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The University of Rhode Island
and U.S. Agency for
International Development

Coastal Resources
Management Project

Prospectus



Introduction

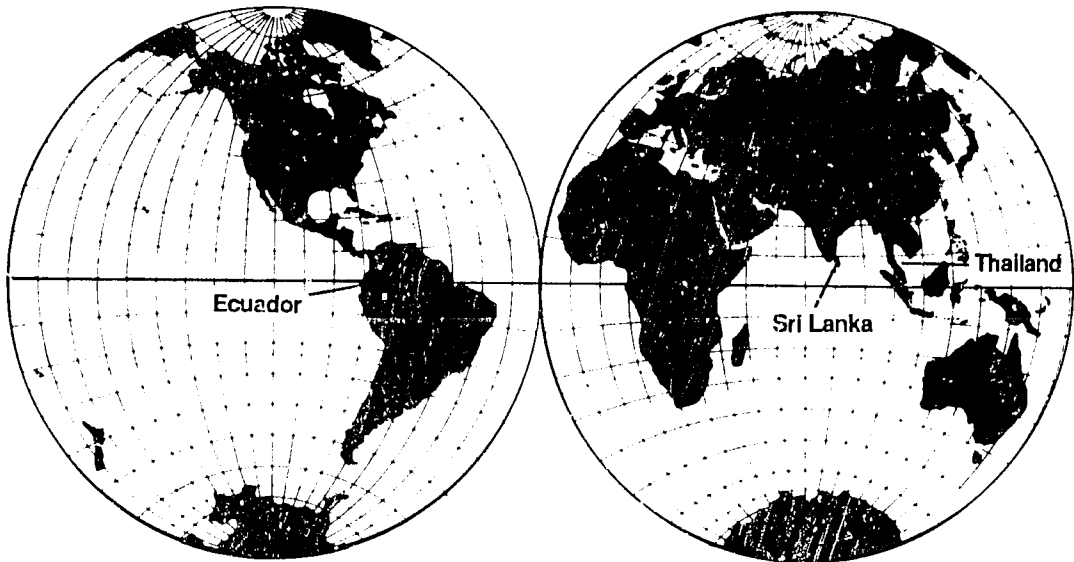
Nearly three-quarters of the world population is now concentrated along coastlines. By 2020, the human population on planet Earth is expected to double to 8.5 billion, with the major increase occurring in developing tropical countries, and concentrated in sprawling coastal cities.

Many developing countries are witnessing, in only two or three decades, the same man-made and frequently self-defeating alterations to their coastal ecosystems that evolved over many generations in Europe and the United States. The rapid pace of coastal development in these tropical nations has resulted in a host of resource-related problems requiring urgent attention:

- degraded water quality
- declines in nearshore fishery resources
- destruction of critically important ecosystems such as estuaries, mangroves, seagrass beds and coral reefs
- acceleration of erosional processes by inappropriate construction practices and other human activities
- failures of government agencies to coordinate their efforts and impose rational restraints over competing activities

Experience in developed nations has shown that integrated coastal resources management (CRM) programs can be an effective means for understanding the causes and linkages among problems such as these, and forming institutions to help resolve them.

In the United States, CRM projects have been initiated principally to conserve natural resources and are often biased against development. In the developing world, however, the resources available must, in most instances, be fully utilized. These countries must apply sound planning, public education and consistent regulation of coastal development if they are to achieve balanced development that allows for sustainable use of their resources.



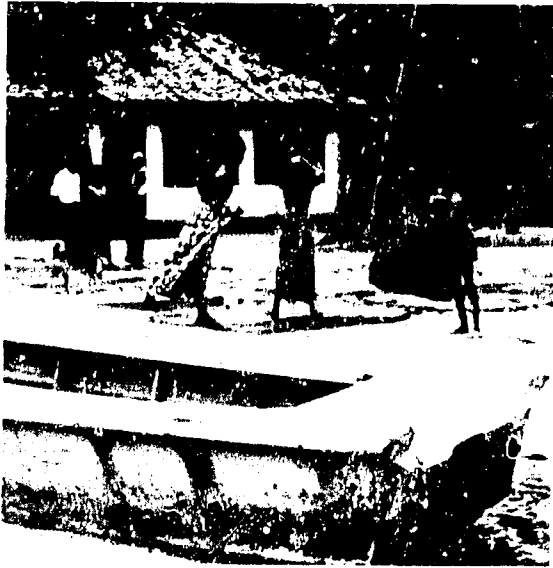
Pilot Projects for Three Developing Nations

On May 15, 1985, the United States Agency for International Development (AID) signed a cooperative agreement with The University of Rhode Island (URI) to launch three coastal resources management programs that can serve as models for developing nations. The 5-year project, sponsored by AID's Office of Forestry, Environment and Natural Resources, within the Bureau of Science and Technology (AID/S&T/FENR), now operates in Ecuador, Sri Lanka and Thailand. In-country teams from each of these nations collaborate with the project staff at URI's Coastal Resources Center.

The timing is good for such an undertaking. The United States and several European countries now have more than a decade's experience in designing and implementing integrated CRM programs--experience that developing tropical countries can learn from and adapt to their needs.

The URI/AID Coastal Resources Management Project (CRMP) is assisting its in-country counterparts to formulate and begin implementing their own management strategies, and is offering technical assistance where needed. Each pilot program is working to:

- develop procedures to assess the impacts of coastal development proposals
- undertake research to clarify the forces that affect trends in the condition and use of coastal ecosystems
- improve the capabilities of in-country professional staff to plan for and manage coastal development
- develop institutional capabilities to effectively address resource use conflicts



Many coastal residents in Sri Lanka depend on the sea for their livelihood.

photo by G. Kem Lowry

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CRM Challenges

There are many impediments to the development of viable integrated coastal resources management programs. Because CRM is an attempt to manage ecosystems where man is usually dominant, it means managing people and, therefore, the needs, values and aspirations of communities. This leads directly into politics and the need for compromise and consensus building, which is invariably difficult and time-consuming. Unfortunately, institutional problems among agencies and inadequate funding often limit the ability of government to implement management policies. Because these difficulties have been recognized, the following basic strategy has been adopted for the project.

CRM Programs must address well-defined issues.

Although coastal management must strive to be holistic, no single program can do everything that needs doing. If a program is to succeed, it must be designed to address a few well-defined management questions that can be handled with the time, skills and funds available.

Planning and implementation efforts must be closely linked.

Many resource management programs around the world are failing, in good part because the planners are usually not the implementers. Implementers may resist because the plans were created without their participation, because they lack the resources to implement effectively, or because the policies, for a variety of reasons, simply are not implementable.

Research must answer questions of direct relevance to the resource manager.

Lack of data and knowledge is often a major impediment to developing effective management programs. While good management must be tied to an adequate understanding of the systems to be managed, too often the scarce funds available for research are directed at answering questions of interest to scientists, but not necessarily useful to those attempting to formulate a management strategy.

The people whose lives will be affected by new management schemes must understand and support them.

Resource management programs succeed when the people affected feel that they have been empowered to exert some control over their environment. Public education and local participation in the formulation of management strategies are therefore keystones for any integrated resource management process.

Coastal resources management planners and managers from both the developed and the developing world have much to learn from each other.

We are impressed by the similarities between the major CRM issues in the three pilot countries and many state programs in the United States. There is urgent need for communication among those struggling to formulate and implement resource management strategies effectively. It is important for them to document and share their successes and failures.

Characteristics of the Pilot Countries

	Ecuador	Sri Lanka	Thailand
Land Area* (km ²)	284,000	66,000	514,000
Shoreline* (km)	2,237	1,340	3,219
Estimated Population in millions (1985)	14.6	16.4	51.6
Population Density* (persons/km ²)	33	250	100
Per Capita GNP (1983)* (US\$)	1,420	330	810
CRM Legislation	no	yes	no
Localized CRM Plans	no	yes	yes

**World Resources 1986*, World Resources Institute and the International Institute for Environment and Development, Basic Books, Inc., New York.

The Pilot Programs

Ecuador

This Andean nation has a continental coastline of 1,600 kilometers, much of it sparsely populated. Ecuador's coast includes a great variety of habitats, ranging from desert to humid rain forest, and including the totally unique Galapagos archipelago. Historically, Ecuador's population and culture were centered in the fertile valleys of the mountainous interior. Only in this century did the coastal region become important, when plantations of tagua palm, bananas, cacao and coffee were planted as export crops in fertile coastal soils. Guayaquil, a port city at the head of the Guayas estuary, the largest estuary on the west coast of South America, recently became Ecuador's biggest city, with an explosively growing population that passed the million mark in 1985.

The Ecuador pilot project officially began on March 3, 1986. The Directorate for the Environment (DIGEMA) within the Ministry of Energy and Mines is the counterpart agency for the CRM project. A priority in Ecuador is for key governmental and private sector representatives to recognize that Ecuador's resources are rapidly being altered, and that many economically important activities are closely linked to environmental quality. For example, good water quality in the estuaries is a precondition for successful mariculture, and increasing threats to coastal water quality must, therefore, be addressed.

During the first phase of the project, major efforts were made to identify and profile the key coastal issues in each of Ecuador's five coastal provinces, and to determine the problems and future prospects of the lucrative shrimp mariculture industry.

Major Phase 1 Work Tasks for Ecuador (1986-87)

- creation of a policy board and steering committee
- analysis of legal and institutional arrangements for coastal resources management in Ecuador
- synthesis of available information on coastal resources and selection of priority issues for CRM program
- development of an integrated management strategy for sustainable shrimp mariculture
- formulation of a public education strategy



Sand mining in Sri Lanka's coastal zone is regulated by the CCD as part of their overall erosion management strategy.

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photo by Stephen Olsen

Sri Lanka

Sri Lanka, formerly Ceylon, is a small island nation off the southern tip of India. Known since ancient times as the jewel of the Indian Ocean, this country has a long and rich history. Although a poor, densely populated country, Sri Lanka rates very high in quality-of-life indicators such as low child mortality, high literacy and long life expectancy. The country's remarkable achievements and natural beauty have recently been marred by racial conflicts which reduced a tourist trade that before 1983 was a major source of foreign exchange earnings.

Like Ecuador, the population of Sri Lanka was historically concentrated in the highlands, but by the end of the British colonial period, in 1947, three-quarters of the population had become concentrated along the coast. Although tea grown in the highlands remains the major export, lowland crops such as bananas, coconut and sugar cane have become important.

As Sri Lanka's population has crowded along the coasts, natural processes of coastal erosion and accretion are creating problems. Roads, railway lines and buildings were constructed close to beaches, and in a country where a family may own the twentieth share of a single coconut tree, there is enormous pressure on the government to prevent or delay property losses caused by erosion.

For decades it has been national policy to "hold the line" against the sea. CRM legislation was enacted by the Sri Lanka Parliament in 1981, charging the Coast Conservation Department (CCD) to develop a comprehensive approach to coastal management and to prepare a CRM plan by October 1986. In 1983, the CCD began to implement a permit program for shorefront construction and extractive activities.

The URI/AID CRMP pilot in Sri Lanka began on January 1, 1986, with the CCD as the counterpart organization. At the time, the CCD had already made considerable progress in formulating the conceptual framework for the national Coastal Zone Management Plan (CZMP), defining the issues the plan would address and developing a comprehensive erosion management strategy.

During the pilot's first year, resources were focused on assisting the CCD in drafting the CZMP, which contains management strategies for coastal erosion, protection of natural coastal habitats, and preservation of historic and cultural sites within the coastal zone. The CZMP also demarcates a setback line for future construction activities, identifies specific features for preservation, and outlines the CCD's research and planning agenda for making coastal management in Sri Lanka more comprehensive. As in Ecuador, an effective public education program is recognized as central to the long-term prospects for success.

Major Phase 1 Work Tasks for Sri Lanka (1986)

- preparation of the draft Sri Lanka CZMP
 - 1) synthesis of available information and mapping of Sri Lanka's coastal habitats
 - 2) development of an integrated management strategy for critical coastal habitats following a coastal habitats workshop
- development of policies for protection of historic and cultural sites
- design of a public education strategy
- training CCD staff

*It is crucial that
Phuket Province's
scenic beauty not be
spoiled by its rapidly
expanding tourism
industry.*



photo by Stephen Olsen

Thailand

This Southeast Asian nation has a 3,219-kilometer coastline exceptionally rich in natural resources. Fisheries, mineral deposits, mangrove forests and coastal tourism contribute significantly to the national economy. These resources are utilized by a wide variety of user groups, and there are many government agencies involved in various aspects of their management.

Coastal zone management is a priority for Thailand's Sixth (5-year) National Economic and Social Development Plan that went into effect in 1986, and the country has already initiated a number of activities in CRM. Site-specific plans for tourism and shorefront industrialization have been prepared by the central government. Marine parks have been created and many studies on coastal resources and management issues have been completed. The priority now is to develop a coherent national policy and to address the problems of implementing regulatory, as opposed to development, programs.

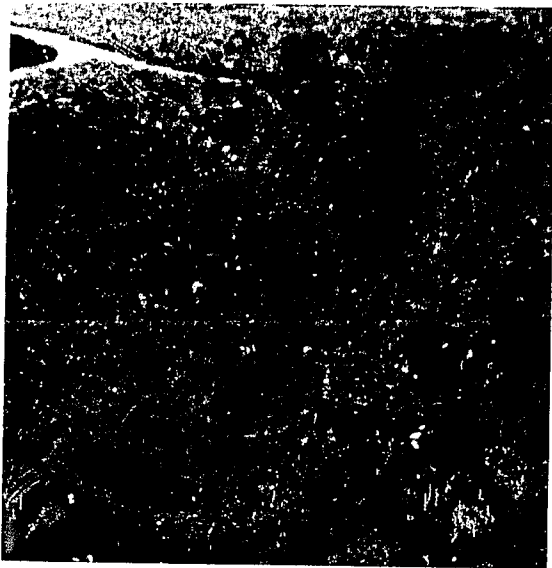
Thailand was selected as the third CRM pilot project in May 1986. The Royal Thai Government designated the Office of the National Environmental Board (ONEB) as the URI/AID CRMP counterpart agency. ONEB, whose primary responsibility is evaluating the environmental impacts of major development projects and setting environmental performance standards for industries, is also the lead agency for Thailand's regional CRM initiatives.

The Thailand CRMP will have a three-pronged approach. There will be a national policy level component to integrate and enhance the ONEB's efforts to develop and effectively implement an integrated national CRM program; a provincial level demonstration project to test policy and implementation concepts; and a component to develop and test marine park management strategies.

The Province of Phuket will be the site of the first demonstration project. Initial marine park planning efforts will focus on Tarutao and the marine and coastal parks in the Phuket vicinity. The CRM project in Thailand is a cooperative effort between the AID/Bangkok Emerging Problems in Development (EPD II) Project and the URI/AID CRMP.

Major Phase I Work Tasks for Thailand (1987-88)

- formation of national CRM steering committee
- formulation of national CRM strategy
 - 1) preparation of background papers on major CRM issues
 - 2) institutional analysis
 - 3) information coordination
 - 4) white paper preparation
- preparation and implementation of action plan for Phuket Province
- marine park planning and management
- training in CRM



Guayaquil is Ecuador's fastest growing city; much of this growth is occurring in mangrove wetlands.

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photo by Jon Boothroyd

New Initiatives

As the three pilot programs take shape, the USAID CRMP staff will test a variety of techniques to promote communication among coastal resources management practitioners to disseminate information on lessons learned and to discuss viewpoints on controversial or sensitive issues.

Developing workshops, publications or other country-to-country exchanges will promote communications among developing countries.

Another way of bringing principal players together from the three countries will be to sponsor an annual round table at which topics such as policy implementation, local level enforcement, public education, and techniques for monitoring trends in the condition and use of coastal ecosystems will be discussed.

Finally, development of training programs for those participating in CRM-related endeavors in the pilot country will be another priority objective during the remaining years of the project.

Major CRM Issues in the Three Pilot Countries

	Ecuador	Sri Lanka	Thailand
Institutional Issues			
Overlapping jurisdictions/interagency conflict	P	P	P
Inadequate public support for management initiatives	P	P	P
Inadequate implementation of existing regulations	P	X	P
Resource Issues			
Coastal erosion	X	P	X
Mineral or sand mining on beaches	-	P	X
Poor shorefront development practices	X	X	X
Degraded water quality in estuaries	P	X	P
Losses in estuarine-dependent fisheries	X	P	P
Destruction of mangroves	P	X	P
Degradation of scenic/cultural resources	X	P	P
Conversion of wetlands to aquaculture ponds	P	X	P
Ocean storms and/or severe flooding	X	X	-
Dams on major rivers	P	P	X

P = priority issue, X = significant issue

The project's central office is the Coastal Resources Center at The University of Rhode Island's Graduate School of Oceanography.



photo by Tom Payne

Project Structure

Board of Directors

The URI/AID CRMP is guided by a three-member board comprised of the Director of AID's Bureau for Science and Technology, Division of Forestry, Environment and Natural Resources (S&T/FENR), the Director of URI's International Center for Marine Resource Development (ICMRD), and the URI Vice President for Marine Affairs. The board sets policy for the CRM project, evaluates project progress and approves domestic work plans.

AID Technical Committee

To assure coordination with the principal AID bureaus involved in the CRM project, the technical committee comprises the CRM Project Manager (AID/S&T/FENR) and the environmental advisors from the Latin American and Caribbean and Asia/Near East Regional Bureaus of the Agency. The senior advisor to the AID/S&T/Fisheries Bureau serves as an ad hoc member.

Project Staff

The URI/AID CRMP operates with a small, experienced core staff at the URI Coastal Resources Center who work directly with AID and the counterpart agencies in each pilot country on overall project design and implementation. In addition, the CRMP draws upon a wide range of expertise, both within the host countries and internationally, for specific program activities.

Issue Teams

The CRMP has formed three issue teams to address concerns common to all three pilot countries. The issue team for legal and institutional analyses has selected methodologies for assessing the existing laws, institutions and norms that affect coastal resources and resource use activities in each pilot country. These analyses will help the countries in the formulation of a legal and administrative framework for managing their coastal resources.

The shrimp mariculture team is responsible for preparing synthesis papers and assessments of shrimp mariculture. Its first papers formed the foundation for a workshop in Guayaquil, Ecuador (August 1986), that provided the basis of an integrated strategy for achieving a sustainable shrimp mariculture industry in that country. Shrimp mariculture is also emerging as a major issue in both Sri Lanka and Thailand, and the work of this team is expected to be useful to CRM policy formulation in those countries as well.

The training issue team, formed at the end of the first year of the CRM project, is responsible for developing the project's training strategy. Training is an important element of the project and will include study tours, short courses, and placement of students from developing countries in academic programs, strengthening in-country education programs, and production of training materials.

External Technical Resources Advisory Panel

To ensure that the CRM project team at URI is kept informed on state-of-the-art advances, an external panel advises the project director on technical and policy matters whenever necessary.

Coastal and Marine Education, Research and Public Service Programs at the University of Rhode Island

Education

- Graduate School of Oceanography
- Dept. of Geo. and Mar. Affairs
- Dept. of Resource Economics
- Dept. of Ocean Engineering
- Dept. of Fisheries and Marine Technology
- Dept. of Natural Resources Science
- Dept. of Geology
- Dept. of Political Science
- Graduate Program in Community Planning

Research

- Sea Grant College Program
- Landsat Remote Sensing Lab.
- Marine Ecosystems Res. Lab.
- Libraries
 - Pell Marine Science Library
 - Nat'l Sea Grant Depository
 - EEZ Library
 - ICMRD Information Services

Public Service

- Coastal Resources Ctr
- International Ctr. for Marine Resource Dev.
- Center for Ocean Management Studies
- Consortium for the Dev. of Technology
- Marine Advisory Service

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The University of Rhode Island: A Leader in Coastal and Marine Resources Management

URI pioneered the study of comprehensive and integrated approaches to marine resource problems. The university has earned an international reputation as a leader in CRM, not only through its various schools and departments dedicated to marine studies, such as the Graduate School of Oceanography, Departments of Geography and Marine Affairs, Ocean Engineering, and Fisheries and Marine Technology, but also through traditional departments that have developed specializations in marine and coastal matters.

In addition, URI maintains a group of programs specifically dedicated to public service and applied research, including the International Center for Marine Resource Development (ICMRD), the Sea Grant Program, the Center for Ocean Management Studies and the Coastal Resources Center.

The ICMRD was formed at The University of Rhode Island in 1969 to help developing countries solve their marine resource problems through education, research and extension services. ICMRD is the prime grantee for the URI/AID CRMP.

The URI Coastal Resources Center (CRC) is responsible for the design and implementation of the project. The CRC has been working with government agencies to formulate workable CRM strategies for the past 15 years, and has developed an approach to problem solving which includes an appreciation that both technical expertise and a knowledge of the political process are essential ingredients to success. The CRC draws on the extensive resources within The University of Rhode Island.

The CRC staff has much experience as bridge builders among academic disciplines, between research scientists and resource managers, between planners and implementers, and among the many publics who ultimately determine whether a management strategy will survive over the long term.

In the past the CRC staff has successfully drawn together multidisciplinary teams to work on topics such as offshore oil drilling, the management of fisheries in coastal lagoons, port development, construction along erosion-prone coastlines, and the pollution of estuaries and groundwater.

Shrimp mariculture ponds along the Guayas estuary in Ecuador.

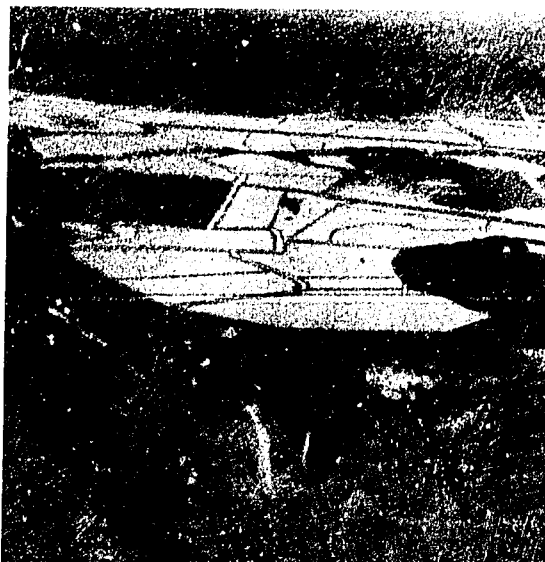


photo by Jon Boothroyd

The URI/AID Coastal Resources Management Project in Action

Shrimp Mariculture in Ecuador: An Example of an Integrated Approach to the Analysis of a Key Coastal Issue

Several of the priority issues in Ecuador's coastal region arise from the farmed shrimp industry. In a little over a decade, this industry grew in a gold-rush atmosphere so that, by 1983, it attained third place among Ecuador's exports at 35,600 metric tons worth \$175 million. This made Ecuador the world's leading producer of farmed shrimp. But in 1986 half of the country's 75,000 hectares of completed ponds were lying idle, many growers were bankrupt and the future of the industry had become uncertain.

At the request of the Ecuadorian government, the CRMP began with an assessment of the shrimp mariculture industry and developed recommendations to promote a sustainable shrimp aquaculture industry.

The approach was to assemble an interdisciplinary team of people recognized for their expertise in the environmental, economic, technical and socio-political aspects of shrimp mariculture. They were charged to integrate relevant worldwide experience with the available information on the cultured shrimp industry in Ecuador. The team prepared a series of papers to integrate existing information and experience that must be considered when attempting to formulate a management strategy. These papers were reviewed at a workshop held in Guayaquil in August 1986. The workshop provided for thorough discussion among the authors, industry representatives and government officials of the information presented and the merits of various recommendations for action, planning and research.

Based on these papers, the workshop and subsequent discussions, an integrated management strategy composed of the following seven priorities was developed:

1. *Maintain water quality in estuaries and near hatcheries.*
2. *Protect and manage the wild shrimp stocks that provide the most abundant and cheapest source of seed shrimp to the industry.*
3. *Strategic planning to maximize the long-term economic vitality of the industry.*
4. *Overhaul and simplify the permit system governing the siting and operation of ponds and hatcheries.*
5. *Evaluate the impacts of national policy on the shrimp industry as it is applied through the fisheries law.*
6. *Initiate a targeted technical assistance program and promote information exchange within the industry.*
7. *Initiate a public education program to help build support for the measures needed to protect the environmental quality that the shrimp industry requires.*

Efforts to implement this strategy through collaboration between the shrimp industry and key governmental agencies are now ongoing.

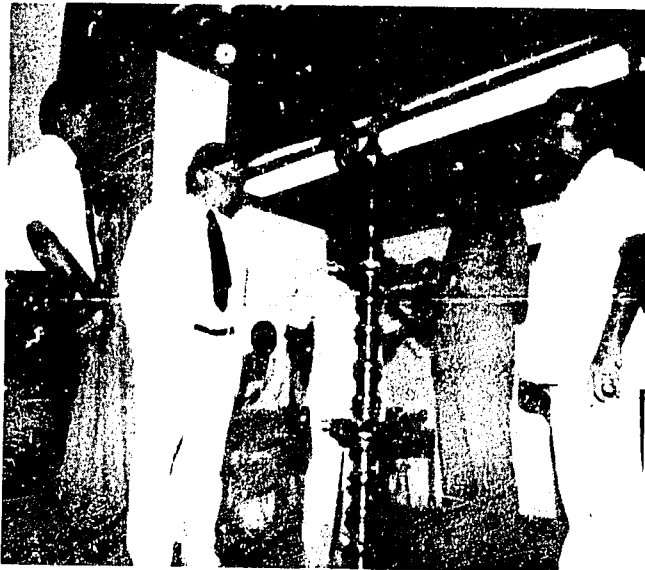


photo by Virginia Lee

*Inaugural session of
the Workshop on
Management of
Natural Coastal
Habitats in Sri Lanka,
May 1986.*

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Management of Coastal Habitats in Sri Lanka

In Sri Lanka, the destruction of coastal habitats is an urgent problem that, by increasing the pace of coastal erosion, destroys features attractive to tourists and reduces locally important sources of food, fuel and building materials. Since several of the most destructive human activities (sand and coral mining and mangrove clearing) are economically important to coastal residents, a coastal management plan must be sensitive to the social and economic implications of controlling the use of these resources.

Sri Lanka's natural coastal habitats are managed jointly by the Coast Conservation Department (CCD) and a number of other government agencies. In addition, many private organizations are concerned about the degradation of these resources.

One of the major initial activities sponsored by the URI/AID coastal program was directed at developing consensus among these governmental agencies and private groups on the causes of habitat destruction and the priorities for immediate action, planning and research.

Coastal habitats were defined to include coral reefs, estuaries, lagoons, mangroves, salt marshes, seagrass beds, coastal sand dunes, barrier beaches and barrier spits. A report integrating available information on coastal habitats specific to Sri Lanka, and priorities for management and research, was prepared by selected faculty from Sri Lankan universities. In addition, coastal habitats were mapped using available aerial photography and maps by a team at the Sri Lanka Survey Department.

The CCD then convened a three-and-a-half-day workshop to:

- review management objectives for each coastal habitat type
- review and rank the causes of the major management problems for each habitat type
- identify the research that will be most helpful in understanding how to better manage each habitat
- identify ongoing management efforts and research
- identify the management initiatives that can be implemented immediately or in the near future

Forty-nine participants representing governmental agencies concerned with the management of coastal habitats and non-governmental organizations interested in environmental conservation attended the workshop. Using facilitated workshop techniques, this diverse group of individuals was able to verify and expand upon the findings of the background documents and reach consensus on management objectives, management priorities, and information and research needs for each habitat type.

The findings and recommendations of the workshop (CRMP Technical Report 1) are the basis of the coastal habitats element of the Sri Lanka Coastal Zone Management Plan.



Participants in the Thailand CRM project are hosted at a luncheon by URI President Edward D. Eddy.

Evaluating U.S. Experience in CRM with Project Participants from Thailand

The design of a CRM project in Thailand, as in Ecuador and Sri Lanka, began with reciprocal visits of key project participants to the United States and Thailand. Visits to Thailand by U.S.-based project staff included tours of Thailand's coast, briefings on important coastal issues and meetings with principal Thai agency and university personnel likely to be involved in the Thailand CRMP.

In early December 1986, a group of 11 Thais representing five key agencies joined project staff from USAID/Washington and The University of Rhode Island for an intensive 12-day visit to the United States. The primary objective of the visit was to relate the experience gained from 15 years of coastal management initiatives in the United States to the design of a CRM project in Thailand.

The visit included in-depth discussions and field visits to several U.S. coastal management programs. The CRM experience in the United States from a national perspective was explored during a round table with policy makers in Washington who examined the central features of the American program and described the balance among federal, state and local interests. The group identified the key ingredients found to be effective in designing and implementing state CRM programs. Site visits to four coastal management programs illustrated the diversity of CRM efforts in the United States. Participants viewed examples illustrating some of the issues that each program addressed--preventing further filling in San Francisco Bay, enhancing public access to the California coastline, controlling waterfront residential development in New Jersey, and implementing a special area management plan for Rhode Island's coastal lagoons. The techniques used to achieve each program's management goals and reasons for successes and failures were discussed.



Appendix

URI/AID Coastal Resources Management Project Participants During 1985 and 1986

Board of Directors

Gerald Donovan, director, ICMRD, URI
 John Knauss, vice president of Marine
 Affairs, URI
 David Ross, Marine Policy Center, WHOI
 (withdrew from the Board in March 1986)
 Jack Sullivan, director, AID/S&T/FENR

AID Technical Committee

Caldwell Hahn, AID/S&T/FENR
 Molly Kux, AID/S&T/FENR
 Random DuBois, AID/S&T/FENR
 Nora Berwick, AID/S&T/FENR
 Michael Phillely, AID/ANE
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URI Coastal Resources Center

Stephen Olsen, project director
 Lynne Zeitlin Hale, asst. project director
 Donald Robadue, asst. director, CRC
 Virginia Lee, marine specialist
 Tundi Agardy, graduate assistant
 Marina Havan, student assistant

Consultants to the CRMP

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Institutional Analysis Issue Team

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 Kem Lowry, chairman, Urban and Regional
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 Brian Crawford, asst. training coordinator,
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 John Clark, International Affairs, National
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 Stanley Cobb, chairman, Zoology Dept., URI
 Lynne Zeitlin Hale, asst. director, CRMP
 Niels West, assoc. professor,
 Geography/Marine Affairs, URI
 Stella Vallejo, economics affairs officer,
 United Nations

Ecuador Pilot Project

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Counterpart Agency:
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 Ing. Jose Vasconez, engineer
 Eduardo Barrigan, marine biologist

USAID/Ecuador

Fausto Maldonado, project liaison officer

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 Efrain Perez, legal and institutional analysis
 Hilda Diaz Soltero, public education strategy
 Fundacion Pedro Vincente Maldonado,
 provincial profiles
 Bruce Eppler, Galapagos environmental
 profile
 Manuel Vacacela, public education

Shrimp Mariculture Issue Team

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Sri Lanka Pilot Project

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Counterpart Agency:
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 Anil Premaratne, asst. manager, Planning
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USAID/Sri Lanka

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Project Consultants

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Thailand Pilot Project

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(ONEB)

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USAID/Thailand

William Knowland, natural resources advisor
Kasem Srinlan, project liaison officer

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Province, Ministry of Interior
Pakit Kiravanich, inspector general, Ministry
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Archari Yuktanandana, chief of USA,
Subdivision, Department of Technical &
Economic Cooperation
Dhira Phantumvanit, associate director,
Thailand Technical Development &
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University

G. Kerr Lowry, chairman, Dept. of Regional
and Urban Planning, University of Hawaii

Thomas Weaver, chairman, Dept. of
Resource Economics, URI

WHOI: Woods Hole Oceanographic
Institution
NMFS: National Marine Fisheries
Service
ESPOL: Escuela Superior
Polyitecnica del Litoral