quota.” This quota becomes its “property” and the basis for a “market” on which this quota can be traded. Thus, if there is a company or a country that does not really use its quota – particularly if it is a developing country – well, in that case, it can sell its quota to a company or state which needs more than its own pollution quota and which, by paying a price in dollars and cents, thus acquires the right to pollute more. It is claimed that this makes

pollution abatement “more flexible” without adding to the total amount of pollution emitted. To the non-economist, this sort of number game with nature might seem rather unethical, but then the modern economist will tell him that economics and ethics have nothing to do with each other.

The second way of dealing with the problem is, first of all, to recognize that it exists, and secondly, that it is not so much an “economic” problem as it is an ethical one and can be solved only by restoring to “economics” the ethical dimension it had before it became a “value-free science.”

In dealing with the economics of the ocean, we are powerfully driven towards this second alternative. For it would be difficult indeed not to recognize that the world ocean, covering 70 percent of our planet and over 90 percent of the biosphere, is an essential part of our life support system. In the light of the magnitude of this fact, monetary considerations appear puny. All we can appeal to is our ethical obligation to conserve our life support system.

If, leading us into this new century, a development is in course to restore to economics the ethical, philosophical, and social dimensions it once had, then, again, it is likely that “ocean economics” will be a lead sector. Hopefully, this will also enhance the development of a new “economics of peace.”

3. Uncertainty

Recent decades have witnessed a radical shift in the philosophy of science, a “paradigm change.” Since the age of enlightenment, scientists thought that they knew much and were learning more and more so that in the future they would have enough data to be able to model, and make linear projections of, processes and developments. Today we have come to the recognition that the more we know the better we know how little we know; that our knowledge will remain for ever incomplete; that the systems with which we are dealing are exceedingly complex, that the behavior of complex systems is non-linear and unpredictable; and that *uncertainty* is the name of the game.

This paradigm change in the philosophy of science has affected the science of economics as well. Additional data on additional factors, making systems more complex,

will induce chaos rather than enhance predictability.

Uncertainty may indeed be caused by lack of information, lack of reliable data, as well as by an overdose of the same. In the marine sciences, uncertainty is caused by both. We know too much about too little – about too small a part of the world ocean.

As applied to the ocean, economics is more dependent on science than in any other sector. Fisheries economics is dependent on marine biology; shipping must rely, among other things, on meteorology; mineral exploration, on marine geology, and volcanology; pollution control, on marine chemistry and physical oceanography, etc. Uncertainties in all of these sciences abound. Interactions between sea-floor, water column, atmosphere, land and rivers are of unfathomable complexity, and only a minuscule portion of the world ocean has actually been explored. Ocean economics thus, to a far greater extent than terrestrial economics, is based on uncertainty. If, impelled by the new scientific paradigm, post-modern economics will have to modify its deterministic models, include uncertainty as an integral factor, and rely less on predictability, ocean economics, again, may be a lead sector.

4. Risk

Uncertainty generates *risk*, the greater the uncertainty, the higher the risk, and risk assessment and management has become an essential component of management in all sectors of the economy, obviously with profound implications for the insurance industry.

An impressive literature has evolved during the past 25-30 years, spearheaded by the International Association for the Study of Insurance Economics (“the Geneva Association”). Essays on the economic theory of risk abound, on the risks inherent in natural disasters, e.g., seismic risks for the largest cities in the world; on the limits of insurability of risks; on the changing pattern of risks; on the risks inherent in climate change; on environment and insurability and the economic relevance of insurance; on uninsurability as a growing problem; etc. As Orio Giarini put it, insurance economics may be playing the pioneering role in the contemporary phase of the industrial revolution that textile economics played during the first phase of this revolution.⁹

⁹ Orio Giarini and Patrick M. Liedke, *Wie wir arbeiten werden. Der neue Bericht an den Club of Rome mit einem Vorwort von Ernst Ulrich von Weizsaecker*. Hamburg: Hoffmann & Campe, 1997.

The risks involved in ocean activities are of a peculiar nature. Economic activities in the oceans are extremely expensive, due to the hostility of the ocean environment. The cost of oil platforms, tankers, container ships may run into the billions of dollars. Accidents, whether due to human error, or fraud, or natural causes beyond human control, may be few and be further reduced by science-based technological improvements, but when they do occur, the damage caused may be enormous and largely un-measurable in financial terms. This requires a lot of new thinking in the insurance business, traditionally based on the assumption of risk distribution over a large number of minor accidents causing measurable damage. While shipping has long been a subject for specialized studies of risk assessment,¹⁰ the insurance industry has been slow in turning its attention to the systematic study of the risks inherent in other uses of ocean and coastal space. From the impressive list of publications by the Geneva Association, going back to 1976, it would appear that risks inherent in ocean uses had to await the 'Nineties to be considered, and attention now appears to be focused on meteorology and related studies in physical oceanography basic for understanding, and predicting, storm surges, hurricanes and tsunamis which may wreak uninsurable havoc in small islands and low-lying coastal areas. Such studies are now pursued by the Biological Station in Bermuda, in cooperation with a number of insurance companies.

In 1998 the International Ocean Institute entered an agreement with one of the largest re-insurance companies, Swiss Re in Zurich, to make studies on integrating risk assessment and management and disaster warning systems, disaster mitigation and adaptation into what is called integrated ocean and coastal management but which can hardly be called "integrated" if it lacks systematic consideration of the risk factor in each and all of its sub-sectors.

And new areas for possible investigation are continuously evolving. One of the newest should be studies on the risk factor inherent in placing installations on the deep sea floor, including the laying and maintenance of fiber optic cables. An incredible half billion miles of these cables are crossing the deep sea-bed of the Atlantic and Pacific Oceans. Besides traditional hazards, they face one that has only quite recently been discovered, and

¹⁰ Especially by Lloyd's.

that is, destabilization of the sea-floor through collapse of gas hydrate-bearing sedimentary deposits. When the hydrates break up due to natural causes or human activities, a solid hydrate cement is replaced by a gas-rich watery fluid allowing sediment mobilization that can result in sea floor collapse, and cause underwater landslides, cable and pipeline breaks, loss of support for drill-pipes resulting in blowouts, and collapse of oil platforms. But perhaps the most important aspect of their potential environmental impact is in their interaction with the atmosphere. Methane is much more effective as a greenhouse gas than carbon dioxide, although the amount presently in the atmosphere is small. The global warming potential of methane is calculated to be 56 times by weight greater than carbon dioxide over a 20 year period after introduction into the atmosphere. Hydrates risk analysis and R&D in mitigation technologies must therefore be an important part of any methane hydrate development project, as well as of any project for the laying of cables, or of any other installation on the deep sea floor.

Thus, in this particular and highly important dimension of the evolving new economic theories for the next century, the ocean sector certainly has not been the lead sector. The reason, perhaps, is the enormity of the unknown and unquantifiable component involved. It is likely, however, that insurance economics, and, through it, economic theory in general, will benefit greatly from entering this new, immensely complex and challenging field. Beneficiaries, obviously, will also be, and in the first place, coastal communities and ocean industries.

5. Conclusion

As we have seen, we may divide the economic value of the ocean into two parts: one part is based on human activities, the production of goods and services which can be measured in dollars and cents. And although straining and stressing the market system to the limits, or, in turn, being limited, stifled and perverted by the market system, it still must be considered part of it. The other part is based on the ocean's "ecosystem services" and even the best efforts to assess these services in monetary terms and thus fit them into the market system seem somewhat puny and ineffective in the face of the majesty of the world ocean as part of the earth's life support system. The fact is that this non-quantifiable, non-monetarizable

sector of ocean economics, situated beyond the limits of the market system, is very much greater than the monetarizable market sector. More imposingly than terrestrial economics, ocean economics thus is faced with the challenge of integrating environmental and economic factors, monetary and nonmonetary values, seeing the market not as the all-comprehensive basis of the world economy but merely as a part of it – a wholesome correction to the presently distorted view of marketmania.

So-called realists may discard the whole argument of this proposition as totally absurd. Is not the whole splendid edifice of modern economics, with its unparalleled wealth creation, dynamism, freedom and rationality, founded on the concepts and institutions of property, money, quantification, market, competition, predictability? Are we supposed to move back into the Stone Age by abandoning this system that has conquered the whole world?

This may well be the argument of the “Haves,” the conquerors. It should not be forgotten that the system was built on the sweatshops of the first industrial revolution, creating wealth on the broken backs of misery, and at the end of its roundly 300-year cycle, we may well bomb ourselves back into stone ages and thus destroy the splendid system that had conquered the world.

We do not suggest, further more, that we should *abandon* or *abolish* the system. We suggest that we should *transcend* it – much like Einstein and Heisenberg transcended Newton, whose theories, however, retained their validity in determined limited circumstances. The market will still be there, but it will not have the all-embracing function we thought it had. Money will still be there, but there will be other measures, other “indicators” of real wealth. We will not “give up” the concepts of sovereignty and ownership, but they have already been transformed and transcended. If we do not want to bomb ourselves back into the Stone Age, we must transform our economics of war into an economics of peace which must comprise the values of non-Western as well as Western cultures. We see such an economics of peace emerge from a convergence of new Western concepts, such as those of the Service Economy, of Eastern concepts, such as those of Gandhi who, interestingly enough, devoted his last years to a study of economics and the development of his own ideas on this subject, and common concepts of the late 20th century, such as those of environmentalism. *The integration of sustainable development and human*

security would be a fundamentally important component of an economics of peace.

These were concepts already familiar to Olaf Palme and Jan Tinbergen. The latter wrote "so security policy has to be integrated into a 'generalized' socio-economic policy."¹¹ I believe it will be, again, in the marine sector, especially at the regional level, that we may first establish an institutional framework for this necessary integration.¹²

III. Guidelines for Ocean Economics in the Next Century

In her latest book, *the Oceanic Circle*, Elisabeth Mann Borgese has tried to extrapolate a set of recommendations based on all this material, and although the route of thinking in this essay is somewhat different, those recommendations may still provide a suitable conclusion:

Ocean perspectives: Economic

The impact of the ongoing process of transformation on our economic system is bound to be profound.

The new system, emerging from the ocean, the Great Equalizer, and its principle of the Common Heritage of Mankind, would have to respond to the needs of the age of the information revolution and the end of Eurocentrism. It would have to embody, in one way or another, the following concepts:

1. Holistic approach

Economics has social, political, environmental, cultural, and ethical dimensions. Its focus must be the human being. Its goal, the welfare of all.

¹¹ Jan Tinbergen and Dietrich Fischer, *Warfare and Welfare: Integrating Security Policy into Socio-Economic Policy*, Brighton, Sussex: Wheatsheaf Books Ltd. 1987.

¹²See, *inter alia*, UNESCO, *Multaqa*, 1998.

2. Decentralisation, Community-based Co-management

The impact of high technology and the principles and methodologies of modern management converge with the ideas and ideals of the non-Western world views in their emphasis on communitarianism and a decentralized social economy, as espoused by Gandhiism. This implies:

- (a) Resource saving through greater discipline on the part of consumers, improving energy efficiency, and better organization of the production and distribution system;*
- (b) A reduction in consumption standards through "voluntary simplicity" and self-restraint;*
- (c) Acceptance of substitutions between material and non-material consumption: fewer goods and more services or less time spent in market-oriented economic activities and more time allocated to non-economic activities and/or small-scale environmentally benign material production for self-consumption;*
- (d) Reducing the demand for intra-urban transportation by redesigning cities;*
- (e) Reducing long distance transportation of materials and goods by better integration of local and regional economies.*

3. Equity

The goal of economics is not the greatest good for the greatest number – which might leave 51 percent of the population free to exploit the remaining 49! – but the welfare of all. Implicit in the above is the basic presumption of equal dignity of and respect for the life and welfare of every individual. Translated into the sphere of economic policy, it entails top priority for meeting the most basic material needs (water, food, shelter, health, education) of everybody.

4. Intellectual Property

Intellectual property rights may have to be reviewed and revised in the context of the economics of the information age and sustainable development.

5. Uncertainty

Decisions on socio-economic policy will have to be made forever in the light of uncertainty inherent in the system. Uncertainty can be reduced, not eliminated, through applying the precautionary principle and new concepts of risk management as developed by contemporary insurance economists. It can further be reduced by blending insights gained through improved scientific and technological methodologies with those gained through ancient wisdom and experience, in community-based co-management systems.

6. Work

Work, as expression of self-development and fulfilment, is a basic human right. Theories of the post-industrial society, and the ideals of other cultures converge in distinguishing "work" from "paid employment" and stressing the importance of "service." This would imply:

- (a) Guaranteed minimum paid employment for every one, sufficient to assure the basic necessities of life: shelter, food, health, and education;*
- (b) Self-employment and "free enterprise" for the free time left by the part-time employment, to increase income and generate savings;*
- (c) A period of life to be devoted to unpaid service to the community, thus enhancing the common heritage and repaying what the community has provided at an earlier stage of life;*
- (d) Such a scheme to be realized at the local community level, on the basis of co-management.*

7. Wealth

Wealth and welfare is a combination of natural or physical and biological, of man made (cultural tools; goods and services) and of monetarized (capital) phenomena; this holistic view reflects our social, economic and environmental dimensions.

Wealth is in stock not in flow. It is to be measured by human development indicators, including economic, social, cultural, ethical and environmental indicators.

- (a) Indicators are needed especially for non-marketed and non-marketable goods and services;*
- (b) Non-remunerated work, i.e. work not exchanged and work exchanged, but not paid with money, must be included;*
- (c) Deducted value, i.e. costs of man-made pollution and over-exploitation of resources, must be taken into consideration; and*
- (d) Uncertainties inherent in complex systems have to be taken into account.*

Indicators of vulnerability and indicators couched within frameworks of probability should systematically be developed.

8. Value

The value of goods is not their "exchange value" ("market value") but their "utilisation value." The longer their duration through inputs, paid or nonpaid, of services such as training, maintenance, repairing, rebuilding, recycling and disposing services, the greater their value.

9. Ownership

The Seas and Oceans and their resources are the Common Heritage of Mankind:

- (a) *“Resources” means nonliving, living and genetic resources; and*
- (b) *Whether they are in areas under national jurisdiction or in the high seas or in or under the International Seabed Area, they must be managed sustainably, keeping in mind the needs of future generations; with special consideration for the needs of poor countries and poor people, aiming at the eradication of poverty; They are reserved for peaceful purposes, peace and security being basic for sustainable development.*

The principle of the Common Heritage of Mankind thus is the foundation of sustainable development, not only in the oceans, but globally. In accordance with the cultures of the vast majority of humankind, its application must be extended from the wealth of the oceans to wealth in general, not to be “owned” by humankind, whether individually or collectively, but to be held in trust, and to be administered on the basis of cooperation between civil society and the institutions of governance, at local, national, regional, and global levels.

10. Internal/International Revenues

Taxation may be shared between municipal, national, regional and global levels of governance, in accordance with the levels of services required.

Gradually, a development tax might be levied on all commercial uses of the global commons, starting with the oceans;

Taxes might be levied on activities generating deducted value, converging with the ethical postulate of the prohibition of trade in weapons, drugs, etc.

11. Adaptive Nonlinear Network

The overall direction of the economy is determined by the interaction of many dispersed units (human beings). The action of any one unit depends on the state and actions of an

unlimited number of other units; leading, inevitably to a system of multiple equilibria thereby making impossible the prediction of unique future states.

The units are not hierarchically arranged and all are free to follow their own way to the goal: the goal is One but the paths are many. The following of this path should lead to an economy which is:

- (a) Flexible, adaptive and creative;*
- (b) Nonexploitative so that assets and income get equitably distributed;*
- (c) in harmony with the natural environment;*
- (d) Self-regulated leading to restraint on unnecessary consumption; and*
- (e) Culturally determined.*

12. Nonviolence

The socio-economic system for sustainable development is based on nonviolence as applied to ownership, production, consumption, work, allocation, distribution and in reforming economic systems. All disputes are to be settled peacefully through the appropriate mechanisms at all levels of governance.

Chapter 2: More on Oceans and the Service Economy

We are reading Orio Giarini's paper "Basic Features of Services and Some Fundamentals of the (New) Service Economy" (*Progress* V. 33, June 2001) through an "ocean lens." Let us start with two of his "fundamentals".

First, Giarini establishes a clear link between the Service Economy and insurance economics:

It is largely and specifically insurance systems that have generated the basic logic of the modern service economy in terms of price and the definition of value: for any system producing wealth or utility, as for an insurance policy, the real issue is to estimate costs measured over an uncertain period of time and at levels which can only be fixed according to probabilities. The risk-management goal is to identify, reduce, exploit and control the uncertainty level.

At the same time,

Thus, the notions of risk and management of vulnerability and uncertainty become a key characteristic of the service economy.

The second "fundamental" is that "insurability" has become an all-pervasive economic issue

a fundamental concept to adequately interpret and manage the key economic problems of our time... for example: insurance (and risk management) has become the essential complement of all social-security and savings policies... insurance provides key professional methods for assessment, identification and management of technological, industrial and environmental risks; insurance is an essential complement to any health policy... It is clear that the notion of insurability is moving, little by little, center-stage of economic policy-making in the future... Once again this process concerns key policies like: social security, the effects of natural catastrophes, industrial and environmental risks (with all the consequences for liability that they involve), health insurance, crime and

terrorism prevention (including fraud and moral-hazard-related issues).

Thus, it would appear inevitable that, with the Service Economy, also insurance economics and the insurance industry is going to find new areas of application (expansion of “insurability”) in ocean economics.

The vitally important subject of “integrated coastal management” is addressed in Chapter 3.

Here, in connection with Giarini’s paper, we would like to suggest two related subjects, and that is (1) shipping; and (2) the complementarity between Investment and Trade.

I. Shipping

The insurance industry has been for a long time heavily involved with shipping, especially through the International Union of Maritime Insurers (IUMI), 400 million tons of shipping are presently covered by unlimited insurance, with the exception of oil pollution where liability is limited to \$2 billion. The insurance industry thus carries a lot of liability, without, however having the opportunity for active participation in the decision-making processes of the regulatory system. I believe the future will offer opportunities for greatly expanding opportunities in the shipping sector, for partnering with the intergovernmental sector as well as for spreading of risks, thereby enhancing insurability.

The globalization of the shipping industry, and, in this context, the growing proportion of ships registered in open-registry states or flags of convenience – almost 40 percent of global tonnage at this time, and the number is rapidly growing – are causing peculiar problems in international law. Traditional international law relied on *flag state control* for the enforcement of standards and regulations regarding the safety of shipping and the protection of the marine environment. Now if a sufficiently large proportion is in fact evading “flag state control” through registration in states, including fictional or failed states which, in law are still “sovereign States,” but in practice, sometimes exercise no control whatsoever, the consequence is something one might call “The twilight of flag state control.”

It is not a simple task to envisage what will take its place in international law. It is a political as much as a legal problem. Flag state control is an apantage of the traditional

concept of sovereignty and the sovereign equality of States. Since sovereignty in the interdependent world of the 21st century cannot be the same as it was in the 17th century, when the European nation State arose from the ashes of the Thirty Years' War and the Treaty of Westphalia, it is logical to assume that, with the changes in the concept of sovereignty, flag state control is obsolescent. What may take its place may be more complex and have a number of components. *Port State Control*, articulated in a number of *Regional Memoranda on Port State Control*, which enforce IMO and ILO Conventions, will be a component of rapidly increasing importance and efficiency. Regional cooperation in the suppression of crimes at sea, including piracy and terrorism prevention (including fraud and moral-hazard-related issues), articulated eventually in protocols establishing *regional coast guards*, may be another component, complementing the Port State Control component. For this latter can deal only with ships voluntarily in a port or offshore terminal of a State party, whereas the regional coast guard would deal with ships at sea.

The crux of the matter, however, is the question of the registration of ships. If national registration has become dysfunctional, the logical alternative would be international registration, and the logical institution to assume responsibility for the international global registration of a globalized industry would be the International Maritime Organization (IMO), with its Headquarters in London. This was already discussed at UNCLOS III in 1974, but no action was taken. The time was not ripe.

To assume responsibility for the registration of ships obviously would add an enormous burden for which IMO might not be prepared at this time. However, the arising extra costs would be covered by registration fees, which, beyond covering the real costs, might even be a source of a modest extra income which could be utilized for other services, enhancing the safety of ships and the conservation of the marine environment.

IMO, however, could not have liability for ships flying its flags. It is the private-sector insurance industry that has already almost totally assumed this liability while it has little input into the system.

The establishment of regional support infrastructure for shipping "that embraces elements such as insurance and P&I..." is already under consideration by IMO. *Mandatory insurance for all ships registered by IMO* would be another essential component of the new system, which, in turn, might have a number of sub-components.

A large proportion of ships would be relatively low-risk. They would fit within the present limits of “insurability,” which, furthermore, would be enhanced in any case by port state control and regional coast guards. This large low-risk proportion would probably be strong enough to carry the whole system.

For the high-risk sector, including oil and LNG tankers and container vessels carrying noxious and dangerous materials such as those covered by the Basel Convention, one could also think of voluntary mutual self-insurance arrangements, such as the former TOVALOP and CRISTAL arrangements, to complement, and partner with, the private insurance sector.

It may take some time to get such a complex new system off the ground, to take the place of the obsolete and dysfunctional flag state control system, but if developments could be headed in the direction of a “vision” of this kind, the opportunities for “expanding insurability,” creating new partnerships between the private and the public sector and enhancing the input of the insurance industry into the system certainly would be great.

Shipping, i.e., the carriage of international sea-borne trade, is one of the pillars of the Service Economy. If Giarini is right with his fundamental recognition that “insurability” has become an all-pervasive economic issue, this will involve the shipping industry just as it is involving all other sectors of the economy.

II. Complementarity Between Investment and Trade

The second observation that comes to mind reading Giarini’s paper concerns his section on the “complementarity between Investment and Trade.” Linked to what has been said above (international sea-borne trade) it leads us already into Chapter III of this monograph, dealing with community-based integrated management.

Due to the very nature of the Service Economy, with the direct involvement of the consumer as “prosumer,” which extends over the whole period of the *utilization of the product*, Giarini notices a shift in the balance between trade and investment. Increasingly, goods are being produced where the consumers are, which generates *direct investment* rather than international trade, which, however, obviously remains important.

What has always been largely true for insurance (where one knows that you cannot cover a fire in Sicily using the same criteria one would use in Holland or in Asia now is true of all economic activities: the selling of hardware and even automobiles, produce costs, turnover or sales where products, systems and services are distributed, used and then disposed of.

The investment side of it, he points out, “creates a much more articulate and compelling situation. *It also stimulates autonomy*” (emphasis added).

Direct investment, like most tools, has its two sides, depending on how it is used. Within the market-driven globalization such as we know it, it may indeed be a tool of neo-imperialism. The indigenous work force may be involved only at a lower, menial level, while research and development remain within the mother firm, so that no real “transfer of technology” is taking place, management is in the hands of expatriates, labour and safety standards are inferior to those in the mother country, and profits are largely expatriated.

If, however, a genuine process of *decentralization* were to be intrinsic in this development, enhancing *local autonomy*, then this shift would dove-tail with the emerging trend towards community-based integrated systems of co-management, into which local managers of insurance companies, together with local managers of any other economic enterprise would have to be included as “stake-holders.” Being part of the community, they would better understand local interests and needs and, enjoying greater autonomy in the context of the Service Economy, they could serve them better.

There is a great message of hope in this situation that far outweighs the theory of comparative advantage (sometimes effective in a classical industrial economy). There now exists a vested interest for all world producers to establish efficient local utilization systems where their investment opportunities for gain are better guaranteed. Thus we rediscover in an economic sense also, a great general interest that all can share, in that the poorer become richer because they are the terrain in which new markets can develop on the basis of their ability to use as prosumers and properly manage available systems.

It is in this sense that community-based, integrated co-management, as the basic component of the emerging system of ocean and coastal governance, may become the best available *countervailing force against the ill effects of “globalization”* as we know it. In socio-political terms, it is also possible that it forebodes a new kind of democracy for this and the coming centuries: community based rather than based on political parties, a system

that may be more congenial to non-European cultures than the parliamentary system based on political parties which is rooted in European history and culture.

If insurance economics and the insurance industry are playing, in the development of the Service Economy, the catalytic role the textile industry played in the industrial revolution, they may well play this catalytic role in the ocean and coastal area where most of humankind resides and which is the most vulnerable zone on the planet. And if the industry does play this role, it will rebound to its own vital and long-term advantage.

Chapter 3:
**Concept Paper - Insurance Industry and World
Summit on Sustainable Development
(Johannesburg, 2002)**

**INSURANCE INDUSTRY AND
WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT
JOHANNESBURG, 2002**

*Integrating the Insurance Industry into Integrated Coastal Management
(A Concept Paper)*

I. Purpose

The purpose of this project is to bring a concrete proposal to the World Summit on Sustainable Development, Johannesburg, 2002, which would greatly enhance the image of the Insurance Industry and expand the limits of "insurability" in the world's most populated and vulnerable areas, and, at the same time, make a major contribution to the reduction of poverty and the enhancement of livelihoods in coastal areas. The project, to be conducted by the International Ocean Institute in cooperation with the Insurance Industry, should run for 5 years. The estimated overall cost is US\$5 million, to be shared by the Insurance Industry and an international donor like the GEF. The IOI will contribute its unique infrastructure, consisting of 17 Operational Centres in all parts of the world and their accumulated experience in working with coastal communities.

II. Background

This is to be a continuation of the project initiated in 1999 by the International Ocean Institute in cooperation with the Swiss Re, Zurich. The culmination of that project was a workshop in Bermuda (February 2000) attended by experts in the insurance business as well as in coastal management. The result of the discussions was that insurers and coastal managers have a common interest in coastal areas. That common interest is *Risk Reduction*. The tangible output was a comprehensive report, a training module in risk assessment and disaster response for coastal communities, already tested and evaluated in IOI training programmes, as well as a series of case studies by several of the Operational Centres.

A large majority of the growing human population lives in the coastal zone, which thus is becoming the most densely populated zone on the planet. It also happens to be the planet's most vulnerable zone, prone to natural disasters such as floods and tsunamis, aggravated by climate change and sea-level rise, and by man-made causes, such as pollution (effects on public health) and erosion, or lack of building codes and of response capacity.

The coastal manager has a mandate of poverty reduction and livelihood improvement in coastal zones (Agenda 21). Risk assessment, disaster preparedness and mitigation through response capacity are an essential element in the fulfilment of this mandate.

The insurance industry, faced with mounting difficulties arising from the hugeness of financial losses caused by natural or man-made disasters and the *erosion* of "insurability," has a stake in expanding "insurability" through risk reduction in the world's most densely populated areas. *The integration of the insurance industry into integrated coastal management would serve this common purpose.*¹³

III. The Insurance Industry: New Thinking

The insurance industry's expansion targets are of two types, strongly interrelated. The first is

¹³ For all the foregoing, see *Geneva Association Information Newsletter: Risk Management*, 28, November 2000, p. 19.

geographic expansion. The recent first CEO insurance summit in Asia is an example (GAIN, *General Information*, 168, June, 2001, p. 1). The second is maintaining or shifting the boundary between the State's responsibility versus the private industry in the management of risks.

What are the limits of insurability and how can we move them....the basic question is defining what the state should or must still do and where insurance can provide superior solutions. In reality, if something is insurable, it can be organized pretty easily in the private market very efficiently. If it is not insurable, we encounter a real problem. Either the activity becomes a business risk where other mechanisms apply or we have to find a solution beyond that. *There are possibilities of creating partnerships between private insurance and public institutions at the local as well as international level in insuring economic, environmental, legal and social catastrophes. The development of new solutions has only begun in this area.*¹⁴

This question of defining the boundary between State and private sector becomes particularly important as the industry expands from the industrialized to the developing countries where the area of "un-insurability" is huge. According to the OCDE, from 1990 to 1998 some 94 % of the world's major natural disasters and over 97 % of the deaths connected with natural disasters occurred in developing countries.¹⁵

Many tools exist and are used to predict the occurrence of catastrophes, or work out which areas are most at risk. New advances in information technology offer an opportunity to estimate more accurately the probabilities and the potential losses of future disasters. The development of faster and more powerful computers and improved data on hazards, properties and people at risk enable one to examine extremely complex phenomena...However, not all those tools are applied. It is not always that simple to collect the data needed and to share information between the concerned parties. There is a financial limit to what can be done in poor countries. Corporations do not necessarily have a real commercial incentive to implement or diffuse their techniques in catastrophe prone areas. *This is undeniably calling for a greater partnership between both the private and the public sector.*¹⁶

¹⁴ *General Information*, 168, June 2001, p.10; also *General Information*, 167, p. 8, "Some additional Potential Research Topics" State versus private management of insurance type of risk" This is an ongoing and fundamentally important problem.

¹⁵ *Risk Management*, 29, May 2001, p.3.

¹⁶ *Ibid.*

It is estimated that by 2025 more than 5.5 billion people worldwide will live in cities and a large proportion of them close to regions with seismic hazards, *a majority of them in coastal Megacities.*

It is statistically clear

that powerful earthquakes and other natural catastrophes will assault several large urban areas. Governments and decision makers should keep the awful events of recent days in mind and wake up to the seriousness of the situation. Without a real effort from stakeholders to set up efficient operational catastrophic risk management programs, it seems unfortunately inevitable that the worst is to come.¹⁷

The Insurance Industry is fully aware of the challenges and opportunities that lie ahead and ready to formulate new responses.

A problem on this scale demands a new level of response from the industry. Insurers have gained great skill in understanding natural hazards and developing practical techniques to handle their economic effects. Often they are not applied because circumstances are not conducive to a purely commercial insurance system — the risks may be too large or the economic base may be too small, for instance. *By collaborating with other stakeholders, it may be possible for insurers to provide services in a hybrid system, with benefits for planning and post-event recovery. Of course, financial systems need to be integrated with local cultures — a good example is Grameen Banking in Bangla Desh, which has given communities the framework to control their own development... To date this avenue has not been explored thoroughly. Innovation will be needed to develop new sources of funds to finance the growing scale of risks.*¹⁸

The key-words are:

- Expanding insurability through risk reduction, including in densely populated urban zones in vulnerable, disaster-prone areas, such as coastal Megacities;
- New forms of cooperation between public and private sector;
- Stakeholder cooperation; and
- Integration with local cultures.

¹⁷ *Ibid.*, p.4.

¹⁸ *Insurance Economics*, 43, January 2001, p. 19.

IV. Climate Change

The involvement of the insurance industry with climate change is obvious.

The Insurance Industry is most concerned about the dramatic increases in claims resulting from weather-related catastrophes and man-induced natural disasters, experienced over the past decade. Over the past 10 years, a dramatic increase in the number of disasters as well as in damage caused could be observed. The continued dramatic long-term incline of insured losses in 1998 led to a loss of at least 15 billion US\$, while the total economic loss was over 90 billion US\$ (source: Munich Re). In order to get an impression on the severity and magnitude of the problem, one might wish to note that a weather event in the order of Hurricane Andrew (1992) hitting the US three times within one year, could destroy the US Insurance Sector and lead to unforeseeable economic losses. An increase of only 10% of a windstorm's wind gust speed of about 200km/h will lead to an increase of insured losses of over 150 %.¹⁹

This has led to the cooperation between the Insurance Industry and UNEP. In the autumn 1999, UNEP's Co-ordination Office for the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) commissioned the Gerling Sustainable Development Project (GSDP) to prepare a consolidated sector view on the role of the financial services providers in implementing the GPA and in recommending possible synergies and linkages in order to help UNEP carry out its mandate and develop new and innovative private-public partnerships. This is excellent work. It remains, however, at the level of *research*. It addresses general environmental problems, and is not specifically involved with the problems of *coastal management*. It inserts itself into UNEP's ongoing "Insurance Industry Initiative" which, in 1995 released a *Statement of Environmental Commitment by the Insurance*, which points in the same promising directions:

The insurance industry recognizes that economic development needs to be compatible with human welfare and a healthy environment. To ignore this is to risk increasing social, environmental and financial costs.

¹⁹ UNEP, "The Role of the Financial Services Sector in the implementation of the GPA with particular reference to the Insurance Industry."

We are committed to work together to address key issues such as pollution reduction, the efficient use of resources, and climate change. We endeavour to identify realistic, sustainable solutions...²⁰

On the level of *Research*, finally, one should mention also a project, conducted jointly by the Insurance Industry and the Bermuda Biological Station — the same that hosted the IOI/Swiss Re seminar in February 2000. This cooperative project between scientists and insurance companies to study the frequency, predictability, and impact of volcanic sea floor activities and tsunamis on coastal areas is of direct relevance to the project proposed by this concept paper.

The present proposal is to build on all this work and transcend the stage of research and declarations and to engage in practical action in determined sites in the coastal area.

V. Integrated Coastal Management

Literally millions of pages have been written by academics globally on the concept of “integrated coastal management.” The concept, applied in the United States internally ever since the ‘Seventies, is a logical consequence of the recognition, enshrined in the Preamble to the United Nations Convention on the Law of the Sea, 1982, that “the problems of ocean space are closely interrelated and need to be considered as a whole.” The concept’s institutional implications were further developed in the Brundtland Report of 1987, and embodied in a detailed programme of action, Agenda 21, by the Earth Summit on Environment and Development (UNCED) 1992.

Integrated coastal management must be seen as a flexible system, adaptable to differences in culture and stage of development. Beneath all differences, however, it has three principal universal features:

(a) It requires horizontal integration, that is, the participation of all major stakeholders

²⁰ UNEP, *loc. cit.*

in decision making and planning, at the local, national, regional and global levels. These stakeholders are both governmental, including coastal municipalities, and nongovernmental, including fishermen's cooperatives and fishing corporations, offshore oil and ocean mining companies; the shipping industry, the harbour masters, tourist organizations, coastal engineers, scientific organizations, coastguards, nongovernmental organizations, including environmentalist organizations, consumers, etc. These must be associated in *Councils*, assisting the municipal authorities in planning, implementing, and enforcing coastal management decisions. *This project proposes that the insurance industry as a major stakeholder must be included in this horizontal integration;*

(b) *Vertical integration*, i.e., there must be fora where local communities and national authorities can cooperate in making decisions on regulations which are the responsibility of the State; and

(c) The system thus functions, not in a top-down paradigm, but in a flexible mixed bottom-up and top-down mode. Regulation is largely self-regulation; enforcement is largely self-enforcement. Having to deal with activities in vast ocean spaces, this is probably the only mode that will work.

To build, in practice, an integrated coastal management system is an immensely complex task. Often the advocates of the theory themselves find it difficult to transcend the horizon of their own academic sector. Scientists tend to limit their "integrative" thinking to science; environmentalists, to the protection of the environment; fishers, to their own industry. In more general terms, it is extremely difficult to achieve genuine integration so long as one has to work within the constraints of a sectoralized institutional framework, whether in government, in academia, or in industry.

Encouraging progress has been made, nevertheless, in all parts of the world, and there are numerous interesting examples, in countries as diverse as Canada and the Caribbean, South Africa and China.

There is a *global consensus that integrated coastal management is the fundamental, necessary tool for the realization of sustainable development, based on the precautionary principle. Insurance economics as a whole is based on the precautionary principle and*

coastal managers have a lot to learn from this experience.

The World Summit on Sustainable Development in Johannesburg next year thus is bound to boost the implementation of integrated coastal management. Concrete pilot projects, defining and implementing structures and functions, will enhance the success of this great endeavour. *This is the time for the insurance industry to apply its new and innovative thinking concretely, building on what has already been agreed and achieved.*

VI. The Project

(a) Site selection

We propose to conduct 4 or 5 pilot projects, also for the reason of comparison, in Asia, Africa, and Latin America, in sites where IOI Operational Centres have already initiated work with coastal communities and where “stakeholder participation” in coastal management has already been or is being established. These sites could be selected in South Africa, Kenya, Costa Rica, Thailand, China, India or the South Pacific. One small island developing State (SIDS) and one coastal Megacity should be included. This might be Yokohama, where IOI Japan is located and where an interesting, decentralized disaster management system already exists. A team leader will be selected for each site.

(b) Preparatory phase (6 months)

- After the site and team leader selection, the first task will be to identify a local NGO (where this has not already been done);
- Two special training courses for this NGO will be prepared: one on integrated coastal management, one on risk assessment, disaster prevention, response, mitigation, etc. These courses can be adapted from existing IOI courses; and
- Local national and municipal legislation on coastal management, law of the sea, Biodiversity, Climate, GPA, and Agenda 21, etc. will have to be collated

(c) Innovation (2 years)

- Next we will have to determine the structure and function of the stakeholder Council or Commission or whatever name the local municipality wishes to give to this body. This will probably vary from country to country. Work with local communities is slow and requires the building of a relationship of trust through a number of projects.

(d) Selection of Insurance partner (1 year)

- The next task will be to recognize the insurance industry as a legitimate *major stakeholder*, with the right and duty to participate in this Council and to start negotiations with the appropriate local or regional company.

- During this phase the Industry's contribution to integrated coastal management should be defined. It will have a number of components, namely: risk assessment and management; training; and introduction of mini-mutual insurance schemes. These contributions might be articulated as follows, taking into consideration the need for flexibility and adaptation to specific local circumstances:

- (i) Introduction of new advances in information technology offering an opportunity to estimate more accurately the probabilities and the potential losses of properties and people at risk and enhancing the analysis of extremely complex phenomena. Introducing meteorological models for hurricanes and floods and geodesy techniques for earthquakes as well as skills in understanding natural hazards and developing modern risk valuation techniques, as a basis for the introduction of mitigation measures and the development of risk transfer systems;

- (ii) Training of local scientists in the use of these new technologies.
- (iii) Participation in zoning, infrastructure construction, standard setting, the drafting, implementation and enforcement of building codes;
- (iv) Risk assessment of coastal engineering projects;
- (v) Community training in disaster response;
- (vi) Directing the introduction of *mini-mutual insurance schemes*, to complement the *mini-loan schemes* (Grameen banking) which IOI has already introduced in some of its "eco-villages")

It should be noted that these activities are and must be *an essential part of integrated coastal management, including the reduction of poverty and the enhancement of livelihoods. The participation of the Insurance Industry as a major stakeholder in planning and decision making for these activities will greatly increase the chances of success while laying the ground for the commercial expansion of the Industry.*

(e) Implementation (18 months)

The final 18 months of the project would be the initial period of implementation, after which the system should have been internalized and self-supporting.

Considering the need for *vertical integration*, it should be noted that the Insurance Industry, as a *major stakeholder in integrated coastal management*, is entitled, at the regional level, to participate in the process of *revitalization of the Regional Seas Programme*, which faces a number of important risk management problems.

At the global level the Industry is entitled to participate in the UN Commission on Sustainable Development as well as in the Consultative Process of the General

Assembly. This might open quite a few avenues for the expansion of the Industry.

Following the recommendation of its Consultative Process, the General Assembly will decide this year to act on the implementation of Articles 276 and 277 of the Law of the Sea Convention which mandate the establishment of regional "Centres" (or in today's context: "systems," or "virtual centres") for technology development and transfer. "Risk assessment of new technological developments" is one of the focal interests of the Insurance Industry. *Participation of the Insurance Industry in the establishment of these "Regional Centres" thus should be built in from the very beginning.*

Globally, the shipping industry is facing increasing risks from piracy and armed robbery at sea linked to criminal syndicates. These risks are magnified by what might be termed "the twilight of flag-State control." The globalization of the industry together with the relentless growth of tonnage registered under "flags of convenience," where the State of registry has no control whatsoever over the ships sailing under its flag, are making reliance on "flag state control" obsolete. What will take its place is not at all clear but the insurance industry should play a major role in dealing with the risks involved.

VII. Conclusion

Thus one can envisage a new role — and new markets — for the Insurance Industry, from the grass roots level to that of the United Nations, in this century, which may well be the Century of the Ocean. Johannesburg, 2002 will be a landmark in this development. A significant contribution to this event will ensure a major role throughout the system during the coming decades.

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For Further Information

For further information regarding the contents of this monograph, or the programs and activities of the International Ocean Institute, please contact:

International Ocean Institute – Headquarters
The University of Malta
Tal-Qroqq, Msida
Republic of Malta

Tel. + 356-346-528
Fax. + 356-346-502
E-Mail. ioimla@kemmnet.net.mt
URL. <http://www.ioinst.org>



International Ocean Institute
c/o François Baille
Special Assistant to Elisabeth Mann Borgese
Dalhousie University
1226 LeMarchant Street.
Halifax, Nova Scotia
B3H 3P7
Canada

Tel. + 1-902-494-1979
Fax. + 1-902-494-1334
E-Mail. F.baillet@dal.ca



Or consult the International Ocean Institute's Home Page : WWW.IOINST.ORG

