Intergovernmental Oceanographic Commission
Workshop Report No. 104

Workshop on Integrated Coastal Management

Jointly organized by the Coastal Zone Canada Association, the University of Rhode Island's Coastal Resources Center, the Canadian International Development Research Center and the Intergovernmental Oceanographic Commission

Dartmouth, Nova Scotia, Canada
19-20 September 1994

UNESCO

TABLE OF CONTENTS

1. INTRODUCTION

The purpose of the Workshop was to give representatives from developing countries an orientation to Integrated Coastal Zone Management (ICM), focusing on the importance of community participation, and to provide an opportunity for participants to consider and resolve issues associated with ICM at both the national and local levels. It was jointly organized by the Coastal Zone Canada Association, the University of Rhode Island (URI)'s Coastal Resources Center (CRC), and the Canadian International Development Research Centre. The Workshop was held prior to Coastal Zone '94 and emphasized participation of all attendees, particularly those from developing countries.

The agenda for the Workshop is given in Annex I. A total of 60 participants from 28 countries attended the Workshop. A list of participants is given in Annex II.

Steven B. MacPhee, Director of the Bedford Institute of Oceanography, welcomed the participants and noted that twenty years ago saw a melding of natural sciences. Now, in 1994 natural scientists, social scientists, policy-makers, and environmental managers are all working together to address problems. He recognized the importance of this cooperation, both nationally and globally.

H. Brian Nicholls, co-chair of CZ94, also welcomed the group, citing the importance of community participation and noting the example of groups working together on the cod crisis on the Atlantic coast of Canada.

2. INTEGRATED COASTAL MANAGEMENT FOR THE 21st CENTURY

Biliana Cicin-Sain, Professor of Marine Policy, University of Delaware and Editor, Ocean & Coastal Management Journal, presented background information and a post-Rio assessment. She reviewed the major actions taken at the Rio Conference and discussed the meaning of ICM. Concepts of interdependence are key-interdependence between environment and development, interdependence between the developed and the developing world, and interdependence between sectors. Chapter 17 of Agenda 21 emphasizes capacity building and gives political legitimacy to pro-active multi-sector management.

She reviewed the progress that has taken place since the Rio Conference, citing some successes but a lack of funding in many areas. The Climate Change Convention entered into force in March 1994 and the Convention on Biological Diversity in December 1993. The Commission on Sustainable Development, created under the UN Secretary-General to implement and monitor the progress followed the Rio Conference, has held two sessions. At the national level she gave examples of new institutions and processes established as well as financial commitments by developed nations and restructuring and replenishment of the Global Environmental Facility. Nordic countries have been in the lead. Developing countries need to have a greater say in how resources are spent. There has been a refocusing of existing UN resources which is a positive development, particularly for small island states. With regard to Oceans and Coasts, substantial activity is taking place though with limited funds. This Workshop is an example. A Straddling Stocks Conference has resulted in a draft treaty completed in August 1994 to become an amendment to the Law of the Sea (LOS) treaty; a Conference on Sustainable Development of Small Island Developing States was held in May 1994; a Conference on Land-Based Sources of Marine Pollution is to be held next year to prepare guidelines for pollution discharges. The LOS Convention negotiated in 1983 will come into force in November 1994.

She addressed the meaning of. "Integrated Management" in the context of oceans and coasts. Integration means to unify, to put parts into a whole, i.e., constituent elements are brought together. There are several dimensions of integration in this context:

i) Among sectors
ii) Between coastal land and coastal waters
iii) Among levels of government
iv) Between nations
v) Among disciplines

Integration is a continuous process:

Fragmented Approach ->Communication ->Coordination ->Harmonization ->Integration

<----------Less Integrated - **B B B B B B B B B B** - More Integrated---------->

She described the need for a continuum, the need for less integration in some cases and more in others. There is a need to identify factors and incentives to facilitate inter-agency cooperation such as perception of a shared problem, financial incentives, legal mandate, shared professional values, political advantage, desire to reduce critical uncertainties, and availability of fora for cooperation. There is a contrast between the local perspective and the national perspective. The local community is concerned about economic well-being, infrastructure needs, quality of life; the local community knows best the needs of the people and has the best information and understanding of the area. The national perspective deals with issues of overriding importance and has a strong sectoral orientation and specialized agencies. It is concerned with the frequent need to give guidance to lower levels of government and seeks uniform approaches across the nation, tending toward technological fixes. Thus, local governments can bring a detailed understanding of real problems and needs, a better understanding of constraints, and the best data and information. National governments can legitimize interests and validate concerns, insuring full equality and standing of both partners.

Steven Olsen, Director of CRC, URI, described one approach to coastal management. Why do it? Coastal management can permanently enhance the capacity of coastal societies to sustain or improve their quality of life. Currently the long-term capacity of ecosystems to provide people with adequate quality of life and sustainable wealth is being reduced. We are losing ground, according to many indicators. The challenge is not one of applying technical solutions to technical problems; it is rather to sustain coastal ecosystems as healthy life support systems and to develop the governance systems that foster the necessary changes in societal values and behavior to achieve sustainable forms of development. Integrated management means resource management and requires a different paradigm and strategy. He indicated that Integrated Coastal Management (ICM) features transdisciplinary analysis of social and environmental issues, strategic selection of issues for focus, a dynamic policy process, and progress toward sustainable development. From an ecological perspective the coastal region extends from the outer edge of the continental shelf to the inland boundary of the coastal watershed. From a legal governance perspective the area may be different.

An approach to ICM must be incremental, it will take a long time, it must be modest to be successful. Progress towards more sustainable forms of coastal development must be through strategically designed increments implemented through successive programme generations, each of which will take ten years. Objectives and actions selected for each step within a generation of a programme must match, and there must be indigenous capacity.

The phases of the policy process are:

(i) Planning (iii) Implementation
(ii) Adoption (iv) Evaluation

The following questions can be asked when assessing results:

(i) Does the programme produce measurable positive effects?
(ii) Does it address the actual needs of the local people as they themselves define them?
(iii) Does the programme build indigenous capacity?
(iv) Does the programme incorporate lessons learned?
(v) What is sustainability?

Larry Hildebrand, of Environment Canada and CZ ’94 Co-Chairman, compared U.S. and Canadian approaches and experiences, two continental nations with significant coastlines and valuable natural resources

for generation of national wealth and experiencing very significant stress on coast with declines in environmental quality. There is a dramatic and obvious need for change. In the late 1960's Canada recognized the need for coastal zone management though the intensity of that need was not as great as in the U.S. In 1972 the U.S. passed the Coastal Zone Management Act. He described objectives, how they are addressed, and responses. Major US achievements include:

(i) Viable state and local coastal zone management programmes
(ii) Reduced or mitigated adverse impacts
(iii) Some projects in the coastal zone have been modified and in some cases prohibited
(iv) A simplified planning process
(v) Greater administrative efficiency

Canada attempted national policy development in the 1970's, but it was not recognized as a national priority. Canada has taken a very different approach from the "top-down" approach of the U.S.**B** - a bottom-up approach. Growing provincial interest has followed demonstrated successes, and the need for an integrated approach is now accepted and legislation is being considered.

He presented the following principles of ICM:

(i) Seek to manage the coastal zone as a whole, using an ecosystem approach
(ii) Move beyond traditional sector-oriented and fragmented management approaches
(iii) Maintain a balance between protection of valuable ecosystems and development of coast-dependent economies
(iv) Promote awareness about sustainable development
(v) Incorporate an analytical process
(vi) Ensure a dynamic and continuous process of administering the use, development, and protection of the coastal zone

He described regional approaches in Canada such as in British Columbia where there is a comprehensive estuarine marnagement programme addressing a number of conflicts. The Great Lakes, where most of the population of Canada is concentrated, is now the site of efforts to tackle 43 hot spots of concern. And the Arctic, Atlantic, and Gulf of Maine (a large marine ecosystem shared jointly with the U.S.) are also receiving attention.

Dr. Chua Thia Eng, Regional Programme Manager, International Maritime Organization, described the "ASEAN Experience in Coastal Zone Management" and referred to a book entitled "Integrated Framework and Methods for Coastal Area Management" which he co-authored in 1992 with L. Fallon Scrura. The Philippines has developed a policy but it has not been implemented. Southeast Asian nations have many social and economic differences and a variety of political, cultural, and geographic conditions. There are excellent examples of characteristics of the diverse coastal zone problems, with the appropriate approach depending on the social, economic, and cultural conditions. The last decade has seen greater public awareness among policy-makers, economists, and resource planners for the need for integrated coastal management. The region has developed a network of institutions with the capability to help implement coastal zone management. There is now a better understanding of the process, concept, and approaches in developing integrated coastal management programmes and a blueprint for sustainable development at the local level. There is a greater investment among governments in the region for integrated management of the coastal areas, and the formation of national coastal policies in a number of nations is underway.

However, these efforts are still driven by external funding sources. Many local government planners and resource managers are not familiar with the process and concept of integrated coastal management. Past initiatives spent too much research effort on massive data gathering, much of which has not been used. There is a lack of successful cases to demonstrate the beneficial effects of integrated coastal management. Most programmes were developed outside the government framework and are not fully integrated with the existing government development programmes. Most programmes were initiated by a single agency. Donors also

contributed to some failures of these programmes. Most initiatives are still at the research or planning stages, very few are in the implementing phase. The concept of integrated coastal management has not been fully understood, resulting in a mix of sectoral policies and management actions which are not fully integrated. He reiterated that many initiatives cannot be sustained because of a high dependency on the external funding sources.

To attain the objectives of integrated coastal management, he emphasized the importance of understanding the concept and process, the options for actions, and the institutional and organizational arrangements. The approach must include acknowledging the conflicts and causes and types of degradation. An institutional structure should be in place which builds on existing institutions for efficiency and has a sustainable self-financing mechanism. Science (and consequently information) is important but it by no means the only aspect. The values of society are important as another aspect.

3. THE IMPORTANCE OF COMMUNITY PARTICIPATION

Elmer Ferrer of the Philippines presented "People's Participation in Community-Based Coastal Resources Management". In the Philippines there is a growing role of central government in managing resources. There is also a growing awareness of the limits of development and a search for participatory approaches for development. As a result some community-based resource management is emerging, focusing on empowerment in the interests of one's own family and community. He summarized the rise of people's participation in such programmes from the 1950's to the 1990's. Experience in the Philippines was pioneered by universities in response to serious resource overexploitation. A Coastal Environment Programme was established in 1993 with a number of government agencies involved, cooperating with non-government organizations. Enhancing participation has several dimensions and development paradigms. It is equated with the process of obtaining power and reflects changes in thinking in rural development. Community-based coastal resource management is a mechanism where people obtain power to change the future as an act of choice. The power is both a resource and a product of progress. People have to be organized and mobilized and coordinated in order to participate on a substantive basis so that all members benefit.

The biggest constraint to people's participation is attitudes. The process must begin with the basic needs of the people. One must build confidence in the beginning, starting with small groups on their priority needs.

Juan Carlos Castilla gave a presentation on "Community-Based Management of Coastal Benthic Resources in Chile". Small-scale fishing activities are economically important and well-organized in Chile, with 60 different species of benthic resources. Ten are exported, with substantial commercial value. A coastal preserve has been established to determine the ecological effects of removing human impacts-from coastal areas and creating a seeding ground. Success has been achieved in restoring fish in the managed area, following ten years of basic research. The challenge now is to apply the knowledge and techniques. It is a lengthy process with many aspects.

Rick Williams, Halifax, described the experience of Canadian communities in ICM. There is now a transition in Atlantic Canada to "co-management" of Maritime fisheries. It is.an untested approach here but is being tried in response to the economic crisis caused by the collapse of the groundfish stocks. He described the following elements or indicators of co-management in the context of Atlantic fisheries:

(i) Fisheries science which overcomes discourse conflict and recognizes and synthesizes experiential and traditional knowledge

(ii) Equalization of education/training levels and social status among harvesters and the formal "managers"

(iii) Breakdown in the distinction between managing the resource and managing fisheries enterprises

(iv) Emergence and strengthening of government agencies with a mandate and skills to do communications and provide leadership

(v) New structures for decision-making, with more accountability to constituents, industry, communities

(vi) Emergence of new fisheries communities through new harvesting and communications technologies

Consideration is being given to the importance of the coastal community as a constituency, recognizing the economic base of fisheries and the public interest. There is a reduction in the abstract authority of the state (bureaucracy); the wider fisheries interests are coming to the table (including women, families, households). Objectives include innovative. locally-based management, with the adaptation of advanced communications technologies and a diversification of fisheries. There have been some positive signs of change with fisherman involved in setting standards and innovations in fisheries science and encouragement from industry groups. Constraints include the present weakness and fragmentation of industry organizations, the lack of clear policy framework, the overlapping responsibilities of federal agencies.

K.T. MacKay presented further the concept of "Co-Management of Coastal Resources". He indicated that co-management is a partnership between people and governments and between various levels of government and communities. The concept is based on the premise that the centralized management approach does not work; for example, groundfish fisheries have collapsed in both the U.S. and Canada under different centralized management schemes. It is not certain that community-based management works better. At a minimum a good resource assessment is needed, as well as some means of allocating access and use, and a set of rules and regulation and boundaries, and monitoring, surveillance and enforcement. These are all available in community-based systems. It is now used in Indonesia and in the Philippines. It takes time; community organizations must be developed and fostered. There are problems of inter-community management. Community-based management can be used to manage sedentary resources, it is not so effective with migratory species. It is open to abuse by local elites, and there is the perception that community-based management is not science-based.

In contrast, state (federal or provincial) management can handle migratory resources and numerous sectors and stakeholders, it is science-based, it can address allocations between communities. It is also expensive and does not incorporate local participation and feedback, making it insensitive to local communities and open to abuse by national and multi-national elites. State management has experienced many failures.

This co-management is not easy. Evolution is very difficult; administrators are reluctant to relinquish authority. He challenged the group to consider how community-based knowledge can be legitimized and how co-management can be used effectively.

The Irondale Ensemble Project and citizens of the Sheet Harbour community presented an improvisational sketch of life in the village of Sheet Harbour, dramatizing its history, its sociology, and its economic problems as a coastal community. A discussion followed, focusing on the potential role of popular theatre in addressing community problems.

4. THE CHALLENGE FOR DEVELOPING COUNTRIES

Muriel Cole, Intergovernmental Oceanographic Commission (IOC) of UNESCO, introduced the IOC and its role in ICM training efforts. She encouraged the participants to communicate the importance of these activities to their own governments in an effort to foster more such work.

Brian Needham, Coastal Resources Center (CRC) of the University of Rhode Island, introduced the work of the CRC and its publications.

Steven Olsen, CRC, asked the participants to put themselves in the position of international experts recommending to the Nova Scotia Premier measures to be taken to address the crisis now facing the Atlantic coast of Canada. The collapse of fisheries in this region has created widespread adverse economic impacts and unemployment. The group discussed the role of central government, the importance of scientific understanding, and the need to consider the local history. It was suggested that *how* actions are taken may be more important than *what* actions are taken.

Participants noted the importance of addressing coastal agriculture when implementing coastal zone management. Participants also expressed concern that difficulties experienced by the Atlantic coast of Canada will be repeated unless effective measures are taken.

5. CASE STUDY

Don Robadue, CRC, presented terms and definitions to be used in conjunction with a case study of the Rio Chone Estuary, Ecuador, including the terms "stakeholder" and "user group". Using illustrations, he described the geography, sociology, economy, and marine ecosystems of Ecuador, a country of 11 million people which has developed an extensive shrimp mariculture industry. Shrimp is now Ecuador's third largest export. But this development has occurred at the cost of the environment. A coastal zone management programme began in 1986. He described in detail the Rio Chone Estuary and its watershed, where all mangroves have been destroyed to make shrimp ponds. The area includes major nesting grounds for frigate birds and is now heavily sedimented, causing increasing navigation difficulty. The situation, as presented, is given in Annex III. He also listed the stakeholders, shown in Annex IV.

He first asked the group to act as consultants, conducting a "brainstorming" session to identify the relevant issues affecting the Rio Chone Estuary, encouraging everyone to contribute. Participants were asked to present the one or two most important issues and stakeholders. Responses included water quality, fisheries (food production), mangrove degradation, land/resource (multiple use) conflicts, and governance. Concern was expressed that the whole suite of problems must be considered and integrating themes must be sought.

He then introduced the concept of special area management and the CRC definition **B** - an integrated approach for addressing coastal resource management problems in specific locations where multiple authorities and multiple issues must be harmonized. Rio Chone is one of those locations. The characteristics include:

(i) The use of participatory techniques
(ii) The selection of locations in consultation with local residents
(iii) The use of the approach as a testing ground for strategies that can be applied to broader programmes
(iv) The establishment of national and local level partnerships (i.e., a two-track approach) to make existing laws and institutions function better

Situations where special area planning may be appropriate are situations where:

(i) Emphasis is on existing legal authorities
(ii) Prior sectoral efforts have failed
(iii) Cumulative effects of development are a key concern
(iv) Local stewardship offers promise
(v) Financial and administrative resources are very limited

Criteria for sorting a list of management problems to identify key issues are the following:

(i) Will it have a positive effect on the solution of other problems?
(ii) Will it be well-received by the community?
(iii) Is it relatively easy to carry out?
(iv) Does it affect a diverse group of people?
(v) Is it directly related to a coastal resource management issue?
(vi) Will the solution actively involve the community?

Participants were asked to write a one-sentence goal for the Rio Chone Estuary and to define one or two policies with specific actions to implement those policies. Goal statements reflected the importance of sustainable development, utilizing estuaries on an economically and environmentally sustainable basis. Policies and actions included proposals for a public awareness campaign, active community participation and empowerment, and environmental education; establishment of water quality standards and improvement programmes; planning, allocation, and zonation of industries with identification of suitable areas for shrimp farming; waste treatment programmes; reforestation of mangroves; a legal regime based on the needs of the local community; a coordinated network among stakeholders; integrated, scientific studies and monitoring; and environmental impact assessments for all projects. Actions need to be selected based on a determination as to whether they are implementable (feasible), acceptable, and measurable.

A role play was then conducted to address policies and experiences in governance and enforcement. A simulation was presented of a forum to discuss the consequences of having adopted a special area management plan which was not accepted by the industry. Mangroves had continued to be cut, and a committee of the workshop participants was asked to make suggestions. Emphasis was placed on involvement by the stakeholders. The simulation was a replica of a debate that had taken place in Ecuador, with a great deal of heated debate and a lack of confidence expressed in government. Stakeholders were given a month to make a plan, and eventually reforestation of some mangroves by shrimp farmers was required.

Steven Olsen summarized the discussions observing that the problems are similar in developed and developing countries, only the pace in ecosystem degradation is different; it is more dramatic and urgent in some areas. Local government does not always exist. Much of what has been done has not worked. Because of the commonality of problems among countries, international collaboration is especially important and useful.

6. OVERVIEW OF DONOR PROGRAMMES AND INTERESTS

Brian Davy, representative of a Strategy for International Fisheries Research, noted that the donor community is also a stakeholder and introduced three speakers to describe donor approaches, programmes, and interests. Short overviews of present projects and future directions were given.

Philip S. Reynolds, Science, Technology, and Private Sector Division, UNDP, noting that UNDP has 130 field offices, described UNDP's new focus on sustainable human development and the process for making priorities. UNDP is now allocating certain resources via the Global Environmental Facility (GEF) and is supporting activities such as the International Ocean Institute, a large marine ecosystem project in the Red Sea, pollution studies in East Asian Seas, a Patagonian coastal zone management plan, and coastal activities in Belize, Cuba, Dominican Republic, and the Black Sea. A total of $36M is now allocated to projects through GEF in this area. He noted that "international waters" and "biodiversity" are key words for GEF. Two new projects relate to the sustainable development of small island states in the Caribbean and the South Pacific (part of the Capacity 21 Programme). A "Train Sea Coast" initiative includes coastal zone management training.

Kenneth T. MacKay, Environment and Natural Resources Division, IDRC, described IDRC as a small budget agency that plays a role in ICM. A few regional offices are involved in funding projects. IDRC is attempting to integrate social and economic aspects, using a broad approach with increasingly closer

involvement of Canadian agencies and communities. IDRC can serve as a catalyst for larger donors. He noted the trend toward exploring integration further.

Lennox Hinds, Marine Affairs and Fisheries Policy Branch, Canadian International Development Agency (CIDA), described the examples of relevant CIDA projects. The focus is on strengthening infrastructures in developing countries. In Sri Lanka, Indonesia, and the South Pacific research and exploratory fishing projects are underway. Research is supported on disease control and on ecological aspects of shrimp farming. An ASEAN-Canada project in coastal areas includes teaching about Canadian experiences to Southeast Asian countries. CIDA is experimenting in using local people in projects. He concluded by saying that a major problem is that the limitations on contributions from recipients result in difficulties in sustaining projects. Countries need to integrate activities into their budgets to make a long-term sustainable regional activity.

ANNEX I

WORKSHOP PROGRAMME

This workshop, aimed primarily at persons from developing countries, is being presented in association with the. Coastal Zone Canada '94 (CZC'94) international conference. CZC'94 takes place in the adjacent city of Halifax, Nova Scotia, from September 20-23, 1994. The workshop is jointly organized by the Coastal Zone Canada Association, the body responsible for the conference, the Coastal Resources Center (CRC) of the University of Rhode Island, and the Canadian International Development Research Centre (IDRC).

1. Objectives

a) To introduce approaches to Integrated Coastal Management (ICM), focusing on the importance of community participation.

b) To provide an opportunity for participants to consider and resolve issues associated with ICM at both the national and local levels.

2. Participants

The workshop is aimed primarily at participants from developing countries. However, it is also expected that some persons from Canadian communities and native peoples organizations will attend. The total number of participants will be restricted to approximately 40.

3. Support

The workshop has the support of several Canadian and international organizations, including:

- $ Canadian International Development Agency
- $ Coastal Resources Center, University of Rhodes Island
- Commonwealth Secretariat
- Environment Canada
- Fisheries and Oceans Canada
- $ Intergovernmental Oceanographic Commission of UNESCO
- $ International Development Research Centre
- National Oceanic and Atmospheric Administration, United States Department of Commerce
- United Nations Environment Programme

4. Method

During the first day of the workshop there will be presentations and discussions of concepts of integrated coastal management and the experience of selected countries in community participation in ICM. This part of the exercise will be facilitated by the International Development Research Centre led by Gary Newkirk.

The second day will be devoted to an analysis of a case study from a developing country during which participants will be asked to develop strategies to meet the challenges of ICM. The case study exercise will be facilitated by a team from the Coastal Resource Center, University of Rhode Island and with guest speakers.

5. Program

MONDAY, SEPTEMBER 19, 1994

09:15-09:30 Welcome and Announcements

On behalf of BIO	S.B. MacPhee H.B.
On behalf of CZC'94	Nicholls

09:30-11:30 "Integrated Coastal Management for the 21st Century"

Background to ICM post-Rio	B. Cicin-Sain (USA)
Learning to manage coastal ecosystems	S. Olsen (CRC)
North American experience in ICM	L. Hildebrand (Canada)
ASEAN experience in ICM	Chua Thia Eng (Philippines)

11:30-12:15 Questions and Discussions

Question and answer period, and discussion, in relation to issues raised and participants' concerns.

12:15-13:15 Lunch

13:15-15:15 "The Importance of Community Participation"

.Community involvement Ca-Management of coastal resources Community based management	E. Ferrer (Philippines) K.T. MacKay
of living resources in Chile	J. Castilla (Chile)
Canadian communities in ICM	R. Williams (Canada)

15:15-16:15 Popular Theater as a Tool

The Irondale Ensemble Project and members of the Sheet Harbour community will present selected material from the Sheet Harbour's popular theater work. They will also lead discussion on the development and process of popular theater in community development.

16:15-17:00 Group Discussions

Priority issues in coastal zone management relating to the participants' own countries will be discussed.

17:00-19:00 Reception (at BIO)

6. Proceedings

The results (output) of the workshop will be recorded, with the highlights, conclusions and recommendations being incorporated in the Conference Proceedings of Coastal Zone Canada '94.

Rapporteurs: a) Subba Rao (BIO)
b) Muriel J. Cole (NOAA)

7. Benefits

In addition to the benefits that will stem from the workshop-objectives (refer to 1, above), the following additional benefits will be realized:

a) productive interaction among ICM specialists and community representatives from developing and developed countries;
b) contribution to the international objectives of training and capacity building in ICM for developing countries; and
c) provision of input into the deliberations of the Coastal Zone Canada '94 international conference, which in turn will result in the development of specific recommendations and guidelines aimed at governments, international organizations and other bodies having responsibilities in the coastal zone.

TUESDAY, SEPTEMBER 20, 1994

"The Challenge for Developing Countries"

08:45-10:15 Introduction — S. Olsen vice B. Needham (CRC)

Introduction to Coastal Resources Center (CRC) Response to key issues of concern of previous day Brief general discussion
Group discussion of the strutegies to meet the challenge, followed by short presentation of outputs.

10:15-12:15 - Case Study

Application of group strategies: participatory case study of a coastal site in a developing country.

12:15-13:15 Lunch

13:15-15:45 Case Study (Cont.)

Continuation of case study with emphasis on community participation in planning and implementation.

15:45-17:00 Conclusions

Wrap-up of discussions on ICM — S. Olsen vice B. Needham (CR

Discussion with participants of the needs for, and role of, international donors in ICM. — B. Davy (IDRC) P. Reynolds (UNDP)

18:30-20:30 CZC'94 Opening Reception (Chateau Halifax Hotel, Halifax)

ANNEX II

LIST OF PARTICIPANTS

Kolawole O. Adeniji
OAU/STRC, P.M.B. 2359
Lagos
NIGERIA
Tel: 234-1 2633430 or 234-1 2633289
Fax: 234-1 2636093

Renato F. Agbayani
SEAFDEC
Tigbahan, Iloilo
PHILIPPINES
Tel: 271-009 Fax: 271-008

Ebenezer A. Barnes
Water Resources Research Institute
P.O. Box M32
Accra
GHANA
Tel: 233 21 775351
Fax: 233 21 777170

Mohd Nizam Basiron
Mima, 16th Floor
Wisma Sime Darby Jalan Kaja Laut
50350 Kuala Lumpur
MALAYSIA
Tel: 603-291 2960
Fax: 603 293 3044
OI 603 293 9117

Alwyn E. Brathwaite
20 Gemswick Road
St. Philip
BARBADOS
Tel: 809 435-5414 Fax: 809 424-9415

Veronika Brzeski
Dalhousie University
Halifax, N.S. B3H 4J1
CANADA
Tel: 902 494 3610 902 494 2284
Fax: 902 494 6689

Ramon Buzeta
International Coastal Development Company
Casilla
Post Office Box 283
Vina del Mar
CHILE
Tel: 56 32 973944
or 56 32 910634
Fax: 56 32 974563

Les L. Carpenter
General Delivery
Sachs Harbour, N.W.T.
CANADA
XOE OZO
Tel: 403 690 4411 Fax: 403 690 4455

Juan Carlos Castilla
Fac. de Ciencias Biologicas
Pont.V.Catolica de Chile
Casilla 114-D
Santiago
CHILE
Tel: 56 2 2224516
Ext. 2620/2651
Fax: 56 2 2225515

Momodou A. Cham
Fisheries Department
6 Marina Parade
Banjul
GAMBIA
Tel: 228727 Fax: 229436

Poansook Chongprasith
539/2 Gymsum Building,
17th Floor
Sri-Ayudhya Road
Bangkok 10400
THAILAND
Tel: 66 2 642 5021
Fax: 66 2 6425026

Patrick Christie
School of Natural Resources and Environment
Dana Bldg.
University of Michigan
Ann Arbor, Michigan
48109-1115
USA
Tel: 313 213 0048

Muriel Cole
IOC Consultant
National Ocean Service, NOAA
1305 East-West Highway
Silver Spring, MD 20910
USA
Tel: 1 301 713 2981
Fax: 1 301 713 4392

Garry A. Comber
Comber & Associates Consulting
1687 Vernon St.
Halifax, N.S.
CANADA
Tel: 902 422 0733
Fax: 902 423 6747

Michael Comeau
Dept. of Fisheries & Oceans
200 Kent Street
Ottawa, Ontario, K1A OE6
CANADA
Tel: 613 993 2692 Fax: 613 993 9230

William E. Cross
LGL Limited, 22 Fisher Street
P.O. Box 280
King City, Ontario L7B 1A6
CANADA
Tel: 905 833 1244
Fax: 905 833 1255

Phillip DaSilva
P.O. Box 12286
Bourda, Georgetown
GUYANA
Tel: 022 4921
Fax: 02 67980

F. Brian Davy, IDRC (SIFR)
250 Albert Street
P.O. Box 8500
Ottawa, Ontario K1G 3H9
CANADA
Tel: 613-236 6163 Ext.: 2540
Fax: 613-567 4349

Apurba Krishna Deb
Community Development Centre
House 122/B, RD-6
Chandgaon R/A
Chittagong
BANGLADESH
Tel: 880 31 225029
Fax: 880 31 2029985

Lenore Polotam De La Cruz
College of Social Work and Community Development
University of the Philippines
Diliman, Quezon City 1101
PHILIPPINES
Tel: 632 97 24 77
Fax: 632 97 84 38

Ella S. Deocadiz
Environmental Management Bureau DENR Compound, Visayas Ave. Quezon City
PHILIPPINES
Tel: 63 2 976626-40
Local: 2127/2128
Fax: 63 2 96 30 11

Brent Doberstein
2-3018 Point Grey Road
Vancouver, B.C. V6K 1B1
CANADA
Tel: 604 731 7227 Fax: 604 822 3787

Brian Emmett
Archipelago Marine Research
525 Head Street
Victoria, B.C. V9A 5S1
CANADA
Tel: 604 383 4535 Fax: 604 383 0103

Peter A. Espeut
South Coast Conservation Foundation
91A Old Hope Road
Kingston 6
JAMAICA
Tel: 8 0 9 9 7 8 4 0 4 7 / 48/49/50!51
Fax: 809 927 3754

Quentin Espey
Sea Fisheries Research Institute
Private Bag X2
Rogge Bay 8012
Cape Town
SOUTH AFRICA
Tel: 27 21 4396160 Fax: 27 21 4399345

Elmer M. Ferrer
College of Social Work and Community Development
University of the Philippines
Diliman, Quezon City
PHILIPPINES
Tel: 97 24 77

Fax: 97 84 38

Becky Field
Dalhousie University
Halifax, N.S. B3H 4J1
CANADA
Tel: 902 494 3610
902 494 2284 Fax: 902 494 6689

Silvana Giordano
Instituto Nacional de Pesca (INAPE)
Constituyenne 1497
Montevideo
URUGUAY
Tel: 42 39 83

Edgardo D. Gomez
Marine Science Institute
University of the Philippines
Diliman, Quezon City 1101
PHILIPPINES
Tel: 922 3962
Fax: 924 3735

Angel Herrera
Universidad Nacional
362-4005
Belen
COSTA RICA
Tel: 506 237 3438
Fax: 506 237 6427

Lennox O. Hinds
Canadian International Development Agency
200 Promenade du Portage
Hull, Quebec K1A OG4
CANADA
Tel: 819 997 0483
Fax: 819 953 3348

Malikusworo Hutomo
Puslitbang Oseanologi - Lipi
Jl. Pasir Putihi, Ancol Timur
Jakarta
INDONESIA
Tel: 62 61 683850 Fax: 62 21 681948

Thomas Janossy
Remedial Ecotoxicological Expeditions Fund (REEF)
175 Elm Street, Suite 805
Toronto, Ontario MST 228
CANADA
Tel: 416 598 4729
Fax: 416 599 9540

K. Johnson
c/o M.S. Swaminathan Research Foundation
III Cross St. Taramani
Madras 113 600113
INDIA
Tel: 235 1229
Fax: 91 44 2351319

Felix Kaloki
Coast Development Authority
P.O. Box 1322
Mombasa
KENYA
Tel: 254 011 224490
224406
Fax: 254 011 490615

C

Kishan Kumarsingh
Institute of Marine Affairs
P.O. Box 3160
Carenage Post Office
Chaguaramas
TRINIDAD, W.I.
Tel: 809 634 4291-4 Fax: 809 634 4433

Kenneth T. MacKay
IDRC, P.O. Box 8500
Ottawa, Ontario K1G 3H9
CANADA
Tel: 613 236 6163 Ext. 2209
Fax: 613 567 7749

Dr. Subrata Maity
Qrs. No. B2/210
Kalyani, Nadia
West Bengal Pin 741235
INDIA
Tel: 91 33 829788 Fax: 91 33 828460

Dr. D.E. (Niel) Malan
Dept. of Environmental Affairs and Tourism,
P/Bag X2
Rogge Bay
Cape Town Kaapstad 8012
SOUTH AFRICA
Tel: 021 402 3021
Fax: 021 25 2920

Anthony McKenzie
Natural Resources
Conservation Authority
53‘/z Molymes Road
Kingston
JAMAICA
Tel: 809 937 2920 Fax: 809 923 5070

Liana Talaue McManus
Marine Science Institute
University of the Philippines
Diliman, Quezon City 1101 PHILIPPINES
Tel: 632 995071
-76-7428
Fax: 632 924 3735
632 818 9720

Jessica C. Munoz
Bureau of Fisheries and Aquatic Resources 860 Arcadia Building
Quezon Avenue, Quezon City PHILIPPINES
Tel: 965444/965465
Fax: 632 98 85 17

Anne Mvecke
Griffiths Mvecke Associates
1687 Brunswick Street
Halifax, N.S. B3J 2G3
CANADA
Tel: 423 8629 Fax: 421 1990

Brian Needham
Coastal Resources Center
University of Rhode Island
Kingston, Rhode Island 02881
USA
Tel: 401 792 6136 Fax: 401 789 4670

Gary Newkirk
Dalhousie University
Halifax, N.S. B3H 4J1
CANADA
Tel:902 494 3610
902 494 2284
Fax: 902 494 6689

Stefan Ochman
Ocean Voice International
C.P. 49 RRI
Chelsea, Quebec
CANADA
Tel: 613 563 2078 Fax: 613 563 7236

Stephen Olsen, Director
Coastal Resources Center
University of Rhode Island
Kingston, Rhode Island 02881
USA
Tel: 401 792 6224 Fax: 401 792 4670

Jesper Duer Pederson
10 Upper College Rd. Apt. D4
Kingston, R.I. 02281
U.S.A.
Tel: 82 6063

Beverley Pereira
c/o The Vice-Chancellery
University of The West Indies
Kingston 7
JAMAICA
Tel: 809 9770054/
9275465
Fax: 809 9270264

Beth Power
Co-operative Programme on Marine Science
195 Pemberton Avenue
North Vancouver, B.C.
V7P 2R4
CANADA
Tel: 604 986 4331
Fax: 604 662 8548

Sian Pullen
WWF V.K., Panda House
Weyside Park, Catteshall Lane
Godalming, Surrey, GU7 1XR
ENGLAND
Tel: 44 483 426444 Fax: 44
483 426409

Zhou Quilin
No. 178 Daxus Road
Xiamen 361005
CHINA
Tel: 86 592 2085880
Fax: 86 592 2086646

Dr. A.V. Raman
Div. Marine Biology
Dept. Zoology
Andara University,
Waltair 530003
INDIA
Tel: 91 891 555904
Fax: 91 891 555547/544765

M.V. Lakshmana Rao
Bullibabugar Shed
Tuni 533401
A.P.
INDIA
Fax: 06812 5406

Subba Rao, D.V.
Habitat Ecology Division Bedford Institute of
Oceanography P.O. Box 1006
Dartmouth, N.S. B2Y 4A2 CANADA
Tel: 902 426 3837
Fax: 902 426 7827

Tauraki Raea
c/o Conservation Service
P.O. Box 371
Rarotonga
COOK ISLANDS
Tel: 21 256 Fax: 22
256

Philip S. Reynolds
United Nations Development Programme
One United Nations Plaza
New York N.Y. 10017
U.S.A.
Tel: 212 906 5866
Fax: 212 906 6350

Roberto R. Rigby CIDCA
Bluefields P.O. Box 42
NICARAGUA
Tel: 083 735

Donald Robadue
Coastal Resources Center
University of Rhode Island
Kingston, Rhode Island 02881
USA
Tel: 401 792 6224 Fax: 401
789 4670

Prof. Dr. Massoud A.H. Saad
Oceanography Department
Faculty of Science
Alexandria University
Moharem Bay
21511 Alexandria
EGYPT
Tel: 203 422 6485
Fax: 203 483 4381

R.A.D.B. Samaranayake
Coastal Resources Development
Coast Conservation Dept.
New Secretariat, Maligawatta
Colombo, 10
SRI LANKA
Tel: 941 449 754
Fax: 941 438 005

Jonathan Sector
Secter Enviromental Resource Consulting (SERC)
#4-2585 Sinclair Road
Victoria, B.C. V8N 1C1
CANADA
Tel: 604 477 6912
Fax: 604 477 7573

Hellmuth A. Sievers
Instituto de Oceanologia
Universidad de Valparaiso
Casilla 13-D
Vina del Mar
CHILE
Tel: 56 32 833214
Fax: 56 32 833214

Ong Kah Sin
ASEAN-Canada Co-perative Programme on Marine Science
3rd Floor Block B, Wisma Tani
50628 Kuala Lumpur
MALAYSIA
Tel: 603 298 1776
Fax: 603 291 3199

Seung Mun Tang
Dept. of Physics
National University of Singapore Kent Ridge, Singapore 0511 SINGAPORE
Tel: 65 772 2603
Fax: 65 777 6126

Chua Thia-Eng
International Maritime Organization
P.O. Box 2502
Quezon City
1165 Metro Manila
PHILIPPINES
Tel: 632 969712
Fax: 632 969712

Soo Loong Tong
Department of Chemistry
University of Malaya
59100 Kuala Lumpur
MALAYSIA
Tel: 60 3 7577000
Fax: 60 3 7568940

Pum Vicheth
State Secretariat for Environment 48 Samdeck Preah Sihanouk Phnom Penh
CAMBODIA
Fax: 855 23 27 844

Dwight Watson
Suite 302, Block B
Wisma Tani
Jolan S. Salahuddin
Kuala Lumpur 50628
MALAYSIA
Tel: 60 3 298 1776
Fax: 60 3 241 3199

ANNEX III

THE RIO CHONE: AN ENDANGERED ESTUARY

(Presented by the Coastal Resources Centre, University of Rhode Island)

INTRODUCTION

This shrimp-mariculture dominated estuary is located in the central coast of Manabi Province, with an opening to the Pacific Ocean at the city of Bahia de Caraquez and terminating 25km inland at a tide barrier in a small village of Sombocal. The watershed of the Carrizal and Chone Rivers drains 4,200 km- of a once forested hilly dry tropical zone now converted into agricultural land. Since the Spanish colonial period the city of Bahia has been a port, reaching its.peak in the 1940s with the export of cacao, coffee, rubber and balsa wood. The 1950s was a period of decline for the region as the port of Manta replaced Bahia as the centre for exports, and traditional agricultural products from the region no longer had a market.

The economic stagnation of the region continued until the late 1970s when two new activities, tourism and shrimp mariculture, began to utilize the area's key coastal resources. These include more than 10 km of ocean fronting beaches, 4000 hectares of mangroves and 400 hectares of salt flats. By 1990 some 5000 hectares of shrimp ponds had been constructed utilizing virtually all the mangroves and salt flats as well as some open water on the estuary. Vacation apartments and hotels were being constructed in both Bahia and the tourist village of San Vicente to the north of the mouth of the estuary. Migration of population to the estuary has continued unchecked since the early 1980s. There are now about 35,000 people living in the zone, half in Bahia and San Vicente and the rest in rural areas and the fifteen small, crowded communities around the edges of the estuary.

The relative prosperity of the 1980s has produced a number of equally dramatic problems for the 1990s. The expanding economy attracted many more people than the region could support, and the completely uncontrolled expansion of the shrimp mariculture industry has created enormous stresses on the coastal ecosystem. At a larger scale, the Regional Planning Agency for Manabi Province is aggressively promoting the construction of a large dam to divert fresh water flow of the Carrizal and Chone rivers to other agricultural zones, at the same time that demand for irrigation water is increasing within the watershed.

Large agricultural investments are being made in cotton, poultry and fresh water fish production. There is a significant labour force which is seeking alternate sources of employment.

THE MANAGEMENT CHALLENGE

The Rio Chone was selected in 1989 as one of five sites to prepare and implement coastal resource management plans, primarily due to concern over the future of the shrimp industry. The co-ordinator assigned to lead the planning process has faced a unique challenge. On one hand, this special area zone has the advantage that its boundaries coincide with a single ecosystem. On the other hand. there are three different counties which share responsibility for decision-making, but only one, the Canton Sucre which includes Bahia and San Vicente, has the majority of its population living near the estuary. Local politics in

Canton Sucre is dominated by a few large shrimp pond owners who do not necessarily welcome the national attention which the Rio Chone is now receiving.

Until the creation of the special area management zone by Presidential Decree, the different economic forces at work in the estuary, both rich and poor alike, did not have any means to address the serious problems affecting their livelihoods and did not see how the estuary is a resource they share in common, and for which they therefore have a mutual responsibility.

Existing laws on natural resources management have contributed very little to improving mutual understanding and co-operation. Wealthy businessmen can obtain permission to build new shrimp ponds direct from the capital city, Quito, even after ponds were illegally constructed. Enforcement of rules for licensing pond construction and management, as well as the prohibition against cutting mangroves rarely occurred. Agencies which have direct responsibility for environmental law enforcement. include ministries of forestry, fisheries and the Navy.

Enforcement of the shrimp pond owners' prohibition against access by local people to the remaining mangrove areas, on the other hand, is made very effective through the use of guns, dogs and barbed wire fences. The seasonal ban on the capture of shrimp larvae is proving unenforceable. A British Television crew making a documentary on the shrimp mariculture industry arrived during the middle of one ban to find the port captain overwhelmed by the thousands of "larveros" on the beach during a high tide. Effective enforcement of this rule, made in the capital by the same fisheries agency which does not enforce the shrimp pond construction laws, would impose a harsh cost on thousands of people who have no alternative source of income, for reasons which the "laveros" themselves do not understand.

Decisions on the construction of the Carrizal-Chone project, which could rob the estuary of its fresh water will not be made in public nor with the participation of even the wealthy shrimp pond owners who stand to suffer great losses. There is no environmental impact assessment procedures which would require full disclosure and debate of the project, and could enable local residents to recommend project modifications to reduce impacts.

MANGROVES AND CRITICAL NATURAL AREAS

There are 600 hectares of mangroves remaining in the estuary, including Isla Corazon, Isla de la Frigatas, and a small mangrove reserve in the midst of the major concentration of shrimp ponds, as well as fringes of mangroves along most of the other dikes of the shrimp ponds. In the 1950's, this estuary contained mangrove trees up to 30 m tall, with abundant crocodiles and monkeys, as we11 as fish and shellfish. These virtually have all disappeared. "Laveros" continue to work the remaining canals and discharges of shrimp ponds. Some shrimp pond owners, including the president of the special area planning committee, are replanting their dikes and water supply canals with some mangrove species. Others have diked off open water areas which is causing the death of fringing mangroves, and continue to,expand their ponds. Existing untouched mangrove areas and unique habitats do not have formal monitoring, interpretation or protect',on programmes.

WATER QUALITY AND POLLUTION CONTROL

The water pollution problems in the Rio Chone can be divided into distinct zones. At the mouth of the river, adjacent to the tourist beaches, raw sewage from Bahia flows untreated into the waterfront. The sewage treatment facility built by the municipality of Bahia for its 10,000 inhabitants was supposed to be a series of four oxidation lagoons. Only one was constructed and the land for the other three is currently occupied by squatters. The sewage is pumped into drain pipes which discharge a few hundred metres from a tourist beach. Most of the people living around the Rio Chone have access to potable water only a few hours per day from a pipeline built to serve the tourist zone. Many poor dwellings in the hills and south of the city in Leonidas Plaza have no sanitary -facilities, so sewage often finds its way into the open storm drains. On the other side of the river, in San Vicente, ground disposal of waste water is the only technique used. It is only adequate during the dry season, since the soils in the area are quickly saturated in the wet season. The central portion of the estuary is used primarily by artisanal fishermen, and for the future has the potential of recreational boating use. The interior estuary from Portovelo east to the tide barrier at Simbocal, is the area most intensely used by shrimp ponds. Water quality in the interior canals has dropped well below 4 mg/l of dissolved oxygen during certain periods, and salinity has been as high as 50 parts per thousand, considerably saltier than the incoming ocean water. These water quality problems are slowing growth of the shrimp in the ponds. At the same time, the first case of cholera occurred in Ebano, adjacent to the shrimp packing plant.

Primitive sanitary conditions also exist in the other coastal villages surrounding the ponds. On the other side of the tide barrier, at the confluence of the Carrizal and Chone Rivers, the protection of habitat for the large number of migrating birds and fresh water fish production is most important. Plans to convert the large seasonal wetland into pasture will destroy the habitat. No effective waste water collection or treatment exists anywhere in the special area planning zone and all of the small communities suffer from similar problems of water supply, poor sanitation practices and human waste disposal.

FISHERIES

More that 1000 artisanal fishermen were displaced from the Rio Chone by the time shrimp pond construction reached its peak due to a dramatic decline in fish stocks and loss of access to mangrove areas now occupied by ponds. The shrimp larvae fishery continues both on the ocean fronting beaches and throughout the interior of the estuary. Some larveros have proposed the enforcement of an effective ban on catching larvae in the river itself as well as selective closures on the beaches rather than the current comprehensive closure of the fishery.

The impact of larvae fishing inside the estuary upon wild stocks is unknown, as well as the effect of loss of fresh water input and the intensive larvae fishery along the coast. Artisanal larvae grow out ponds are being established to improve the incomes of the larveros. Shrimp larvae hatcheries, which only supply about 15% of larvae to the Rio Chone ponds, are located in the middle of tourist zones, have direct discharges onto beaches and yet depend on good water quality for their operations. Fishing and collection of shellfish continues to be an important activity inside the estuary for members of the small communities, despite conflicts with shrimp pond owners and degraded habitat.

A wealthy group of land owners has promoted the development of a fishing port along the ocean at Punta Bellaca, even though little artisanal or commercial fishing is taking place. A road to the undeveloped small watershed has already been constructed but no development controls or plan has been prepared for the surrounding hillside. A costly system of breakwaters is proposed since the site is subjected to strong wave action, which could trap the sand moving along the shore that is currently replenishing the eroding beach of the town of Bahia.

TOURISM

There is considerable untapped development potential for this zone. Several hundred hectares of prime beach front property at Punta Napo, just north of San Vicente, is targeted by the national government for tourism development, with private investors anxious to begin construction. These beaches already attract upper income Ecuadorian and some international tourists, who are spending nearly twice as much per day as the local and regional visitors to most of the other beach areas. The interior of the estuary has colonies of frigate birds and other species which rival in number of the found in the Galapagos Islands, Ecuador's major tourist attraction.

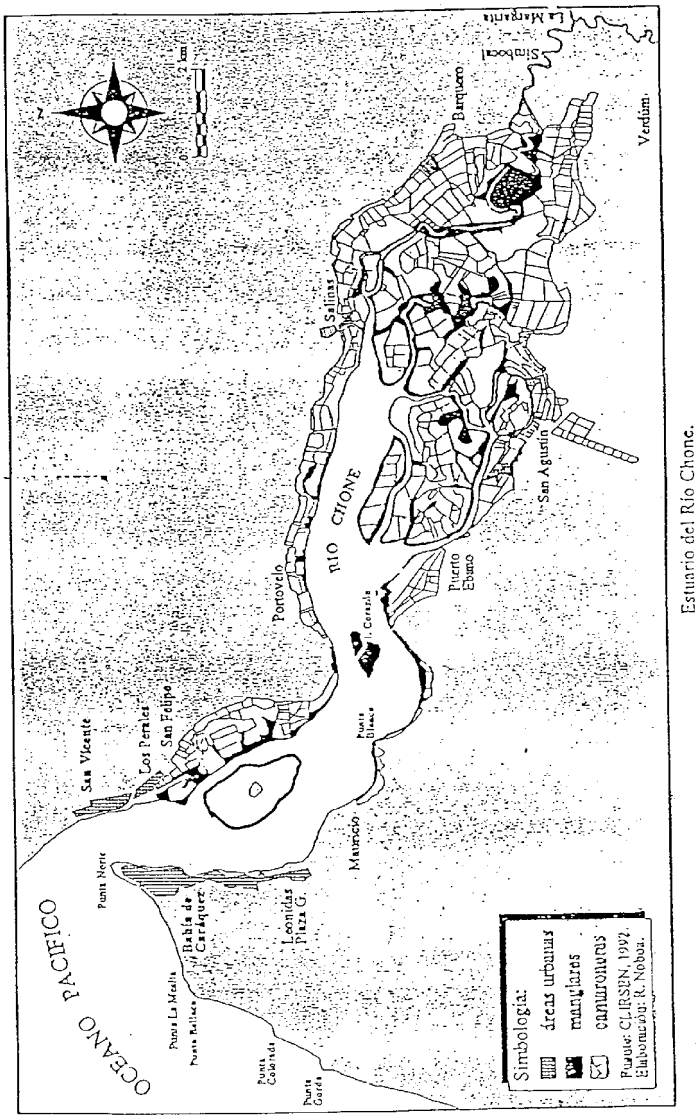
The designated tourism area at Punta Kiapo is being provided with water supply, roads and other infrastructure in anticipation of major investment projects. The plans for these projects will be approved by the National Tourism Agency, not the local community. There is no public involvement process, and the criteria for the review of projects is not publicly available. Remarkably, the Punta Napo site has not yet been encroached upon by shrimp ponds or larvae growing laboratories, or any of the "invasions" by squatters which have accompanied the construction of new roads and urban facilities elsewhere in the estuary. The shoreline is erosional in sections, and the hills behind the wide coastal plain have not been excavated or damaged. There are few examples in coastal Ecuador of well planned shore development. Buildings are usually located on or near the beach, public access is limited and the surrounding hillsides are typically excavated for construction materials. The village of Canoa, and a major portion of the tourist beach, are occupied by between 1000-2000 artisanal shrimp larvae fishermen.

The potential influx of new, high spending visitors, provides an excellent opportunity for creating a new awareness of the tourism value of the inner sanctuary, as well as to establish water-based recreation, including excursions, sailing and surfing which at present do not exist.

MARICULTURE

The estuary which has built the fortunes of the 150 or so pond owners is changing because of their activities. The area of the estuary has been reduced dramatically since the ponds walls prevent the natural movement of water. New ponds are now being constructed on mud flats. Sedimentation both from sand entering the estuary, river input and organic matter is continuing to fill both the estuary and the shrimp ponds. The volume of shrimp ponds is about 40 million cubic metres, compared to a low tide volume of the estuary of 68 million cubic metres and a high tide volume of 105 cubic metres. The estuary is producing abut 3000-5000 metric tonnes of shrimp per year. Productivity problems are beginning to appear.

IOC Workshop Report No.104
Annex III - page 5



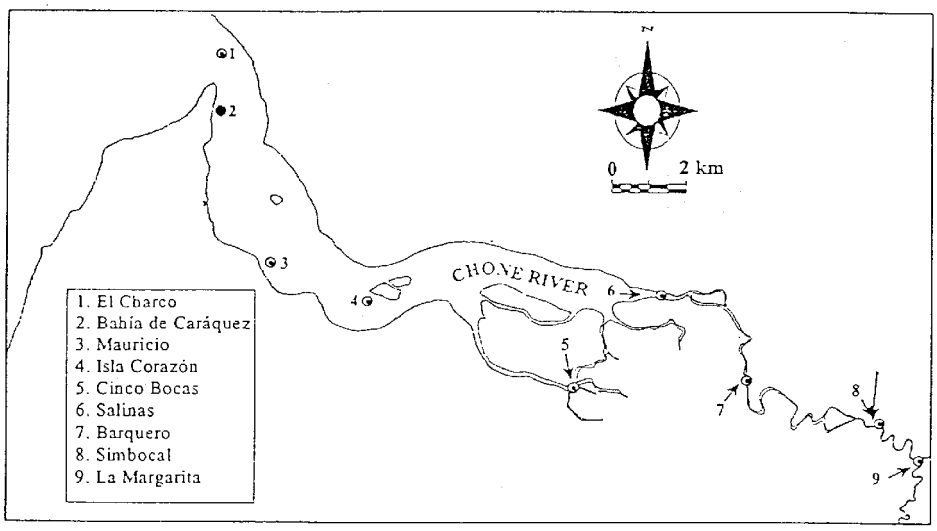
Estuario del Río Chone.

Area (ha) of mangrove forest, salt flats and shrimp ponds in the province of Slanabi and the ZEM Bahia de Caraquez San Vicente - Canoa between 1969 and 1991
Source: CLIRSEN (1992)

IOC Workshop Report No.104
Annex III - page 6

Area (ha) of mangrove forest, salt flats and shrimp ponds in the province of Manabi and the ZEM Bahia de Caraquez - San Vicente - Canoa between 1969 and 1991
Source: CLIRSEN (1992)

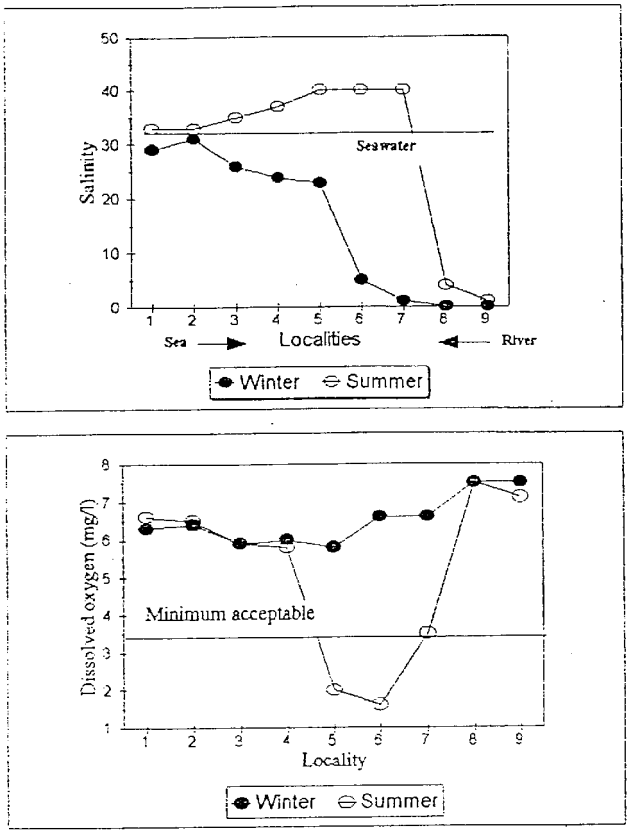
YEAR	MANGROVE FOREST		SALT FLATS		SHRIMP PONDS	
	MANABI	ZEM	MANABI	ZEM	MANABI	ZEM
1 969	12 416	3 980	815	584	0	0
1 984	7 992	1 674	164	0	8 377	4 239
1 989	6 401	1 040	164	0	10 238	4 985
1 991	4 547	785	164	0	12 579	5 304



Localities sampled for oxygen and salinity

Localities sampled for oxygen and salinity

IOC Workshop Report No.104
Annex III - page 7



ANNEX IV

CHECKLIST OF STAKEHOLDERS INVOLVED IN COASTAL MANAGEMENT ISSUES

STAKEHOLDER	ISSUE 1	ISSUE 2
Port Captain		
Manabi Regional Planning Agency		
Municipality of Sucre		
Municipality of Chone		
Municipality of Tosaguas		
Forestrydistrict officer		
Tourism agency officer		
Maritime Interests Agency		
Ministry of Agriculture		
Water Resources Agency		
Local fisheries inspector		
Regional university of Manabi		
Shrimp farm owners		
Hotel owners		
Town of Bahia de Caraquez		
Village of San Vicente		
Village of Canoa		
other villages around estuary		
National sanitary and waterworks agency		
shrimp larvae fishers		
Yacht club members		
shellfishers		
finfishers		
water transport collective		
health authority		
public school teachers		
public school teachers		
Church		

[end of document]