# IHDP Proceedings No. 3

IHDP

International Human Dimensions Programme on Global Environmental Change

# IHDP/START International Human Dimensions Workshop

# "Human Dimensions in the Coastal Zones"

September 10-19, 2000
Bonn, Germany

Edited by Ramine V. S. Shaw

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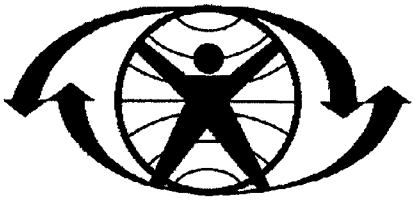

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# 1. FOREWORD

The International Human Dimensions Workshop 2000 was the second such event co-sponsored by IHDP and START. Its purpose was to bring together a group of outstanding young scholars from a wide range of disciplines and developing countries in order to discuss human dimensions research priorities. For this workshop, held in Bonn in September 2000, we chose the topic of "Human Dimensions Issues in the Coastal Zones". This allowed us to explore the perspectives of the IHDP core projects on coastal zone issues: transformation processes and particularly urbanisation in the coastal zone, human security, institutional dimensions that play a role, for example, in coastal pollution and land use changes in coastal areas. The topic also meant that we could develop a dialogue with scientists from the IGBP project on "Land-Ocean Interaction in the Coastal Zone", as well as with a number of other projects carried out at national and international levels.

The scholars that attended the meeting participated actively in the sessions and clearly developed a vision of the importance of human dimensions research in tackling complex global environmental change issues. We hope that most, if not all of them, will use what they learned at the Workshop in their further work. We look forward to their future participation in the IHDP and START networks. We also note that those who organised sessions, gave talks and participated in evening discussions also departed with some exciting new ideas and quite a few new contact addresses in their briefcases.

The Workshop would not have been possible without the financial support of a number of organisations. We are most grateful to the German Research Association (Deutsche Forschunsgemeinschaft, DFG), the Asia-Pacific Network for Global Change Research (APN), the US National Science Foundation (NSF), the Inter-American Institute for Global Change Research (IAI), the Swedish Council of Planning and Coordination of Research (FRN), the Land-Ocean Interactions in the Coastal Zones project (IGBP-LOICZ), the Norwegian Research Council and the Swiss Human Dimensions Committee for their financial support. Again the Gustav-Stresemann-Institut in Bonn provided a convenient setting and pleasant surroundings for our meeting.

All events of this kind require, in addition to financial support, a large portion of human resources – wide distribution of the announcement, managing the application process, dealing with all of the financial aspects of the meeting, evaluating the applications, organising the travel and other arrangements of the participants and actually running the workshop and the related social events. In particular, we are indebted to Ramine Shaw and Maarit Thiem of the IHDP Secretariat for their hard work in ensuring the success of the workshop. Thanks also to Petra Pommerening, Neil Hamilton, Ike Holtmann, Laura Siklossy and Lisa Jibikilayi, who all helped in the fulfilment of our objective of enhancing the capacity of a wonderful group of people to engage in human dimensions research and expand our networks in this critical area of global environmental change studies.

We hope very much that we will be able to organise a similar Workshop in 2002.

Roland Fuchs
Executive Director
START

Jill Jäger
Executive Director
IHDP

# 2. EXECUTIVE SUMMARY

Current scientific research must be increasingly involved with the development of practicable solutions to tangible, real-world problems. This is only possible through inter- and transdisciplinary research in collaboration with key actors in society, including grassroots, policy and industry levels. While this method of research represents a great opportunity, it carries with it an additional burden for the new generation of human dimensions of global environmental change (HD-GEC) researchers. To discuss how they are addressing these challenges, the IHDP[1] and START invited 28 scientists, representing 20 countries from all over Asia, Africa and Latin America, to Bonn, Germany from September 10-19, 2000 for the second bi-annual IHDP/START International Human Dimensions Workshop for young developing country scientists.

Over 350 applications were received for the 30 workshop slots – a strong indication of the interest and relevance of the IHDW event. Participants were selected on the basis of age (under 40 years), educational qualification (minimum requirement of Master's degree), application packages (which included a sample of research and statement of interests), region, gender and disciplinary background. The final group consisted of 16 women and 12 men, and was a mixture of social and natural scientists (from such diverse backgrounds as economics, anthropology, engineering, oceanography, political science and coastal zone management).

The guiding theme of the workshop was "Human Dimensions in the Coastal Zone". The workshop was opened by a keynote talk from Professor Volker Linneweber of Magdeburg University, Germany, on "Coastal Zone Management and Environmental Psychology". The workshop was then divided into four major sessions organised by the Science Projects of IHDP:

Global Environmental Change and Human Security (GECHS)
Land-Use and Land-Cover Change (LUCC)
Industrial Transformation (IT)
Institutional Dimensions of Global Environmental Change (IDGEC)

During these sessions the participants also gave presentations on their own research, which corresponded with the session themes. The workshop sessions were designed to be "interactive" – departing from a more traditional format of lectures and discussion. The participants had the opportunity to experiment with tools used in interdisciplinary human dimensions research, to work in small groups on assigned problems and to find ways to link their own research interests to research foci of the IHDP projects.

In addition, a full day interactive session was organised by members of the project of the International Geosphere-Biosphere Programme (IGBP) on "Land-Ocean Interactions in the Coastal Zone" (LOICZ). Evening sessions were scheduled to highlight other key coastal zone research initiatives at both the German national, regional and international level, including a representative from UNESCO's Environmental and Development in Coastal Regions and Small Islands initiative.

For two half-day sessions the participants worked in smaller working groups to write short Policy Briefing Papers on "Human Dimensions Issues in the Coastal Zone". These papers were

[1] All acronyms and abbreviations used throughout this report are listed in Appendix F.

based on the participants' own disciplinary and regional perspectives integrated with the information they received during the course of the workshop.

Since the IHDP wants to encourage young scientists to become involved in, coordinate and even initiate human dimensions activities and networks in their home countries, a representative of the IHDP Secretariat gave an account of how HD national committees and contact groups have been established to date, and discussed how the experience gained during the workshop can be carried forward at the national, regional and international levels.

# 3. Objectives and Background of the Workshop

The programme of IHDP is designed around three main objectives of promotion of HD-GEC research, research capacity building and developing international scientific networks. START, co-sponsored by the three Global Environmental Change Programmes (IGBP, WCRP and IHDP) also has the objective of capacity building. **The IHDW events contribute directly to the objectives of IHDP and START.**

Global change issues will remain high on both the science and political agendas of the 21st century. Appropriate assessment of these issues cannot occur without a greater involvement by the human and social science communities than has been evident to date. We need to provide opportunities for a new generation of young human and social science scholars, as well as scholars trained in interdisciplinary research and those who can bridge the natural and social sciences, especially from the developing countries, to enhance their capacity to deal with – and to achieve greater access to – this exciting field. These scholars need a forum in which to discuss how they are addressing the challenges of doing interdisciplinary research on the human dimensions of global environmental change.

In 1998 the first IHDP/START IHDW was held. There was a report on the workshop in the IHDP newsletter Update (3/98) and a full report is available on the IHDP web site (www.uni-bonn.de/IHDP). 23 scientists (13 women, 10 men selected from a total of 121 applications) from 20 countries in Asia, Africa and Latin America participated in the meeting. The meeting was very successful in developing a network of young scientists in developing countries linked to the IHDP. Several of the participants have, in the meantime, established human dimensions activities in their country and almost half of them had papers accepted for the major human dimensions conference held in Japan in June 1999. Based on the excellent quality of the participants, and overall positive experience of the second IHDW, we are sure to improve on this record for the next Open Meeting of the international HD research community, which will take place in Brazil in October 2001.

Sessions of the IHDW 2000 were organised around a major theme: "Human Dimensions in the Coastal Zones". This was not a workshop on coastal zone issues, but rather used this theme as a framework in which to apply the various research approaches and results from IHDP projects. In coastal regions, human activities are contributing to significant environmental changes and at the same time these regions are expected to experience major consequences as a result of global environmental change (GEC). Throughout the world, most urban development and economic activity occurs in the coastal zone. There is, therefore, a need to understand the driving factors of GEC in the coastal zone, the vulnerability of humans and human settlements in this zone to projected changes, and the possible response options. Major questions addressed throughout the workshop included:

- What are the unique relationships between humans and the intense biophysical gradients characterising the coastal zone?
- How does GEC feed back and affect the lives of those living along the coast?
- What are the roles and effects of social structures and institutions at local, national, and international scales on coastal environments?
- What are the characteristics of 'successful' institutional responses to GEC in the coastal zone?
- How do people make decisions about land use in the coastal zone, and what are the implications of these decisions?
- What types of change in the coastal zone affect human security?
- Are 'vulnerability' and 'risk' useful concepts in understanding impacts of, and responses to GEC in the coastal zone?
- Can we make useful generalisations about the causes and consequences of urbanisation in the coastal zone, and understand the implications of this for policy development?

Both organisers and participants alike felt that future IHDWs should continue to be organised around such major themes that can better facilitate integrated scientific approaches.

# 4. THE PROGRAMME

The Programme of the workshop was specially designed to give participants maximum time to explore and share experience on human dimensions issues in the coastal zones. The programme offered opportunities for participants to present their own research to group, and to work with representatives of the four IHDP Science Projects and other invited speakers to identify regional priorities and potential research activities that correspond with the aims of the projects. The theme of coastal zones was used as a framework in which to explore the various research approaches in the IHDP Science Projects and the IGBP-LOICZ Project. Two session leaders from each project network were invited to develop a 1-2 day session including presentations, working groups and interactive exercises.

## 4.1. KEYNOTE LECTURE: COASTAL ZONE MANAGEMENT AND ENVIRONMENTAL PSYCHOLOGY

**Volker Linneweber,** *Magdeburg University, Germany*

In the first part of the presentation, environmental psychological concepts explaining interrelations between natural and social systems were discussed using coastal zone management as an example for application. Since coastal zones show typical attributes of "multi-user-settings", systematically different perspectives of stakeholders and implications of incongruent perceptions, assessment and decisions were elaborated in order to explain social systems dynamics.

Volker Linneweber then presented an interdisciplinary case study in which the specific vulnerability of coastal zones to possible climate change was studied: on the island of Sylt, northern Germany (1997-2000). The island of Sylt was selected because of its specific position, shape and coastline – which are requiring intensive efforts to protect against hydrodynamic impacts. Based on previous research and on regional climate change scenarios, impacts of increasing storm intensities and sea level rise on natural as well as social systems were studied. Since a selective view on climate dynamics necessarily has to be complemented by considerations of social systems dynamics independent of climate change, these were also included.

## 4.2. INDUSTRIAL TRANSFORMATION AND CITIES IN THE COASTAL ZONE

**Session Leaders:** **Richard Rockwell** *(Executive Director, The Roper Center & Institute for Social Inquiry, Professor of Sociology, University of Connecticut, USA, and IHDP-Industrial Transformation Project Scientific Steering Committee Member)*

**Xuemei Bai** *(Institute for Global Environmental Strategies, Japan)*

The sessions opened with a brief overview of environmental changes at global, continental, regional, and local scales, provided by Richard Rockwell. He differentiated between systemic changes in the biogeochemical systems that sustain life on earth (e.g., climate change) and cumulative changes that add up to global problems (e.g., deforestation). He also emphasised that global changes are occurring outside the realm of the environment, including con-

tinued population growth in some countries, urbanisation in many countries, industrialisation and its associated globalisation of trade in many countries, and economic growth in many countries (although poverty persists in large parts of the world).

Richard Rockwell then provided an introduction to the IHDP-IT Science Plan. The IHDP-IT project has the goal of finding ways of transforming the production and consumption systems that sustain human life (and the macro systems and incentives that structure them) in such a manner as to reduce humanity's impact on the global environment while also improving human well being. It was later discovered that the concept of "industrial transformation" could easily be misunderstood to mean either industrialisation itself or the transformations in the environment caused by industrialisation. This misunderstanding persisted until the second day, perhaps indicating a problem with the terminology. No alternatives were suggested, although some participants noted that many of the ideas of industrial transformation are captured in the older concept of industrial ecology.

Xuemei Bai offered a report on case studies being conducted by IGES (Institute for Global Environmental Strategies, Japan), and on the theoretical framework and major findings of comparative analysis of these case studies. She introduced major features of case study cities (all of them are coastal cities in the East Asian region), their geographical location, social and economic role in the country and their typical urban environmental problems. Through a horizontal comparison of current urban environmental problems in case study cities, major features of urban environmental problems in this region were identified. Xuemei Bai emphasised the importance of longitudinal comparison in conducting this research – to compare the process dynamics and the hidden mechanism of this kind of change rather than directly compare various phenomena. She presented a conceptual stage model of urban environmental evolution in East Asia together with evidence supporting the hypothesis. Research questions such as the size distribution of cities in this region, the contribution of cities to the nation's economy and environment and its change over time, and the comparability of these cities are further explored through rigorous statistical data analysis covering major cities in China, Korea and Japan.

Richard Rockwell then discussed possible research themes for a focus on cities in the coastal zones and industrial transformation. He first raised the question of how large a proportion of humanity lives in marine coastal zones. Estimates differ sharply, with one United Nations study suggesting that only about 40% of the world's population lives within 120 km of a coastline, while other estimates suggest that 60% of the population lives within 200 meters of sea level (plus or minus). Despite this apparent disagreement, due to the difference in definition and methodologies, there is broad agreement that the population of the coastal zones is the most rapidly growing part of the world's population, partly due to migration from the interior of many countries. Most of the world's mega-cities of the 21$^{st}$ century will arise in the coastal zones, and about half of those mega-cities will be in Asia. Richard Rockwell suggested areas of research that have been identified by a United Nations Environment Programme (UNEP) working group on coastal zones, including severe air and water pollution from industrial processes, loss of coastal wetlands and other coastal ecosystems, erosion and subsidence, and overfishing. To UNEP's list he added salinisation of groundwater, sea level rise, and damage to the built environment and risks to human life from storm surges (possibly association with climate change). He showed the participants several conceptual models of the interaction between cities and the environment, one developed for the Southeast Asia Regional Committee for START (SARCS) Science Plan and one developed by him for a START visiting lectureship. Emphasising the major aspects of the IT Project "Cities and Industrial Transformation" focus, he provided conceptual models of how cities fit into and affect the hydrological cycle and of how cities interact with and change the global carbon cycle.

Xuemei Bai presented a talk on "the other IT" – information technology – and how it might be used to achieve industrial transformation that preserves the environment and improves human well being. She discussed what kind of change information technology may bring to traditional industries, and presented both positive and negative evidence of environmental consequences associated with this change. In addition, the changing importance of place due to information technology was discussed, which has direct linkages to coastal cities since many of them enjoy a better economic situation because of the advantage of better geographical access. Xuemei Bai ended her presentation with an open question: Will the information technology revolution strengthen or weaken the privilege of coastal cities? In the discussion that followed, the participants expressed keen interest and excitement about the opportunities information technology may bring to developing country cities.

Participants were divided into four working groups with the task to develop one or more researchable ideas and questions about cities, industrial transformation, and the coastal zones:

**Group 1** (Castellanos, Kalikoski, Acerbi, Umoh, Bennagen, Chen, and Pham) reviewed key parts of the IHDP-IT Science Plan as background to the development of a conceptual model for researching sustainable cities. In their model, a sustainable city meets the needs of its residents, provides a good quality of life, protects the environment both locally and globally, and is economically productive. There are, however, barriers to reaching this condition, among them external factors, uneven distributions of wealth, and divergent interests of stakeholders. They sought to develop a community-based methodology for determining needs and for ascertaining stakeholder concerns.

**Group 2** (de Sá, Mera-Orces, Ngwale, Demetriades, Caringal, Prasad, and Salahuddin) took as their issue the rural to urban migration found in many countries, which is often from landlocked regions to coastal cities. This presents problems such as increased pressure on infrastructure (water, sewage, transportation, etc.), increase in diseases and crime, coastal resource depletion and degradation, and change in cultural, social, family, and traditional systems, as well as increased opportunities. They saw $IT^2$—Information Technology *and* Industrial Transformation—as perhaps offering a means to influence migration and to mitigate its effects.

**Group 3** (Mendoza, Lopez, Ramessur, Adelekan, Singh, and Somasundaraswaran) took as premises that coastal cities are in fragile environments and are often host to marginal populations of indigenous people. They asked which socio-economic and environmental indicators should be taken into account by large industrial plants to ensure sustainability in the coastal zones. They also noted the exposure of coastal zones to cyclonic storms, tsunamis, and flooding due to storm surges, and suggested that Information Technology may be capable of mitigating such natural disasters by giving people early warning.

**Group 4** (Maharaj, do Carmo, Martinez, Soumare, Petersen, Haladjian, and Yedla) also considered how information technology and industrial transformation could influence migration patterns. Noting the presence of carbonates in shallow marine areas, they asked how outfalls from coastal cities (including from industrial processes and agriculture) affect carbon sequestration in this form. Observing extensive engineering to facilitate industrialisation in the coastal zones of many countries, including Nigeria, they asked how these modifications affect the marine pathways that transport water and runoff from the land into the ocean. Finally, they asked what effect industrial transformation might have on employment, a concern of considerable importance in many developing countries where unemployment rates are high.

Four participants gave talks on their own research interests that relate to cities and the coastal zones:

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| 1. André Leal de Sa (SeaWest Windpower, Inc., Rio de Janeiro, Brazil) | **CDM and Wind Energy Projects in Brazil**<br>The field of work which I am pursuing concerns the development of wind energy projects in relation to the Clean Development Mechanism (CDM) implementation in Brazil, as a way to offset carbon emissions. The objective of my research/work analyses the feasibility of using the CDM flexibility mechanism as a financing and development tool for the growth of wind energy projects in Brazil, providing significant benefits to the country and an important instrument for GHG emission reduction by the Annex I countries. CDM provides the capacity for Annex I countries to claim credits for GHG emission reductions achieved together with developing countries like Brazil. However, the Protocol does not provide guidance as to how Cupertino for GHG reduction and sustainable development would be undertaken in real projects. If it is true that CDM will facilitate a form of project based on a joint implementation, governed by a multilaterally agreed set of rules, and operating under the supervision of an intergovernmental body, it is important to analyse and understand (and even establish) how the process dynamics will operate in the Brazilian market for one of the best renewable energy alternatives in Brazil: wind energy. In fact, wind energy is cheaper and more suitable for large-scale renewable energy projects than other sources like photovoltaic and biomass. |
| 2. Kathirgamalingam **Somasundaraswaran** (Department of Civil and Environmental Engineering, Faculty of Engineering, University of Ruhuna, Hapugala, Galle, Sri Lanka) | **Development and Management Profile of Transport Infrastructure in Asian Developing Countries**<br>Throughout the world in many cities, most of the economic activities and development works occur in the coastal zone. Since the early 1970s, developing countries in Asia have experienced rapid economic growth compared with other regions of the world. These regions are also expected to face major consequences as a result of global environmental change, such as global warming, changes in rainfall period and so on. Therefore how to make decisions about land use in the urban area and understanding the outcome from those decisions are very important issues. Economic and social development has been possible through increased production in both the primary and secondary sectors and has been accompanied by increasing activities in the service sector. As a result of this economic growth, there have been increasing demands for more transport service activities and transport infrastructure, i.e., need for more and bigger ports, improved roads and highways, more efficient railways and more modern airports. To meet the growing demands, most countries in Asia try to make major investments in the transport sectors. For example, large-scale container port development projects are either under way, or will shortly be commenced, in Hong Kong, Singapore and Thailand. Major extensions to port or island container-handling facilities are planned or are in progress in India, Indonesia, Malaysia and Sri Lanka. Necessary improvements have to be identified in order to reduce constraints caused or to be likely caused by inadequate transport infrastructure upon economic growth. The economic growth impact due to infrastructure investments depends on the timing and location of the addition to capacity, and on the existing imbalance between supply and demand. This on- going research will be very useful to facilitate analysis and comparison of long-term trends of urban infrastructure planning, development and management of the transport sector in this region. |

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| 3. Sudhakar **Yedla** (Indira Gandhi Institute of Development Research, Mumbai, India) | **Strategies for better municipal solid waste management in Indian cities**<br>The Indira Gandhi Institute of Development Research (IGIDR), Mumbai, India has been doing advanced research in development studies with a wide spectrum of specialisations ranging from agricultural economics to human resources development and energy & environment. Research at IGIDR includes diversified areas viz. agricultural economics and policy, public economics, microeconomics, finance, poverty and rural development, energy policies, transportation studies, ecological economics, environmental policies and capacity building for better environmental management, global environmental issues and so on. Along with other faculty members of IGIDR, I have been working in the areas of environmental economics, development of waste management policies and strategies, GHG mitigation from urban transport sector, industrial process modification and their economic performance etc. We have started a project on assessment of GHG emission potential of municipal solid waste and various options for mitigation of the same. We are attempting to analyse the problem, its intensity in developing countries and various possible abatement methodologies and their economic as well as technological feasibility. Further, barrier analysis also has to be carried out to find the level of adaptability of various methodologies. Also, we have been tying to develop waste management policies and strategies for better municipal solid waste management in Indian cities. Feasibility analysis has been carried out for various possible waste management methodologies with due consideration for the external costs and benefits to find out which one gives the better management of the waste. We have diversified to the transportation sector as well. We have been working, for a project sponsored by AIT-SIDA, on analysis of technical alternatives for GHG mitigation from the urban transport sector in Asian countries. This research project is aimed at developing environmental friendly and energy saving modes of transport in urban areas of developing countries and minimising the contributions of transport sector in climate change by controlling GHG and other toxic emissions. Furthermore, we have been trying to study the feasibility of common effluent treatment plants, commonly known as CTPs, for their technical as well as economical feasibility. CTPs have become an important feature both in industrial parks as well as urban hospitals. Though they are technically proven, their economical feasibility and other matters such as the mode of operation and maintenance, people's participation and strengthening of institutions are still to be studied. |
| 4. Yazeed **Peterson,** Botany Dept. Univ. of the Western Cape, South Africa | **Information and Communication in Coastal Education**<br>South Africa's Apartheid history, coupled with ongoing patterns of environmental disruption, has over the last two decades or so led to the development of a vibrant and responsive non-governmental sector. Within this sector more and more specialist environmental service organisations are broadening their focus to include educational and awareness-raising programmes for raising public knowledge and concern about environmental degradation. This is in fact a global trend that originates from the worldwide adoption of *Agenda 21* as a framework for environmental management and education. This presentation will focus on the educational experiences and challenges facing NGOs working in the Western Cape region of Southern Africa as they strive to make the concept of environmental sustainability a reality through education. Within such programmes various communication media and methodologies are used to enhance the outreach and research capacity of EE-geared organisations and to improve the public's knowledge of environmental matters. The presentation will reflect on the experiences of three projects involved in marine / coastal education. These are: the *Internet for Environmental Education Project (INforEEP)*, the national Department of Environmental Affairs' *CoastCare Project* and a local radio programme called *Envi-* |

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| | *roWise.* The presentation will make suggestions for further work on environmental communication in coastal areas, by drawing on lessons learnt from these projects. Most of these suggestions will focus on the need for better co-ordination and networking effort amongst media organisations, information professionals, education resource producers / service providers and specialist environmental organisations. |

## 4.3 Global Environmental Change and Human Security in the Coastal Zones

**Session leaders:** **Chris Cocklin** *(Professor of Geography, Monash University, Australia, and IHDP-Global Environmental Change and Human Security Project - Scientific Steering Committee Member)*

**Okey Ibeanu** *(Professor of Political Science, University of Nigeria and IHDP-Global Environmental Change and Human Security Project - Scientific Steering Committee Member)*

The GECHS sessions had three principal objectives:

- To develop a common understanding of the relationships between global environmental change and human security based on the framework of IHDP-GECHS.
- To employ the understanding and relationships in characterising human security in coastal zones.
- To evaluate the utility of the GECHS framework and, on that basis, develop an agenda for research on environmental change and human security in the coastal zones of developing nations.

The sessions opened with two plenary presentations by Chris Cocklin and Okey Ibeanu. Chris Cocklin gave an overview of the GECHS project and an outline of the GECHS session, while Okey Ibeanu addressed GECHS in coastal zones from the perspective of developing nations. In the case of Nigeria, as is the case in many other developing nations, national security tends to negate the security of nationals! This paradox arises from the dominant way state officials have posed the issue of security by giving privilege to state or national security over other forms. In this state-driven conception of security, national security is synonymous with the survival of the political regime. As a result of the predominantly state-centric way in which security has been imposed in Nigeria, the blind pursuit of a state security agenda has become a threat to the environment and to the livelihoods of millions of Nigerians. From this the point can be made that the environment is at the core of human security.

Okey Ibeanu proceeded to explore the links between environmental change and human security using the coastal region of Nigeria (in particular, the Niger Delta) as an example. On the one hand, poor environmental policy choices and backing given by the state to harmful environmental practises by *petrobusiness* creates the necessary conditions for insecurity by threatening lives and livelihoods. On the other hand, state violence and deprivation in the Niger Delta provides sufficient conditions for human insecurity. In short, by congealing power relations in a society, the state structures the patterns of resource control and access. The political powerlessness of communities along the Nigerian coastline, particularly as they belong to ethnic minority groups, explains their particular susceptibility to both environmental change and insecurity. To break the link between environmental change and human

insecurity in such a situation, it is important to address both harmful environmental practises and the power configurations of the state. Okey Ibeanu then discussed with the participants, other cases in different parts of the developing world where such a configuration exists. The group emphasised the importance of democratisation processes, and the role of local people and groups in becoming involved in both political decision-making and decisions affecting their environment.

Participants then broke into small groups to discuss the major issues raised in the presentations and later reported back to the plenary. Five major issues were discussed:

**1. Key concepts in human (in)security**

Based on the GECHS framework, the participants agreed that there are three central concepts in understanding human (in)security in coastal zones. These are:

- **Vulnerability** – which refers to the level of susceptibility of groups to environmental change in coastal zones.
- **Capacity** – which deals with the differential abilities of groups to cope with the effects of global environmental change. Which groups are most likely affected by global environmental change and why?
- **Participation** – which refers to opportunities available to people to be part of processes and institutions for dealing with environmental change and redressing resultant vulnerabilities.

However, there is still need to operationalise these key concepts based on community, national, cross-national and cultural experiences to aid research.

**2. Types of environmental change in coastal zones that are important to human (in)security**

Three major types were identified based on working group reports from the participants:

- Water - quantity, quality and delivery
- Sea level rise
- Ballast water

**3. Linking environmental change and human (in)security**

The link between environmental change and human (in)security is not necessarily a direct one. Often, there are intervening variables in this link. These mediators include:

- Existing institutions - adequacy, access, etc. - formal and informal institutions
- Knowledge and information - scientific knowledge, traditional knowledge, etc.
- Political structures
- The cultural setting

**4. Method of research**

The following components were suggested:

- Interdisciplinary, comparative and historical data.
- Combination of exploratory, descriptive and explanatory research designs
- Mapping of environmental change/human (in)security; establishment of databases
- Three levels of analysis should be covered: community, national and cross-national
- Qualitative and quantitative research designs
- Computer-aided designs
- Internet resources/information/communication technology

**5. Sharing national and cross-national experiences**

The workshop emphasised the need for researchers to constantly share experiences both within countries and cross-nationally. Four principal means of achieving this were identified:

- Networking
- Workshops
- Regional organisations/institutions both governmental and civil society
- Publications

Five participants gave talks on their own research interests and activities that relate to human security in the coastal zones:

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| 1. Roberto **do Carmo** (Univ. Estadual de Campiñas, Brazil) | **Aspects of the relationships between population and environment in Brazil**<br>My work and study are focused on the relationship between population and environment issues. I'm interested in the impact of population growth and the spatial distribution of the population over the environmental quality, especially in water quality and quantity. I also consider the other side: the impact of the environmental quality in the people's quality of life. I have worked on population and environment issues for almost ten years. My first work focused on conceptual matters. "Quality of life," "sustainable development" and "social and environmental indicators" are examples of these interests in my earlier papers. The project "Environmental Quality and Regional Development in Piracicaba and Capivari River Basin" gave me the opportunity to work in a multidisciplinary team, with an interdisciplinary approach. The interface between social/ demographic data and environmental data in the context of a river basin led me to think about the fundamental role of water – my current concern and the object of my Ph.D. thesis. The insertion in this larger project, with more than 30 researchers, allowed me to do my master's thesis about Campiñas, the largest city of the Piracicaba/Capivari River Basin. I focused on the relationship between the urbanisation process and change in quality of life indicators. With this work I could examine some aspects of demographic dynamics, such as migration, population distribution, sex and age composition. In my doctoral thesis I am studying one of the most fundamental aspects of these interrelations: demographic dynamics and water questions. As a consultant to the São Paulo State Environment Secretariat on the recuperation plan of the most degraded river basin (Billings) in São Paulo Metropolitan area, I was able to get first-hand experience with a complex and dramatic environmental disaster. The proposal of my thesis is to verify the existence and conditionings of environmental limits.<br>Besides the projects mentioned, I have also participated in a survey on environmental perceptions in local populations and in a major study of socio-institutional needs in Brazil's major oil refinery and petrochemical centre, the neighbouring city of Paulínia. The major project at this time, in which my thesis research is inserted, is "Population Redistribution and environment: São Paulo and Center West". This project is focusing on aspects of land-use/land-cover change in two different regions of Brazil. One is rich, industrial, urbanised, with high population densities (the state of São Paulo) and the other where the economical activity is basically rural. This experience with local situations has allowed me to think about its global consequences. For example: the contribution of burning fields ("queimadas") in Center West of Brazil on global warming, the intense urbanisation process and $CO^2$ (Carbon dioxide) emissions, growing water demand and water availability, impacts of deforestation on the water cycle, etc. One of my first efforts in this direction was in my collaboration in a paper on environmental vulnerability in Campiñas, presented at the Third Open Meeting of the Human Dimensions of Global Environmental Change Community, in Japan, in 1999. |

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| 2. Alexander **López**<br><br>(Escuela de Relaciones Internacionales, Universidad Nacional de Costa Rica) | **Environment and security in the Brazilian Amazon: Politicising, militarising or securitising the environment?**<br><br>I argue that in the Brazilian Amazon environmental issues have been politicised because there is a strong relationship between public spending, infrastructure development and environmental policies. In fact, Brazilian governments since Getulio Vargas up to now with Fernando H. Cardoso have dedicated great effort to oversee the development of the Amazon. Thus, several states agencies have been created to deal with the Amazon, large amounts of resources have been allocated, and big-scale projects have taken place. Concrete example of such dynamics are the creation of states agencies such as the Bank of Amazonia (BASA), the National Indian Foundation (FUNAI) and the Ministry of the Environment, Water Resources and Legal Amazon (MMA). My second argument states that in the Brazilian Amazon *environmental issues have been militarised.* An issue is militarised when the issue is part of the ordinary tasks carried out by the military apparatus, whether or not emergency actions have been taken to face a given threat. In fact, the Amazon has been a focus of concern for the armed forces. Thus, the most important agency for Amazonian development, the Superintendence for the Development of Amazonia (SUDAM) is a direct product of the military regime. Finally, all the most important projects in the Amazon have had military involvement whether or not they were carried out during the military dictatorship. A recent example is how the Secretariat for Strategic Affairs (SAE) has been involved in designing and implementing environmental policies in the Amazon. Lately it has been co-ordinating the Ecological-Economic Zoning. The most recent example of military participation is the participation of SAE in the Surveillance System of the Amazon region (SIVAM). *My third statement is that the environmental sector has not fully been securitised.* The securitisation of the environmental sector requires the recognition of existential threats, the need to take extraordinary measures and the existence of securitising actors. The essential question here is if there is a significant threat requiring emergency action. The case of the effect derived from dam building (Tucuruí and Balbina), deforestation (southern Pará) and pollution of some river due to mercury contamination (Madeira) can be mentioned. However, the question is if such environmental threats have involved emergency actions. Summarising and linking all the above argumentation it can be said that in the Brazilian Amazon *security has become a comprehensive concept.* The Brazilian case shows the declining of military threats. While Brazil has a border with all the other South American countries (with the exception of Ecuador and Chile), the Brazilian concerns are certainly less related to the potential problems with other countries in the border regions or the potential invasion from a neighbouring country. As exemplified by the political-strategic view of the SAE, contemporary geopolitical perception focus upon the necessary political and scientific definition of realistic parameters for sustainable development of both the Amazonian border and region. The issues included in this comprehensive concept are very much in the line of the new threats: environmental protection; drug trafficking control; halting the smuggling of timber, rare minerals and biodiversity; controlling and supervising the use of land; fighting forest fires and illegal mining; surveillance and border control. |
| 3. Aracely **Martínez Rodas**<br>(Centro de Investigaciones Regionales de Mesoamérica, Guatemala) | **Migration in Guatemala: the cases of Calel and Petén**<br>This presentation is a synthesis of two related migration researches done in Guatemala in 1998 and 1999: one in a rural highland village, Calel, and the other one focused in the Petén department, a lowland region in the north of the country. The major migration trends of both cases are rural-rural, rural-urban and international migration, whose dynamics and characteristics are taken in account. It also considers the causes and effects of the three trends, as well as the profile of the migrants in each one. The economic aspect of migration is emphasised, since it has become an important issue for the departure of thousands of |

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| | Guatemalans, either into the country or outside of it. Besides, the cultural and ethnical aspects of migration are also considered, because of its relevance in the individual, the family and the community. |
| 4. Pia del Campo **Bennagen** (University of the Philippines and Institute for Strategic and Development Studies, The Philippines) | **Development and (In)security in a Philippine Community: The Case of Pangascasan, Sual, Pangasinan and the Sual Coal-Fired Thermal Power Plant**<br>Developing the countryside was one of the agenda items under the Philippines 2000 plan of the Ramos administration. This was to be accomplished, in part, by the implementation of various development projects that will benefit the local communities in particular and the entire country in general. In the President's home province, one of the key projects was the construction of the Sual Thermal Power Plant – a project aimed at generating sufficient energy through the use of coal in order to provide electricity to the local communities and to support the industrialisation efforts in the Northern Luzon Growth Quadrangle. The project was launched in 1994 and became operational in 1999. The construction of the project revealed a trade-off between development goals and the security of the people and their environment. The people of Pangascasan, a coastal community in the Northern Philippines, opted to host the project with the hope that it will bring with it a better life for them – new and better jobs, higher income, electricity, basic services, and other "luxuries" that have been deprived them for quite some time. However, while some of these did materialise, they are now facing various problems that are making them rethink their earlier decision of accepting the project. These problems – health hazards, loss of traditional sources of income, environmental problems, loss of plant-related income, lack of land tenure – are becoming sources of human and environmental insecurity. The initial experience in Sual reveals a need to rethink the government's approach to development. |
| 5. Kakoli **Singh** (Centre for the Study of Regional Development, Jawaharlal Nehru University, India) | **A case of indirect population displacement: the collapse of Atlantic fishery and its socio-economic consequences**<br>It is an unfortunate but acceptable fact that though commercial overfishing has been widely recognised as the primary cause of the collapse of Atlantic Fishery, there are also other causes. Collapse meant the unemployment of those dependent on fishing for their livelihood, not only directly but also indirectly. Moreover, the whole ecosystem comes under threat, as disruption in the food chain occurs because of fall in the 'trophic level'. The paper will focus on the reasons behind the collapse of Atlantic Fishery and identify if any developmental effort has been responsible for this calamity. An attempt further has been made to see whether this led to any displacement of population, physical (direct), economic (indirect) or both. |

## 4.4 Land-Ocean Interactions in the Coastal Zones (Core Project of the International Geosphere-Biosphere Programme)

**Session Leaders:** **Peter Burbridge** *(Director of the Centre for Tropical Coastal Management, University of Newcastle upon Tyne, England)*

**Hartwig Kremer** *(Deputy Executive Officer, LOICZ International Project Office, The Netherlands)*

**Doug McGlone** *(The Marine Science Institute, University of the Philippines Diliman, The Philippines)*

**Major themes explored:**

- Concepts behind integrated coastal zone management.
- Outline and research objectives of IGBP-LOICZ project.
- Practical input in the area of integrated analysis and modelling taking for example the SARCS WOTRO LOICZ project as a template for such work in developing countries.

To start out the session, Peter Burbridge gave a presentation on the use of integrated coastal zone management (ICZM) as a tool for sustainable development. On the part of stakeholders, city and regional planners need to give greater attention to the powerful and dynamic processes which influence options for sustainable human use of coastal areas and natural resources. On the part of science, natural and social scientists can make a powerful contribution to the formulation and implementation of innovative policies, spatial plans and economic strategies to harness opportunities for sustainable coastal activities.

There are two components of the Marine Realm that are considered in ICZM, and which together occupy approx. 71% of the earth's surface:

1. Deep Oceans: Major functions include the regulation of global climate through exchange of gases between the seas and atmosphere; moderation of regional climates by oceanic water circulation; and biological production.
2. Shallow Coastal Seas: This area comprises ocean areas less than 200 metres in depth, and forms 10% of the marine realm.

Land-Ocean Interactions in the Coastal Zones
Major geological, geomorphological, biological and chemical processes are stimulated by land-sea interaction in coastal zones. Some examples of these interactions are:

- river inputs: energy, water, sediments, nutrients and wastes
- oceanic influences: gas exchange and global climate, ocean currents and moderation of regional climates
- geomorphological processes: erosion, transport, deposition
- role of coastal ecosystems in biological production, gas exchange, buffers, etc.

Issues discussed by the group included:

1. *Impact of Exclusive Economic Zones (EEZ) which increases national jurisdictions over coastal waters up to the 200-mile limit.* This will give individual nations more control over former common property resources shared with their neighbours. It will also allow them to allocate those resources to the expansion and diversification of their national economies. As pressures on traditional land-based resources mount, marine resources within coastal zones will take on a more crucial role in meeting future development requirements.

However, the role of traditional land-use planning, or more strategic plans in achieving sustainable use of these resources, remains largely unresolved.

2. *Developing a Framework for and measuring Competence of land-use planning systems.* Planning systems are designed primarily to guide the development of land-based activities and not necessarily with specific problems of coastal systems in mind. Coastal management initiatives are typically focussed on development controls which operate on the landward side through the spatial planning system. They are therefore reactive, rather than proactive policies and plans, without a clear vision of how terrestrial and marine systems are interlinked or how to promote sustainable use of coastal and marine resources. Burbridge focussed here on research work he has done to assess the effectiveness of European coastal zone management efforts:
   i) Spatial planning report of the coastal zone in the Baltic Sea Region adopted in Stockholm, 1996, recommended that a landward planning zone of at least 3 kilometres should be implemented, as well as a protected strip outside urban areas of at least 100-300 metres landwards and seawards of the mean-water line; comprehensive plans should be drafted at appropriate levels in a participatory manner; there should be planning or functional justifications for any coastal developments including infrastructure; and, impact assessments should be carried out for all large projects.
   ii) Integrated Land and Sea-Use Planning Systems such as in Sweden, Finland and Norway relies heavily on decision-making at the local level. Counties/local regions have statutory decision-making powers and implementation oversight responsibilities for some sectoral legislation affecting the coastal area. Counties/local regions can also provide the specialised management skills which are not available at the higher levels. In this way, local units within the countries provide regional perspectives, and ensure horizontal coordination between municipalities.
3. *Scales of Planning for Coastal Seas and Land Management.* Although, the appropriate level of planning varies according to the scale and complexity of issues being addressed, Burbridge suggested that the regional level is most appropriate for three reasons:
   i) A regional perspective may be more appropriate for representing terrestrial and marine linkages through river basin/catchment management (e.g. EuroBasins programme);
   ii) It may form a more rational basis for linking strategic development planning, structural funds, etc.
   iii) There could be greater capacity for incorporating environmental management principles and management techniques appropriate to the maintenance of the health and productivity of marine and coastal systems (technical capacity, resources, etc.).

Peter Burbridge made several conclusions from his presentation and the discussions that took place. Most, if not all, nations will continue to depend upon coastal ecosystem functions and services to sustain economic and social development objectives. It is, therefore, essential to develop and integrate our scientific understanding of the ability of marine and coastal systems to sustain human development pressures into the development planning process. Of equal importance, is effective communication of that understanding to policy makers, planners and managers. The appropriate scale of planning will vary according to the scale and complexity of coastal management issues.

Hartwig Kremer proceeded to give an overview of the IGBP/LOICZ project. LOICZ synthesises past, ongoing and future science on global change in the coastal zone to provide a better understanding of

- the coastal zone as a sink or source of $CO_2$

- the fluxes and mass balances of carbon, nitrogen and phosphorus in the coastal zone, and
- the role of the coastal zone in trace gas (e.g., DMS, $NO_x$) emissions

Human dimensions-oriented questions comprise a fourth area of LOICZ research:
- *How are humans altering these mass balances, and what are the consequences?*
- *How do changes in land use, climate and sea level alter the fluxes and retention of water and particulate matter in the coastal zone, and affect coastal morphodynamics?*
- *How can knowledge of the processes and impacts of biogeochemical and socio-economic changes be applied to improve integrated management of the coastal environment?*

LOICZ tries to follow the **DPSIR** scheme (OECD 1993, LOICZ Reports & Studies Vol. 11, 1998), which provides a framework for comparable site description and allocation of data. It reviews coastal change in terms of:
- DRIVERS: forcing functions causing change such as damming, urbanisation or more general economic activities;
- PRESSURES affecting key ecosystem and social system functioning (indicating human pressures on the environment e.g. energy, industry, agriculture, fisheries);
- STATE and STATE-CHANGE: are key variables that a) characterise the boundary conditions of the coastal systems and b) indicate the changes the systems undergo due to natural and human action;
- IMPACT: the effects on systems and how they are expressed, i.e. habitats, biodiversity, social and economic functioning and resource and services availability and use;
- RESPONSE: the action taken (reflecting coastal management) to either protect against change (e.g. increased nutrient input or sea level rise), ameliorate adverse effects and/or ensure sustainable use of the system resources.

In the last part of the LOICZ session, Doug McGlone presented some of the results from a LOICZ South East Asian core project, SARCS/WOTRO/LOICZ, (SWOL). The major goal of SWOL I to date has been to provide better scientific understanding on human induced flux changes and related Pressure - State interaction in affected coastal zones. The regional implication was to make reference to the rapid developments of South East Asia in the past, their effects on demography and thus anthropogenic drivers of environmental change as well as the influence of natural global change processes. In the recently terminated first stage, the study attempted to determine how residuals derived from waste production by land and water-based economic activities affect the cycling of materials and the health of the coastal environment. Investigation sites so far are the Merbok Mangrove System, Malaysia, the Lingayen Gulf, northern Philippines, Ban Don Bay, Thailand, and the Red River, Vietnam.

Five workshop participants gave presentations of their ongoing research activities related to integrated coastal zone management:

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| 1. Roshan **Ramessur** (Faculty of Science, University of Mauritius, Reduit, Mauritius) | **Integrated Coastal Zone Management - Mauritius**<br>Integrated Coastal Zone Management (ICZM) issues in the South Western Indian Ocean island states result from the desire to accelerate implementation of various projects related to coastal issues in the region. Following the Arusha Resolution (1993), Seychelles Statement (1996) and the Colombo CZM workshop (1999), the need for ICZM in Mauritius has become critical because of the limited land resources and disproportional domination of coastal areas. Some links in coastal issues the region include http://www.motherjones.com/coral_reef/mauritius.html and http://www.mauritius-info.com/g-tour/sea.htm. The coastal zone of Mauritius (1850km$^2$, 20°S, 58°E, South Western Indian Ocean, 1.12 million inhabitants) was redefined in 1997 in the Environmental |

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| | Protection Act of 1991 (Part VII [Act 34]) to include all islets within the Exclusive Economic Zone (1.7 million $km^2$). Agriculture in 1996 occupied approximately 45% of the existing land area (186 500 ha) with a sugar productivity of about 588 455 tonnes. The population density on the island amounted to 548 $km^{-2}$. During the 1980s the Mauritian economy underwent major structural changes successfully diversifying into 2 major activities (textiles and tourism). The number of tourists projected to visit the island will exceed 750 000 by year 2000 and the hotel room capacity is expected to reach 9000 by 2002. Both industrial development and tourism have contributed to environmental pressures enhanced by inadequate sewerage systems (18% population served) and violations of standards for textiles industries in the Export Processing Zone. The coral reef ecosystem (300 $km^2$; 150 km fringing reef) is considered to be overexploited and damaging levels of nitrate-nitrogen and phosphate in lagoon waters have been reported. Fish production in 1995 caught by about 3400 fishermen was 17 539 tonnes and 800 000 tonnes of sand are extracted annually for construction work and phasing out of lagoon sand extraction is scheduled for 2001. Projects include the installation of permanent mooring buoys, the establishment of research sites to be used as bio-region projects, lagoonal coral reef surveys and estuarine modelling studies carried out jointly by the University of Mauritius, the Shoals of Capricorn, the Albion Fisheries Research Centre, the Mauritius Marine Conservation Society and the Mauritius Underwater Group. A considerable amount of improvement has been noted though over the recent decade following the enactment of the Environmental Protection Act (EPA) as formulated in the National Environmental Action Plan II in 1998 and the setting up of the Mauritius Oceanographic Institute. |
| 2. **Pham** Thi Minh Hanh (Centre for Marine Environment Survey, Research and Consultation, Hanoi, Vietnam) | **Tourism Activities Impact Assessment and GIS Application on Environmental Management**<br>In my study I consider two methods of environmental management in general and coastal zone environment management in particular. Vietnam has a long coastal line (about 3620km) and islands from North to the South with many beautiful beaches can be used for tourism purpose. Tourism activities impact assessment is necessary for both tourism development and sustainable environmental practice. This short presentation focuses on the example of CuaLo beach. The field of management, in close connection with geography, the application of information technology and Geographical Information System (GIS) techniques is an efficient way of strengthening the management capacity of the whole system. The effects of the application of this technique are as follows: 1) To create a high reliability in information storage to facilitate updating and the access to information; 2) To establish strong capacity in data-seeking and data-processing (collecting statistics of area, overlaying, modelling, mapping); and 3) To facilitate information exchange and utilisation by different agencies and institutions. (using Nghe An province as a case study). |
| 3. Nicolette **Demetriades** (Marine & Estuarine Research and Prawn Fisheries & Development Association, Hyper-by-the-Sea, South Africa) | **A new approach to coastal management in South Africa**<br>The rapid increase of awareness in environmental issues has meant that researchers in the biological sciences now need to concentrate more broadly on human impacts and development on the environment and particularly in sensitive areas such as the coastal zone. As a result much of my recent research activity has concentrated on environmental impacts and assessments in the coastal areas of Kwazulu Natal and Mozambique, with some of the more noteworthy of these being in the harbours of Richards Bay and particularly Durban Bay. The monitoring and management of the crustacean trawl fisheries of KwaZulu Natal is one of the long term projects which combines scientific investigation and application, with communication and management of a number of different user groups. This has grown out of an ever-increasing awareness within the commercial fishing fraternity in Kwazulu Natal that the coast and its associated resources are being stretched to the limit and that interaction with ecologists for |

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| | wise management is needed. The more recent Thukela Water Project, which investigates the impact of damming one of KwaZulu Natal's major rivers on the marine environment, also signifies a major change in the way in which catchment and coastal issues are approached. Proposed harbour developments in the Port of Durban presented an interesting opportunity for research into ecosystem assessment of a highly modified environment. The results of this research resulted in the port authorities committing themselves to a rehabilitation/habitat recreation programme due to start September 2000. |
| 4. Jema **Ngwale** (National Environment Management Council, Dar es Salaam, Tanzania) | **Gender and Coastal Zone Management: socio-cultural issues identification and strategies for Kilwa district**<br>Kilwa is a coastal district situated in Lindi region of Tanzania about 180 km south of Dar Es Salaam. It has a coastline of about 150km and a total area of 13,920km$^2$ with an estimated population of 208,467.Given Kilwa's vast coastal resources and the pressures of development upon them, there is an urgent need to promote sustainable development and conserve the coastal resources. But lack of human and institutional capacity coupled with a lack of local people's commitment to coastal management initiatives has been a major barrier to Kilwa's coastal zone development. Other issues are such as demographic, social services, cultural and institutional have also been a major problem to the promotion of sustainable coastal management. If current growth rates are left to continue unchecked it will cause more pressure on resource use and densities increase overtime. Currently, immigration is not a major issue but will become important after the completion of gas production in Songosongo island which is also rich in coral reefs and fishing activities. The population depends on coastal resources both for commercial and domestic purposes. There is inadequate understanding among different stakeholders on the role of culture in economic development. Population increases, changes in social systems, policies and human interaction have contributed to reducing the importance of some cultural attributes such as taboos that were used to preserve resources. New rules and regulations and the centralisation of natural resources management have excluded local people in playing their part using traditional institutions. Planning and promoting any developments such as mariculture should incorporate a participatory approach by including socio-cultural considerations. Women – who perform most of the short-term work – should be included as fully as possible in economic development activities. There is a need of awareness campaigns at all levels to increase understanding of the benefits of conserving the coastal resources and risks of destroying them. At the same time, there is a need to make more efficient use of available resources by establishing priority research objectives and co-ordinating research efforts between various institutional stakeholders. |
| 5. Herminia **Caringal** (Marine Science Institute, University of the Philippines, Quezon City, The Philippines) | **Economic Modelling of Residual Generation for Lingayen Gulf Watershed**<br>The presentation will outline some of the research outputs of this SWOL I project conducted by my Institute, funded by WOTRO, the Netherlands, and completed in December 1999. My major contribution to the project as a socio-economic scientist was to link the biogeochemical budget approach of LOICZ with an economic modelling tool (the regional input-output model) to analyse the impacts of anthropogenic drivers on the processing of materials along the coastal zone of Lingayen Gulf. The project team consisted of a biologist, chemist, physical oceanographer, marine geologist, economic modeller and a hydrologist. |

## 4.5 Institutional Dimensions of Global Environmental Change in the Coastal Zones

**Session Leaders:** **Louis Lebel** *(Science Coordinator for Southeast Asia Regional Committee for START, Northern Remote Sensing and GIS Centre, Faculty of Social Science, Chiang Mai University, Thailand)*

**Liana Talaue-McManus** *(Associate Professor, Division of Marine Affairs and Policy, Rosenstiel School of Marine and Atmospheric Science, Miami, USA, and Member of LOICZ Scientific Steering Committee)*

**Purpose and overview of the session:**

The session aimed to provide background on key concepts, theories and ideas about institutions and to show how such a perspective can be usefully applied to global environmental change issues. This served also as a good overview of the IHDP international research project on Institutional Dimensions of Global Environmental Change (IDGEC).

The major institutional instruments in the context of coastal zones are coastal management regimes that governments employ at the local and national levels. The session focussed on generalisations at the regional level, looking at North-South, South-South, and North-North management partnerships and concrete examples of institutionalised "coping mechanisms" for global environmental change in the coastal zone. Institutions were defined at various levels:

i) Public Policy Process – political institutions, NGOs, ruling elites, business networks
ii) Property Rights Systems – local tenure, coastal and inland zoning, international access
iii) Environmental regimes – environmental protection, ASEAN agreements, international conventions
iv) Trade and Investment – markets, AFTA, GATT, IMF, Asian Development Bank, World Bank

The group studied two examples in more detail from an institutional perspective – the first one being the role of exclusive economic zones (EEZ) under the Law of the Sea as an international environmental regime. By the mid 1970's over 200 EEZs existed, placing 37% of oceans under national jurisdiction (this included almost all continental shelf areas and approx. 95% of fisheries catch). Fish stocks have nevertheless declined in many areas – for a variety of reasons, including institutional failures:

1. Effectiveness – How has the establishment of EEZs, shifting jurisdiction over natural resources in more than one third of the world oceans, affected our ability to utilise the oceans in a sustainable manner? In practice it is often difficult to determine the effectiveness of such environmental regimes until catastrophes have occurred. Indicators for effectiveness were discussed by the group: sustainability, efficiency, fairness and robustness (compliance).
2. Fit – In practice often the match or fit between the environmental institution and the resource or environment it is supposed to govern is partial or very poor. In the case of EEZs, often the area covered by different national EEZs can overlap and do not match population movements of the resource (EEZs do not cover fish movements in the high seas).
3. Interplay – Success of institutions depends not only on their own characteristics but also on how they interact with other institutions. Some interplay questions discussed include:
   i) Under what circumstances do international environmental regimes reinforce, or conversely counter-act, the intentions and activities of local coastal management practices?

ii) How can the various international environmental and trade regimes be re-designed so that they interact in ways that will facilitate sustainable and just management of coastal lands and resources?
iii) Under what conditions down integration in the global economy lead to more sustainable management of coastal zones?
iv) Is the interplay between global and local markets on the one hand, and between state and civil society, on the other, reinforcing, antagonistic or irrelevant to sustainable coastal zone management?

4. Coupled Dynamics – Institutions are dynamic, contested and do not arise in a vacuum. They co-evolve with broader transformations of social, economic and political contexts and in response to changes in ecological systems. Ecological and socio-economic crises can be important triggers for their (re-) design.
5. Resilience – Institutions must be capable of adapting to a changing environment. Resilience refers to the size of the stability domain of a system, or the measure of adaptive capacity in the system to cope with external surprises and shocks AND slower transformational changes (capacity for early warning, mechanisms for social learning, flexibility to adjust in a timely manner).
6. Redundancy – It is a common view that redundancy or overlap of organisations/institutions is inevitably negative. However, redundancy can often be very important for resilience of a system as it acts as a type of back-up system to reduce risks; can offer multiple responses to exogenous change; and allows for experimentation and learning.

A second case study focussed on the institutional dimensions of global environmental change in Southeast Asia. For the 7 countries located around the South China Sea the top environmental concern is habitat modification and mangrove areas. By 1994 4 South China Sea countries contributed 66% of global shrimp trade. Use of mangrove areas has been governed by export-oriented economic policy (non-internalisation of environmental costs) – to increase shrimp culture to boost foreign exchange for industrialisation over domestic food security. However, a current Strategic Action Plan for mangroves by GEF seeks to coordinate at the regional level the sound management, environmental costing of mangrove loss and restoration technology of these areas throughout the South China Sea area by 2009.

The limitations of this new plan were discussed by the group. At which level is it best to implement this plan? At the regional level in this area, joint action by multiple countries is plagued by the ASEAN principle of non-intervention, soft law approaches that only apply at national levels, and other territorial disputes (such as the Spratly Islands) occupying government attention. At the local level although coastal resource management has been successful in mobilising local stakeholders and building consensus, and participatory and integrative planning approaches, there is often a battle with lack of financial resources for these measures. The group worked with a chart that mapped the various scales of response (regional, national and local) their response options and the limitations to implementation of these response options.

Four participants gave presentations of their ongoing research activities in the area of institutions and global environmental change:

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| 1. Edwin **Castellanos** (Centro de Estudios Ambientales Universidad del Valle de Guatemala, Guatemala) | **Studies on the Impact of Environmental Change in the Republic of Guatemala**<br>My presentation will focus on the three main areas of research in which I am currently active. The first area involves the use of GIS and Remote Sensing in studies related to the impact and mitigation of possible climate change. I study the potential of tropical forests to sequester carbon dioxide from the atmosphere and the use of that potential to develop projects to commercialise carbon offsets. In this area, satellite images are very useful to monitor the change in forest cover. In a related project, we are proposing to use satellite images to study the impact of deforestation on the transmission rates of Malaria and Leishmaniasis. A second area of research involves the study of the impact of institutions on changes in the environment, particularly deforestation. This project involves work with a multidisciplinary team of anthropologists, political scientists, geographers, and ecologists to study how human settlements organise themselves to regulate the use of the natural resources around them. This work is done jointly with a team of scientists at the Center for the Study of Institutions, Populations, and Environmental Change located at Indiana University in the US. Finally, I have been collaborating with the Climate Change Office in Guatemala in preparing initial assessments of the status of emissions of greenhouse gases and the vulnerability of the country to possible global warming. The vulnerability studies were completed for five priority areas: public health, agriculture and food supplies, energy and industry, hydrological resources, and forests. The studies followed a combination of the methodologies used by the UNEP and the U. S. Country Studies Programme. |
| 2. Daniela **Kalikoski** (Brazil) (Institute of Resources and Environment, University of British Columbia, Canada) | **Institutional analysis of the estuary of the Patos Lagoon, Brazil: local lessons, national challenges and implications for conservation of coastal resources**<br>Fisheries belong to a category of resources often referred to as common pool resources, in which exclusion is difficult and joint use involves subtractability. In the estuary of the Patos Lagoon, Brazil, artisanal fisheries are going through a tragedy of the commons. Fisheries resources are decreasing sharply compromising the livelihood of more than 10,000 small-scale fishers. The crisis in artisanal fisheries represents an indicator of the overall mismanagement of coastal resources, as illustrated by over-exploitation of many fisheries resources, loss of biodiversity, poverty, and loss of cultural identity of fisheries communities. Triggered by a consensus of the failure of current institutions to manage these resources, new institutional arrangements have been established in the area, redefining rules and rights, to manage the resources. They involve a forum (Forum of Patos Lagoon, a co-management arrangement) comprising all stakeholders to discuss and develop alternative actions to mitigate and/or resolve the problems of the fishermen and the crisis in artisanal fisheries activities. The fundamental issue here is to analyse the institutional factors of the failure of past institutions and determine whether new institutional arrangements are being designed in a way that allows for the sustainable utilisation of common pool resources. Specific objectives of the research are: (i) to develop a framework for analysing the structure, development and implementation of co-management arrangements of common pool resources; (ii) to undertake a case study analysis of the establishment of co-management arrangements in the estuary of Patos Lagoon, RS, Brazil; (iii) to analyse the historical changes in institutional arrangements and the contemporary move toward the conceptual framework of co-management of artisanal fisheries resources, the institutions which are created by co-management arrangements and the altered relationships or other benefits resulting from these institutional change; (iv) to evaluate the process of implementing co-management (strengths and weaknesses, challenges) and what, if any, adjustments are needed; and (v) to recommend ways to strengthen the |

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| | forum co-management process and to overcome challenges for the future. The project draws on common property theory, which provides general principles for successful common property regimes. Methods of investigation involve document analysis, interviews with fishermen, researchers, public officials and other key stakeholders and attendance at the Forum of the Patos Lagoon meetings. An understanding of what went wrong in the past, and how new arrangements are being established might generate essential insights into the design of successful management institutions, where the maintenance of both ecological and social long-term objectives are taken into account. |
| 3. Sylvia **Haladjian** (Kaslik Saint-Esprit University and Saint-Joseph University, Lebanon) | **Family and School: important institutions for social and sustainable development in Lebanon**<br>The current situation of the coastal zones in Lebanon is alarming: 80% of the water is polluted or threatened by pollution; the pollution of the atmosphere has also become severe because of the harmful effects caused by power stations and industrial production facilities operating in residential areas, expanding car parks and the use of individual electric generators (all of this without any respect for hygiene and security standards); and garbage collection is very random and the incineration factories insufficient in number. Another problem is the existence of barrels of toxic waste imported clandestinely into the country during the war in 1987, and which constitute a serious risk to the population and animals as long as this toxic waste is not completely neutralised. Of course, the application of existing laws could solve most of these problems, or at least limit their harmful impacts. It would also be very efficient to think of updating these laws so that they are relevant to current situations and environmental changes. However, the most beneficial sustainable development for Lebanon is that of social development; and social development could be promoted by the socialisation agents, particularly family and school, as institutions able to develop the civic sense of the future generations. But, as the Lebanese family is at present concerned with more urgent needs (like priorities of immediate survival in a situation of military conflict), the Lebanese school could and should take on the role of educating the younger generation on environmental issues. Thus, these young people, once they become parents, will be, in their turn, ready to integrate in the primary socialisation of their children new values and social rules, which then hopefully may become an integral part of Lebanese culture. |
| 4. Mame Arame **Soumare** (Université Cheikh Anta Diop, Dakar, Senegal) | **The Sahel : an environment struck by the lack of water**<br>This research has at its core the question of availability of water in the geographical area of the Sahel. The decrease of water resources has become a crucial problem in the world. The insufficiency of water is felt at the same time from the qualitative point of view. This reality justified the organisation of the World Forum on Water in March 2000. Certain scientists do not hesitate to say that water will be the "oil of tomorrow ". In the countries of the Sahel lack or water has had disastrous consequences: famine, migration from unproductive lands to other areas, and death of livestock. The crisis of water gave the "Sahel" its name: "shore of the desert ". I will propose here a short table on the availability of water in the Sahel which shelters significant pockets of settlement, and explain the cycle of drought – poor economic productivity – poverty, and the interrelationships between water, economic exploitation, and the environment. Many primary and secondary activities are strong water consumers: industry, agriculture, livestock breeding, and fishing. The spatial distribution of economic activities in Senegal according to the availability of water will also be presented, with a focus on the Average valley of Senegal, which shows characteristics common to other areas of the Sahel which have profited from hydro-agricultural installations. Here irrigation generated new productive strategies and new environmental problems. I will touch also on the fit of scales of observation. |

## 4.6 Land-Use and Land-Cover Change in the Coastal Zones

**Session Leaders:** **Louis Lebel** *(Science Coordinator for Southeast Asia Regional Committee for START, Northern Remote Sensing and GIS Centre, Faculty of Social Science, Chiang Mai University, Thailand)*

**Carlos Russo Machado** *(Centro de Investigação da Universidade Atlântica, Barcarena, Portugal)*

**Maria do Rosário Jorge** *(Centro de Investigação da Universidade Atlântica, Barcarena, Portugal)*

**Objectives of the Session:**

1. To provide an overview of land-use and land-cover research and its relationship to global environmental change
2. To begin to think in a more integrated way about land-use and land-cover changes and its environmental and social effects
3. To exchange ideas about how to design, analyse and implement integrated and policy-relevant research on global environmental change in the coastal zone

Types of Land use and Land cover:

| Land Covers | Land Uses |
|---|---|
| • Forest<br>• Grassland<br>• Cropland<br>• Wetland<br>• Non-biotic | • Logging<br>• Ranching<br>• Agriculture<br>• Wildlife preservation<br>• City/urban/industry |

Types of "Sea" use and "Sea" cover:

| "Sea" Covers | "Sea" Uses |
|---|---|
| • Sea-grass beds<br>• Soft-bio-sediments<br>• Mangrove swamps<br>• Coral reefs<br>• Marshes | • Fishing<br>• Rearing<br>• Pollution sink<br>• Conservation<br>• Recreation<br>• Shipping transport |

The session also focussed on drivers, consequences and responses to land-use and land-cover change. The challenges are great: growth in the need for space for cities and the production of wood, food and energy, as well as luxury products to earn foreign exchange, will continue to place tremendous pressure for the continued development of land in the coastal zones of the world. Many of these transformations have consequences for vulnerability and for further global environmental change. Louis Lebel focussed his presentation on several case studies in Southeast Asia:

1. Key economic development processes often involve intensification and expansion of certain types of production. The impacts of mangrove conversion for shrimp acquaculture on the socio-economic and ecological systems in Southeast Asia were studied as an example of this.

2. To examine the question of whether a higher diversity of land-use systems makes a landscape (region) more resilient to global environmental changes, Lebel used the case of the privatisation of previously common property coastal lands in Vietnam for the rapid conversion (and resulting degradation) of mangroves. This privatisation in turn led to reduced collective action in maintenance of sea-dikes and increased the area's vulnerability to climate hazards.

Overall Lebel showed that land-use and land-cover changes affect carbon, nitrogen and hydrological cycles as well as biodiversity. Changes to land surface at large enough scales can also influence regional climate. Lebel pointed to evidence that historical evolution of land-use over China and Asia has changed the behaviour of the Asian monsoon. Changes in land-use in catchments also affect the delivery of sediments, nutrients and other pollutants to coastal zones. Participation in planning of land use is always unequal, and land-use changes often produce winners and losers, some of which arise from locational effects (marginalisation in space). As we see in the case of the *Doi Moi* system in Vietnam, collective impact often results in changes of individual, household, community and regional vulnerability (or resilience). Markets, incentive structures and land tenure systems are often among the key external factors influencing decision-making behaviour.

So how do we tackle the institutional design problems behind the above issues? How, and by which criteria do we evaluate competing land uses? How do we allocate land uses – who negotiates, who allocates, for how long? How do we integrate conservation, production, equity and other social goals. In order to address these issues which cross both LUCC and IDGEC session themes, the group was divided to perform role-playing exercises.

Land-use and land-cover changes are largely a result of human decisions. Yet, environmental (land) conditions influence human decisions. Therefore, to study their coupled dynamics (even when constrained by plans and regulations) is difficult, but of tremendous importance – and for this we often need to employ the use of models. In conclusion, Lebel summarised some of the key models developed to study these dynamics.

In the second part of the session Carlos Russo Machado and Maria do Rosário Jorge presented results from their research work on coastal zones in the Mediterranean Basin, emphasising the usefulness of tools such as GIS and Remote Sensing in data-gathering for such research.

Participants formed their own working groups based on research interests, and discussed ideas for future research not only on land-use and land-cover change issues, but on other issues such as vulnerability, and information and communication aspects of global environmental change research.

Five workshop participants gave brief presentations of their ongoing research interests in the area of land-use and land-cover change:

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| 1. Marcelo **Acerbi** (Geographer, CONICET Fellow Research, Pro-MAB, Institute of Geography, University of Buenos Aires, National University of Buenos Aires, Argentina) | **Identification and assessment of environmental conflicts: the case of "Parque Atlántico Mar Chiquito Biosphere Reserve" (Buenos Aires Province, Argentine)**<br>Biosphere Reserves are UNESCO/Man and the Biosphere Programme designated areas throughout the world whose objective is to integrate conservation of biological diversity with regional planning and development. These were among the first attempts to reconcile development and conservation and are an early forerunner of the ongoing ecosystem approach to conservation. During the past decades, the establishment of Biosphere Reserves has been increasing, but this has not been accompanied by the necessary increase in implementation and management of these areas. Today it is absolutely necessary to ascertain to what extent established Biosphere Reserves are being implemented and managed. A few attempts to measure implementation in protected areas have been made in the last few years, and some basic criteria have been designed for this purpose. However, a practical procedure for Biosphere Reserves which permits an evaluation of implementation, and whose results are comparable, has not been defined. The presentation deals with a relevant management topic developed from Geography. By means of a quick method, it is shown how a series of factors and environmental conflicts – direct and indirect threats and contributing factors – combine to influence some target conditions related to the conservation of an important Argentine coastal wetland protected under an UNESCO/MAB Biosphere Reserve. We consider that these critical factors need to be addressed or modified in order to have some impact on the status of the target conservation conditions of the Biosphere Reserve. A method to identify and assess those critical factors was developed. This step is essential for efficient management. In particular, a more complex method to analyse Biosphere Reserves' implementation will be introduced. In this case we concentrate on a preliminary identification and assessment of environmental conflict in a Coastal Biosphere Reserve. We selected the case of Parque Atlántico Mar Chiquito Biosphere Reserve and identified, analysed and classified typical spatial units, threats and conflicts for the reserve. In so doing, we determined which of the spatial units have management and control priorities that could be used as a basis for general management guidelines. |
| 2. Arisbe **Mendoza-Escalante** (Department of Management and Conservation of Natural Tropical Resources, Dept. of Veterinary Medicine and Zootechnics, Autonomous University of Yucatan, Mexico) | **Valorisation of indigenous knowledge: gardening and compost in a Yucatan fishing community**<br>During the last two decades, the Yucatan coastal area has been subjected to many transformations. In addition to increasing development of tourism, the region serves as a migration zone for several groups of inland peasants now engaged in fishing activities. Fishing represents the main source of income for more than half of the active population. This project, proposed by an interdisciplinary team (anthropologists, agronomists, economists and engineers) aims at promoting, within the coastal community of Santa Clara (75 people) an agricultural technique, called "Ka'an ché". The project includes the production and use of compost for cultivating vegetables and fruits with the help of worms and the recycling of domestic waste products. Such a technique was previously used by the inland peasants before coming to Santa Clara. Given poor soil quality in the area, the spread of this technique could reduce dependency on external traders in acquiring basic food. The community has an "ejidal fishing society" with 35 members and a co-operative, with 23 members, working on a part-time basis in salt extraction. The general objective of the project is to promote the use of the "Ka'an ché" technique, to identify its constraints and advantages, and to evaluate its economic impact on the community. One aim of the research team is to establish, in accordance with the local authorities and paying attention to the local knowledge of the inhabitants, a formal group which will be involved in |

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| | follow-up activities. In addition to various publications, they will produce a video and two students will be able to complete their thesis. Publicity efforts will also be undertaken through regional communication networks. |
| 3. Xiaoling **Chen** (National Lab for Information Engineering in Surveying, Mapping and Remote Sensing (LIESMARS) Wuhan University, P.R. China) | **Change Detection and Modelling Related to Urbanisation in the Pearl River Delta of southern China Based on Remote-Sensed Images**<br>This research is part of preliminary results from one of my on-going project: "Research on the Land-Use and Cover Changes in East China". The Pearl River Delta is one of four selected areas in the project, and is located in southeast China along the coast and belongs to the administrative division of Guangdong Province. The economic reform of 1978 and the land reform of 1987 in China have led to a rapid increase in foreign investment and economic development and rapid urbanisation, especially rural urbanisation in the Pearl River Delta. Guangdong province is situated right next to Hong Kong, which is the major source of foreign investment in China, constituting over 50% of its total foreign investment. Three images are available for the analysis including 1 MSS data and 2 Landsat TM data. The image data on Feb. 10, 1977 is collected by Multispectral Scanner (MSS) with a spatial resolution of 80 metres to collect reflectance data of the earth's features. ERDAS-Imagine version 8.2 and ARC/INFO version 7.0 and Arcview version 3.1 were used in the study. Geometric correction and georeference of the images enables the exact overlay of image-on-image that can be carried out by ERDAS, ARC/INFO and Arcview. The images were registered together using ERDAS by 40 control points. The control points were interactively selected across the whole area in the three images. The standard error for the registration was less than 1 pixel. On the basis of all information the images provided with and the extracted NVDIs, maximum likelihood classification was used to classify the images. A map-by-map subtraction was performed and their associated land-use changes were detected. The authors selected Dongguan city in the Pearl River Delta as a case study to develop an urbanisation spatial model based on the oriented-decision CA method which can be used to analyse the mechanism of urban sprawl and to held determine a more appropriate land-use policy. |
| 4. Ravidya **Maharaj** (Trinidad) (Department of Geography and Geology, University of the West Indies, Jamaica) | **Beach Erosion in Negril, Jamaica**<br>There is tremendous concern about potential beach erosion at Negril because of the sun-sea-sand brand of tourism offered there, and the threat posed to buildings and other structures located near the beach. The causes of beach erosion in Negril are complex, and when coupled with local variations in oceanographic and geomorphological factors (such as the direction of wave approach, shelf slope, depth to bedrock and degree of protection from shallow reefs) result in spatial variations in the vulnerability of Long Bay shoreline to erosion. These causes include: **1). Sea Level Rise:** It is likely that the actual rate of sea-level rise in Negril could actually be greater than the predicted 30 cm/century, as the area is subject to block faulting. At Negril, sea-level rise would normally have resulted in the beach system incrementally transgressing over a morass. However, the highway and coastal properties will prevent this, and lead to increased vertical incision as we try to "hold the line", with seawalls, etc. **2). Tidal Fluctuations:** Short-term erosion occurs in Negril as a result of tidal fluctuations, particularly during spring tides, when the maximum difference between high and low tide is 52 cm. **3). Adverse Wave Climate:** The Negril shoreline has a general lack of natural breakwaters (coral reefs are below wave base, and shallow reefs do not represent a significant barrier) and is therefore particularly vulnerable to the effects of storms. **4). Increasing Landbourne Flooding:** development of coastal lands also leads to higher overland storm water flows through the creation of a higher proportion of impermeable surfaces, and improper storm water disposal. Transmission of these floodwaters across the beach result in channel incision, and offshore transport of sediment. **5). Reduction in Sediment Supply:** Between 1980 and 1999 there has been a significant change in the bioclastic |

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| | composition of the beach sands, with a decrease in the relative proportion of foraminifera and an increase in the relative proportion of red algae. Reduced sediment supply increases the time taken for the system to recover after storms. Declines in nearshore carbonate productivity may be due to changes in ambient water quality or direct clearing of seagrass meadows. Sand is temporarily stored in various locations across the system, including the shelf, foreshore/beach zone, and berm/dune area. Carbonate sediments cycle through this system until they are either broken down or dissolved or transported beyond the shelf edge. In the case of Negril, the subaerial stores (berm/dune) of the sediment have been greatly reduced by hotel development. Accommodation space on the shelf is therefore the most important storage of sand. Where sediment production is declining, the accumulated sand (stored) becomes increasing important to the supply of sand to the beach. **6). Common misconceptions about the system:** the belief that beach sediment comes from coral reef has lead to the general neglect and lack of protection for the inshore seagrass communities. Use of structural options (groynes and breakwaters) has been less than successful as these measures assume that wave action/longshore drift are the principal causes of beach loss, and do not address the fundamental cause of erosion at Negril - major decline in sediment production. |
| 5. Arona **Soumare** (Pluridisciplinary Team for the Study of Coastal Ecosystems – EPEEC c/o Université Cheikh Anta Diop, Dakar, Senegal) | **Spatio - temporal dynamic and restoration of mangrove ecosystem in the Saloum Biosphere Reserve (Senegal, West Africa)**<br>Our study's objective is to proceed with monitoring of the environmental changes in the Saloum Biosphere Reserve. The study also seeks to determine the spatio - temporal dynamic of mangrove vegetation and to draw conclusions for a sustainable management of the ecosystem. The methodology combines diachronic cartography using aerial photographs, satellite data and social assessment. In the first step, the time base covers 35 years (1954 and 1989), which we then divided in two distinct intervals: a long sequence of 24 years (1954-1978) and a short sequence of 11 years (1978-1989). From 1954 to 1989, mangrove areas declined from 3397 hectares to 2733 hectares, which represents a loss of 20% of initial areas. The next step (1990 - 2000) is a global monitoring of the whole Saloum Biosphere Reserve including SPOT data. The main natural factors of degradation are rainfall deficit and human pressures. From 1976 to 2000, the population of this area has increased at a rate of 5,4% per year. A process of rehabilitation of these ecosystems has been initiated with the collaboration of local populations and the pluridisciplinary scientists' team of University of Dakar with the support of UNESCO and the International Society of Mangrove Ecosystems (ISME). |

## 4.7 Evening Sessions

Two evening sessions were held in order to give participants the opportunity to learn more about other ongoing coastal zone research initiatives.

- **Stakeholder Participation in Coastal Management**

**Speaker:** **Martin Welp** *(Potsdam Institute for Climate Impacts Research (PIK))*

Martin Welp is involved in several different initiatives on coastal zone management:

i) PIK Stakeholder Dialogue – The objectives of this initiative are to improve the quality of science by learning from "real-life" problems, and to improve the societal and political relevance of research results. Therefore, the focus of this initiative is on improving the link between stakeholders (global players, NGOs and government agencies) and research (integrated modelling of GEC initiatives). Martin Welp presented results from focussed stakeholder interviews in three case studies: Hiiumaa in Estonia, the Archipelago Sea in Finland and Rügen in Germany.

ii) EU Demonstration Programme on ICZM – This initiative included meetings in 12 EU countries. Factors that encourage or discourage ICZM (e.g. legislation, participation, technology, sectoral and territorial cooperation, role of EU policy, etc.) were debated by various government actors involved in planning, management and use of European coastal zone.

iii) Urban LifestYles, SuStainability and Integrated Environmental ASsessment (ULYSSES) – This initiative employed participatory integrated assessment techniques in working group sessions with citizens, regional decision-makers, and representatives from financial and media sectors, in various EU cities. The working groups produced collages to illustrate perceptions and concerns about coastal zones; evaluated the use of Integrated Assessment Models; and prepared Citizens' Reports with recommendations on addressing climate change.

- **Environment and Development in Coastal Regions and in Small Islands, (CSI-UNESCO)**

**Speaker:** **Dirk Troost** *(CSI-UNESCO)*

Dirk Troost coordinates this CSI-UNESCO programme, which will run from 1996-2007 in 4 phases. In this evening session he presented results from this programme to date:

i) 1996 onwards – Inter-sectoral pilot projects initiated/inherited and co-sponsored to implement sustainable coastal and small-island development, with emphasis on resolving conflicts over resources and values; University chairs initiated to complement pilot projects through training, as well as capacity and awareness building in sustainable coastal and small-island development;

ii) 1998-1999 – Experiences of pilot projects used to determine nature and characteristics of wise coastal practices;

iii) 1999-2000 – Wise coastal practices discussed and debated through Wise Practices Virtual Forum (web-based);

iv) 2000-2007 – Discuss, review and advance examples of wise coastal practices at national, regional and global levels; evaluate and implement pilot projects incorporating the findings of Wise Practices Virtual Forum.

## 4.8 Working Group Reports

As part of a structured working group exercise the participants were divided into four groups and given time to prepare policy briefing documents on selected issues addressing institutional barriers to managing GEC in coastal zones.

### *4.8.1 Working Group 1: Sustainable Tourism*

**Group 1:** Edwin Castellanos, Guatemala
Daniela Kalikoski, Brazil
Marcelo Acerbi, Argentina
Gabriel Umoh, Nigeria
Pia del Campo Bennagen, The Philippines
Xiaoling Chen, P.R of China
Arisbe Mendoza, Mexico
Pham Thi Minh Hanh, Vietnam

**Issues for Group 1:** *Discuss the apparent choice in developing countries between the protection of environment vs. economic growth using the example of tourism, and sustainable tourism initiatives. Given the assumption that in 2025 we want to have achieved sustainable tourism, working back from this date, what kinds of policies are necessary, and therefore what kind of science is needed, to achieve this?*

**Group 1 Report:** Sustainable Tourism and Initiatives in Developing Nations: Policy Briefing for Period 2000-2025

Introduction

- In international trade terms, the global tourism industry is the second largest industry in the world
- Estimates for the year 2000 see tourism as the largest global industry involving 661 million tourists and generating 300 million related jobs

Consequences:

1. Economic – high leakage to foreign investors, high inflation, seasonal economic disparities, over-dependence on single industry.
2. Socio-cultural – negative impacts on culture and traditions.
3. Physical environment – mass tourism results in increase in pollution of air, coastal regions, rivers and lakes, traffic congestion, loss of natural habitats (disruption of feeding and breeding of wildlife), increased pressure on land use.

Sustainable Tourism

Sustainable tourism is a type of tourism that satisfies the needs of the present without compromising the needs of both present and future generations. This concept should take into account economic capacity, environmental capacity as well as social and cultural values. With this definition in mind the group set the following goals for achieving sustainable tourism by the year 2025:

Short term, 5 years – Conduct diagnostic studies; recommend temporary closure of highly degraded tourist attractions; formulate legislation that supports sustainable tourism; implement an education programme; establish a multi-stakeholder forum that will consider project proposals and monitor projects.

Medium term, 15 years – Establish general sustainable tourism standards through certification programmes; conduct training programmes to develop and strengthen human resources; incentive systems to local entrepreneurs to provide quality tourism services; promote joint tourism ventures between local and foreign investors.

Longer term, 25 years – Integrate sustainable tourism policies in the overall development policies of countries; encourage regional cooperation in the development of sustainable tourism; follow-up and standardise processes set in place by short and medium-term policies.

Sustainable tourism and the challenge for science – Researchable questions:

- To what extent has tourism degraded the natural environment?
- What indicators can be used to measure sustainability in the tourism industry?
- What indicators can be used to measure environmental carrying capacity in the context of sustainable tourism?
- What is the nature and extent of the impact of tourism on local cultures?
- What policies regarding tourism are presently in place? To what extent are they being implemented? What implementation gaps exist? How should these gaps be addressed?
- How does globalisation affect the tourism industry?

### *4.8.2 Working Group 2: Policy levels and Policy fit*

**Group 2:** Ahmed Salahuddin, Bangladesh
André De Sa, Brazil
Herminia Caringal, The Philippines
Jema Ngwale, Tanzania
Manju Prasad, Fiji
Nicolette Demetriades, South Africa
Veronica Mera-Orces, Ecuador

**Issues for Group 2:** *Policy levels – Select one or more major environmental problems/issues and determine which policy planning level is most appropriate for each, e.g. global (UN), regional (ASEAN), national (Thailand), and local (Phuket). Policy fit – what kinds of policies are appropriate for what kinds of environmental issues, e.g. regulatory policies that limit actions; fiscal policies that affect prices; market stimulate to achieve set goals; trading rights; investment in technologies, etc.*

**Group 2 Report:** Appropriate policy-planning levels for major environmental problems/issues.

Introduction

Anthropogenic activities impact on natural resources in several ways. Policy is important to manage people and/or resources and we believe a number of different layers are necessary in order to allow for correct policy implementation, enforcement and monitoring. It is important however to maximise the efficiency of a multi-layered system by having sufficient integration between the different layers and by choosing the appropriate number of layers for a particular coastal issue.

Proposed Strategy

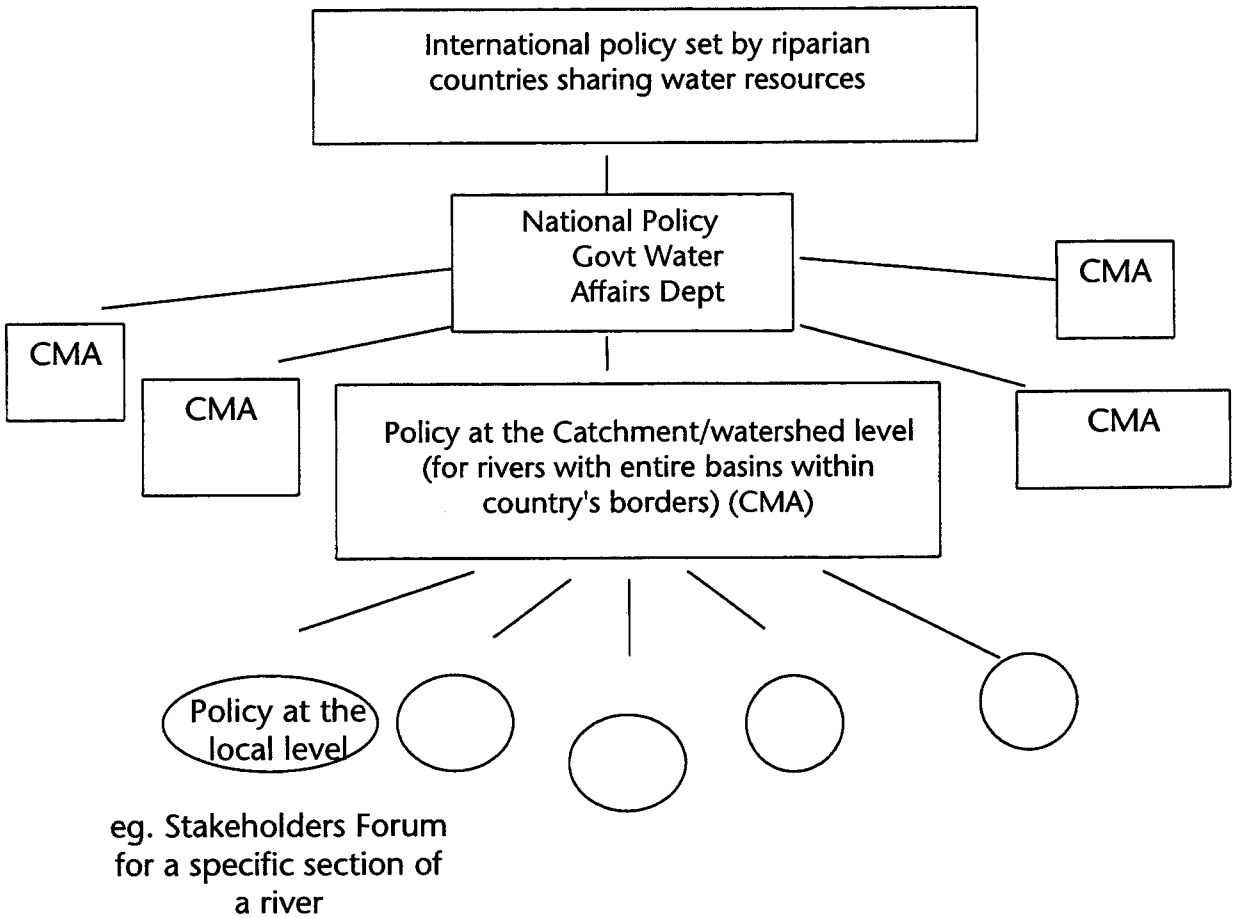
For most of the major environmental issues in the coastal zone, we suggest that national and local policy levels are always appropriate and necessary. Policy at the national level plays an important coordinating role throughout the country, while at the local level the stakeholders act as on-site managers. There must be a good mechanism however for interplay between these two levels. This will mean that there will always be a guiding policy for the country's resources as well as allowing stakeholders to guide policy for what is useful and practical on the ground.

**The National and Local levels of policy are always appropriate and necessary**

It is recognised, however, that policy is also sometimes appropriate at other levels depending on the scale of the environmental problem / issue.

Examples and Case Studies

For example, the management of a nation's water resources would need additional layers to the national and local levels. These would involve the inclusion of regional policies as well as international policy in the case of transboundary river basins.




eg. Stakeholders Forum for a specific section of a river

The next example chosen illustrates how policy levels can also incorporate the cultural aspects of society. In Fiji the issue of property rights is of great significance to fisheries. The land, sea and its associate resources are customarily considered to be property of a "Vanua" or Province. Each Province has a traditional chief and these chiefs come together to form a council. This council has direct access to the government and advises on fisheries access. Others who do not belong to a certain Province are not allowed access to fish in this region. Therefore ownership is a way of achieving sustainable fisheries by limiting access. Problems arise due to the leasing of the areas to others that do belong to the Province. Leases are issued by the Native Land Trust Board – the members of which are not necessarily aware of local concerns and local resource management. The issue of transference of property rights poses problems, especially towards the expiry date of the lease, as people begin to lose interest in resource management and over-exploit the resource. During the lease period therefore the system appears to work, but currently in Fiji these leases are expiring and due to racial and political reasons the policy process is unable to deal with these issues. This model does illustrate however, the way in which cultural aspects can be incorporated into policy planning levels.

Another example of a global issue being dealt with at different policy levels is the energy sector. In Brazil energy issues are generally dealt with at the national level, and at least until now, with a minor responsibility at the regional level, with many international and/or global groups to co-ordinate, predict and/or supervise the sector in various countries. This is mainly because energy projects are more related to the macroeconomics of the country, or to the macroeconomic predictions of a certain economy. At the moment there are few local level policies to influence or guide the sector. This does not mean, however, that the local level is unimportant to the global energy issue. This is confirmed by the fact that despite some lack of structure and capacity building at this level, local dialogue plays an important role in the strategies such as the implementation of energy projects (e.g. power plants).

The Ecuadorian experience shows that the lack of proper policy coordination and implementation has lead to a progressive depletion of coastal zone resources. Related to this problem is the "multi-layer dimension of environmental policy" that was described above. For example, at the local level it is possible to determine that inequities in resource access and benefits create the basis for a lack of communication and compromise with the long-term management of resources. At the regional level, corruption, contradictions in statutes, manipulation and asymmetrical implementation of laws and regulations are causes of mangrove deforestation, uncontrolled urbanisation and resource pollution by various human settlements. At the national level, macro-economic neo-liberal policy has determined that coastal resources can be utilised as basic providers of economic activities without considering environmental externalities or food security of the local population. At the international level, market forces, unequal trade regulations and political conflicts (such as the military conflict in neighbouring Colombia) are placing acute pressure on coastal resources.

Researchable Questions:

- What are the interactions between the different policy levels?
- What is the role of different Institutions/Organisations at each level of policy?
- How is it decided which types of policies are necessary in each level?

### *4.8.3 Working Group 3: Planning Horizons*

**Group 3:** Alexander Lopez, Costa Rica
Roshan Ramessur, Mauritius
Mame Arame Soumare, Senegal
Ibidun O. Adelekan, Nigeria
Kakoli Singh, India
A. K. Somasundaraswaran, Sri Lanka

**Issues for Group 3:** *Planning horizons – how can governments at any level make what could be painful decisions in the short term in order to achieve benefits in the long term? Rates of environmental change in coastal zones are extremely fast. How do we develop policies in coastal zones to deal with extreme events and rapid environmental change?*

**Group 3 Report:** Planning horizons

Introduction
Global environmental change is a critical issue that has far reaching consequences at local, national, regional and global levels. Governments at all levels therefore have significant roles to play in terms of formulating policies that can reduce the rate of environmental change as well as mitigate the impacts. In most cases the formulation of appropriate policies meets with stiff opposition from stakeholders involved, as their 'felt' and real interests are often perceived to be endangered. There is, however, need for governments at any level to make choices which may be painful for the short term in order to achieve long-term benefits. These choices could be made in a number of ways depending on the specific environmental issue and taking into account the socio-economic and cultural characteristics of the stakeholders involved. For example, with respect to fishing in coastal waters, governments can make the following choices to ensure sustainability:

- imposition of moratorium
- restriction of harmful practices like trawling
- introduction of closing season
- enforcement of EEZ for artisanal fishermen
- restriction of tools or practices of fishing (e.g. specification of net mesh size and prevention of use of dynamite)

In order to promote long-term policies, governments could consider a series of mechanisms that could facilitate the achievement of long-term benefits. Thus, we would like to suggest eight steps that governments could take into account.

**i) Promotion of formal and informal environmental education**
Environment education must be integrated in the primary level of schools in order to build awareness at an early stage. Awareness raising should also be undertaken in other forums such as social associations (e.g. religious groups). Environmental protection awareness–building should take differences of social groups into account, such as level of education, perception, economic situation, etc. Governments should use communication networks (e.g. radio, TV, etc) to better inform citizens and social groups. They must be the coordinators of the management of available resources and provide different kinds of support (e.g. institutionally and financially) to the actors of education.

### ii) Gradual policy implementation

For these choices to be operational, there is an urgent need to develop a set of guidelines which would direct policy implementation. Often, enforcement of environmental laws and policies is difficult due to conflicting views of different stakeholders. Decision and policy makers must ensure that implementation and enforcement of laws are done in a gradual way and occur across spheres such as capacity building, training and technological transfer. The implementation of such policies should be supported by appropriate funds and resources. There is also a need for monitoring the implementation processes to ensure the success of the plan at the local, national, regional and international levels. There is also an important role to be played by government officials at various levels to ensure compliance with laws.

### iii) Development of new methods of governance

Traditionally governance has been linked to state performance. However, currently the question is whether we can develop governance without government. The conceptualisation of the state as omnipotent actor has implied the marginalisation of several stakeholders, with important implications for global environmental change. Taking into account that in many cases the state has limited financial and technical capacity to address crucial environmental problems, the participation of other agents in a more horizontal way is required. For instance, environmental cooperation in border regions including municipalities from different countries, NGOs and the civil society, can be a more effective way to address certain environmental problems, rather than leaving all responsibility to the state. In short, decentralisation and horizontal cooperation among non-state actors are critical variables to reach a new form of environmental governance.

### iv) Creation of a new type of regional environmental organisation

Most of the international environmental organisations are based on state representation, resulting in very little interaction between the regional and local levels. For this reason, we suggest a new type of international environmental organisation with representation from three levels: the government, the private sector and civil society. This configuration could ensure more policy implementation as the most important actors are represented, and are therefore more willing to take actions with long term horizons. In addition, this scenario offers a multi-sectoral and multi-level approach.

### v) Constitution of quasi-autonomous national/regional environmental funds

The key issue here is to create an entity that can be conceived of at national and/or regional levels as dealing with the generating and allocating of funding. The institutions should have a quasi-autonomous character in order to avoid the politicisation of environmental issues and potential corruption. This would be a positive sign for international donors considering that this type of mechanism is more flexible, less bureaucratic and normally more long-term oriented.

### vi) Development of environmental regimes

Regimes can be an effective way to promote new forms of governance, and to address urgent environmental problems with greater effectiveness and efficiency. However, even though the above two variables are crucial, there are two other issues even more critical for developing countries when it comes to the development of environmental regimes: first, regime robustness considering the political instability of many developing countries – the challenge here is to design institutions that can guarantee long-term activities despite political instability; and the second issue is regime fairness, given the critical issue of social gaps in these countries.

**vii) Cost-benefit analysis and compensation to the policy affecting interest group(s)**
It has been increasingly realised that there is a need to undertake cost-benefit analysis and fixing "trade-offs" among different policy choices or options that are open to governments. This is due to the fact that most policies consider only economic costs without considering the social costs involved. As has been mentioned earlier, these environmental protection policies can be painful choices as they sometimes entail policy decisions which go against the interests of certain actors. What is desirable then, is that these groups who are adversely affected because of long-term governmental policy measures, should be adequately compensated in some form which is acceptable to both parties.

**viii) Horizontal interaction or coordination among institutions**
As environmental problems are systemic in nature, horizontal coordination among institutions is necessary for overall CZM. This is because several government institutions might be involved in the same sphere with different or overlapping objectives. For example, ministries of fisheries and tourism may have conflicting policy goals regarding the same coastal area. The institutional structure is generally discussed in terms of a vertical linkage but horizontal coordination among institutions is also necessary for effective implementation of policies.

Research Questions
From the above suggested eight steps, the following overall research questions were identified:
1. What should be the priorities for a developing country to achieve sustainable development under limited financial resources?
2. How can policy implementation become an important force for effective environmental management?

### *4.8.4 Working Group 4: Policy Interaction*

**Group 4:** Aracely Martinez Rodas, Guatemala
Arona Soumare, Senegal
Ravidya Maharaj, Jamaica
Roberto Luiz do Carmo, Brazil
Sudhakar Yedla, India
Sylvia Haladjian, Lebanon
Yazeed Peterson, South Africa

**Issues for Group 4:** *Interaction of policies – How can policies in different spheres often counteract or support each other, e.g. the interaction of health policy with policies about environmental changes (incursion of malaria into territories where it had not been for years, because of climate change, etc.)? How is better policy coordination possible?*

**Group 4 Report:** Improving policy interaction: strategies and opportunities

Introduction
This report presents three broad categories of mechanisms which can be used to transform the ways in which policies from various sectors interact. These are:

1. **Capacity building** – This category tries to build institutional capacity that enables agencies executing/implementing policies to better coordinate their actions;

2. **Processes that improve policy interaction** – This category includes strategies to structure policies with improved coordination and adequate institutional linkages;

3. **Improvement of willingness** – Assuming that capacity and linkages have been established, there is still the question whether actors have the desire to cooperate at a policy level.

## 1. Capacity Building

i) Translation of Scientific Documents for Civic Authorities

Problems often arise when technical issues are represented using scientific jargon which is not easily understood by all actors. Use of simple language will improve understanding and adaptability of policies. Efforts need to be made in this area for better implementation of policies and to minimise the negative impacts of policy interactions. For instance, as a part of Capacity 21 (an implementing step of Agenda 21), IGIDR, Mumbai, India has developed strategy documents on air pollution, water pollution, land use and forestation aimed at a grassroots level audience. These documents have been circulated extensively to decision-makers as well.

ii) Use of GIS in Policy Development

These techniques can be adopted as they facilitate standardisation of data and easy comparison of overlapping policies. This enables better control and streamlining of databases. The outputs of these techniques can serve as a platform for dialogue.

iii) Strategic Mandatory Interventions prior to policy implementation

Many countries have adopted processes that allow for evaluation and assessment of policies and their potential impacts, sphere of influence etc. prior to implementation of the actual policies. These processes (Strategic Environmental Assessment at the policy level, and EIA at the specific development project level) attempt to integrate information and viewpoints from a wide range of stakeholders. However, some regard this intervention policy as having failed in its far-reaching goal to protect the environment as often the process becomes too institutionalised and interests in the process too entrenched.

iv) Developing a Better Understanding of the Interaction of Human and Environmental Systems

There is a need to understand system interactions which are not obvious. For example, in Jamaica the agricultural ministry and rural development extension workers have engaged in soil conservation education among small farmers – with only limited success. The reason for this was that land tenure of farm plots was a major variable that affected farmers' choice to implement conservation techniques; if they did not own their plots, there was no reason to allocate resources to improve it. Land policy that made it possible for small farmers to acquire deeds for lands therefore supported soil conservation policies/efforts.

v) Education and Awareness Programs at Grassroots Levels

Education and awareness programmes are crucial, especially at the grassroots level, and must be geared to stakeholders. Using different and appropriate types of media can be a key to success of these programmes.

vi) Alignment of Global and National/Local Agendas

These are particularly important in improving coordination of policies with respect to aligning global agendas (Kyoto, Rio, Basel, Ramsar etc.) with national and local policy imperatives. National governments may commit to global agendas that are far-reaching in scope (both temporal and spatial), and fairly broad (e.g. achieving carbon emissions goals). At a

local level, stakeholders may care about specifics like reforestation and coral reef health. Although the scales of these two policies are different, it is possible to align them in terms of actions. The case of Saloum Biosphere Reserve in Senegal illustrates the challenges involved in adapting national environmental policy to an international framework (Strategy of Seville). The dispersion of the decision process between many governmental agencies often does not allow enough consideration of the immediate needs of local population and conservation of the coastal environment. On the other hand, this fragile ecosystem extends to the neighbouring country (Niomi National Park in Gambia) in which another policy (integral conservation) has been applied without any coordinated action or institutional arrangement at the bilateral or regional level. This situation has led to increased conflicts between the stakeholders and the depletion of the coastal resources.

## 2. Improved Processes for Interaction

i) Institutional Reform

At a governmental level it may be possible to merge administrative bodies which have jurisdiction of overlapping systems e.g. development control (town planning) and environmental management, especially where there is a high degree of complementarity. However, this approach may not work with larger countries, where government regulatory bodies are highly evolved (e.g. India). In addition, redundancy in policies or executing agencies could work as part of an iterative process in finding the most suitable approach. The example of dengue in Brazil describes the lack of coordination between institutions. On one hand the Ministry of Health (SUCEN) has a health policy to combat mosquitoes using DDT. On the other hand, the Municipal Secretary proposed restricted use of DDT in different sectors. Thus, conflicting policies were being proposed – solving one problem but creating another.

ii) Legislative Reform

Clarification in the statutes may be necessary with respect to decision-making systems, particularly to avoid ambivalence in the ways in which policies and institutions may interact. Legislation may provide for both the preparation of policy or national plans, as well as the requirement of interaction between institutions/policies. There must be clear instruments to enforce the application of legislation.

iii) Policy Paper Development

This process is critical as stakeholders with various concerns, who may have been the same actors in other policy development processes may bring their experience and appreciation of opportunities for co-ordination to bear on the development of a policy paper. This will be very effective if the process is participatory, iterative and facilitative of mutual understanding of each others' priorities.

iv) Creation of Informal Partnerships

Creation of informal partnerships improves 'complimentarity' between policies. This may create opportunities for institutional rearrangements (e.g. between informal health sector and local entrepreneurs). This approach would help in minimising conflict among stakeholders.

### 3. Enhancement of Willingness to Collaborate

i) Declaration of stakeholders/policy implementers' "position"

Actors' position with respect to what they are willing to make trade-offs for, and what is not open to negotiation is critical in building confidence in the collaborative process.

ii) Overcoming role ambivalence

Often when policies are brought together to guide programmes, there may be ambiguity in understanding stakeholders' responsibility, especially when such roles and responsibilities have not been clearly stated. When the South African governmental Education Department embarked on policy development for environmental education (EE) , the Department of Environmental Affairs and Tourism has already been introducing EE into their policy frameworks. When national EE programmes are planned and implemented by these agencies, there exists much uncertainty as to who the lead agency should be and where resources (funds, human resources) should be derived. Avoiding this ambiguity may lead to cost effective projects and the sharing of human resources.

iii) Development of Appropriate Forums for Negotiation and Conflict Resolution

People advocating particular policies which are in conflict with others may be more willing to come to a negotiating table if they feel their views and concerns will be duly evaluated. This can help in improved willingness to participate in the policies so developed. Further, development of appropriate incentives would further the level of participation and collaboration.

# 5. RECOMMENDATIONS AND FOLLOW-UP

The workshop programme was both dense and diverse – with a focus on all major human dimensions research themes in the context of coastal zones. One of the main outcomes the IHDP and START would like to see coming from these workshops is the building and integration into the international HD community of a network of young scientists in developing regions. The workshop took place to serve this group – the young, interdisciplinary, international GEC community. The IHDP's and START's philosophy is a bottom-up one – which means the development of its programmes by and for the GEC research community – to build on their responses, feedback, enthusiasm and activity. The work being done on the local, national and regional levels comprise essential scientific approaches in studying and determining the impacts of GEC.

The IHDP charge to the participants once back at home in their regions, is to take on an ambassadorial role for the IHDP as a research programme, among colleagues in their institutes and networks; to enter into a self-confident dialogue with other social and natural scientists; and to face the research challenges of the present and future together with them in integrated approaches. On the other hand, the participants, through local networks, provide a new and rich source of expertise and regional perspective which will not only help to support the IHDP and START in our research activities – but also the entire GEC research and policy communities.

## 5.1 RECOMMENDATIONS

The IHDW organisers have compiled the following recommendations, based on participant evaluations, to be considered in future planning of these workshops:

1. The IHDWorkshops were strongly endorsed by the participants as an event which IHDP and START should continue to support/implement.

2. The workshop was given an average rating of 8 out of 10, and met the overall expectations of the participants.

3. Aspects of the workshop most enjoyed:
   i) Working group sessions which gave opportunity for close interaction and discussions among the participants, and also with the session leaders;
   ii) Exposure to scientists from different natural and social science backgrounds;
   iii) Use of case studies in theme session presentations.

4. Aspects of the workshop to be improved:
   i) Often participants may not have much experience in working in intense multicultural and multi-disciplinary settings. Exercises at the beginning of the workshop on team-building would be helpful – semi-structured discussions which allow participants to learn more about each other, and to learn how to work and think together, perhaps through facilitator/communications expert;
   ii) Participants were eager to become more involved in ongoing HD research initiatives. Indicate mechanisms which would facilitate this.
   iii) Offer more opportunity for unstructured discussions and interaction amongst participants.

5. Specific comments on Programme/Sessions:
   i) The overall workshop theme of "HD Research in the Coastal Zones" was given an average rating of 9 out of 10. Most found this theme offered a framework which was extremely useful in examining and learning more about GEC research. This allowed for theme sessions which were well connected and offered clear flow/linkages between different methodologies and experiences from one session to the next. Not only did participants gain new insights into their specific areas of research, but also into the general issues/problems related to coastal zones.
   ii) Relevance of the theme sessions to the research work of the participants was rated 8 out of 10. Most sessions proposed methodologies, concepts and research approaches which were often under-represented or non-existent in certain fields.
   iii) A general presentation is recommended on Global Environmental Change – the evolution of this field, etc., as a stage-setting presentation for the workshop.
   iv) Ensure good representation in session leaders from north and south, and also from all regions. This also ensures that case studies used will be from all areas.
   v) Ensure that presentations include good amount of case study analysis and specific examples of how concepts and methodologies of particular projects are being put into practice – this increases relevance and interest to participants. Case studies should be balanced among regions represented. This will give participants clearer ideas of how to link into research projects presented.
   vi) Ensure that any sessions in which models or more theoretical/technical concepts are explored are allotted ample time to explore the concepts they present.
   vii) All working group sessions were highly valuable – especially the working group session during the LUCC session (Sept. 18) where groups were formed according to interests defined by the participants themselves to talk about networking and possible future research activities. Continue to use various interactive sessions to get different sets of participants working together. Role playing and debate exercises were especially enjoyed and effective. Provide opportunities for different compositions to form – avoid having set working groups for whole workshop.
   viii) Ensure good balance among disciplines/scientific backgrounds of the participants, especially natural-social science balance/representation.

6. Where relevant, ensure that participants are informed about and connected to national committees existing in their countries before the workshop.

7. Participants welcomed the idea that the next IHDW should be held in a developing country, but many do not see this is as absolutely essential, especially given the logistical constraints of many developing countries. As long as a balance is kept in representation of session leaders from north and south the issue of location was less relevant.

8. We thought it would be useful to know how our GEC networks are working thus far, and also for use in future networking and information dissemination, so we asked the participants how/where they heard about the IHDW 2000:
   - Various international associations and other email listservers
   - Colleagues in northern universities
   - Colleague/Professor
   - World Wide Web searches
   - IHDW 1998 workshop participant
   - IHDP newsletter
   - HD Open Meeting (Japan, 1999)
   - Posted in University/Institute
   - Letter sent by national committee to their university
   - National HD committee

The IHDP and START will assist the participants in the following ways:

1. Information exchange and networking
2. Linking participants with existing related projects
3. Encourage and support South-South and South-North collaboration
4. Support the formation of regional and national human dimensions programmes in developing countries
5. Continue to provide research exchanges and support participation of young scientists at major HD research events, conferences, etc.
6. Help to identify research and funding opportunities in the area of HD for young scientists
7. Keep them informed on the state-of-the-art HD research

## 5.2 Follow-up Activities

An exciting aspect of the workshop was the research linkages, networks and plans for future collaboration among participants. This excitement was also felt by session leaders, who left with new perspectives on their research, and new contacts in their communities Several ideas were discussed among participants and session leaders for joint projects and initiatives to be developed for possible input to major GEC conferences in 2001 (Global Change Science Conference, Amsterdam and HD Open Meeting, Brazil). Two groups were formed as a result of the workshop are elaborating their own projects: one will develop a network of Latin American and African researchers on land-use and land-cover change issues; and the other will design and distribute a course manual and study guide on HD in the coastal zones (in printed and CD-ROM multi-media versions). Other participants are interested in acting as contact points for national HD communities in their countries, with the goal of further developing existing, or establishing new, national committees. IHDP's already successful Seed Grant Initiative was suggested as a mechanism to assist in this.

IHDP and START would like to thank our participants for their incredible energy and dynamism, and our session leaders for their commitment - and we look forward to the coming months and years of collaboration and activity!

We also gratefully acknowledge the sponsors of the workshop: the German Research Association (DFG), the Asia-Pacific Network (APN), the US-National Science Foundation (NSF), the Inter-American Institute for Global Change Research (IAI), IGBP-LOICZ, and the IHDP national committees of Sweden, Norway and Switzerland.

The IHDP and START are considering holding the International Human Dimensions workshops as an annual event, pending a steady funding source. This would complement and be in addition to IHDP and START support of the participation of young scientists at the biannual Open Meetings of the international Human Dimensions research community (next meeting to be held October 6-8, 2001 in Rio de Janeiro, Brazil). It is planned to hold the next IHDW in mid-2002 in Bonn, Germany.

# 6. APPENDICES

## APPENDIX A: PROGRAMME

| | | |
|---|---|---|
| **Saturday September 9** | All Day | ***Arrival of Participants at Gustav-Stresemann Institute, Bonn, Germany*** |
| Sunday September 10 | 8:45 – 19:00 | **FIELD TRIP**<br>Mosel River Trip with walking tour of "Burg Eltz"<br><br>*To attend:*<br>All participants<br>IHDP Secretariat Staff<br>Roland Fuchs (Executive Director, START)<br>Kazuko Watanabe (Asia-Pacific Network for Global Change Research, APN) |
| Monday September 11 | 9:00 - 10:30 | **Welcome and Opening of Workshop**<br><br>**Eckart Ehlers** (Past Chair, Scientific Committee-IHDP)<br>**Jill Jäger** (Executive Director, IHDP)<br>**Roland Fuchs** (Director, START)<br>**Neil Hamilton** (Deputy Executive Director, IHDP) |
| | 11:00 - 12:30 | ***KEYNOTE LECTURE***<br>Coastal Zone Management and Environmental Psychology: reflections and results from a case study on the island of Sylt, Germany<br><br>**Volker Linneweber** *(Vice Dean of the Faculty for Humanities, Social Sciences and Education, University of Magdeburg, Germany)* |
| | 13:00 - 14:00 | *Lunch* |
| | 14:00 - 18:00 | **IHDP Science Projects (1) – Industrial Transformation and Cities in the Coastal Zones**<br><br>**Richard Rockwell** *(Executive Director, The Roper Center & Institute for Social Inquiry, Professor of Sociology, University of Connecticut, USA, and IHDP-Industrial Transformation Project Scientific Steering Committee Member)*<br><br>**Xuemei Bai** *(Institute for Global Environmental Strategies, Japan)* |

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| Tuesday<br>September 12 | 9:00 – 10:30 | **Participant Presentations Group I: Industrial Transformation, Cities and Coastal Zones**<br><br>**André Leal de Sa**, Brazil: "CDM and Wind Energy Projects in Brazil"<br>**Kathirgamalingam Somasundaraswaran**, Sri Lanka: "Development and Management Profile of Transport Infrastructure in Asian Developing Countries"<br>**Sudhakar Yedla**, India: "Policies/strategies for better municipal solid waste management in Indian cities"<br>**Yazeed Petersen**, South Africa: "Information and Communication in Coastal Education" |
| | 11:00 – 13:00 | **Industrial Transformation and Cities in the Coastal Zones (cont'd)** |
| | 13:00 – 14:00 | Lunch |
| | 14:00 – 18:00 | **Industrial Transformation and Cities in the Coastal Zones (cont'd)** |
| | 19:00 – 21:00 | **Evening Seminar:** Stakeholder Participation in Coastal Management: Case Studies from the Baltic Sea and Germany<br><br>**Martin Welp** *(Potsdam Institute for Climate Impacts Research, Germany)* |
| Wednesday<br>September 13 | 09:00 – 11:30 | **Working Group Session A**<br>*Facilitators: Ramine V. Shaw, Martin Welp* |
| | 11:30 – 13:00 | **Participant Presentations Group II: Global Environmental Change, Human Security and Coastal Zones**<br><br>**Roberto do Carmo**, Brazil: "Aspects of the relationships between population and environment in Brazil"<br>**Alexander Lopez**, Costa Rica: "Environment and security in the Brazilian Amazon: Politicizing, militarizing or securitizing the environment?"<br>**Aracely Martinez**, Guatemala: "Migration in Guatemala: the cases of Calel and Petén"<br>**Pia del Campo Bennagen**, The Philippines: "Development and (In)Security in a Philippine Community: the case of Pangascasan, Sual, Pangasinan and the Sual coal-fired thermal Power Plant"<br>**Kakoli Singh**, India: "A case of indirect population displacement: the collapse of Atlantic fishery and its socio-economic consequences" |
| | 13:00 – 14:00 | Lunch |
| | 14:00 – 18:00 | **IHDP Science Projects (2) – Global Environmental Change and Human Security in the Coastal Zones (GECHS)**<br><br>**Chris Cocklin** *(Dept. of Geography, Monash University, Australia)*<br><br>**Okechukwu Ibeanu** *(Professor of Political Science, University of Nigeria)*<br>*(Both are members of the IHDP-Global Environmental Change and Human Security Project - Scientific Steering Committee)* |
| | 19:00 – 20:30 | **Evening Seminar:** Towards sustainable living in small islands and coastal regions: an intersectoral initiative of the 'Environment and Development in Coastal Regions and in Small Islands' platform of UNESCO<br><br>**Dirk G. Troost** *(UNESCO-CSI, Paris, France)* |

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| Thursday September 14 | 9:00 – 13:00 | **Global Environmental Change and Human Security in the Coastal Zones (continued)** |
| | 13:00 – 14:00 | Lunch |
| | 14:00 – 15:30 | **Participant Presentations Group III: Vulnerability in the Coastal Zones**<br><br>**Veronica Mera Orces**, Ecuador: "Social Dynamics of environmental change: gender and health"<br>**Ahmed Salahuddin**, Bangladesh: "Vulnerability of Bangladesh coastal islands to climate change: an assessment"<br>**Ibidun Adelekan**, Nigeria: "Climate change, migration and human health"<br>**Gabriel Umoh**, Nigeria: "Rural livelihoods, resource extractions in the Niger delta wetlands"<br>**Manju Prasad**, Fiji: "Coastal Zone Management in Fiji" |
| | 16:00 – 17:00 | **IHDP and National Committees**<br><br>**Ramine V. Shaw** *(International Science Project Coordinator, IHDP)* |
| | 17:00 – 17:30 | **Halfway Evaluation Discussion**<br>Facilitator: Ramine V. Shaw |
| | 19:30 | **Evening Reception for Workshop Participants with Invited Guests** |
| Friday September 15 | 9:00 – 10:30 | **Participant Presentations Group IV: Coastal Zones Management**<br><br>**Ramessur Roshan**, Mauritius: "Integrated coastal zone management in Mauritius"<br>**Pham Thi Minh Hanh**, Vietnam: "Tourism activities impact assessment and GIS applications to environmental management"<br>**Nicolette Demetriades**, South Africa: "A new approach to coastal zone management in South Africa"<br>**Jema Ngwale**, Tanzania: "Gender and coastal zone management: socio-cultural issues, identification and strategies for Kilwa district"<br>**Herminia Caringal**, The Philippines: "Socio-economic evaluation and biogeochemical modeling" |
| | 11:00 – 13:00 | **Partner Global Environmental Change Programmes: Land-Ocean Interactions in the Coastal Zones (IGBP-LOICZ)**<br><br>**Hartwig Kremer** *(LOICZ Project Office, The Netherlands)*<br><br>**Doug McGlone** *(The Marine Science Institute, University of the Philippines Diliman, Quezon City, The Philippines)*<br><br>**Peter Burbridge** *(Centre for Tropical Coastal Management, Uiversity of Newcastle upon Tyne*, England and Member, LOICZ Scientific Steering Committee) |
| | 13:00 – 14:00 | Lunch |
| | 14:00 – 18:00 | **LOICZ (continued)** |

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| Saturday September 16 | 9:00 – 13:00 | Free Time |
| | 13:00 – 14:00 | Lunch |
| | 14:00 - 16:00 | **Working Group Session B** |
| Sunday September 17 | 9:00 – 10:30 | **Participant Presentations Group V: Institutional Dimensions of Coastal Zone Issues**<br><br>**Edwin Castellanos**, Guatemala: "Studies on the Impact of Environmental Change in the Republic of Guatemala"<br>**Daniela Kalikoski**, Brazil: "Institutional analysis of the estuary of the Patos Lagoon, Brazil: local lessons, national challenges and implication for conservation of natural coastal resources "<br>**Sylvia Haladjian**, Lebanon: "Family and School: important institutions for social and sustainable development in Lebanon"<br>**Mame Arame Soumare**, Senegal: "The Sahel: an environment struck by lack of water" |
| | 11:00 – 13:00 | **IHDP Science Projects (3) – Institutional Dimensions of Global Environmental Change in Coastal Zones (IDGEC)**<br><br>**Louis Lebel** *(Southeast Asia Regional Centre for START Science Coordinator, Northern Remote Sensing and GIS Centre, Faculty of Social Sciences, Chiang Mai University, Thailand)*<br><br>**Liana Talaue-McManus** *(Associate Professor, Division of Marine Affairs and Policy, Rosenstiel School of Marine and Atmospheric Science, Miami, USA and Member, LOICZ Scientific Steering Committee)* |
| | 13:00 – 14:00 | Lunch |
| | 14:00 – 18:00 | **Institutions (continued)** |
| Monday September 18 | 9:00 - 10:30 | **Participant Presentations Group VI: Land-Use and Land-Cover Change in the Coastal Zones**<br><br>**Marcelo Acerbi**, Argentina: "Identification and assessment of environmental conflicts the case of "Parque Atlántico Mar Chiquito Biosphere Reserve" (Buenos Aires Province, Argentine)"<br>**Arisbe Mendoza-Escalante**, Mexico: "Valorisation of indigenous knowledge: gardening and compost in a Yucatan fishing community"<br>**Xiaoling Chen**, China: "Pearl River Delta: remote sensing, urbanisation and land-use/cover change in East China<br>**Ravidya Maharaj**, Trinidad: "Beach Erosion in Negril, Jamaica"<br>**Arona Soumare**, Senegal: "Spatio-temporal dynamic and restoration of mangrove ecosystem in the Saloum Biosphere Reserve (Senegal, West Africa)" |
| | 11:00 - 13:00 | **IHDP Science Projects (4) – Land-Use and Land-Cover Change in the Coastal Zones (LUCC)**<br><br>**Louis Lebel** *(Southeast Asia Regional Centre for START Science Coordinator, Northern Remote Sensing and GIS Centre, Faculty of Social Science, Chiang Mai University, Thailand)* |

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|---|---|---|
| | | **Maria do Rosário Jorge** *(Centro de Investigacao da Universidade Atlantica (CIUATLA), Portugal)*<br><br>**Carlos Russo Machado** *(Centro de Investigacao da Universidade Atlantica (CIUATLA), Portugal)* |
| | 13:00 - 14:00 | *Lunch* |
| | 14:00 - 18:00 | **Land-Use and Land-Cover Change (continued)** |
| Tuesday<br>September 19 | 9:00 – 13:00 | **Working Group Session C**<br>*Facilitators: Jill Jäger, Neil Hamilton and Ramine V. Shaw* |
| | 13:00 -14:00 | *Lunch* |
| | 14:00 -15:00 | **Evaluation** (Written) |
| | 15:00 -16:00 | **Wrap-up and Next Steps**<br><br>*Jill Jäger*<br>*Neil Hamilton*<br><br>****End of Workshop**** |

## APPENDIX B: PARTICIPANTS

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## APPENDIX F: LIST OF ABBREVIATIONS & ACRONYMS

| | |
|---|---|
| AFTA | Asian Free Trade Agreement |
| APN | Asia-Pacific Network for Global Change Research |
| ASEAN | Association of South East Asian Nations |
| BASA | Bank of Amazonia |
| CDG | Carl Duisberg Gesellschaft |
| CDM | Clean Development Mechanism |
| CTP | Common Effluent Treatment Plant |
| DFG | German Science Foundation |
| DPSIR | Drivers, Pressures, State and State-change, Impact, Response Approach |
| EEZ | Exclusive Economic Zone |
| EPA | Environmental Protection Act |
| FRN | Swedish Council of Planning and Coordination of Research |
| FUNAI | National Indian Foundation |
| GATT | General Agreement on Tariffs and Trade |
| GEF | Global Environment Facility |
| GC | Global Change |
| GEC | Global Environmental Change |
| GECHS | Global Environmental Change and Human Security, IHDP Science Project |
| GHG | Greenhouse Gas |
| GIS | Geographic Information Systems |
| GTZ | German Agency for Technical Co-operation |
| HD | Human Dimensions |
| IAI | Inter-American Institute for Global Change Research |
| ICLIPS | Integrated Assessment of Climate Protection Strategies |
| ICRAF | International Centre for Research in Agroforestry |
| ICSU | International Council for Science |
| ICZM | Integrated Coastal Zone Management |
| IDGEC | Institutional Dimensions of Global Environmental Change, IHDP Science Project |
| IGBP | International Geosphere-Biosphere Programme |
| IGES | Institute for Global Environmental Strategies, Japan |
| IGIDR | Indira Gandhi Institute of Development Research, India |
| IHDP | International Human Dimensions Programme on Global Environmental Change |
| IHDW | International Human Dimensions Workshop |
| IMF | International Monetary Fund |
| ISME | International Society of Mangrove Ecosystems |
| ISSC | International Social Science Council |
| IT | Industrial Transformation, IHDP Science Project |
| LOICZ | Land-Ocean Interactions in the Coastal Zones, IGBP Core Project |
| LUCC | Land-Use and Land-Cover Change, IHDP-IGBP Joint Science Project |
| MAB | UNESCO Man and Biosphere Programme |
| MMA | Ministry of the Environment, Water Resources and Legal Amazon, Brazil |
| MSS | Multi-Spectral Scanner |
| NGO | Non-Governmental Organisation |
| OECD | Organisation for Economic Cooperation and Development |
| PIK | Potsdam Institute for Climate Impacts Research, Germany |
| SAE | Secretariat for Strategic Affairs, Brazil |

| | |
|---|---|
| SARCS | Southeast Asia Regional Committee for START |
| SIVAM | Surveillance System of the Amazon Region |
| SSC | Scientific Steering Committee |
| START | Global Change SysTem for Analysis, Research and Training |
| SUDAM | Superintendent for the Development of Amazonia, Brazil |
| SWOL | SARCS/WOTRO/LOICZ core research project |
| TEACOM | START Committee for Temperate East Asia |
| UNEP | United Nations Environmental Programme |
| UNESCO | United Nations Educational and Scientific Organisation |
| UNFCCC | United Nations Framework Convention on Climate Change |
| US-NSF | United States National Science Foundation |
| WCRP | World Climate Research Programme |
| WHO | World Health Organisation |
| WMO | World Meteorological Organisation |
| WOTRO | Netherlands Foundation for the Advancement of Tropical Research |


**INTERNATIONAL HUMAN DIMENSIONS PROGRAMME ON GLOBAL ENVIRONMENTAL CHANGE**

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