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ICOD Info

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South Pacific Surveillance:

Tightening Up on Foreign Fleets

Foreign fishing interests have traditionally exploited the rich tuna stocks in the waters surrounding the South Pacific island states.

With the Law of the Sea Convention, however, the nations in the region could assert more control over the development and management of the resources within their exclusive economic zones (EEZ's). The new jurisdictions also brought new challenges.

With millions of square kilometres of ocean to license and patrol, the sixteen island states of the region recognized the need to act together and share costs through their cooperative organization, the South Pacific Forum Fisheries Agency (FFA). The Agency was established in 1979 to assist its members to develop and manage their fisheries resources in a coherent and coordinated way.

"The right to harvest ocean resources is one thing," says FFA President Phillip Muller. "The ability to protect that right is quite another. The first issue of a nation is to assert control over its jurisdiction."

Director

Title
check
needed

In 1985, FFA requested that Canada's International Centre for Ocean Development (ICOD) provide the assistance necessary to develop a more effective surveillance capability. As the request fell within the Centre's mandate to support regional projects related to ocean management, ICOD responded with a one million dollar, five-year technical assistance program.

ICOD selected Don Aldous, a nine-year surveillance veteran with the Canadian Department of Fisheries and Oceans, to act as a technical advisor to the FFA in the Solomon Islands. He immediately set out to help develop a regional network of individuals trained in surveillance procedures.

Individual states also involved Don in specific projects. Papua New Guinea requested advice on how to expand the use of its navy into surveillance work. The Federated States of Micronesia sought direction in selecting the international personnel required to design and build its first patrol boat.

More effective tracking was essential. With the compliance of the Australian and New Zealand air forces, patrol flights were re-tasked to fly over the region's seasonal fishing areas, a procedure that greatly improved the sighting of foreign vessels.

In November 1986, Don met with fourteen of the sixteen Surveillance Officers of FFA to discuss initiatives and directions. A key recommendation of the meeting was to establish a hands-on training programme.

The second year of his appointment concentrated on implementing the recommendation. By February 1987, a set of training objectives was approved by FFA member governments, and, in October 1987 a seven-week course was organized at the Australian Maritime College in Tasmania. The course provided basic training for enforcement officers in navigation, seamanship, fisheries, biology, safety at sea, weapons, and other aspects of enforcement.

A hands-on fellowship programme was developed for individuals from the region. Robert Elias, the chief fisheries surveillance officer from Papua New Guinea, was invited to FFA's headquarters in Honiara, where he learned how to draft a surveillance plan. During his three month training period, Robert mastered the art of generating computer maps and forecasting boat movements for each fishing season.

In terms of new technology, FFA looked into advanced surveillance systems that could potentially provide instantaneous tracking information. One option was to put transponders aboard fishing vessels. Vessel operators could use the technology to key in their catch and vessel location and relay the information to FFA's data base. Acting on behalf of FFA, Robert Elias went to Vancouver to witness a successful demonstration of the technology and endorsed it in his report. A further demonstration is scheduled for Papua New Guinea in 1988.

Don's successor, Andrew Armstrong, met with FFA Regional Surveillance Officers at a meeting in Vanuatu on March 18, 1988. Andrew works with the Canadian Coast Guard in the three "C's": command, control, and coordination. Transferring skills in these areas is the next phase in developing FFA's surveillance capability. To address infractions, FFA countries must establish a system for quick information exchange and response which involves regional cooperation.

Surveillance and enforcement give teeth to new legislation such as the Multilateral Access Treaty recently negotiated between the sixteen FFA members and the United States. The Treaty encourages foreign fishing vessels to report when they enter and leave the region's EEZ's.

According to Phillip Muller, a strong, coordinated response involving legislation and surveillance has already produced results. "There has been only one request for blacklisting a vessel for fishing illegally, resisting arrest, and leaving the jurisdiction. The vessel was repainted and refitted in Honolulu, where owners spent thousands of dollars trying to change her identity. On learning of the blacklisting procedures, the owners returned the vessel, paid her fees, and bought a license."

When completed, the ICOD Surveillance Programme will leave the Pacific Islanders with sufficient training to coordinate their own surveillance efforts. A recommendation for the future is to establish a Regional Surveillance Centre to respond to the growing number of requests to know, "Who is fishing where?" Such a centre will require sophisticated equipment and extensive funding. Continued cooperation in developing better telecommunication networks through regional bodies like FFA will be essential for such a centre to succeed.

Reflecting on his work in the South Pacific, Don Aldous was impressed by the people who would ultimately carry on surveillance in the region. "The people I met and trained in surveillance were young, and in many cases just out of university, where they had earned their fisheries degrees. They were immediately placed in positions of great responsibility. A good many of them were extremely capable and likely to go far as the future leaders of their countries. It was a privilege to work with them."

Developing Human Potential

ICOD Info will regularly feature articles and interviews on issues underlying ocean resource development and management. The aim of the series is to present stimulating perspectives on a wide range of challenges being faced by coastal states. The viewpoints presented do not necessarily reflect ICOD's position as an agency.

This newsletter features an interview with the Chairman of ICOD's Board of Directors, Elisabeth Mann Borgese. Ms. Borgese is a professor of International Ocean Affairs at Dalhousie University and Chairman of the Planning Council of the International Ocean Institute.

She is widely known for her active role in the United Nations Convention on the Law of the Sea and her involvement in the *Pacem in Maribus* series of conferences. She is the author of many books including *The Drama of the Oceans*, *The Mines of Neptune*, and ~~the soon to be published~~, *The Future of the Oceans*.

ICOD Info: What do you see as the most pressing issues facing developing coastal states today? What role does ICOD play?

Elisabeth Mann Borgese: Since the Law of the Sea Convention, coastal nations have been faced with the challenge of developing and administering their Exclusive Economic Zones. ICOD's role as a funding agency is to assist developing coastal states in this process.

Within that context, the issues of national legislation, institutional infrastructure, and skills are basic, and will continue to demand our attention for the next twenty years. However, there have been significant changes in the approach to these issues in development strategy as a whole.

~~Ocean development is a part of development strategy in general, but our sector can be more innovative because it is where things are moving.~~ If you look at the general history of development cooperation, there has been a shift in emphasis from hardware- and capital-intensive big technology to the so-called "basic needs" approach. *But that does not appear to be the solution either.*

new Historically, we have come to recognize that you satisfy human needs most effectively by generating a surplus or increasing productivity. Among organizations like the World Bank, this recognition has led to a shift in perception concerning the gap that exists between industrial and developing countries in technology development. The imbalance is now recognized as a serious problem that must be addressed in creative ways.

towards paying more attention to

ICOD can assist in bringing developing countries into the high technology process. The marine sector provides a framework that is already in place, but, as an agency, we must be prepared to go beyond traditional approaches.

Q: How can such an approach benefit a developing country without the infrastructure to absorb new research and development?

A: This new wave of the industrial revolution stresses software over hardware; the human factor is the most important. This ~~counteracts~~ *is contrary to* our habitual thinking that technology is dehumanizing. ~~To the contrary~~ *Amazingly*, when we come to this development peak, the technology itself points to a direction you might call a "new humanism", with emphasis on the development of human potential. ~~We can take a lesson from~~ *Look, for example,* today's multinational companies ~~which devote a significant part of their budget to training.~~ *at the unprecedented amount of time and money*

You see, what developing countries have is human resources. It doesn't take any longer to develop them than it does to develop human resources anywhere else. Human beings are human beings. I see a very great opportunity here. This new *phase* of technology development is more accessible to the third world than was the previous phase that was hardware- and capital-based.

human-factor-based

Q: Are you saying that people from developing countries should participate in the development of technology wherever it happens?

A: Yes. And we must find new ways to include them in research and development and finance that participation. Their inclusion from the outset should make the technology appropriate to the needs of their country and avoid the cost of later adaptations.

But we can't think of going ahead in the usual intergovernmental mode where, for example, countries are asked to contribute on the basis of their participation in the UN. Setting up an international bureaucracy is not feasible for many reasons.

Instead, we must devise new, economically productive forms of industrial and scientific cooperation between north and south. These would mobilize the private sector and set up, or make use of, existing frameworks where private industry, government, and international organizations could work together productively.

This cooperative way of approaching development is already evolving in Europe. It can be used in Law of the Sea and ocean management assistance.

Q: How would a participant in one of these international megaprojects create an impact on his or her own country?

A: As things are now, technology is being developed by the north, then licensed and sold to the south. The south usually has no part in developing the technology which may or may not be applicable to the region. Furthermore, the south may or may not be able to maintain the associated equipment. This has been the classical pattern of failure for technology transfer.

Instead, let's imagine that this particular technology evolved by including the best trained engineers from developing countries from the beginning. These engineers would learn by working on the job. Once the technology had been developed jointly, the project participants would become co-owners with a major say in how it would be sited and managed in their own countries. This approach would reduce costly errors and inefficiencies.

Q: Will developing nations be as responsive to this approach as to one that gives them immediate tangible aid?

A: What I am suggesting is a complementary form of assistance to help them join the current phase of the industrial revolution. The technologies being developed in the industrial world are neither resource nor labour intensive. This fact has implications for developing countries who hope to base their competitive advantage on exporting cheap labour or natural resources. If these countries do not readjust their strategies to meet contemporary industrial trends, their relative prosperity and influence will continue to be marginal. My concern now is to find ways to involve personnel from developing nations in the most advanced and useful contemporary technology.

Q: Won't this approach to development create a gap between those trained in sophisticated technology and the rest of the country where illiteracy may be high?

A: What we are seeing already in countries like India is the spectre of a dual society where one part is highly developed without affecting the others. Accomplishments by the minority don't "trickle down". We have to find an approach to solving that issue. Each country will have to develop its own solution. Certainly it can't be left to the market forces. Selective participation must be planned so that the whole population benefits. One approach is broadly based education.

High Tech projects are not necessarily "mega projects". They can be fairly decentralized.

We are moving towards an era that is beyond market and Marxist economics. So we have to construct social and economic theory that takes care of today's needs.

That is why the marine sector is so tremendously exciting. By a quirk of history, we have a framework through which we can tackle the broad issues of development as a whole. Ocean development may be the way to show how this new approach can work.

The Honourable Monique Landry
Minister for External Relations and International Development
Ottawa, Canada

Elisabeth Mann Borgese (Chairman)
Chairman of the Planning Council
of the International Ocean Institute
Halifax, Nova Scotia

Gary C. Vernon (President)
International Centre for Ocean Development
Halifax, Nova Scotia

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ICOD's Board of Directors is comprised of the Chairman, the President, eight other directors from Canada, and up to four directors chosen internationally. The directors are chosen for their experience in the field of ocean resource development and international development.

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West African Fisheries:

International Effort Creates New Training Course

In February 1988, a training session in Dakar, Senegal, was given to twenty-three participants selected from among the member nations of the Committee for Eastern Central Atlantic Fisheries (CECAF). Course participants were joined by six observers from Madagascar, Mauritius, and the Seychelles.

The subject of the one-month training session was " tropical fish stock assessment", a special branch of fisheries biology that requires a basic knowledge of ecology, mathematics, statistics and computer science. The need for the course was recognized by CECAF, an organization of approximately twenty West African nations promoting cooperation in the management and development of coastal fisheries resources.

Successful training courses for qualified fish assessment personnel had been developed in English by the Food and Agricultural Organization (FAO) and the Danish International Development Agency (DANIDA), but nothing was specifically designed to meet the needs of francophone countries in West Africa.

Addressing the need to expand expertise among its members, CECAF approached Canada's International Centre for Ocean Development (ICOD) to design and deliver a French language training course in tropical fish stock assessment.

What resulted was a study in international cooperation. ICOD responded with funding of Can. \$373,000. CECAF personnel, West African scientists from the Centre de Recherche Océanographique de Dakar-Thiaroye (CRODT), five experts from Canada's Department of Fisheries and Oceans(DFO), and ICOD personnel participated in designing and delivering the course. Bob O'Boyle, a Canadian scientist working at DFO, was a key man in coordinating the international contingent.

The FAO/DANIDA training course was translated into French as a course reference. New materials, along with case studies on tropical African fisheries prepared by CRODT, were also developed to enhance the actual course presentations. Experts were consulted from as far away as Canada's University of British Columbia, FAO in Rome, and the International Centre for Living Aquatic Resources Management (ICLARM) in the Philippines.

An international team of lecturers from Canada, France, Morocco, Senegal, and Spain delivered the course. CRODT provided lecturers, computer hardware and software, as well as research, secretarial, and office support. CECAF coordinated the workshop logistics and provided computer support.

Course participants got hands-on training via new software and support materials designed for scientific calculators and IBM-compatible personal computers. They also received programmable hand-held calculators to assist them in carrying out their work in their own countries.

Course materials will be revised according to feedback from the participants and the opinions of international experts. The new manual is scheduled for publication in early 1989.

In retrospect, Course Organizer Bob O'Boyle feels that the international group was able to transfer a basic understanding of fish stock assessment techniques that could be used in the tropics. "Participants experienced a hands-on approach to preparing resource evaluation documentation. The course also provided enough training materials and computing facilities to allow self-training, transfer of knowledge to new recruits, and promote self-reliance in stock assessment."

Guide to Marine Training In Canada Published

Where are fisheries-related courses offered in Canada? Who provides specialized marine training programs? What merchant marine certification is available?

Questions like the above are frequently asked by the international community and by Canadians themselves.

To answer them, and make Canadian expertise more accessible to developing nations, ICOD recently published the *Directory of Marine Training in Canada*.

The new *Directory* is a single-source guide to the marine-related training and education available in Canada. Included are the relevant programs, courses, and associated research specializations of seventy-two Canadian universities, colleges, technical schools, and government departments.

The publication is useful to ICOD in matching up Canadian expertise to the needs of its training programmes for qualified instructors and institutions; it also gives developing countries and others access to what is offered in the marine field in Canada.

ICOD's training courses, scholarship programmes, and short term attachments are designed to respond to the specific needs of developing countries for skilled personnel in the ocean sector. In implementing training, ICOD uses the expertise of people and institutions both in Canada and the developing countries themselves.

With the first edition completed, planning for the second edition, expected in two or three years, is already underway. This version will include the marine-related training offered on a regular basis by Canadian industry. Readers' suggestions for improving the present *Directory* will also be incorporated. Please address all requests for copies of the *Directory of Marine Training in Canada* to ICOD's Information Division.

ICOD Projects Active in Four Regions

ICOD's total assistance budget is \$ million over five years. Although this budget is small by international assistance standards, ICOD has been highly active in initiating and responding to cooperative projects between Canada and developing countries.

One reason for the activity is that ICOD supports smaller and discrete projects that develop human resources or expertise and do not require large capital outlays. The Centre directs most of its assistance to countries where the development of ocean resources will have the maximum economic impact. Four regions - the Caribbean Basin, South Pacific, South and West Indian Ocean, and West Africa - provide the major focus for its programmes. In addition, ICOD undertakes selected global projects whose benefits will have wide applicability.

To date, the Centre has funded completed projects, and has another active in its target regions and globally. The total value of the projects is more than \$16 million.

Most of the requests for funding derive from the developing nation's or the region's own perceptions of priorities. While ICOD makes Canadian marine expertise and assistance more available, the developing countries themselves advise on how it can be used in their best interests.

ICOD programs take place at a regional, bilateral or global level and often complement the work of other Canadian or international agencies. In keeping with ICOD's organizational structure, its programs fall into three categories:

Through its **Technical Assistance Division**, ICOD aims primarily to help create or strengthen institutions involved in ocean management, especially in the developing island and coastal states.

Through its **Training Division**, ICOD assists in the design, development, and delivery of training courses and seminars, the preparation of related teaching materials, institutional development, and scholarship administration.

ICOD's **Information Division** generates learning and research materials that are relevant to the marine programmes in developing countries. ICOD also assists island and coastal states in building their own capacity to gather and use information from indigenous sources.

ICOD projects are gradually diversifying into all aspects of ocean resource development and management. A quick scan of the "Approved Projects List" reveals activity in the areas of research vessel operation, surveillance, marine information, and marine affairs diploma programme, to name a few. This project list is indicative of ICOD's scope and available to interested applicants. (*See "In Brief" for information on this publication*)

Becoming familiar with the territory has helped the Centre to achieve momentum. Being small and highly focussed allows it to initiate or provide support for projects quickly. With three years of experience, ICOD has become involved with the marine issues that affect the coastal nations it serves. The number and the diversity of ocean projects completed and "on the go" gives ICOD a truly international orientation.

Scholarship Assistance Available

The objective of ICOD's Scholarship Programme is to develop human resources and specialized expertise in fields related to ocean resource development and management.

To be eligible for scholarships, candidates must be nominated by the governments or institutions of their country of origin. Scholarships focus on specific developing countries in four geographical areas: Caribbean Basin, South and West Indian Ocean, South Pacific, and West Africa.

ICOD grants up to twenty scholarships per year for suitable candidates to attend a one year graduate diploma programme in Marine Affairs given in Canada. Ten scholarships are available for study in English at Dalhousie University and ten for study in French at the Université du Québec in Rimouski, Québec.

Up to twenty scholarships are granted annually for study at the Master's level in marine-related fields at Canadian universities.

Further scholarships enable students to attend the World Maritime University (WMU) in Sweden and the regional universities of the South Pacific, West Indies and Papua New Guinea. ICOD administers specific WMU scholarships on behalf of the Canadian International Development Agency.

ICOD also offers a limited number of awards for participation in the International Ocean Institute's ten week training programme in the "Conservation and Management of Marine Resources: The Exclusive Economic Zone".

Eligible governments wishing to obtain further information on academic requirements and application deadlines may contact ICOD's Training Division.

Scholarships:

The End of a Successful Year

Barbara Chow is a Jamaican student who recently completed a Diploma Programme in Marine Affairs at Dalhousie University in Halifax, Nova Scotia.

Barbara was recommended for the one-year ICOD-sponsored scholarship by the Marine Science Unit of the University of West Indies, where she is currently completing her Masters thesis. She has also worked for approximately four years in Jamaica's National Resources Conservation Department (NRCD).

The Marine Affairs Diploma Scholarship is a one-year graduate course designed to provide students with concepts and tools that allow them to work effectively in various aspects of ocean management. There were nine full time international students enrolled in the course during the 1987-88 academic year, with a substantial increase projected for 1988-89.

Barbara applied for the scholarship because of her interest in coastal zone management, particularly in the area of eco-toxicology. "The way the course is structured allowed me to bring my background in science into an ocean management framework. I wanted a chance to develop my own ideas, and the course gave me broad exposure to many different sectors such as environment, fisheries, pollution control, information systems, and Law of the Sea."

Barbara was appreciative of Canadian expertise in the marine fields and also for the chance to meet and discuss marine issues with co-students from around the world.

As one of the first to be trained in Marine Affairs in her country, she looks forward to being useful when returns. "The Government of Jamaica will decide where I will ultimately be placed. My immediate plans are to return to NRCD where I hope to contribute to the framing of marine policy in regard to pollution issues."

Note: This item to be used in close proximity to the Surveillance article.

Profile: Fisheries of the Solomon Islands

ICOD Info regularly profiles a country where ICOD provides assistance for marine resources and industry development. The profile highlights information and statistics of interest to other developing countries.

Graph 1977-1985

1. total catch and tuna catch
2. fisheries exports volume
3. tuna export value

Information also contained on the graph:

Total Fish Catch (1985)	44 500 tonnes
.Fisheries Export (1985)	U.S.\$2.2 million
Exclusive Economic Zone	1.3 x 10 km
Growth Prospects	Total Allowable Catch - 83 500 tonnes Actual Catch (1985) -44 500 tonnes (22 500 tonnes of tuna)

Text

With other South Pacific Island States, the Solomon Islands is set within one of the world's richest tuna fishing areas. Fisheries is the country's largest private sector employer, and contributes 32% of foreign exchange earnings through exports to European Economic Community, Hong Kong, Japan, and Thailand .

The Solomon Islands has bilateral fishing agreements with Japan, South Korea, and Taiwan and a multilateral agreement with the United States negotiated through its membership in the 16 nation South Pacific Forum Fisheries Agency (FFA).

The Solomon Islands looks to the fisheries as a focus for development and as a means of increasing its foreign exchange earnings. Development assistance is provided through bilateral donors - Australia, New Zealand, Japan, and U.K.- and multilateral donors (e.g., FAO/UNDP and the Asian Development Bank).

Future development assistance is required to train fisheries officers and extension workers; develop artisanal fishing vessel designs; conduct fisheries research; and survey fisheries resources other than tuna.

ICOD is sponsoring a Can.\$82,000 bilateral project to establish rural fishing groups in the Western Province of the Solomon Islands. In conjunction with FFA, ICOD provides assistance in a number of projects which involve the Solomon Islands. Most noteworthy is a Can.\$1 million, five-year project to develop a fisheries surveillance capability.

In Brief

Available Now

World Fisheries Map - This ICOD-produced map is an educational tool for use abroad and in Canada.

The map conveys basic information on the fisheries of all countries at a glance. Colours differentiate the extent of national development in fisheries. Insets give further information on catches by country and region, international trade and fishing effort. Also available with the map is a pamphlet of explanatory notes on the statistics, as well as suggestions for using the map as a teaching aid.

Now in English and French, the map will soon be available in an Arabic version. Free copies of the map may be obtained by writing to *ICOD Info*.

Cooperation: Key to Ocean Development in the South Pacific is a video documentary describing the achievements of 16 independent nations working together through membership in the South Pacific Forum Fisheries Agency (FFA). The Agency assists its members in developing and managing their fisheries resources in a coherent way. *in*

The eighteen minute video (twenty-two minutes in French) profiles the issues, challenges, projects, and personalities of FFA. Suitable for seminars and educational use. Requests for further information on this product should be addressed to the Information Division of ICOD.

On its way

In August 1988, ICOD will make available a computer program library designed to perform many of the geodetic tasks associated with the delimitation of maritime boundaries. Designed to run on IBM Personal, XT, or AT computers (or compatibles) the library's structure allows users to select options that provide valuable technical information during the preparation, actual negotiation, or verification prior to ratification of an international boundary agreement. The five floppy-disc program is user-friendly, and will be made available with documentation in English, French or Spanish. Enquiries about the program's availability and cost may be addressed to the Information Division of ICOD.

Masthead Information

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ICOD Logo

The International Centre for Ocean Development was established as federal Crown Corporation in February 1985 with a mandate to initiate, encourage, and support cooperation between Canada and developing countries in the field of ocean resource development. Under the guidance of a fourteen member Board of Directors including four international members, ICOD initiates and supports programs for the development of indigenous expertise and institutions in developing countries for the improved management and utilization of ocean resources, particularly as a source of food. Programmes are carried out by enlisting individual and institutional expertise in Canada, developing countries, and elsewhere and by developing and sponsoring technical assistance/training/information programs, advisory services, and research relating to ocean resource development.



Women in Development:

South-South Technology Transfer in Sao Tomé and Príncipe

The artisanal fisheries of Sao Tomé and Príncipe play an increasingly important role in the economy of this island nation nestled on the Equator off the west coast of Africa. Representing 6.5% of the GNP, landings in the fisheries have doubled since 1980. As a result, the consumption of fish, an important source of protein in local diets, has increased from 27 kg per person in 1984 to 45 kg per person in 1989.

Improved landings have meant greater economic independence for those involved in the fisheries, from the men who harvest the rich waters to the women who traditionally purchase and market the fresh and preserved products. The larger

volume of landings has accentuated a longstanding difficulty in tropical climates - the prevention of waste in that percentage of the catch that cannot be sold fresh.

As in other parts of West Africa, the women of Sao Tomé and Príncipe have relied for generations on the techniques of salting and smoking to ensure a longer storage life for their products. The techniques are very labour intensive and do not always result in the desired storage life. Assuring storage life would of course increase the economic potential realized by the women involved in the process.

Salt shortages in Sao Tomé and Príncipe have undermined one traditional preservation technique. Current smoking methods

are not efficient in terms of fuel consumption and are seen as dangerous due to the tendency to rely on open, unprotected fires that are often set very close to or inside a dwelling. Local authorities identified a growing need for alternative smoking technologies.

At the request of the Women's Organization of Sao Tomé and Príncipe (OMSTEP) and in cooperation with the UN Development Fund for Women (UNIFEM), and the Canadian Embassy in Gabon, ICOD is participating in a pilot project with the "palayé" women from the coastal town of Neves. This project (ICOD contribution - \$24,410) focuses on the introduction of the Chorkor smoking technology to the "palayé" women, many of whom are married to artisanal fishermen.

The two principal advantages of the Chorkor oven (see back page article), developed in the Gulf of Guinea by the Food Research Institute of Accra and the FAO, are its capabilities for handling larger volumes of fish and its improved fuel efficiency over open fire methods. Introduction of the Chorkor oven also entailed training in its use and construction, an analysis of market potential for the finished product, and a focus on community development for the "palayé" to strengthen the cooperative nature of the undertaking.

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Mrs. Prera (seated, with pen, at left) leads a discussion on the Chorkor oven in Neves.



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**International Centre for
 Ocean Development**



Canada

The International Centre for Ocean Development was established as a federal Crown Corporation in February 1985 with a mandate to initiate, encourage, and support cooperation between Canada and developing countries in the field of ocean resource management and development. Under the guidance of a fourteen-member Board of Directors including four international members, ICOD initiates and supports programs for the development of indigenous expertise and institutions in developing countries for the improved management and utilization of ocean resources, particularly as a source of food.

Canadian Cooperation Office — South Pacific
 Private Mail Bag
 14 McGregor Road, Suva, Fiji
 Fax: 679-302-014
 Telex: 679-302039 or 679-302016
 Attention: Mr. P. Saunders

Two West African consultants played a central role in the project's implementation. Mrs. Anne-Marie Prera, a Senegalese consultant with UNIFEM, prepared the groundwork by leading community development workshops for the 20 "palayé" women initially involved in the project. Mr. Jules Zinsou, an expert in the Chorkor smoking technology from Benin, was contracted by ICOD to train the women in the construction, use, and maintenance of the Chorkor oven. He also helped them to analyze the marketing potential of, and consumer reaction to, the finished products.

The complementary skills of the two consultants helped to ensure that project objectives were met and that the concerns of the "palayé" women were addressed. Mrs. Prera served as a resource person in the areas of group organization, management, and financial administration, all essential elements for the successful outcome of the project.

Mr. Zinsou brought five years of experience with the Chorkor smoking technology to the Neves project from his work in other West African projects. He believes that the Chorkor oven is aptly suited to the women and conditions of Neves.

"This oven responds well to the socioeconomic conditions of the Neves women. It's an improved version of a traditional oven which is inexpensive and can be built by the women themselves."

Mr. Zinsou also emphasizes other important benefits of the Chorkor system: "This oven results in a considerable reduction of wood used for smoking, a reduction in the women's work load, and an improved product quality and subsequent increase in revenue".

Taste tests using local species such as tuna, the grey sea bream, "culombetta", and "andalla" were termed a great success. Taste, consistency, and colour were all highly desirable, with top marks going to the "andalla" fish.

Market potential for the smoked fish is considered excellent

and should serve both local inhabitants as well as the hotel and restaurant industry of the country. Gilles Alie, a Canadian serving in an artisanal fisheries development project sponsored by the International Fund for Agricultural Development, witnessed the market tests.

"It's an excellent product which tastes better than smoked salmon. However, for larger markets, improvements will have to be made in packaging and presentation".

Mrs. Prera, who worked on the project from its inception, highlights the importance of the project for the women of Neves: "The women truly felt involved in the economic development of their region and their country. Those selected to make up the group took their roles to heart in regards to the viability of the project and its possible further development. The new technology improves their marketing potential and increases their buying power which results in an improved quality of life".

To help the women of Neves to take their product to market in the larger inland area, the Canadian Embassy in Gabon has contributed two motorized tricycles. This will greatly aid market penetration as it will cut down on transportation costs and time.

The only serious drawback for the project was an unusual lack of raw materials. Fish landings in Neves and the surrounding area were down in 1989 and could not meet with the volume that the Chorkor oven is capable of handling. However, this problem should be resolved in the near future.

With the concerted efforts of West African consultants, the government of Sao Tomé and Principe, and sponsoring agencies, the women of Neves have learned skills which are opening new doors and providing new opportunities for them in their pursuit of food security and economic independence.

(See also accompanying story on the Chorkor Oven on page 16.)



Fresh fish on the way to market in the town of Sao Tomé.

Caribbean Environment Takes Higher Profile: An Ocean Under New Management

The pristine, tropical ocean is part of the Eastern Caribbean's allure and the basis of its tourism industry.

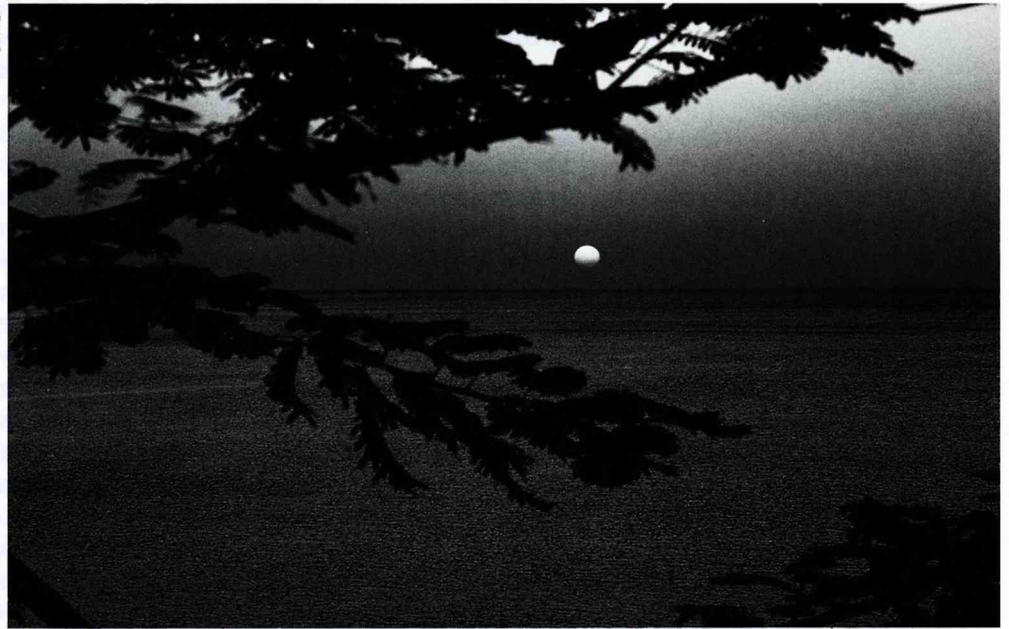
For island people, the same ocean provides tuna, conch, and myriad forms of aquatic life as a source of food and fisheries-related opportunity.

While the Caribbean has been an accepting host to many competing uses in the past, its limits are now being reached. Particularly in those areas where land-based development, such as tourism and agriculture, is concentrated, the surrounding waters, with their species and ecosystems, have been subject to degradation. This limits development in the short term and, if unchecked, may jeopardize any sustained effort to use the ocean to improve the quality of life.

Using Barbados as an example, Dr. Euna Moore, Director of the Centre for Resource Management and Environmental Studies (CERMES) at the University of the West Indies, states: "Studies over the last thirty years indicate a five-fold increase in the contamination effect on the south- and west-coast bays."

Along with such factors as overfishing and climatic variations, coastal contamination is contributing to some notable changes in the Caribbean. These include the deterioration of coral reefs, the decrease in fisheries stocks, the reduction of species such as the sea urchin and conch, the failure of local industry, an increase in fish kills, and the more frequent appearance of algal blooms.

Among Caribbean countries, there is a clear awareness that limiting adverse environmental effects is an ocean management challenge for the entire region. Organizations such as the Natural Resources Management Unit of the Organisation of Eastern Caribbean States (OECS) and the Caribbean Conservation Association have recently expanded their profile in encouraging the use of more sensitive



policies in land development and fisheries management.

Assistance organizations such as ICOD, which encourages ocean resource management, are conscious of the need to consider the environmental impacts of any projects undertaken in the region. In fact, ICOD has identified marine environmental conservation as one of the primary themes that form a focus for its program funding.

"Obviously, it is counterproductive to fund a marketing, training, or aquaculture project that unwittingly creates an adverse environmental effect," says ICOD's South Pacific and Caribbean Basin Director Peter Flewwelling. "We encourage projects that measure and mitigate the long-term effects of resource exploitation on the environment."

ICOD's concerns in this respect reflect those of its program partners. A first wave of projects, explains Flewwelling, addressed the fisheries as a socioeconomic concern. A second wave directly relates to bolstering the ability of Caribbean nations to monitor and manage their ocean environment for the long term. He cites the example of the Caribbean Environmental Health Institute's (CEHI) program to expand its environmental monitoring capability.

In 1982, CEHI, a CARICOM agency, established a subregional network to monitor bacterial pollution levels, primarily at principal sewage outflow areas. These health measures were necessary to protect swimmers, particularly around densely populated tourist areas.

With ICOD assistance, CEHI will now expand its sampling capabilities to include microbiological, physiochemical, hydrocarbon, pesticide, and herbicide pollution indicators. This information will be used to evaluate environmental degradation,

Among Caribbean countries, there is a clear awareness that limiting adverse environmental effects is an ocean management challenge for the entire region.

particularly for influencing policy formulation and land-use regulations. Scientists may also be able to make more convincing correlations between pollution levels and fish kills, the disappearance of species, and algal blooms. As scientists are quick to note, however, this information must be gathered over a number of years to note trends and account for significant changes.

While some programs will gather information, others will attempt to conserve areas that are at present unspoiled. To date, Caribbean nations have declared 27 protected areas as marine parks. These "ocean wilderness" sites are preserves for many species that otherwise might be



Artisanal fisheries are an important means of livelihood in the Eastern Caribbean region.

lost due to development or over-fishing; they are also breeding grounds for juvenile fish. Managed wisely, marine parks could be major tourist attractions in providing ocean-interpretation and controlled scuba-diving activities.

While a marine territory may be designated as a park, effective management is necessary to truly protect the environment. As David Simmons, a program officer with the Caribbean Conservation Association, states: "Many areas designated as parks are at present poorly demarcated and lack adequate regulations. Most management constraints stem from budgets being small and limited staffing. Suitable regional training for managers and technical staff is just now starting to develop."

To address these problems, CCA, with ICOD assistance, organized a workshop on project development for national parks and protected areas. The work-

shop, held in Dominica in March 1989, attracted 30 participants from 20 Caribbean countries. It provided an opportunity to establish a region-wide network of managers who could share experience and expertise. As a result of the workshop, a number of proposals will be submitted to ICOD as part of a large program to fund marine park management.

Central to the whole question of environmental decision-making is the necessity of training competent ocean management specialists who can begin to influence policy and political decision-making. As a result of this need, the UWI's CERMES program will expand beyond its diploma level to grant a master's degree in marine resource and environmental management.

ICOD assistance — \$699,000 over two years — will allow CERMES to increase its teaching staff and administrative support to make the program viable within the region. In addition to formal course study, both the diploma and masters programs will require that students undertake research projects identified by their sponsoring governments or regional organizations. Future CERMES graduates are expected to contribute significantly to ocean policy and management in the Eastern Caribbean region.

Public education will play a key role in making environmental issues a political priority. The new OECS newsletter, *On Board*, joins similar publications in covering environment-related topics. A recent issue of *On Board* carries a report on an unexplained fish kill off Barbados, Grenada, and St. Vincent. A second article in the same issue describes how, as a result of better management practices, fishermen from Barbados harvest sea-eggs once again after a ban of two years.

Other ICOD-sponsored programs, such as the preparation of a marine education kit for St. Kitts and Nevis, will teach school children how different interest groups put different and often conflicting demands on the ocean environment. The development of a Marine Interpretation Centre in Barbados, located next to a protected area, will help to educate the general public and tourists on the role played by parks in contributing to the overall environmental health of the oceans.

OECS Director-General Vaughan Lewis feels that the ocean's environmental component must be put into its proper perspective. "For years, we've been able to develop our fishing efforts, tourism, and land developments without really knowing the consequences for our marine environment. In many areas, that type of development has now reached the point of diminishing returns where we are seriously limiting the ocean's ability to sustain future development. To understand the extent of the problem, we must collect more information and utilize it wisely in the shared management of our common resource. By acting cooperatively, we have the best opportunity of putting our precious Caribbean ocean under new management." ○

Boundary Delimitations:

Good Fences Make Good Neighbours - Ocean Style

We sometimes assume that the boundaries between nations are fairly well-defined and have been for some time. While this is true of land boundaries, ocean boundaries present a different scenario. There are at present approximately 300 ocean boundaries between states that are undecided or in dispute. At issue is the growing importance of ocean resources in the development plans of many coastal nations.

Indeed, expanded offshore jurisdictions are particularly meaningful for smaller island or coastal nations whose landmass and resources are limited. Mauritius, in the Indian Ocean, for example, has an onshore territory of 2,000 km². By laying claim to its offshore territory, the country gained jurisdiction over an additional 1,183,000 km² and legal access to a bountiful fisheries.

The 13 island nations of the South Pacific, ranging from Papua New Guinea to Vanuatu, and representing (by rough estimates) a land mass of 522,000 km², now control over 19 million km² of offshore territory. While the extension of jurisdictions by neighbouring coastal nations brings potential gains, it also entails the necessity for agreements. There are at present well over 20 maritime boundary negotiations to be resolved in the South Pacific region.

Reasons for change

Since we've lived without exact marine boundaries up to this point, why is it so important to establish them now?

The maxim that "good fences make good neighbors" holds true for offshore boundaries. For many countries, the offshore areas often represent the greatest potential for new resource wealth and food security.

As land resources are depleted, the still fertile and mineral-rich offshore areas offer the last frontier for exploitation. In the past, wars were often fought for possession of scarce resources; in the present context, however, which is influenced by the 1982 United Nations Law of the Sea Convention (UNCLOS III), countries are increasingly referring their problems to international courts or tribunals for resolution. At risk in the dispute between Venezuela and the Eastern Caribbean island states, for example, are significant fish stocks and access to mineral and energy reserves.

Coastal and island nations are putting a new emphasis on settling their offshore boundaries for many reasons.

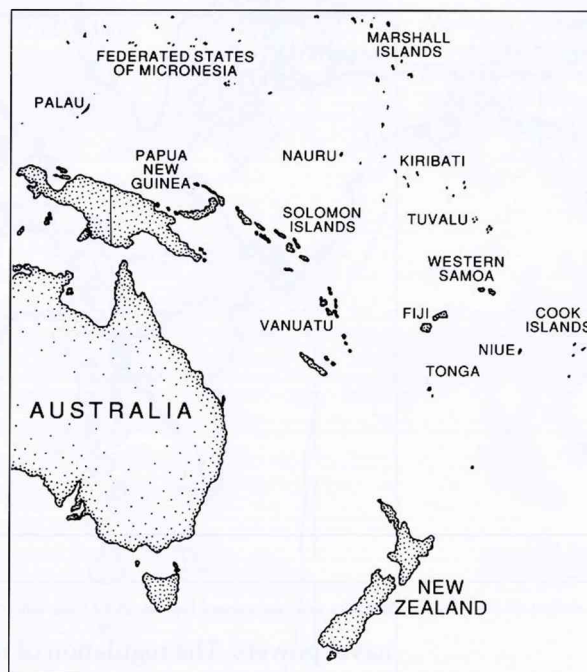
Fisheries

Coastal and island nations endeavour to define their exclusive economic zones by treaty in order to determine their own internal fishing

quotas and control access to fisheries resources. Canada, for example, regularly negotiates fisheries treaties with EC countries, the Soviet Union, the United States, Japan, and others. Having a boundary is a prerequisite for negotiating such a treaty and for determining responsibility in the case of a violation.

Global navigation and positioning

New pressure for accuracy is coming from other directions. Satellite positioning systems are now more common. Ships making use of such systems are able to define their location anywhere on the globe to within



Amongst the island nations of the South Pacific, over 20 maritime boundaries have yet to be resolved.

100 metres. The cost of employing this technology is coming down dramatically so that it will soon be more widely employed.

When satellite positioning is combined with surveillance, coastal nations can track a foreign ship in their territorial waters and determine whether it is in violation of an agreement. Positioning devices also allow infringing fleets to fish just inside boundaries, a capability which suggests that host coun-

(continued on page 6)

tries may require an equal technology to monitor and police such activities. Negotiated boundaries are necessary to enforce many fisheries disputes and to encourage would-be-violators to comply with national maritime laws.

Shipping and national security

More than ever, countries want to control the nature of maritime shipping within their territorial waters. This is particularly true because of the movement of hazardous wastes and the increased risk involved in the transportation of oil. The environmental disaster caused by the Valdez spill off Alaska, for example, raises new concerns for the regulation of shipping in the Arctic and on Canada's west coast. In both areas, the maritime boundaries between Canada and the United States are now being negotiated.

Many states consider shipping and navigation rights essential to their national security. Maritime boundaries are necessary to measure infringements against sovereignty by opposing

tionally. One of the few unexploited reserves of significant minerals is in the deep seabed.

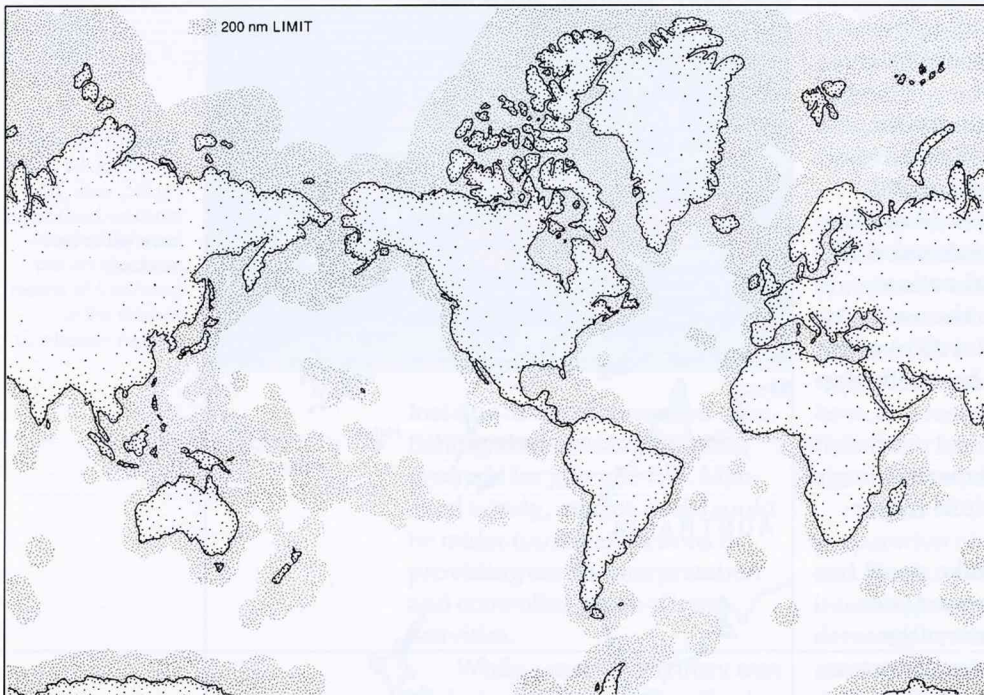
At present, the technology to mine the deep seabed is not cost-effective. However, as land-based mining depletes resources, the cost of developing offshore mining technology will become much more attractive. While deep seabed mining is still in its infancy, it is estimated that the activity will mushroom by the year 2000. Many rich mineral deposits are often located on geological formations that cut through unresolved offshore jurisdictions. *An arcane science becomes commonplace.*

So why is it so difficult to draw a boundary?

One of the principles used in initiating a boundary negotiation, though by no means the determining factor in settling the question, is drawing an equidistant line between states. But even the creation of an equidistant boundary requires rather exact data and some common ground in establishing a baseline from which to begin.

The difficulty is illustrated by the various methods that can be selected for making map projections. Different projections give slightly different results that can result in large differences in the areas delimited over long distances. The importance of agreeing on such methods is demonstrated in the ongoing North Sea boundary negotiation between Norway and Great Britain. A slight variance in the division line will place a significant hydrocarbon deposit under different national jurisdiction.

Geodesy, the study of the shape of the earth, underlies cartography, hydrography (the mapping of the oceans), and surveying. What makes geodesy challenging is that the shape of the earth is three-dimensional and anything but regular, and reproducing that shape via two-dimensional projections creates a distorted view of actual areas.



Shaded areas show the extent of the offshore territory encompassed by the 200 mile limit on a global scale.

naval powers. The regulation of traffic in sea lanes is a complex issue, particularly when it affects maritime states with unresolved offshore jurisdictions. There are areas in the South Pacific, for example, where the resolution of pressing shipping issues is tied to pending boundary claims.

Mineral exploitation of the deep seabed

The U.S. Congressional Committee on International Relations published a report entitled "Deep Seabed Minerals: Resources, Diplomacy and Strategic Interest,"*. The report outlines the role played by so-called strategic minerals in future development. Minerals such as manganese, nickel, copper, and cobalt may someday be in short supply, not only in the U.S. but interna-

*Library of Congress, Science Policy Research Division. 1978 "Deep Seabed Minerals: Resources, Diplomacy, Strategic Interest". Washington, D.C. United States Government Printing Office.

The computer, with its ability to incorporate many dimensions, has been an invaluable tool in assisting geodesists in their calculations. They, in turn, have been able to provide the various members of boundary delimitation teams with accurate data as a basis for negotiation. Negotiators can then bend and pull their starting positions to reflect geological formations, traditional fishing grounds, long-standing sovereignty, and the myriad other factors that influence a boundary in the making.

As the world moves into the post-UNCLOS III era of realignment, geodesists are looking forward to a bright future. Galo Carrera, for example, is a Canadian geodesist and consultant based in Nova Scotia. Carrera serves as the secretary of a special study group of the International Association of Geodesy. The mandate of the group is to determine and advance the international science of boundary-making, particularly in a maritime context.

As a consultant working with ICOD, Carrera developed DELMAR, a maritime boundary delimitation software package. The program was prepared to run on IBM and compatible PCs, a feature that would make it economically accessible to developing nations.

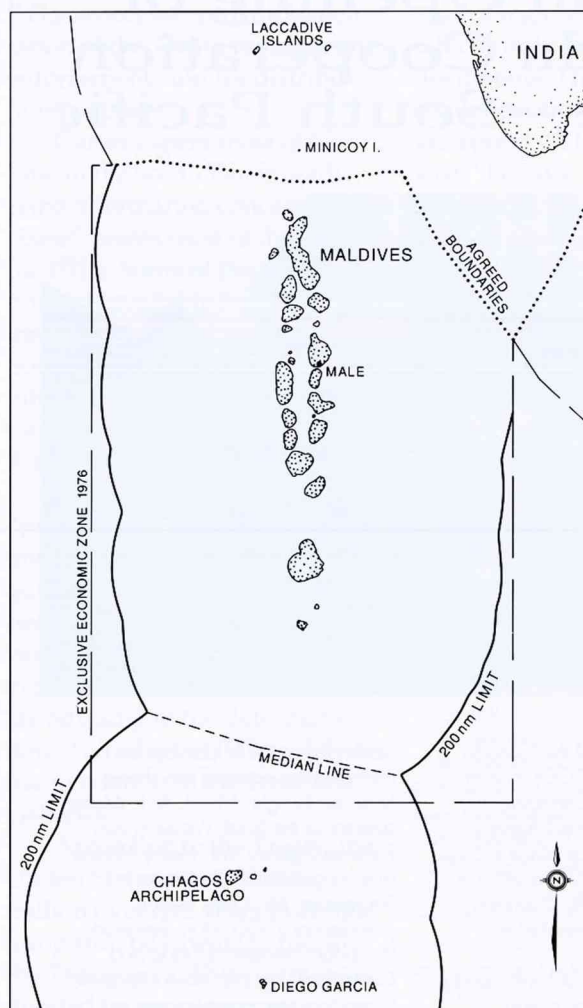
The forerunners of DELMAR were designed to perform on large mainframes. DELMAR, by contrast, is portable and can be applied to most delimitation questions. It allows negotiating teams to calculate and verify potential boundary lines on the spot, a feature that speeds up a drawn-out process. DELMAR also makes possible a graphic simulation so that politicians and lawyers can make sense of the arcane figures and calculations of surveyors and cartographers.

DELMAR is already being used in boundary negotiations in the South Pacific. Its release by ICOD in French and Spanish has made it available to more developing nations. There may

also be wider applications. Carrera received an enquiry from the U.S. State Department, as well as the Canadian Air Traffic Controllers Association, who see a use for DELMAR in the determination of air-space boundaries which after the ocean may be the next frontier for boundary-makers.

"Delimiting boundaries is a demanding business," says Carrera. "Countries approaching boundary delimitation talks unprepared may be surprised years later to find they signed an agreement where they lost territory or a valuable resource through poor calculations. As an assessment tool, DELMAR can be used to gain insight into the methods used in the past. In the process, any discrepancies will likely be found.

"We can also look ahead to an era of active negotiations. One has only to consider the Canadian Arctic. It's impossible to discuss Canadian sovereignty there without including boundary negotiations in the process. And yet, there are immense stretches of the Arctic Sea where we have not begun to determine where Canadian jurisdiction begins and ends." ○



Monitoring, control, and surveillance of a large EEZ is a major challenge being faced by the Maldives, a small island nation in the Indian Ocean.

(Note: The Maldives is not depicted to scale.)

New and Recently Approved Projects in Brief

SOUTH PACIFIC

Continuing the Nearshore Minerals Prospecting Program

Two Canadian geologists are being posted for two years to CCOP/SOPAC's Nearshore Minerals Prospecting Program in Suva, Fiji, to provide training in marine and coastal geology and to coordinate research. This initiative builds on an earlier ICOD project, in which Canadian geologist John Harper helped to survey

nearshore mineral resources in the South Pacific and establish the scientific procedures for managing them.

Recommending Provisional Treaty Lines

ICOD is providing funding to enable Forum Fisheries Agency (FFA) consultants to identify and recommend basepoints and baselines for FFA member states to use in defining areas affected by the multilateral tuna treaty. The consultants will also do the

groundwork for a further proposal to prepare and recommend provisional treaty lines.

Conducting a Fisheries Extension Development Workshop

In early 1990, the South Pacific Commission will conduct a one-week regional workshop to help Pacific Island countries review and strengthen the extension services provided by their fisheries divisions and to develop a support network for fisheries extension officers. This is the third in a series of ICOD projects to develop the extension services.

Official Opening of Canada Cooperation Office – South Pacific



The official opening of the Canada Cooperation Office (CCO), a joint venture between the Canadian International Development Agency (CIDA) and ICOD, took place in Suva, Fiji, on Sept. 29, 1989. The office is being directed by Phillip Saunders, ICOD's regional representative.

Through the CCO, ICOD will manage a five-year, \$10 million ocean development project on CIDA's behalf as well as administer its own projects, which involve a further \$10 million over five years. The CCO will also serve as a coordination point for other Canadian development assistance organizations in the South Pacific.

Some of the official participants attending the opening are shown here, left to right: Mr. D. A. P. Muller, director of the South Pacific Forum Fisheries Agency; Mr. Henry Naisali, director-general of the Forum Secretariat; Mr. Gary Vernon, president of ICOD; Hon. Beranado Vunibobo, minister of Trade and Commerce, Fiji; Mr. Allen Kilpatrick, Canadian high commissioner to Australia; and Mr. Leslie James, chargé d'affaires for Canada to Fiji and acting high commissioner to New Zealand.

CARIBBEAN BASIN

Examining the Causes of Low Catch Rates

ICOD is helping the OECS Fisheries Unit to investigate the biological and climatic factors that contributed to the reduction in catch rates of major migratory pelagic fishes, as experienced by the Windward Islands during the first half of 1989. Remedial action will also be recommended.

WEST AFRICA

Providing Undergraduate Scholarships for Technicians

ICOD has awarded scholarships to two technicians from the Centre de recherches océanographiques de Dakar-Thiaroye (CRODT) in Senegal. The recipients are currently studying in the one-year multidisciplinary Fisheries Studies Certificate program at the University of Moncton in Shippagan, New Brunswick.

Revising Cameroun's Merchant Marine Code

To assist Cameroun in completing the revision of its merchant marine code to reflect the current state of the country's shipping industry and international obligations, ICOD is providing the assistance of Canadian lawyer Guy Vaillancourt. Mr.

Vaillancourt, who is Director of the Canadian Association of Maritime Law, will also help to draft the new code.

Training Trainers of Fishing Technology at ISSTH

A professor from L'Institut supérieur des sciences et techniques halieutiques (ISSTH), a regional institution located in Mauritania, is spending ten weeks at the New Brunswick Fisheries School in a course designed to train him to train others in the use of fishing gear and technology. At the end of the ten-week program, the professor will teach the course at ISSTH.

INDIAN OCEAN

Providing Advice on Marine Conservation and Management

The government of Mauritius has asked ICOD for help in implementing its recently developed long-term plans for controlling the exploitation of the country's marine resources and protecting its marine ecosystems. A marine environmental specialist is being posted to the region to coordinate the new strategy and to assist in the development of the National Marine Environment Management Plan.

Establishing Marine Parks in Mauritius

As part of its new environmental program, the Government of Mauritius is establishing two marine parks in an effort to preserve the country's fragile coral reefs. To this end, ICOD is providing a consultant to help delimit the parks, establish park policy and management procedures, and train two members of the Marine Conservation Unit as park managers.

INTER-REGIONAL ACTIVITIES

Awarding Technician and Engineering Scholarships at ISSTH

Starting in late 1990, ICOD will provide four scholarships each year for the next three years to enable students selected from Benin, Ivory Coast, Mauritania, and Senegal to study at the Institut supérieur des sciences et techniques halieutiques (ISSTH). ○

DELMAR Sees Action in South Pacific

DELMAR*, ICOD's boundary delimitation software, recently saw yeoman's duty in the hands of its creator, Galo Carrera. The geodesist/consultant was contracted by the South Pacific Forum Fisheries Agency (FFA) to advise in the determination of the provisional treaty lines (PTLs) between the 16 member countries.

The multi-phased project is a consequence of the multilateral Treaty on Fisheries concluded between FFA and the United States. The Treaty requires that the U.S. fishing fleet observe Treaty provisions and national laws, report catches, and remunerate FFA parties affected by the fishing effort. Drawing the PTLs is necessary to implementation of the Treaty for reporting, enforcement, and fee distribution purposes.

Carrera spent most of his time in the South Pacific gathering information concerning the "base" points used in drawing the PTLs. Some of the information was available from the member countries; in some cases, however, he had to search for information in charts located in Canada, Fiji, New Zealand, and Australia.

Carrera emphasizes the "provisional" aspect of the treaty lines, noting that they could be quite different from the boundaries that will be established between states in negotiating their exclusive economic zones. "We are advising in the determination of a full set of PTLs solely for use in relation to the Treaty on Fisheries."

According to the Treaty, the United States pays US \$60 million over five years in annual lump sum payments to fish in the Treaty area. This payment is divided by supplementary agreement among the Pacific Island parties, 85 percent according to where the fish are caught, 15 percent in equal shares. PTL's assist in the distribution of the 85 percent portion of the payment.

Carrera is being assisted in the project by a team of Canadians which includes Don McCrae, Dean of Law at the University of Ottawa, and Allan Willis, a lawyer with Canada's Department of External Affairs. John

"...I was forced to do calculations in two to three weeks that can take years if done manually."

Cooper, a private consultant, is providing technical advice.

Carrera had less than a month and a half to put together a set of regional boundaries which could be used as working documents. There were many challenges from a technical viewpoint. "The Pacific Ocean is vast," he says, "with thousands of features, such as tiny islands one can encounter in the middle of nowhere. These can influence boundaries one way or another. Another challenge is the lack of charts in some areas."

He credits DELMAR with helping him meet his deadlines. "This project has been the most telling test of DELMAR to date. Since so much time was spent on gathering information, I was forced to do calculations in two to three weeks that can take years if done manually." ○

*DELMAR is a portable computer program for the delimitation of maritime boundaries. It is designed for use by those familiar with IBM personal computers or close compatibles. Key features include an on-line tutorial and a collection of modules to compute maritime areas, determine offshore limits, delimit equidistant boundaries, and delimit boundaries to which partial effects have been assigned. Copies of DELMAR are available from the International Centre for Ocean Development (ICOD) for \$800 Canadian. A limited number of free copies are available to qualified developing-country users. For further information, write to ICOD at 255 Argyle Avenue, Ottawa, Ontario, Canada K2P 1B8.

ICOD Reorganizational Changes: The Inside Story

As announced in an earlier edition of *ICOD Info*, the Centre has reorganized its program-related personnel into divisions defined on the basis of geography. The program activities in ICOD's four target regions are now administered by two divisions: the South Pacific and Caribbean Basin Division and the West Africa and Indian Ocean Division. The Inter-regional and Cooperative Activities Division (IRCAD) handles projects that involve more than one region and other trans-sectoral activities.

Each of the three new divisions – the South Pacific and Caribbean Basin, the West Africa and Indian Ocean, and the Inter-regional and Cooperative Activities – is under new leadership.

The recently appointed director of the South Pacific and Caribbean Basin Division is Peter Flewelling, who joined ICOD from the Canadian Department of Fisheries and Oceans in 1988.

This division includes the two geographic regions in which ICOD is most active: to September 1989, over 70 projects have been undertaken in the South Pacific, and nearly 40 in the Caribbean Basin. The South Pacific unit will be broadening its emphasis to include more programs outside the area of fisheries management, in which the majority of its projects have concentrated; these will include new emphasis on non-

living resource management, coastal development and management, marine environmental conservation, and maritime boundary delimitation.

The Caribbean Basin unit will be expanding its focus and place special emphasis on projects that address the need for a more coordinated exchange of information. A priority will be programs to develop improved educational materials at the primary- and secondary-school levels and to promote public awareness of ocean-related issues. Several new program officers have been added to this division to handle a growing number of projects.

The West Africa and Indian Ocean Division is headed by François Gilbert, who came to ICOD in July from his position as the Section Head of the Multilateral Program at CIDA's head office. The activities of this division will increase significantly over the next few years.

Within West Africa, the fisheries will continue to be ICOD's priority, with projects in fisheries economics, stock assessment and management, data analysis, and monitoring, control, and surveillance. These activities will be conducted through scholarships, training programs, and technical assistance, both regionally and at the community level. Regional courses and seminars will be offered in law of the sea, fisheries management, boundary delimitation, and management of the economic zone. Cooperative ocean management between countries of the region will also be encouraged.

Projects in the South and West Indian Ocean will be concentrated in the areas of marine resource management, marine environmental protection, tourism, and mineral exploration and development. The Centre will increase its activities in East African coastal states and encourage linkages with organizations in the other regions, especially between francophone countries in West Africa and the Indian Ocean.

At present, the mandate of the Inter-regional and Cooperative Activities Division is under review. During this period the division will be directed by Acting Chief Carol Amaratunga.

IRCAD will continue to administer trans-sectoral activities, such as scholarships, training courses, and the development of relevant course materials. New initiatives will include women in development activities, pilot projects, and the collection of information about the needs and capabilities of ICOD clients.

These organizational changes strengthen ICOD's ability to manage growing responsibilities during a new phase of growth. ○



ICOD veteran Anne Irvin shown accepting her five-year service award. Also honoured with this award recently were Gary Vernon, Paula Scott, and Evelyn Meltzer.

Newsletters Popular in Eastern Caribbean

A philosopher once quipped that if you want to find out what people believe, just ask them what they do. Many organizations are no longer waiting to be asked but are using a newsletter to tell their target publics what they support and what programs they use to achieve their ends. Because of their relatively low-cost and attractively designed information, newsletters are fast becoming a preferred communications tool, at least according to a brief survey of the Eastern Caribbean.

An example of how a newsletter can be used comes from Randolph Walters,* an environmental specialist with the Southeast Land Development and Conservation Board of St. Kitts and Nevis. One of his duties is to ensure the balanced development of the Southeast Peninsula of St. Kitts, a beautiful and relatively untouched parcel of land. The country's National Development Plan identifies the 4,000-acre peninsula as a prime location for tourist-related projects. An initial phase of the plan now in effect is a joint government/ U.S. AID road-building project that may have some impact on the marine environment.

To cover the issues connected with the new development, Walters edits *SKNED*, the *St. Kitts-Nevis Environment and Development Newsletter*. *SKNED* presents relevant background information on the project and the governmental and regulatory framework; it also gives the public a medium through which it can voice opinion.

According to Walters, the newsletter format was chosen "to sensitize a wide cross section of the general public by providing them with technical information on the local environment in an easily digested manner. We hope the publication will help to enlist the support of both the managers and users of local natural resources by highlighting the interrelationships between human activities and a healthy environment."

Although the publication is still young, Walters has some initial impressions about its value as a communications tool. "We hope our newsletter will inform people about the short- and long-term effects of their activities on their surroundings. We see it as a means of suggesting alternative activities or solutions to the negative conditions that arise from misuse."

On Board is a fisheries newsletter recently initiated by the Organisation of Eastern Caribbean States. The newsletter was launched as an ICOD-sponsored project to encourage a regional awareness of fisheries issues and concerns.

In addition to current news about OECS programs, the inaugural issue presents articles on the marine environment, data collection, harmonized fisheries legislation, and surveillance.

The second issue appears to be more vocal, featuring a lead article entitled "More Vessels Arrested". Used in this way, the newsletter can effectively publicize policy and procedures, and encourage more regional management cooperation.

Another newsletter, the *Caribbean Conservation News*, has been published by the Caribbean Conservation Association (CCA) since the fall of 1986. The publication focuses on both land and ocean conservation issues and keeps approximately 1,000 readers up to date on CCA projects.

The Eastern Caribbean Natural Area Management Program works closely with CCA. One of its functions is to produce a newsletter entitled *Park and Protected Area News (PPAN)*. Designed to promote networking among park management personnel, *PPAN* has featured a summary of the parks and protected areas in the region and a list of relevant technical assistance organizations.

CCA Program Officer David Simmons says that producing a publication has become a regular aspect of organizational life, and that its communication potential makes it eminently worthwhile. "The number of new subscribers continues to grow steadily," he says. "We're very pleased with the newsletter as a way of sharing information with our readership and member countries." ○

*Editor's Note: *ICOD Info* apologizes for misspelling the name of Mr. Randolph Walters in an article published in an earlier edition (cf., "Anatomy of an Environmental Decision", *ICOD Info*, vol. 1, no. 2, page 2).



ICOD's 14 directors recently gathered in the Eastern Caribbean for a board meeting, visits to specific project sites, and discussions with ocean-related organizations in Barbados, St. Lucia and St. Vincent. The week-long itinerary included a tour of various facilities such as the OECS Fisheries Unit in St. Vincent. Shown above (foreground) are from left to right: directors Mary Jo Duncan and Sharon Proctor, President Gary Vernon, and Vice-President Garry Comber.

During the visit, the approval of a \$325,000 ICOD-sponsored program to create a Marine Sciences Centre at the University of West Indies Mona Campus in Kingston, Jamaica, was announced.

ICOD-sponsored participants at the closing ceremony of the 1989 Training Program on Management and Conservation of Marine Resources within the Exclusive Economic Zone conducted at the International Ocean Institute in Halifax. Left to right: Eronica Lyimo (Tanzania), ICOD Chairman Elisabeth Mann Borgese, and Leo Brewster (Barbados).



Maritime Boundary Delimitation Course: Learning to Work With Limits

For a developing nation, a first order of business in the management of its Exclusive Economic Zone is the determination of the maritime boundaries.

This challenging task may be complicated by a lack of charts, the vastness of the area to be enclosed, controversy over what measurement techniques should be employed, and the opposing claims of neighbouring states.

To assist developing nations in gaining expertise in boundary delimitations, ICOD sponsors a seven-week course each summer at the University of Toronto's Erindale College. The course trains participants from developing

countries in the technical aspects of boundary making and of defining the various offshore zones of jurisdiction embodied in the new legal regime of the seas.

Erene Nikora of Kiribati was a participant in the most recent course. "We are a country of small islands spread out over a vast expanse of the ocean," he says. "To us, maritime boundaries are a matter of national importance. In fact, my main task on returning home will be to assist in boundary negotiations with our neighbours."

The multidisciplinary course curriculum considers hydrography, geomorphology of the seabed, and nautical charting combined with a knowledge of international law, the role of international organizations, and state practice in the delimitation of bilateral boundaries. The lecture sessions are combined with "hands-on" training, which includes the use of various software programs for computations and word processing.

Twenty-six students have graduated from the program since it began in 1987. The majority of the graduates are involved in using their knowledge to provide technical support to their country's diplomatic and legal representatives on boundary issues.

Francis Charles, for example, attended the course in the summer of 1987, and is now the head of the Hydrographic Service of Trinidad and Tobago, and the chairman of the Inter-ministerial Subcommittee on Maritime Boundaries. Currently he is actively engaged in the boundary negotiations proceedings with Venezuela.

Course director is noted hydrographer Rear Admiral D. Kapoor (ret.). "This unique program responds to the special needs of developing nations," says Kapoor. "Boundary delimitation skills are an essential element in the establishment and exploitation of offshore jurisdictions." ○



Participants in and visitors to the ICOD-sponsored Boundary Delimitation Course held at Erindale College from May 14 to June 30, 1989. Front, left to right: ICOD President Gary Vernon, Calvin Esdaille (St. Kitts), Felix Maharaj (Fiji), Robin Gittens (Barbados), Kenneth Gillet (Belize), F. Malele (Western Samoa), Course Director Rear Admiral D. Kapoor. Back, left to right: Chan Peng Yue (Malaysia, CIDA-sponsored), Erene Nikora (Kiribati), G. Rupadeva (Sri Lanka), Youssef Tber (Morocco).

Short-Term Attachment Program: Looking at Home From Far Away

For Moustapha Deme, the three-month visit to Canada was a rare opportunity to get a new perspective on his work in Senegal.

Deme is a fisheries economist with the Centre de recherche océanographique de Dakar-Thiaroye (CRODT). Although he learns from his work, his busy schedule allows him little opportunity to pursue some of his broader interests which require reflection, discussion, and research. Being chosen a recipient under ICOD's Short-Term Attachment Program provided just the opportunity he sought to expand his personal and professional horizons.

Deme spent three months in Canada pursuing areas of study relating to his work of analyzing the fisheries. He used the opportunity to seek out the opinions of fisheries experts on a number of relevant research subjects.

The ICOD Short-Term Attachment Program permits researchers, officials, and administrators from institutions and agencies in developing countries to undertake brief study periods or practical attachments in Canada and other developing countries.

Through the program, Deme was able to advance his work of creating an accurate model of the Senegalese pelagic fisheries. Travel to Canada also provided an opportunity to seek the advice of Canadian fisheries economists, particularly that of Dr. Tony Charles, an associate professor in Finance and Management Science at St. Mary's University in Halifax, who agreed to organize and supervise Deme's attachment.

While staying in Halifax, Deme attended the International Fishing Equipment Exposition in Lunenburg and met with Canadian fisheries officials in different parts of



Moustapha Deme, left, with Dr. Tony Charles.

Nova Scotia. He also spent time at the Université du Québec à Rimouski, where he conferred with a maritime resources study group under the tutelage of Dr. James Wilson. A major part of his Quebec itinerary was a field trip to the Gaspé Peninsula, where he toured a series of Canadian fish-processing operations.

To gain access to research material not available in Senegal, Deme was able to collect over 200 articles from pertinent journals. The articles will be placed in the CRODT library for use by West African economists and administrators.

In addition to study and travel, Deme capped his stay in Canada by writing two papers: "Small Pelagic Fisheries in Senegal: A Bio-economic Approach" and "Pelagic Fisheries of Senegal: Management Options, Policy Constraints, and the Role of Subsidies." The papers will be submitted to international journals for publication.

Professor Charles was impressed with Deme's dedication to his profession. "Through our exchanges we were able to explore issues related to fisheries modeling and policy, such as the best allocation of the pelagic catch. I think I benefited from the exchange as much as Moustapha, as it gave me insight into the fisheries in Senegal and the developing world, a topic in which I have a strong professional interest."

He used the opportunity to seek out the opinions of fisheries experts on a number of relevant research subjects.

*OECS Fisheries Unit Profiled:***A Cooperative Approach to Resource Management**

Working together to realize common goals is central to the Organisation of Eastern Caribbean States (OECS); in fact, a mutual concern to develop better management of the valuable fisheries resource led to the establishment of a Fisheries Unit by the OECS Authority (heads of government) in November 1985. Financial and technical assistance for the unit, located in St. Vincent and the Grenadines, came from ICOD.

With a 12-person core of professional and support staff, the OECS Fisheries Unit is charged with the responsibility

they also work with national fisheries departments to increase the potential for an economically viable fishery through improved management. Involvement in these issues has made the unit's activities more challenging and responsive to the needs of fishermen, policy makers, and the community as a whole.

Surveillance

One of the more successful ventures undertaken by the OECS Fisheries Unit is in foreign fishing surveillance, monitoring, and control. Member states have adopted compatible fisheries laws and regulations and agreed on minimum conditions of access to the fisheries resources in their exclusive economic zones. The concept of a common fisheries zone is now in place and there is agreement on "hot pursuit" as provided for in the Law of the Sea Convention.

Joint air and sea surveillance exercises were mounted under the initiative of the unit. Several foreign fishing vessels were caught operating illegally in OECS waters and successfully prosecuted. St. Vincent and the Grenadines, for example, fined three Venezuelan vessels a total of US \$100,000 in 1988; similarly, Antigua and Barbuda, the British Virgin Islands, and Dominica have all imposed penalties on foreign vessels fishing illegally in their waters.

Data management

The unit's "Fisheries Data Management: Institutional Enhancement" Program plays a central role in meeting the objectives of fisheries management and development in the Eastern Caribbean*. It involves standardizing and computeriz-

ing fisheries data, securing microcomputers and software, and training personnel in the use of these tools. The entire computer network will link up with the OECS Fisheries Unit. This managed effort to collect, analyze, and interpret fisheries data will provide the basis for informed management and policy decisions.

Infrastructure and training

The unit has an impact on the everyday lives of the fishermen, particularly through a small projects funding scheme. Every island can receive direct benefits such as the improvement of fish-landing sites in Montserrat and the British Virgin Islands. Fishermen, like those in Antigua and Barbuda, will learn how to use better or more productive techniques. In its revised form, this program now focuses more specifically on improving the harvesting and distribution of fish.

Fishermen also benefit through the unit's training program. Already, fishermen have been sent to the Pictou School of Fisheries in Canada and the Caribbean Fisheries Training and Development Institute (CFTDI) in Trinidad and Tobago. Working at two levels, training helps to improve the technical expertise of fishermen and also to qualify instructors who can in turn pass on their knowledge.

Limited staffing at the unit has resulted in the use of outside resources. One example is the recruitment of a consultant to evaluate and improve the role of training in meeting the staffing and institutional enhancement needs of OECS members.

Technology transfer

The unit encourages the

...Antigua and Barbuda, the British Virgin Islands, and Dominica have all imposed penalties on foreign vessels fishing illegally in their waters.

for promoting and facilitating regional cooperation in fisheries. The unit also responds to specific requests from member states for assistance by providing advisory and technical services. It is headed by Development Officer Daven Joseph, a former chief fisheries officer in Antigua and Barbuda.

Overview

Among its broad areas of activity, the unit is involved in the funding of small projects geared specifically at human resource development and technology transfer, education and training, marine insurance, marketing, and other fisheries management programs.

OECS staff bolster the technical and managerial manpower of member states;

*Participating countries include Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Christopher and Nevis, St. Lucia, and St. Vincent and the Grenadines.

advancement of ocean management skills. The promotion of a successful sea moss cultivation project in St. Lucia, for example, also resulted in the sharing of expertise on a similar project in Grenada.

Regular workshops bring together participants from all the member states to collectively address problems or to learn about a particular aspect of fisheries. With an OECS foreign fishing licensing program about to begin, the Fisheries Unit organized a workshop to provide training in mounting a cost-effective fisheries observer program. The Fisheries Unit endeavours to include fishermen in all its workshops and seminars. They value the chance to participate in a decision-making process that affects their lives and livelihood.

Other initiatives of the unit include a fish marketing survey, a regional fishing vessel insurance scheme, and the development of fisheries cooperatives. Its greatest challenge is to increase the number of qualified fisheries personnel in the region. In the past, and to a lesser extent now, work in fisheries was not considered attractive as a career option. The shortfall in human resources places a greater demand on the Fisheries Unit to respond to requests for advice and assistance from member states.

Since its inception, the unit has worked vigorously to promote a positive perception of fishermen and the fishing industry. There has already been a noticeable change, but much more needs to be done to ensure the wise exploitation of the common fisheries resource. The Fisheries Unit is committed to the long-range goals of encouraging an appreciation of the resource and a sound cooperative management approach. ○

A New Handbook For Artisanal Fishermen

A new publication from the National Academy Press, entitled *Fisheries Technologies for Developing Countries (FTDC)*, may best be understood as a form of Whole Earth Catalogue for artisanal fishermen. There is a familiar "Whole Earth" ring to the common-sense solutions devised by resourceful fishermen in meeting everyday challenges.

FTDC contains chapters on boat design, fishing methods, artificial reefs and fish aggregating devices, coastal mariculture, and fish processing and preservation. An objective of the publication is to give individual fishermen with limited budgets access to the economical technologies used in other parts of the world. *FTDC* could also be a useful teaching and reference tool for classrooms and libraries, particularly as it is available at no charge to developing countries.

The goal of *FTDC* is to point out, explain, and teach. The frequent illustrations add to the clarity of the presentation. The book is a primer for those who want a quick introduction to basic fishing vocabulary; it also introduces a number of surprising items to those already familiar with fishing techniques. The construction of artificial reefs and lobster shelters are two examples. In many cases, traditional methods, such as those used in boat building and design, have been improved by modern fabrication methods. All the chapters are supported by well-organized reference material for further study.

FTDC was compiled as a result of a meeting of international fisheries experts at the University of Miami's Rosenstiel School of Marine and Atmospheric Sciences in 1985. The proceedings were brought to publication under the direction of BOSTID (the Board on Science and Technology for

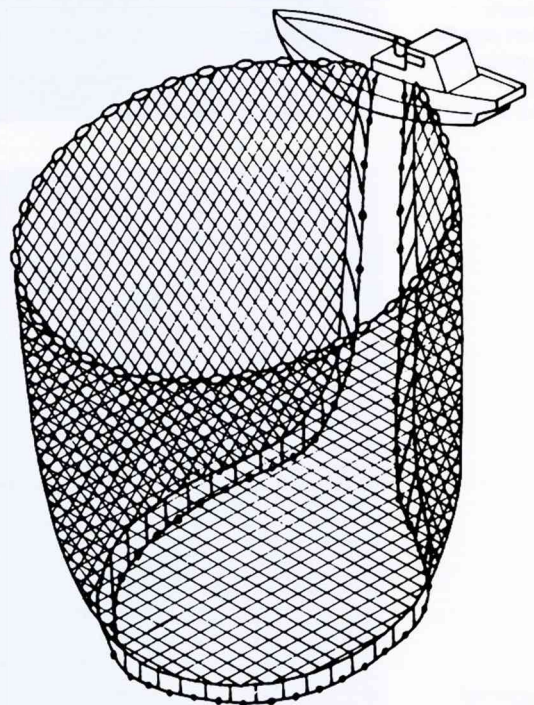
International Development, Office of International Affairs, National Research Council.)

There is a familiar "Whole Earth" ring to the common-sense solutions devised by resourceful fishermen in meeting everyday challenges.

BOSTID manages programs with developing countries on behalf of the U.S. National Research Council.

FTDC is just one of an impressive range of BOSTID publications, all of which address themes of interest to developing countries. A complete catalogue of titles, prices, and ordering information is available through the National Academy Press, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. ○

BOSTID. 1988. *Fisheries Technologies for Developing Countries*. Washington, D.C.; National Academy Press. 168 pp. and 97 illustrations. ISBN 0-309-03788-3. Price: free to developing countries.



Purse seines have a line at their bottom edge that can be drawn to close off the base of the net. (*FTDC*, pg. 76)

The Chorkor Oven: Indigenous Technology

The Chorkor smoking oven is an improvement over traditional smoking techniques. The oven design was initially tested in five villages (1969-1971) of the Gold Coast of the Gulf of Guinea. Since then, the oven has come into use throughout Ghana and has also been introduced to Togo, Guinea Conakry, Gabon, Benin, and most recently Sao Tomé and Principe.

The Chorkor oven can be built in one day using local material and features arched air vents to maximize fuel efficiency. The "chimney" effect created by stacking trays on the oven results in the continuous circulation of heat and smoke. The primary advantage of this feature is that the end product is evenly smoked and of high quality.

Construction costs are low, the power source is renewable (wood), maintenance is straightforward,

and the system reduces labour, making it an attractive alternative for use by women throughout West Africa.

Rectangular in shape and built low to the ground to ensure the easy stacking of trays, the ovens can be built using only clay, clay with a cement covering, or cement blocks. The oven's working life using each of the above methods is 9 and 15 years respectively. Trays constructed of hardwood frames and wire mesh have a smoking capacity of up to 18 kg of fish thus assuring high productivity.

Smoking time varies depending on the species, size, cut of the fish, and the desired storage life. For medium-sized fish, 8 - 18 hours of smoking are required to ensure a long storage life. Larger fish demand up to three days smoking to obtain a very dry, smoked fish with 10 - 15% humidity. Throughout the smoking period, fish are regularly turned and the trays rotated which allows for consistent smoking of the product.

Properly smoked fish can be preserved for up to 9 months if correct storage procedures are followed. This includes the use of containers which minimize the introduction of humid air and insects, covering the containers with plastic sheets, paper, or banana leaves, and ensuring that handling of the fish is kept to a minimum. Fish are re-smoked every two months to prevent the growth of fungi, bacteria, and insect larvae.

As a result of the improved quality, both in terms of taste and prolonged product life, fish smoked using the Chorkor method are usually among the first to be sold and command a higher price.

The Chorkor oven is an excellent example of indigenous technology which was neither imposed nor imported from abroad and that responds to and meets local needs. ○



The "palayé" women of Neves formed a committee to manage their fish-smoking project. Here, the committee's president puts the finishing touches to a new Chorkor oven.



The traditional method of smoking fish in Sao Tomé and Principe.



Seychellois and Canadian Team Evaluates Prototype: **Choosing the Right Boat for the Job**

No one knows more about his boat than a fisherman who uses it to make a living under perilous

conditions. Because of their "hands-on" experience, fishermen from the Seychelles and Canada contributed some val-

uable opinions to a project evaluating boat designs proposed for use in the Seychellois fishery.

The \$257,000 ICOD-sponsored project was a response to a request from the Seychelles Fishing Authority (SFA) for Canadian assistance to address a number of challenges facing its boat-building program.

The program began in 1984 when the Seychelles secured an African Development Bank (ADB) loan for the design and construction of five 8-12 metre fiberglass boats, five 12-16 metre wooden schooners, and five 20-22 metre wooden schooners.

Over the past decade, fish landings in the Seychelles have decreased. One reason is the decline of the schooner fleet traditionally involved in the ground-fish fishery. The number of vessels has dropped from a high of forty-two in 1982 to twenty-one today. The whaler fleet has undergone a similar decline. With poorly maintained boats, unattractive working conditions, and uncompetitive pay, the nearshore fishery was losing fishermen to the foreign tuna fishery and other forms of employment such as tourism.

The boat-building program ran into difficulty when the 11.6 and 21.5 metre vessels chosen for construction were not able to conform to acceptable standards. Not meeting this condition threatened the continuity of the loan. As well, a European country, which had committed to

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Please note that all dollar figures are cited in Canadian funds unless otherwise stated



IAN TULLOCH

Two Seychellois aboard *Lavenir* design.

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**International Centre for
 Ocean Development**



Canada

The International Centre for Ocean Development was established as a federal Crown Corporation in February 1985 with a mandate to initiate, encourage, and support cooperation between Canada and developing countries in the field of ocean resource management and development. Under the guidance of a fourteen-member Board of Directors including four international members, ICOD initiates and supports programs for the development of indigenous expertise and institutions in developing countries for the improved management and utilization of ocean resources, particularly as a source of food.

Canadian Cooperation Office — South Pacific
 Private Mail Bag
 14 McGregor Road, Suva, Fiji
 Fax: 679-302014
 Telex: 679-302039 or 679-302016
 Attention: Mr. P. Saunders

Également disponible en une version française.

providing design and construction assistance in return for fishing rights, withdrew from the project. To get the project back on track, SFA requested that ICOD assist in securing the services of a master fisherman and naval architect who could evaluate the work to date and make some necessary adjustments and recommendations.

To assist the SFA in evaluating the boat designs, the joint team examined the fisheries in which the new boats were to be used and studied the real needs of the fishermen for whom the boats were to be designed. Captain Claude Paulin, a Canadian master fisherman with 25 years of experience, was assigned the central task of working with fishermen in assessing boat designs and productivity during actual sea operations. He worked under the direction of Phillippe Michaud, the managing director of SFA.

The team also included a Canadian naval architect and fisheries consultant who collaborated with a number of Seychellois experts. Joel Nageon de Lestang, the SFA fisheries resource director, acted as the project coordinator.

A number of the prototype boats to be tested were not operable due to the need for repairs. A first priority was making them seaworthy. Because he was capable of servicing the inboard engines, Captain Paulin was soon up to his elbows in grease making repairs and helping to procure or fabricate

replacement parts.

The project's naval architect, Iain Tulloch of Halifax, spent a total of four weeks in the Seychelles. He studied the boat designs, the shipbuilding facilities, the availability of skills and materials, and the ship repair services. He made recommendations for the prototypes that would result in better performance, reduced construction costs, and safety improvements. He also observed that the development of marine regulations for the Seychelles would help to make the fishing effort more productive and improve the working conditions of fishermen.

In responding to the needs of fishermen at sea, Paulin was able to suggest small improvements in technology such as hydraulic haulers for use in the trap fishery and the development of better fish holding facilities. The introduction of these adjustments in gear and fishing methods will result in improved productivity.

The Seychellois fishermen found Paulin a valuable resource. Many of them approached him for help with a specific repair or to discuss a wide range of operational concerns. Topics ranged from how to attract and keep a good crew to how best to store and clean fish during peak fishing periods.

As Paulin's compatriot on many sea trials, Joel Nageon de Lestang commented on the value of sharing information on a person-to-person level. "Fishermen have a tendency to be rather sceptical when it comes to learning new fishing techniques. However, if these techniques are demonstrated in person and proved to be effective, fishermen are more likely to accept them."

As a result of hard work and study and much valuable input from Seychellois experts and fishermen, the project team made a series of recommendations concerning the vessels. The economic potential of the fisheries to support specific boat designs was central to their analysis. Given the use of boats in making short trips to fishing grounds (usually not more than three days), the quantity and kind of catch that could be expected, and the investment and service that were required, the group highly recommended

(continued on page 15)



IAN TULLOCH

Captain Claude Paulin surveys the Lekonomi test craft.

Non-Fuel Minerals Course in West Africa:

Exploring the Ocean's Riches

For most people, mineral prospecting conjures up images of the weather-beaten old-timer traipsing through the bush with his geological hammer, or panning streams in search of the elusive nugget of gold. While those images would no longer reflect modern exploration techniques on land, they have even less truth when it comes to exploring the oceans for minerals. Marine mineral exploration requires a completely different set of strategies, techniques, and equipment. An exploration program has to be implemented from a ship, tens of metres above the seabed, in conditions often less than ideal.

Although the marine mineral industry is still in its infancy, many countries around

the world have discovered economic reserves of both precious metals and aggregate resources in the offshore, and several of these are being actively mined. Off the east coast of England, sand and gravel are being mined to supply the construction industry in London, and for export to other European markets. In Thailand, the production of tin from the offshore has been a major contributor to the country's economy. In total, more than forty countries around the world are actively exploring for or mining minerals and aggregates from the sea floor.

Commodities such as gold and diamonds have been mined in the West African region since pre-colonial times, and are still important to the economies of countries such as Ghana and Sierra Leone today. In 1982, the results of a UN study suggested that certain areas of the region's continental shelf had the potential for mineral exploration. In addition, many coastal cities of West Africa have experienced severe shortages of good quality aggregate over the last decade. Sand and gravel are badly needed for the construction of harbours, roads, and housing.



Group experiences hands-on training during sea-phase of course held in Accra.

For these reasons, there is considerable interest in the offshore as a source of aggregate and mineral commodities. In November 1989, ICOD, in cooperation with the Ghana Minerals Commission, sponsored a two-week course in Accra, Ghana on "Offshore Non-Fuel Mineral Resources: Assessment and Planning". The course brought together nineteen senior geologists and administrators from West and Central African countries, Indian Ocean island states, and Haiti for an intensive program aimed at providing the skills to undertake preliminary assessment of offshore areas and to design approaches to resource development and management in their countries.

Dr. Peter Hale, a marine minerals expert with Energy,

recherche scientifique in Rimouski, Quebec, was brought into the team to help with translation of technical material and to act as a resource person. "On the whole, the translators did very well and I think it shows that this can be attempted for other courses. There were very few problems with communication. For this course, it was the right decision to bring the two language groups together. It demonstrated that adjacent countries who wish to cooperate on exploration programs can deal with language differences".

The groups were each given the task of making a preliminary resource evaluation of their joint offshore region and then developing a plan for exploration that included possible collaboration between their countries. At the end of the course, each partici-

participants who saw the course both as a way of improving their knowledge of marine mineral resources and as a starting point for the creation of resource evaluation programs in their own countries.

There was a practical element to the course as well. Two days were used to give field demonstrations of surveying techniques, one day on the beach and the other aboard a Ghanaian fisheries research vessel. The beach, in Takoradi, some 250 km from Accra, was chosen by Dr. Carl Amos, of the Geological Survey of Canada, for its high heavy mineral content. "The beach showed very clearly how heavy minerals are concentrated by sedimentary processes, so we were able to design a surveying exercise that not only demonstrated survey techniques, but also allowed us to make an assessment of the beach as a potential mineral deposit." The "mini-cruise" on the research ship allowed the participants to get their hands dirty, taking samples of the seabed and analyzing the mineral content.

Most of the participants left Accra thinking of the future. As Regional Coordinator Mr. Kwasi Barning of the Ghana Minerals Commission put it: "The course created an awareness among participants about the need to assess the offshore potential of their respective countries. We need to continue the momentum which has been generated here."

The first step is the preparation of a Proceedings volume that includes the results of the workshop sessions and presentations by the participants. The group also established a steering committee to coordinate future activities that potentially include a newsletter and a regional secretariat for marine mineral exploration. The ICOD-sponsored course provides a strong beginning for the development of a viable marine minerals program in the West and Central African regions. ○

"...it takes careful planning to initiate environmentally sound mineral development projects in the offshore."

Mines and Resources Canada, has been closely involved with similar courses sponsored by ICOD in Halifax and Fiji. "Marine mining appears to be feasible off West Africa, particularly where the demand for construction aggregates is high. But it takes careful planning to initiate environmentally sound mineral development projects in the offshore. That's what the course was all about - integrated resource management and planning."

A team of lecturers and regional experts from Canada, Sierra Leone, and Nigeria combined to present the course in both French and English. This was the first ICOD course at which simultaneous translation was used, and while not without difficulties, it was remarkably successful. Dr. Georges Drapeau of the Institut national de la

part was asked to make a presentation to a panel of resource persons who acted as proxy ministers of mines, finance, and environment.

Course Director Dr. Philip Hill, a consultant hired by ICOD, saw the professionalism with which these presentations were made as confirmation that the course had achieved its objectives. "After two weeks of hard work, the course participants were still full of energy. They joined in the simulation exercise wholeheartedly, presenting assessments, explaining plans for exploration, and placing it all in an environmental context. That's exactly what many will do when they return home - apprise real ministers of the benefits and constraints of marine mineral exploration." Dr. Hill's opinion was shared by most of the

OCEAN CURRENTS

New and Recently Approved Projects in Brief

SOUTH PACIFIC

Developing Fisheries Extension Training

ICOD is funding fisheries extension courses to increase the number of Pacific Island nationals who can deliver in-country fisheries extension services. The project consists of exchanges of tutors between Pacific Island countries, a course to "train trainers", and the printing and distribution of the manual developed during a prior ICOD extension training project. (See article entitled "Mastering the Art of Communication")

INDIAN OCEAN

Expanding the Maldives' Fisheries Science Curriculum

A consultant is being sent to the Maldives to help the Ministry of Education expand its fisheries science curriculum beyond grades 8, 9, and 10, where it is currently taught, to include grades 11 and 12. A textbook, a teacher's guide, and a student workbook will also be produced, and training will be provided for instructors using the new curriculum.

Studying Madagascar's Artisanal Fisheries

A senior biologist, a senior economist, and a junior economist will work with the Centre national de recherches océanographiques et des pêches to increase its capacity to collect biological and socioeconomic data on the country's artisanal fisheries, which supply eighty percent of the domestic market. The goal is to establish a permanent system for collecting information about this sector so that it can be better managed and projects can be better defined.

Strengthening Fish Inspection Services in the Seychelles

A consultant will be provided to the Veterinary Service of the Seychellois Ministry of Agriculture

and Fisheries to help establish and direct a new Fish Inspection and Quality Control Unit. This project builds on a previous ICOD project which trained ten Seychellois in fish quality control.

WEST AFRICA

Strengthening Fisheries Management in Guinea-Bissau

In association with the Centre canadien d'études et de coopération internationale, ICOD is strengthening public administration in Guinea-Bissau, and particularly the Ministry of Fisheries, to develop an integrated marine resource management strategy for the area. A key objective is the identification of fisheries management zones to ensure a sustainable artisanal fishery in the Archipelago of the Bijagos. (See article entitled "Balancing Conservation and Development")

INTER-REGIONAL ACTIVITIES

Supporting Masters-level Study in Canada

Beginning in 1992/93, ICOD will provide fifty-six scholarships for students from developing countries to attend the Master of Marine Management Program at Dalhousie University or the Maitrise en Gestion de l'Environnement Marin program at the University of Quebec at Rimouski (UQAR). The new masters-level scholarship program will be phased in when ICOD's present support for the Marine Affairs Diploma Program, which provides up to ten scholarships a year at both UQAR and Dalhousie University, over a five year period, is completed in 1992.

Providing Lecturers in Marine Affairs

Over the next five years, ICOD will sponsor five year-long lectureships in Marine Affairs at the World Maritime University.

The lectureships will be awarded to Canadian professors, who will also coordinate the delivery of the university's marine affairs and maritime law programs.

Awarding Scholarships for Maritime Administration

In light of training needs around the world and the increasing emphasis on marine affairs at the World Maritime University in Sweden, ICOD is providing thirty scholarships for study in the fields of ports management and marine transportation. Over a period of five years, six scholarships will be awarded annually to nominees from developing countries.

New Publication

Jean-Claude Brêthes, a marine biologist at UQAR, has recently edited a unique publication on fish stock assessment. *Méthodes d'évaluation des stock halieutiques (MESH)* is a substantial 900-plus page document which is expected to be widely used throughout the francophone world, particularly in developing countries. The specialized work is part of a \$373,000 ICOD stock assessment training project undertaken with the Commission for the Eastern Central Atlantic Fisheries (CECAF) in Dakar, Senegal. ○



CAROL AMARALUNGA

New Coral Reef Research Unit for the Maldives: The Pulse of the Living Islands

MICHAEL RISK



A spectacular dropoff from an atoll in the Maldives.

Many of the surrounding coral reefs, which protect the Maldives from the direct force of ocean waves, are now under stress. With the highest point of land a mere five metres above sea level, the people of the low-lying islands are understandably concerned about the continued vitality of the coral reefs and the potential effects of such threats as global warming on rising sea levels.

The land mass of the Maldives is in fact not land; the islands are technically known as atolls, or giant accumulations of coral. The coral grows upwards from the sandy substrate about forty metres below, stabilizing over a period of years under the influence of natural conditions

and the rich reef ecology.

The Maldives is comprised of 26 atolls and 1,200 islands, many of which are uninhabited. Of the 200,000 population, 50,000 live in the capital city of Male, a 2 km² island that is one of the most densely populated areas of the world.

In recent years, the Maldives has enjoyed an expanding tourism industry that has brought prosperity and a balanced budget. The chief attractions for tourists, many of them divers, are the magnificent and pristine coral reefs. Ironically, the increase in tourism, combined with population growth, and the coastal mining of coral for construction aggregates, may be creating a threat to coral in many areas of the country.

To monitor the health of the coral reefs, the Maldives requested ICOD's assistance in establishing a Coral Reef Research Unit (CRRU). The Unit will collect and interpret data related to the surrounding coral reefs and make recommendations for management decisions that would result in the sustained health and use of the coral resource.

As part of the ICOD project, Canadian consultants selected by McMaster University, the executing agency for the project, visited the Maldives in March 1990. The consultants, Drs. Michael Risk and Paula Scott, worked closely with the Maldives Marine Research Section. As a first step, the status of coral research in the Maldives was reviewed.

In terms of establishing a CRRU, an initial objective was to select permanent monitoring sites along the reefs and determine the indicators which would allow for reef health assessment. One of the factors to be evaluated was reef cracking, a phenomenon where dead coral splits and falls away. As Dr. Risk points out, reef cracking is not a problem if the coral can regenerate itself. "Atolls are built by corals, and maintain an approximate steady state with wave erosion as long as the corals continue to grow and add to the structure. Any atoll whose coral cover has died is a shrinking atoll – and one of the most important results to flow from our study will be to estimate the rate of atoll destruction."

Other indicators that will be observed and assessed include reef bleaching, pollution, and the effects of tourism. Many studies have shown that increased sewage contributes to a variety of natural imbalances such as the rise of crown of thorns (COT) starfish and boring organisms, both of which prey on coral. One of the atolls was recently struck by a COT

MICHAEL RISK



Diver surveying coral reefs off Male.

infestation that devastated much of the living coral in the surrounding waters.

A central aspect of the CRRU project is the training of two Maldivian counterparts who will eventually take over the diving and data collection. Both of the counterparts will take diving courses to prepare them for the extensive underwater work which will include gathering core samples of coral.

The core samples display the coral growth rate via rings in a manner similar to trees. Strong growth rates – up to 1.2 cm per year in some corals – indicate vitality or health while a negligible rate indicates the presence of severe stress. As filter feeders, some corals also ingest and store what is in the water at the time (metals for example). A yearly analysis of core samples will give scientists a record of many of the contaminants entering the ecosystem, and hopefully provide data for establishing effluent control guidelines. Coral does have the ability to reestablish itself if the natural conditions are brought into balance, but this may take years.

To develop the necessary expertise for the CRRU, training courses will be conducted for the Marine Research Section staff and other key people. The courses will cover coral reef ecology, monitoring techniques, environmental assessment, and taxonomy of Indian Ocean corals. Intensive field work and the establishment of the permanent monitoring sites will follow the courses.

A final component of the project will be to set up a reef watch program and to prepare a brochure to ensure more public education. The help of the Maldivian diving community will be enlisted to contribute a variety of observations related to reef events.

The Maldivians see the new CRRU as playing a key role in providing an accurate perspective on the health of the coral reefs and contributing to the management of the marine and coastal environment. ○

Fish Smoking Project in West Africa:

Transferring Technology “People-to-People”

In a further development to the fish smoking technology project featured in the last issue of *ICOD Info*, four participants from Sao Tomé and Príncipe and one from Gabon have recently completed a one-month study tour in West Africa.

Representatives of the Neves pilot project, the Ministry of Agriculture and Fisheries, the Women's Organization of Sao Tomé and Príncipe (OMSTEP), and a participant of a fish smoking project in Gabon, had the opportunity to refine their knowledge of the Chorkor smoking technology through visits with practitioners in Benin, Senegal, and Cameroon.

The study trip, jointly funded by ICOD and the UN Development Fund for Women (UNIFEM), also enabled participants to visit fish landing facilities and markets, evaluate packaging and storage methods for the finished product, receive financial management advice from women in established fish smoking projects, and strengthen their skills in the upkeep of the Chorkor equipment.

While in Senegal, participants met with Mrs. Ghislaine Larouche, an ICOD consultant working on a joint ICOD-UNIFEM study to evaluate fish smoking projects throughout West Africa. The purpose of this study is to determine how the Chorkor fish smoking technology can be most efficiently spread within the region.

Even though the Chorkor technology was first developed in 1970 with support from the FAO, very few projects have been evaluated. This study will result in a better understanding of the technology's effectiveness and the impact that it has had on those who employ it. The study involves a review of all existing literature pertaining to fish smoking projects from Mauritania to Zaire and evaluations of projects in the field in Guinea-

Conakry, Guinea-Bissau, Benin, Togo, and Cameroon.

The six projects to be evaluated in the field will determine if the product and its market value have been improved, if the people involved have experienced an increase in their earning potential, and if the technology has provided improved access to a food source. Other areas to be studied include the number of women who have been able to access the technology, how the involvement of other agencies has helped to strengthen and expand the results of the projects, and at what level the projects have been sustained.

The study will result in a better understanding of the technology's effectiveness and the impact ... on those who employ it.

Once completed, the study will assist donors to determine the allocation of future financial resources to fish smoking projects, ascertain improved methods of promoting technology transfers designed to reduce the work load of women, and suggest a means of involving the private sector in the development of appropriate technologies for women.

Two biologists, a Cameroonian with experience in tropical fisheries and a Canadian expert in fisheries research planning, have identified the country's major research requirements; they will also review the pattern of current research activity and determine the most effective means of allocating resources to future research programs. This information will aid the Government of Sao Tomé and Príncipe to better manage an expanding artisanal fisheries sector. ○

Surveillance Programs in the South Pacific and Caribbean: Bringing the Technology Home

David Robin and Colin Brown live on opposite sides of the globe but they share the distinction of bringing technology home. Robin, from St. Vincent, works for the Organisation of Eastern Caribbean States (OECS), while Brown, from the Cook Islands, serves the South Pacific Forum Fisheries Agency (FFA). Both are the surveillance officers of regional organizations, positions they assumed at a pivotal point in the development of programs that began up to four years ago.

ICOD's Director of the South Pacific/Caribbean Basin Division Peter Flewwelling explains: "For many developing nations, one of the first steps in taking control of their fisheries resources is to set up management, control, and surveillance systems (MCS). Canada is a leader in the development of these systems and some of ICOD's earliest requests for program assist-

ance were to establish similar systems in the South Pacific and Caribbean regions. As the cost and manpower to deploy them is beyond the means of many developing countries acting alone, cooperative ventures, spearheaded by regional organizations and Canadian technical assistance, were considered the proper way to proceed."

Both Robin and Brown joined MCS programs that first required achieving a consensus among participating countries as to the nature of their involvement, and the form of components such as licensing arrangements, regulatory regimes, surveillance procedures, and observer training.

David Robin has been a part of the Eastern Caribbean MCS process over the past year. A key event prior to that was the ICOD-sponsored OECS workshop on regional fisheries access and MCS held in Dominica in 1988. There, Antigua and Barbuda, St. Kitts and Nevis, Grenada, Montserrat, St. Lucia, the British Virgin Islands, Dominica, and St. Vincent and the Grenadines laid out the cooperative framework and a series of objectives to set up a regional MCS system. The follow-up involved an ICOD-sponsored project to assist in implementing the regional MCS components under the aegis of OECS. These include a regional register and information system, surveillance procedures, a coastal watch program, a surveillance observers program, and harmonized legislation.

Part of Robin's responsibility is to establish close ties with appropriate national representatives and to find ways to balance regional MCS planning with national priorities. He recently toured the participat-

JOHN CARTER



Carl Goodwin and
David Robin in
Halifax.

ing countries with Canadian advisor Carl Goodwin, the chief of surveillance operations for the federal Department of Fisheries and Oceans in the Scotia-Fundy Region.

Goodwin made a series of recommendations to OECS which would facilitate implementation of the cooperative MCS program. He noted that a regional surveillance officer was central to the task. Robin's background in the Coast Guard, his tact and diplomacy under tough circumstances, his gentle but persuasive approach, and his desire to succeed, will contribute to the future success of the program."

According to Robin, surveillance and control are needed to manage the fisheries resource in the face of foreign exploitation and to realize the economic benefits of the resource for OECS countries. "The primary challenge is actually getting enough surveillance coverage... On the monitoring and control side, the development and operation of the observer corps is going to be a tremendous task involving training and retention of personnel, and initially finding the qualified personnel who can record these data..."

Colin Brown faces another set of challenges in the South Pacific, where the cooperative process is more advanced. Brown assumed his post as the FFA Surveillance Officer in January, 1990. Prior to this posting, he was a director of Fisheries Management in the Cook Islands, received a masters degree in Holland, and then returned to the Cook Islands as the Director of External Affairs. His association with FFA began in 1982 when Pacific Island countries resolved to come to terms with the dominance of distant-water fishing nations.

Brown describes the landmark events in the development of the South Pacific MCS process as the implementation of the Regional Register of Fishing Vessels; the establish-

ment of minimum terms and conditions of fisheries access; the multilateral treaty of fisheries with the US; the driftnet convention banning this activity in the South Pacific; and more recently, the attempt to establish a regional management regime for South Pacific albacore to include distant-water fishing nations.

Brown worked closely with the two Canadian consultants, Don Aldous and Andrew Armstrong, in an ICOD-sponsored MCS project amounting to approximately \$1 million. "Don and Andy have provided a good foundation for the South Pacific and the region has gained immensely from their experience and vision." A third Canadian, Hugh Trudeau, also with DFO, was recently in the South Pacific on an ICOD-funded project to assist the FFA to set up a five-year surveillance plan.

Brown has become familiar with many of the most up-to-date approaches involved in MCS and is now searching for the best way to apply them to the South Pacific situation. "A key concern at present is the need for accurate and timely information. A communications network dedicated to fisheries information covering the participating FFA countries is vital for effective management. Investigation into appropriate

"A key concern at present is the need for accurate and timely information."

systems is ongoing. It is likely the system will involve both satellite and HF radio links. The necessary element of cooperation amongst members has always been evident."

ICOD's President Gary Vernon views the involvement of Caribbean and South Pacific nationals in the regional surveillance programs as a sign of program maturity. "MCS in both regions has been a priority concern since ICOD was established in 1985. The process involved a series of discrete projects, financial support, and long-term commitment. We feel most pleased when the key roles of the surveillance coordinators can be taken on by people like Robin and Brown. It indicates that technology transfer in a sophisticated area like MCS has to a certain level been accomplished." ○

A Biosphere Reserve for Guinea-Bissau?

Balancing Conservation and Development

The Bijagos Archipelago off the coast of Guinea-Bissau in West Africa comprises a group of islands that as yet has not been subjected to large scale development pressures. The Archipelago lies at the mouth of two large estuaries on the edge of

the Conservation of Nature (IUCN), which has been active in the country since the early 1980s. Aiding the IUCN in its work is the Centre canadien d'études et de coopération internationale (CECI), a Canadian non-governmental organization active in the Archipelago for more than ten years.

ICOD was asked to participate in the development of the marine component of the proposed reserve. In February, the Centre invited Michèle Lemay, a coastal and marine planner with experience in Southeast Asia, the Caribbean, and the Galapagos, to travel to Guinea Bissau to meet with government officials, members of IUCN, and CECI. She visited the Archipelago in order to define an integrated marine resource management project which could complement the government's initiative.

Lemay stresses that the proposed reserve is not a park in the conventional sense. "The site is ideal for a demonstration project of integrated marine resource management in an archipelago. We're looking at involving local people and considering marine resource management in the context of development of the whole Archipelago."

Comprised of approximately 25 islands and several islets with a total area of 550,000 hectares, Bijagos is the largest archipelago in West Africa. The larger islands are inhabited by the Bijagos people, an ethnic group whose cultural values have remained strong due in part to the relative isolation of the Archipelago.

Pierre Campredon, IUCN's representative in Guinea-Bissau, emphasizes that development must consider the local population. "Their relationship with the environment is extremely practical. We believe that it is indispensable that the Bijagos people can continue to live according to their traditional ways."

The waters surrounding the Archipelago serve as home to a colony of salt water hippopotami, manatees, and a variety of sea turtles.



Michèle Lemay



A typical landscape along the Bijagos Archipelago

the continental shelf. Complex currents, strong tidal effects, and shallow waters have all played a role in keeping the area relatively isolated.

Recognizing the uniqueness and natural wealth of the Archipelago, the Government of Guinea-Bissau wants to ensure that any development is undertaken within a framework of sound environmental management. A scenario being considered by the government is the establishment of a "biosphere reserve" – a management concept which promotes development that is in accordance with the needs and traditions of the local population and demonstrates a concern for and awareness of the area's ecosystems.

The reserve is currently in the planning stages, with research underway to develop an in-depth proposal for the consideration of the Guinea-Bissau government. Coordinating these preliminary activities is the International Union for

Surveys undertaken by the Portuguese and French also indicate that the Archipelago is an important nursery area for Guinea Bissau's fisheries. As a result of shallow bottom conditions, there are no commercial fisheries and the area has served as a natural sanctuary.

For a country whose industrial fisheries are playing an increasingly larger role in the national economy (approximately forty percent of foreign exchange earnings come from fisheries), it is essential that nursery areas be preserved to ensure that the resource is not depleted. The proposed biosphere reserve, which will incorporate a marine resource management program and a revision of policies and regulations affecting the fisheries, will make a timely contribution to the sustainable development of the country's fisheries sector.

This is the first time that Lemay has been called into a project at such an early date. She believes that the foresight of the government of Guinea-Bissau will have a great impact on the success of the proposed reserve. "The government of Guinea-Bissau is really interested in looking at the facts. They understand what's at stake in terms of long-term management of marine resources and they know very well that they have to look at every possibility."

Tourism is the main challenge for the short term in the Archipelago. Unbridled development could create an adverse impact on fragile ecosystems as well as the traditional ways of life of the Bijagos people. Tourism development is now at the beginning of a very steep curve, primarily in the area of sportfishing. The proposed biosphere reserve will also take into account this new element in the life of the Archipelago.

As Pierre Campredon points out, the biosphere design serves as a model to reconcile development and tradition. "The concept of biosphere reserves is well adapted to developing countries. It does



Unbridled development could create an adverse effect on the traditional lifestyle of the Bijagos people.

not mean freezing an area of land in the interest of conservation, nor does it mean undertaking development with the sole aim of short-term profit. It is concerned with marrying conservation and development in the most harmonious manner possible."

Once underway, the biosphere reserve project will bring together the skills and expertise of Guinea-Bissau's Ministry of Fisheries, Ministry of Rural Development, Ministry of Planning, and the Secretary of State for Tourism in partnership with the IUCN, CECI, and ICOD. This integrated, cooperative approach will help to maintain the uniqueness of the Bijagos Archipelago for generations to come. ○

Biosphere Reserves

The biosphere reserve concept was introduced in 1971 within the framework of a UNESCO program entitled "Man and the Biosphere". The first sites were designated in 1976, and by 1987 there were approximately 266 reserves in 70 countries.

In recent years, the international community has started to look more closely at the creation of reserves in marine and coastal areas. Currently in West Africa, there are ten biosphere reserves. Only one of these, the

Saloum Delta of Senegal, is in a marine environment.

According to Pierre Campredon, IUCN's representative in Guinea-Bissau, the biosphere reserve concept has met with a great deal of success because, unlike traditional models of national parks, local populations are not excluded. Core zones are set aside within the reserves to safeguard genetic biodiversity and buffer zones are created to experiment with methods of sustainable development.

Marine Affairs Diploma Program at UQAR: The Roots of a World Ocean Management Community

(Based on an article submitted by Mario Belanger, Information Officer, Department of Public Relations and Information, University of Quebec at Rimouski.)

Students at the University of Quebec at Rimouski (UQAR) come from different parts of the globe to study a common interest: ocean management.

Since 1987, ICOD has supported a one-year postgraduate program in marine affairs at UQAR for francophone students and its anglophone counterpart at Dalhousie University in Halifax, Nova Scotia. Each year, a number of students in each program receive ICOD scholarships to undertake a comprehensive, multidisciplinary survey of the uses of the ocean that focuses on the special needs of developing countries.

using enclosures made of branches that serve not only to hold the fish but as food and as a site for reproduction and spawning."

Cyrille enrolled in the UQAR program because it was francophone and he wanted to learn from North American experience. "Some courses are very interesting, especially those relating to ocean management and Law of the Sea," he explains.

"...there is a need to balance profit-related ventures with ... cooperative management practices."

After his studies, he hopes to become involved in developing markets for fish products. While at UQAR, Cyrille attended the Boston Seafood Show and believes that African countries could benefit from exhibiting their own ocean products. "The fisheries sector is complex," he observes, "and there is a need to balance profit-related ventures with those which favour cooperative management practices."

Gabriel Ngoma headed the Marine Artisanal Fisheries Division of the Congo's Fisheries Department for five years before coming to UQAR. In 1984, he studied fish processing at an institute for advanced learning in Astrakhan, Soviet Union, which awarded him a diploma in engineering technology.

"The Government of Congo is now concentrating on developing the agricultural and fisheries sectors," says Gabriel. He notes a shift in emphasis and financial support away from nationalized fishing programs to those that allow artisanal fishermen to purchase equipment. "Today, we are aware of a greater need for skills in fisheries management at all levels. The Department's training service informed me of this program (at UQAR) and I decided to apply."

Gabriel sees particular benefit in courses on public management of the fisheries, Law of the Sea, project management, and oceanography. Upon returning to the Congo, he hopes to become a consultant with the Fisheries Department or to manage a project to develop the fisheries. "I will be capable of supervising, harvesting, or processing operations or of establishing a centre to sell gear to fishermen and provide them with maintenance services.

"In Africa, coastal countries can and should



Gabriel Ngoma, Michèle Chartran, and Cyrille D'Almeida

Cyrille D'Almeida, of Benin, a West African country with four million citizens, has always been fascinated by the sea. He studied geography at school in the Ivory Coast and his work has often involved the geography of the seas. He has experience in the fisheries and marine-transportation sectors.

Fisheries is not a major economic activity for Benin, but many families depend on fishing to make a living. Declining stocks in recent years have forced many fishermen to seek a livelihood in neighbouring countries.

"The know-how of Benin's fisherfolk is often appreciated abroad," explains Cyrille. "The 'acadjas' technique of attracting fish to lakes and lagoons was invented in Benin. This involves

invest in fisheries to assure food security. Further, exploiting valuable species like shrimp, tuna, crab, octopus, and squid helps us to acquire foreign exchange to reduce the social problems created by national debt. Equally, management of fish stocks is needed as some stocks are being depleted. Training and education are also priorities."

In contrast to the international students, some of which are ICOD-funded, Michèle Chartrand offers the perspective of a Canadian studying in the program. She began her career by working as a teacher for five years. Next, she turned her talents to human resource management at the Canadian Department of Fisheries and Oceans (DFO) in Ottawa, where she was a director of human resources responsible for regional personnel offices. Last year, she was

granted a leave of absence by DFO to pursue new horizons by studying ocean management.

"I appreciated DFO," says Michèle. "Their work has an impact on industry, fishermen, and the general population. Ocean management is a large field with many challenges. I wanted to have a more well-rounded education to allow me to move from administrative to operational work. New challenges stimulate me."

She is very positive about her experiences at UQAR. "I've been exposed to a wide range of issues in ocean development. It is rewarding to be around adult students with work experience and different cultural perceptions." She is also positive about the guest lectures, site visits, workshops with ocean managers, and the group approach which mirrors conditions in the working world. ○

WMU Student Reception at ICOD: Sharing Information

On March 21, ICOD hosted an information session for students from the World Maritime University (WMU) who are currently studying in Halifax, N.S. The gathering brought together six students from Kenya, Morocco, Somalia, Tunisia, and Saudi Arabia. David VanderZwaag and Ray Côté of the Dalhousie University Marine Affairs Program and Edgar Gold of the Oceans Institute of Canada also attended.

Representatives from ICOD's three program divisions made presentations related to ICOD's work and received in turn a series of questions and suggestions from their international guests. ICOD is currently examining a new proposal to establish an ICOD Lectureship in Marine Affairs at WMU. The new program would promote more linkages between WMU and marine affairs programs currently underway in Canada.

Present at the gathering was Abdullahi Sheikh Hussein from Somalia, who is pursuing masters-level studies in maritime law at Dalhousie University on an ICOD scholarship. Another Somalian, A.F. Qaarey, is a state lawyer, a legal advisor to the Ministry of Fisheries and Marine Resources. He is presently studying General Maritime Administration and was in Halifax for one month of job training. He is working on a project related to fisheries legislation in Somalia and while in Canada studied such issues as marine pollution and environmental regulation.

Qaarey found the ICOD gathering valuable for the information it provided on ICOD and the kind of programs it supports. He said that while various kinds of marine funding are available, training is one area where Somalia could benefit from increased assistance. "We have a coastline over 3,000 km in length that is very rich in resources and more training is essential to manage and develop this zone."

Another participant was A. Laamrich, a Moroccan studying General Maritime Administration at WMU. His project work concerns the establishment of an efficient coast guard in Morocco. "Recent environmental threats in Morocco, such as a major oil spill, and the extension of our limit to 200 nautical miles, require an adequate coast guard." Meeting with ICOD officials gave him a chance to learn of programs in progress with Morocco and to discuss some of his country's future project needs.

C.W. Muriuki is a WMU student from Kenya where she works in the Kenyan Maritime Administration. She expressed her country's need for the type of training that could be applied to the Kenyan situation.

For ICOD, the event provided an opportunity to explore the perspective of students on education and assistance issues. There was a consensus among students that emphasis should be placed on making the theoretical aspects of study apply to practical situations in developing countries. ○



A. Laamrich listens as Consolata Muriuki makes a point during the discussion.

*ICOD Scholarship Students:***Combining a Personal and National Interest**

Each year, ICOD sponsors up to twenty students pursuing graduate study in marine fields at Canadian universities. These students are acquiring knowledge in areas that are important to a national or regional interest. While



Elizabeth Maruma Mrema

foreign study has a certain allure, the reality often means a lot of hard work over a short period of time and absence from the comfort of family and friends.

Elizabeth Maruma Mrema has been studying the international law of boundary delimitation at Dalhousie University in Halifax since September 1988. Having completed her course work, she is putting the finishing touches on her thesis, "Africa and Maritime Boundaries: A Study of Maritime Boundary Delimitation Problems in Africa".

Before working on her LL.M., Elizabeth was employed by the legal department of the Ministry of Foreign Affairs in Tanzania. She explains that it was involvement in the early phases of the maritime boundary negotiations between Tanzania and Mozambique that

sparked her interest in further study in the area of ocean boundary-making. "I realized that our delegation required a broader knowledge of the international boundary issues, the experiences of other countries, and the reasoning behind some of the international court decisions that were reached."

Very shortly afterwards, she applied for an ICOD scholarship for study in Canada. Although her interests were specific to Tanzania, her thesis eventually encompassed the study of maritime boundary issues over all of coastal Africa. One of the key trends in new settlements, she points out, is to negotiate a clause that covers trans-boundary marine resources such as the discovery of offshore oil, gas, or mineral deposits, migratory fish stocks, as well as environmental issues which straddle boundary lines.

Her experience of studying in Canada was quite demanding, with her time spent almost exclusively on her work. Her limited social contacts took place with other international students in her program, professors, and friends at ICOD.

Having completed her academic work, Elizabeth will return to Tanzania to rejoin her husband and two young children whom she has not seen since beginning her study.

She looks at her study from the point of view of what it means to Tanzania. "My interest was to combine my personal development with an area of international law of boundary delimitation that could benefit Tanzania."

... the reality often means a lot of hard work and absence from ... family and friends.

Another ICOD scholarship student, Transform Aqorau, is a senior legal officer with the Solomon Islands Ministry of Foreign Affairs. He took a leave of absence to expand his knowledge of maritime law through graduate study at the University of British Columbia. His particular interest is the development of ocean management regimes in light of the LOS convention. His thesis topic focuses on the role played by the South Pacific Forum Fisheries Agency, a cooperative regional body, in the development of the region.

Transform appreciates his time at UBC, particularly his access to the law library. But he also looks forward to returning home, where he will do more research and contribute to the development of a comprehensive ocean and sea policy based on the LOS conventions.

Before coming to study in Canada, Transform represented a number of South Pacific island nations as a witness to the deposition of the U.S. instrument of ratification to the multilateral fisheries treaty with the United States. He has also represented the Solomon Islands in numerous bilateral and multilateral negotiations such as the proposed multilateral fisheries treaty with Japan and those seeking to ban driftnet fishing. "There is no substantial international law governing this practice, and its regulation to date has been by way of bilateral and multilateral conventions."

Transform also had to leave his family behind in order to pursue his studies. He does feel, however, that the experience and hard work of the past year have improved his skills and knowl-

edge: "One of the main benefits has been to develop a thorough research methodology. My hope is that when I return to the Solomon Islands, my work will be utilized in Foreign Affairs and contribute to various aspects of the regional administrative structure." ○



Transform Aqorau

Choosing the Right Boat for the Job

(continued from page 2)

two of the designs, *Lavenir* and *Lekonomi*. A third design – the 11.5 metre schooner – might be economically viable if used in exploiting an underdeveloped crab fishery and more distant fishing grounds.

Common to all the recommendations was more regard for safety, improved crew comfort, better fish holding compartments, and new equipment such as hydraulic haulers and automatic reels. The group did not suggest a specific number of new boats for the fisheries as this was judged best left to the demand for them by Seychellois fishermen.

As an alternative to wood construction, fiberglass technology could possibly be used to better advantage. To improve fiberglass construction skills, the group proposed that a consultant be brought into the Seychelles or that Seychellois shipbuilders receive training abroad.

Along with its technical suggestions, the consultant's report supported the creation of government-sponsored courses in boat maintenance, fishing techniques, and accounting. Fishermen were encouraged to keep

logbooks for better trip records.

The group also felt that younger fishermen wishing to become boat owners would be better prepared by a training course on the subject. The course, in conjunction with an apprenticeship period, would help to qualify new boat owners for a potential government loan. Fishermen could also profit by forming a professional association that would help to elevate the general perception of fishermen.

SFA Managing Director Phillippe Michaud felt that the evaluation of the boat designs provided information that would be used in creating better working conditions for fishermen and a more productive fishery. "The project will play a significant role in developing our demersal fishery if the suggested recommendations are well implemented." ○



IAN TULLOCH

A 22.5 m boat design that was evaluated.

Fisheries Extension in the South Pacific: Mastering the Art of Communication

Many of ICOD's training programs are considered "mature" when participants from developing nations are able to teach their countrymen what they have learned from offshore specialists.

Training, in particular, is a central component in building human resources in fisheries. And for many developing countries, training the trainer with help from outside experts is the necessary first step in getting a training program underway that can have widespread impact at home.

One of the most successful and longstanding programs to develop trainers in fisheries extension skills began in the South Pacific in 1986-87. At that time the South Pacific Commission (SPC) surveyed the countries in the region to determine their fisheries training needs. Most countries responded that it was the training of their fisheries staff in communication skills and extension techniques that had the highest priority.

As a part of the Regional Technical Meeting on Fisheries held at Noumea in August 1987, the South Pacific Commission conducted a one-day workshop on the role of the fisheries extension officer in the South Pacific. The participants at the workshop recommended that SPC initiate training for fisheries extension officers and establish the general form the training should take.

SPC responded with a two-

part fisheries extension training course. Stage I would be conducted at the regional level to train national instructors. In Stage II, those participants would return home to pass on their skills to their own fisheries department personnel.

With ICOD assistance, the Stage I course took place in Suva in April 1988. The first two weeks concentrated on teaching the skills of a practicing fisheries extension officer; the last two weeks developed teaching methods, or the means of communicating what they knew.

Nineteen participants from eleven Pacific Island countries attended the course. Alastair Robertson, the SPC fisheries training officer, was the course supervisor. Three members of the Queensland Department of Primary Industry (QDPI) acted as course tutors.

As a result of the course, a draft training manual was produced to assist participants in delivering the course in their own countries.

After the first phase, SPC secured a further \$115,000 in ICOD funding to stage two Phase II courses in Papua New Guinea, and one each in the Solomon Islands, Vanuatu, the Federated States of Micronesia (including the Marshall Islands), Tuvalu (including Cook Islands and Kiribati), and Kiribati.

In these courses, two trainers involved in the Phase I course, along with a tutor from QDPI, essentially replicated the Suva

course in one of the host countries. In all, ninety-six national fisheries officers from across the region received training in the practical skills of communication which they can use in their day to day work. The manual which emerged from the Phase I course and was used by participants in Phase II has been revised to incorporate new suggestions and will be published.

A solid enthusiasm and esprit de corps resulted from the first two phases, encouraging the original participants to get back together. A third phase of the program took place in March of this year in Suva, Fiji, where seventeen Pacific Island fisheries extension workers, who had both participated in the original Suva course and conducted a course at a national level, gathered to discuss their experiences. This group was led by Alastair Robertson, two of the original tutors, and Wayne Ledwell of the Canadian Centre for International Fisheries Training and Development.

During the ICOD-sponsored workshop, the group reviewed their experiences in presenting Phase II courses, and discussed their specific national fisheries extensions programs. Participants used the opportunity to enhance their motivation, confidence, and communication skills.

One of the trainers involved in all three phases was Mel Ware, deputy principal of the National Fisheries College in Papua New Guinea. Ware emerged as one of the trainers with the skills to contribute to the staging of courses in Papua New Guinea and other South Pacific countries as the need arose.

As the senior fisheries training officer of the South Pacific Commission, Alastair Robertson was involved with all phases of the extension training program. He described how the program grew from reliance on New Zealand and Canadian consultants to one that could be carried on by South Pacific nationals:

"Our experience suggests that courses run inside countries by nationals from those countries have more long-term impact on the participants than courses run by experts outside the region, even though such courses may have better facilities or be more professionally run. In developing a fisheries extension training program for the region, we were thus determined to assist participating countries in building their own capabilities. The approach was structured to give individuals the skills and help to operate their own in-country courses. This method has achieved even more success than expected. With the assistance of some very good tutors at the beginning, the participants gained self-confidence and enthusiasm. They can now develop and run their own courses with the assistance of an associate participant who has also attended the course. The program in the future will continue to encourage and build on individual skills."



Participants at a recent workshop in Panape, Federated States of Micronesia.



Fisheries Resource Assessment in Madagascar: **Achieving a Sustainable Perspective**

Situated in the Indian Ocean region, some 300 km east of Mozambique, is the world's third largest island, Madagascar. Through a cooperative effort between Madagascar's marine research agency, the Centre national de recherches océanographiques (CNRO), the government's key fisheries management group, the Department of Fisheries and Aquaculture (DFA), and ICOD, much more will be learned about the island's coastal and marine fishery and the people who bring these vital products to markets. The means to accomplish this will be through biological and socio-economic studies of Madagascar's artisanal and traditional fisheries.

Madagascar's economy depends heavily on rural activity, especially its fisheries, forestry, and agriculture. Madagascar's fishery contributes protein to the diet of the country's 11.2 million people and valuable commodities such as shellfish to the export trade. Fisheries production has doubled over the past two decades, totalling almost 100,000 tonnes annually. The estimated average local fish consumption has risen from 5.5 kg to over 7.5 kg per person per year.

Madagascar's fishery extends from its fresh-water lakes, swamps, lagoons, and rivers to its

(continued on page 2)

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Jean-Claude Bréthes



An experimental oyster culture. A worker is spreading oysters brought from the southern part of Madagascar over the shore close to Toliara.



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Ocean Development**



Canada

The International Centre for Ocean Development was established as a federal Crown Corporation in February 1985 with a mandate to initiate, encourage, and support cooperation between Canada and developing countries in the field of ocean resource management and development. Under the guidance of a fourteen-member Board of Directors including four international members, ICOD initiates and supports programs for the development of indigenous expertise and institutions in developing countries for the improved management and utilization of ocean resources, particularly as a source of food.

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View of Madagascar near Nosy-Bé.

coastal and offshore marine waters. The marine fishery of Madagascar provides the bulk of the island's fish production, approximately 70 per cent of the total. About one-quarter of this, or some 17,500 tonnes, comes from more recently developed industrial fisheries involving mainly shrimp and tuna. The remaining 52,000 tonnes comes from a combination of traditional and artisanal fishing methods. Malagasy using traditional methods fish from boats like dugout canoes or from shore; artisanal fishermen work from small motorized craft. These two flourishing fisheries provide approximately 80 per cent of the island's local consumption and also contribute 10 per cent to the country's fisheries exports.

The most critical problems facing Madagascar's small scale fisheries include:

- isolated and scattered fishing villages
- poor roads or no roads at all
- long distances to large markets
- limited range and capacity of canoes
- lack of fishing equipment
- inadequate or non-existent methods of storage and distribution channels
- limited purchasing power of the Malagasy

If these can be alleviated, DFA estimates that the island's rich coastal and inland waters have the potential to provide Madagascar's fishery with about 470,000 tonnes of a variety of different species of fish from natural and cultured shrimp, crab and lobster, to tuna and other surface-water species. Clearly, there is a large resource to develop.

ICOD recently approved a five-year project to assist and strengthen the capabilities of CNRO to collect and analyze biological and socio-economic data. Project team members will compile detailed information about the artisanal and traditional fisheries. With the broader knowledge available to them, Madagascar's fishery managers will be better equipped to pinpoint their industry's problems and potential and to assist with its management and growth. The project also meets important government objectives:

- to increase the fishery's overall production and profits
- to ensure the resource provides increasing shares to the protein diet of Madagascar's population
- to increase the island's export revenues.

The project will provide fisheries managers with better knowledge of the actual potential of Madagascar's fishery sector, what can be harvested and how, and the average volume of the catch per year, particularly in selected regions of the country. Initially, CNRO/ICOD's expert team will travel to particular areas of Madagascar to assess the fishery and prepare a plan of action to determine the type of studies which should be carried out during the five-year project.

The ICOD-funded project will provide CNRO with technical assistance, on-the-job training,

Fisheries Management in Namibia:

New Initiatives for Africa's Newest Nation

In March 1990 Namibia officially announced its independence and in April, as one of its first official acts, declared its Exclusive Economic Zone.

The linkage between the two events has to do with economic development: Namibia's fisheries has the potential of becoming a significant commercial industry and foreign exchange earner for the country's 1.8 million people. Foreign exchange earnings from commercial fishing licenses and from Namibia's own fishing fleets are estimated at US\$200 million in 1990.

Last summer, a Namibian delegation visited Canada and met with ICOD officials to explore Canadian ocean development assistance programs. A strong bond between Namibia and Canada had developed during the independence process in which Canada was one of the emerging nation's strongest international supporters.

Shortly after the Namibian delegation's visit, an ICOD program officer travelled to Namibia for further discussions. He recommended that a Canadian fisheries consultant confer with Namibian experts to define their ocean management priorities and determine in what areas Canadian expertise could be most helpful.

In November, Mike Shepard, a Canadian fisheries expert spent four weeks in Namibia where he was hosted by Calle Schlettwein, the permanent secretary of the Ministry of Agriculture, Forestry, and Wildlife, Jan Jurgens, the director of fisheries, and his deputy, Berger Oelofsen. Shepard toured the port facilities of Walvis Bay and Luderitz, and the research station at Swakopmund. He spoke with fishermen, fisheries officials,



Namibian fish inspectors examine rock lobsters in Luderitz, Namibia.

and researchers to put together a composite picture of the fishing industry and marine environment.

Shepard's observations confirmed the rich fisheries potential of Namibia's coastal waters, which are among the most productive in the world. The fisheries, however, must be rebuilt. Prior to the EEZ declaration, Namibia's inshore fisheries (pilchard, anchovy, and rock lobster) was dominated by South African companies and its offshore fisheries (hake and horse mackerel) heavily exploited by European fleets. As a result of over-exploitation, many of the stocks have been seriously depleted.

Namibia's fisheries policies are now under development. The priorities are to restore the stocks and to increase the economic benefits of the resource by encouraging more local enterprise. Access fees will also be levied on the foreign fleets that are allowed to continue operating in territorial waters.

The coast of Namibia is almost entirely desert, with no artisanal fisheries. Future fishing development will thus be industrial, employing larger ships and more sophisticated techniques. Much of the busi-

ness expertise for the enterprise already exists among Namibians working independently or with South African and foreign fleets. New development strategies, however, will encourage new joint ventures and the growth of local enterprise. The expansion of skilled human resources in fisheries management is a priority and an area where Canadian technical assistance could prove helpful.

ICOD President Gary Vernon also visited Namibia in November, where he met with Shepard and Namibian officials. Vernon was impressed by the country's commitment to develop its fisheries in a rational and sustainable manner. "The wise management of the newly-declared EEZ could make fisheries a dominant element in Namibia's economy. By conservative estimates, a revitalized fisheries could produce an annual yield of over one million tonnes, placing Namibia (on a per capita basis) among the top fishing nations in the world." ○

An Interview with Maizan Hassan Maniku of the Maldives: Managing the Marine Environment



Maizan Hassan Maniku is the Director of Fisheries Research and Development and Marine Research in the Maldives. Over the past five years, he has worked with ICOD to develop a series of projects related to fisheries and the marine environment. In the fall of 1990, on an extended trip that included stops in Canada, Sweden, and England, he visited the ICOD office in Halifax where he was interviewed by ICOD Info.

Info: In a paper you wrote in 1988, entitled "The Status of the Marine Environment", you set out the major ocean management challenges facing the Maldives. Have your opinions altered since that time?

The Maldives is a small group of islands in the Indian Ocean off the southwestern tip of India. Ocean resources such as fisheries play an important role in the nation's economy, with approximately 13.4% of the total population engaged in fisheries-related employment (1988 statistics). Marine fish are abundant and about 1000 species have been recorded in the reefs and surrounding ocean, making this one of the most species-rich marine areas in the world. (Munch-Petersen, 1982 and 1985)

Maizan Hassan Maniku: Not really. Specifically, one of our requirements is to generate the information required for marine resource management. This is the reason for the emphasis on research on reef ecology and the reef environment through the establishment of a new Coral Reef Research Unit, a project we implemented with ICOD support.

Generally, there is now more awareness about the environment created through the threat of

global warming and sea level rise. This has motivated the government to encourage research with a broader perspective. The Ministry of Planning — now called the Ministry of Planning and Environment — was expanded to include an environmental component. So, some effort is now focussed on developing the infrastructure to deal with the challenge.

Info: Do you have programs to attract people to ocean research?

MHM: In the early eighties, education became a critical issue and we developed the idea of introducing fisheries sciences as a subject in secondary school. This encouraged students to consider that marine resource management might offer them a career with employment potential.

Fisheries sciences as a subject is designed to include the local environment. The course has been accredited by London University, which corrects our papers and directs our curriculum. Students taking the course over the past four years have declined because it does not link up with fisheries science programs at the post-secondary level. To correct this, we have approached ICOD for assistance in establishing an A-level fisheries science program which we project will be established in early 1991. We hope this will be integrated with universities so more students will pursue fisheries science in terms of a career.

Info: How have you approached managing the marine environment?

MHM: Resource use is considered a very sensitive issue. For example, in terms of our Exclusive Economic Zone, we are very cautious about introducing foreign access and licensing. In so doing, we would like to have control over the type of gear that is used to fish our limited tuna resource.

At present, the Maldives does not have a commercial fleet and we fish within a 35 mile limit. We assume that without continental shelves our atolls act as a fish aggregating device so tuna congregate closer to shore and there is no reason for our fishermen to venture out into the ocean.

Info: You mentioned that you were discussing a monitoring, surveillance, and control project with ICOD. Is there any movement toward regional cooperation on tuna stocks?

MHM: There are foreign fleets operating

within the Indian Ocean and some nations in the region are developing a commercial capability. Some discussion has resulted. FAO, for example, has taken the lead in developing a regional management program but there are various constraints. The island states by themselves have initiated a program to develop an agency like the South Pacific Forum Fisheries Agency so that we can standardize the licensing programs and create a central clearinghouse for data and management.

This proposal inspires a lot of in-house thinking in the case of the Maldives. As tuna is our only major fisheries resource, we have to be very careful as to how we should look at it over the longer term. Once we enter a regional agreement, for example, we commit tuna management to a second party for whom tuna might not be a primary resource. We feel the need to establish such an organization but at the same time we are very cautious about how it would affect the sovereignty of Indian Ocean nations. We are the only country in the Indian Ocean that has traditionally exploited the tuna resource. Many of the countries who might be involved in a regional tuna management agreement do not have an indigenous tuna fisheries.

Info: One of your major environmental threats is infestations of crown of thorns (COT) starfish. Have you made progress in containing this hazard to the coral reefs?

MHM: With ICOD help, we began a study project three years ago when it became apparent that COT infestations were damaging some of our more visible reefs. Since 70 to 80 per cent of tourists to the Maldives are divers, we need to manage the reef environment to sustain the tourism industry. As part of that project, we started to manually collect the starfish and remove it from certain reefs. We also began to conduct research to find out if infestations are natural cycles or are triggered by man's use of the reef.

We know that there have been prior infestations. Reefs have died and recovered. At the same time, we tend to believe that man's impact on the reefs makes the cyclic process happen more frequently. The COT study aims to develop general awareness about the reef and to monitor reef ecology. We hope it will allow us to contain the COT populations at appropriate levels.

Info: Have you monitored any changes in sea level?

MHM: The Coral Reef Research Unit will do some research on historical sea level changes through coral cross sections. Frankly speaking, in my opinion, I do not see rising levels as the major problem; rather, I see global warming leading to possible climatic change which could cause short term environmental problems. A shift in the location of the nearby cyclone belt could wipe out the Maldives.

Info: You describe the Maldives as being in the "third wave" of construction resulting from

tourism. To quote from your paper: "The available material - aggregates - has been reduced from an estimated 200 000 m³ to about half that within a 16 km radius of Male. If the present demand continues, the whole North Male Atoll will be barren by 2014." Will this happen?

MHM: At the beginning of this year, we introduced a complete ban on mining coarse aggregates on those reefs linked to an island. But this is not going to happen without providing an alternative material. We are also trying to select one or two reefs from each atoll where mining could take place.

This year, two reefs in the vicinity of Male were identified and some borings were done to find out how much coral could be extracted. The results were not promising. The thin layer of coral found on the reefs weakens once it is broken, making the reef more vulnerable to collapse or disintegration. So what we thought was initially a good idea now requires further understanding.

...there is now more awareness about the environment created through the threat of global warming and sea level rise. This has motivated the government to encourage research with a broader perspective.

Sand is the final product of coral degradation and we are promoting the idea of making hollow building blocks out of sand. There is also a proposal to completely cut the import tax on aggregate and sand imported from India and Sri Lanka to minimize the amount of coral extracted. But only 30 per cent of the population can afford to import sand. A much larger percentage of builders on the outer islands depend on coral. There is an urgent need to do something.

Info: What would you say is the greatest challenge in your work today?

MHM: Strengthening our manpower and training. The Maldives does not have its own institution of higher learning. We send many students abroad. Because of the demand for skilled people in all the sectors, graduates serve in many capacities. In terms of marine environment research, our limited staff are concentrating on building good baseline information that will be used in the future when more trained people enter the field. It's a process that we have to live with. We can't import labour. My biggest concern is how to effectively train a high percentage of our own population to contribute to the management of the marine environment. ○

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Francophone Countries Expand Ocean Expertise: West African Maritime Boundary Delimitation

The 1982 United Nations Law of the Sea Convention allowed coastal and island nations to extend their legal jurisdictions up to and sometimes beyond 200 nautical miles. Many countries did so with good reason, for the stakes have the potential to be high.

Wider ocean boundaries can

Erindale Campus of the University of Toronto to train hydrographers from developing countries in defining offshore limits. Subsequently, several West African countries asked ICOD to organize a French-language course to familiarize their legal experts with this specialized field.

These nations needed a background in law relating to maritime boundary delimitation and assistance in evaluating the legal and practical options. Guidance on preparation for negotiations of boundaries with other states was also essential.

In the past, controversies have arisen over which techniques to use in defining maritime boundaries, and the consequences of using these techniques. Should ocean boundaries be established by equidistance where a boundary is set by measuring distances between the coastlines of two countries and drawing a line that falls precisely in the middle? Or should the principle of equity apply, where a host of other factors are weighed, ranging from historic use of fishing grounds and ocean areas to navigation, security, traditional maritime treaties, and oil exploration permits? When considering the underwater expanses of the Continental Shelf, what point of land

should be used to set a maritime boundary? And what should be done when islands belonging to one country are located near the coast of another?

These and other issues encouraged ICOD's pilot project to create a nucleus of francophone lawyers with the appropriate training to provide valuable assistance to their country's boundary delimitation teams. Early in May 1989 in Rabat, Morocco, the University Mohammed V welcomed participants from eighteen countries to a three-week French-language seminar on the legal complexities of ocean-boundary setting.

The course was designed, directed, and coordinated by a professor of law at Quebec's Laval University, Dr. Maurice Arbour, in cooperation with Dr. Abdelmounain Dilami at the University Mohammed V in Rabat. ICOD provided \$185,250 to organize and deliver the course and to pay associated costs for its eighteen participants.

As with any new field, building reliable, up-to-date information is an onerous task. Arbour undertook the huge job of gathering the informa-

provide access to rich mineral deposits and more plentiful fishing areas. Yet, defining these new Exclusive Economic Zones has become a highly complex endeavour involving the skills of lawyers, hydrographers, and resource experts. In fact, many boundaries have yet to be legally delineated.

To date, most advances in the embryonic field of defining the boundaries of the sea have occurred in the English language. Thus, access to ocean expertise has been a particular problem for developing francophone countries, where maritime boundaries are often a matter of national importance.

In 1986, ICOD began to support a yearly seminar at the



Some of the participants at the French-language seminar held in Rabat, Morocco.

tion on maritime boundaries from a wide variety of sources including the International Court of Justice, arbitral tribunals, and bilateral treaties to prepare a course syllabus and textbook.

Arbour claims that "access to francophone information on the subject is a key issue for many developing countries. There was not much documentation available." While many World Court judgements and key agreements are in French or have been translated at the U.N. in New York, most of the theory is in English and more French materials must be published.

The seminar's nine lecturers came from Canada, Algeria, Madagascar, and Morocco. Course participants, while students in one sense, were also highly trained legal professionals from selected West African countries working in the area of maritime boundary delimitation or fisheries management. Participants came from the Comoros, Gabon, Equatorial Guinea, Togo, Benin, Haiti, Ivory Coast, Guinea, Morocco, Mauritania, Cape Verde, Mozambique, Sao Tomé and Príncipe, Congo, Seychelles, Senegal, and Cameroon.

The seminar first covered fundamental concepts of maritime boundary delimitation, new aspects of the Law of the Sea, how to negotiate boundary disputes, and how to establish boundaries using the DELMAR™ computer program library for boundary delimitation. This software package, developed by ICOD for developing countries, allows maritime boundary negotiators to perform many of the technical tasks previously assigned to hydrographers.

Participants reviewed and analyzed international cases between countries regarding Continental Shelf boundaries. According to Arbour, this review was the most important part of the course; when countries wish to set ocean boundaries, they must analyze maritime delimitation decisions already rendered by international tribunals to understand the basis of these judgements. Reviewing earlier judgments also illustrates the complexity of these disputes.

Case histories included Canada's negotiations with France over fishing rights around the French territorial islands of St. Pierre and Miquelon, and boundary disputes between Canada and the U.S. on both the east and west coasts where fisheries and oil exploration are still major concerns. Bilateral treaties were also analyzed to evaluate state practice in delimitation problems.

There was a practical element to the course as well. At the end of the session, participants prepared arguments based on existing cases such as the Anglo/French arbitration over English Channel rights or the Tunisia/Libya arbitration over the Tunisian islands off Libya's coast. In addition, each participant was required to speak to the group about the particular ocean boundary problems their country is working to resolve.

In evaluating the course, it was clear that the seminar was a great success and should be held

again. Participant Robert Guehi, manager of Ivory Coast's Marine and Port Relations section, said that while he has studied Law of the Sea issues since 1978, ICOD's course was his first formal opportunity to study maritime boundary delimitation problems. "I'll now be able to offer counsel to my government on these matters." Boubakary Ndiaye, of Senegal, secretary of the Subregional Fisheries Commission, said "ICOD has developed an invaluable tool which provides the fundamental elements necessary to begin dealing with problems associated with maritime boundary delimitation."

Arbour feels the course created an opportunity for dialogue between people from different governments. "The only way to solve boundary questions is to talk, to learn, and then to negotiate equitable solutions. Today, single states cannot arbitrarily decide where

"The only way to solve boundary questions is to talk, to learn, and then to negotiate equitable solutions. Today, single states cannot arbitrarily decide where boundaries will be set."

boundaries will be set."

ICOD's course illustrated that negotiators from different countries can achieve a great deal through communication and consultation. "It's basic", says Arbour. "You can't manage your resources if you don't know the limits of your territory." ○

Achieving a Sustainable Perspective

(continued from page 2)

equipment and supplies. Through ICOD support, selected CNRO staff will also have a chance to attend specific fisheries-related seminars to discuss and compare project results. ICOD will help to purchase a microcomputer, software, and other supplies needed to collect and analyze the data.

The project team will consist of CNRO staff with research, economic, technical, and field

investigation capabilities and three external consultants – a senior biologist, a senior economist, and a junior biologist. Each year, it is expected that the plan of action will be reviewed and activities adjusted to meet priorities and needs.

The project team will work closely with DFA, the department responsible for analyzing and managing the island's fishery. This institution, with the support of the United Nations Food and Agriculture Organization, has been collecting statistical information on catches and the fishing effort by artisanal fishermen. The CNRO/ICOD project will complement UN-assisted field studies, which are currently part of the government's priorities in the fisheries sector.

A significant component of the project is related to the socio-economic aspects of artisanal and traditional fishermen. It is important to understand their way of life and explore the factors that will encourage the adoption of new procedures.

The jointly-funded project will begin in the first quarter of 1991 and end in 1995. The Director of the Department of Fisheries and Aquaculture, Mr. Charles Andrianavojaona, says the information gathered through the project is vital to Malagasy. "Developing our fishery resource will help us to tackle the crucial problem of lack of protein in our diet. We believe a more fully managed fishery will help us put more food on people's tables and to improve our quality of life." ○

Jean-Claude Bréthes



The piroque is a dugout-like canoe used for fishing.

Jean-Claude Bréthes



A shrimp trawler in Nosy-Bé.

Marine Affairs at World Maritime University (WMU): New ICOD-WMU Professorship Announced

Since 1986, ICOD has supported the delivery of three one-week seminars at the World Maritime University in Malmö, Sweden: "Introduction to Marine Affairs"; "Introduction to the Principles of International Maritime Law"; and "Implementation of Ocean Management".

The seminars are presented by visiting professors who are distinguished in their fields and have become an important part of WMU's curriculum. As a result, WMU students, most of them from developing countries, are exposed to up-to-date information on marine systems, the marine environment, and the development and management of ocean resources.

Building on the success of the seminars, WMU requested that ICOD support a series of lectureships in marine affairs. In

response, ICOD recently approved a new project to sponsor a Canadian professorship over a period of five years to teach marine affairs at WMU.

The professor's primary responsibilities will be for the organization, coordination, and delivery of the marine affairs and maritime law components within the WMU program. The professor will be WMU's recognized expert in marine affairs.

Recruitment for this position is now underway in Canada, with a March 15, 1991, deadline for the receipt of applications. The WMU position will commence between August 1991 and January 1992. Ideally, the successful candidate will possess credentials equivalent to a full professor or a senior associate professor in the Canadian system in the fields of environmental or international maritime law.

For information contact *ICOD Info* at the masthead address or address applications to: Appointments, The Rector, World Maritime University, P.O. Box 500, 201 24 Malmö, Sweden. ○

REGIONAL MEETINGS



Participants at the Annual Intergovernmental Meeting of the South Pacific Regional Environmental Programme, held at the South Pacific Commission headquarters in Noumea, New Caledonia, in September 1990.

South Pacific Fisheries Extension Training: Vanuatu Strengthens Commercial Fisheries

Despite being a nation comprised of some eighty-five islands, with a modest inshore fishery, the Republic of Vanuatu has only recently begun to set a course for the offshore.

With traditional agriculture on the decline – the copra market dropped twenty-five percent in 1989 – , the fisheries sector is gaining in importance, with small-scale commercial fishing providing much-needed employment. Along with the venture into deeper waters has come new challenges for both the government and fishermen.

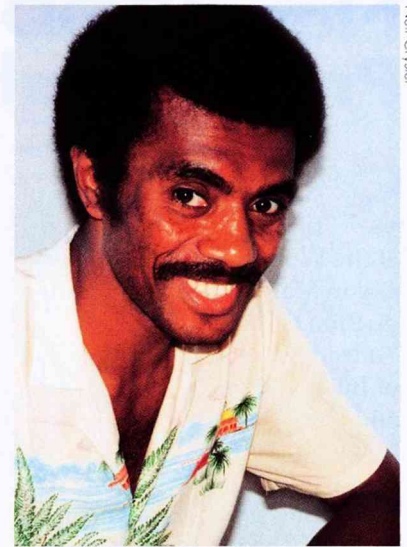
Foremost among these challenges is the training of management personnel and of fishermen themselves. Neil Crysler, a Canadian commercial fisherman with fifteen years experience complemented by a diploma in aquaculture and fisheries technology, recently returned from a four-year posting in Vanuatu's northern

region. For the last two years, he served the Vanuatu government as the senior extension and executive officer in the Northern District under an ICOD-funded project.

From his base in Luganville on the island of Santo, Crysler managed upwards of 150 fisheries-related projects. The thrust of most of these projects was to enable artisanal fishermen to make their operations financially viable by offering them a real alternative to working for a wage in town or on a plantation.

Working in cooperation with Vanuatu personnel, Crysler oversaw a canoe-modernization program which entailed placing Samoan hand reels on boats, thereby eliminating the need for handlining. Fishermen were also able to purchase small outboard motors to eliminate paddling and increase productive fishing time.

To upgrade skills, a Fisheries



Neil Crysler

Graham Nimoho is the principal fisheries officer in Vanuatu's Northern District.

Training and Extension Centre was constructed offering some of the best facilities in the South Pacific. Candidates who successfully completed a novice course became eligible to participate in a lease program which allowed for further training and on-the-job experience, with the added benefit of material and advisory support from the extension service.

For Crysler, this was one of



the highlights of his work with the ni-Vanuatu. "It was very satisfying to observe the progress of a fisherman like Paul Sokerie who entered our training program and then went on to our lease program. Within fourteen months he had saved sufficient money to purchase his outboard, all his fishing equipment, and fifty percent of his boat."

Aside from the technical, hands-on experience gained through the lease program, the fishermen are also able to come to terms with the business aspects of their operations, acquiring the management skills that will provide their enterprise with a firm foundation. A percentage of earnings are set aside for savings and records are kept of individual landings.

As Crysler points out, this is an essential component of a fully developed fisheries.

"Without this kind of information there is no way that an individual fisherman can put together a cohesive and realistic business plan. Without a business plan, it's virtually impossible to secure a loan."

Food and economic security were the cornerstones of Vanuatu's Village Fisheries Development Program, which evolved into the Fisheries Extension Service (FES). Management of the FES is rapidly being passed over to ni-Vanuatu.

Shortly before his departure, Crysler began an on-the-job training program with Graham Nimoho, a recent graduate of the University of Papua New Guinea with a Bachelor of Science degree in fisheries.

After working in close cooperation with Crysler for six months, Nimoho was appointed as the principal fisheries officer in the Northern District. He currently has wide-ranging responsibilities in executive and extension capacities, which include overseeing the Luganville boat yard and the marketing program.

As a fresh graduate, Nimoho is energetic and enthusiastic.

However, he is eagerly awaiting the arrival of a fellow ni-Vanuatu who will become the senior extension officer of the Northern District. This will enable Nimoho to assume the role of senior executive officer of the same area.

For Crysler, the major drawbacks of the project were, "time and manpower constraints". These are also of concern to Nimoho who is pleased that another ICOD-funded advisor is due to begin a two year engagement in the near future. The new advisor will work in close collaboration with Nimoho and his yet-to-be-named counterpart.

"I am currently doing the job that Neil (Crysler) did and will work with the new advisor to increase my skills. Having just recently graduated from university, I don't have a lot of on-the-ground, practical experience."

Over the course of two years, the ICOD-funded cooperant's advisory and supervisory roles will gradually be phased out to the point where Nimoho and his counterpart will assume full managerial direction of the Northern District. Apart from the invaluable practical education experience associated with the three individuals in question cooperating as a team, Nimoho's current workload will be dramatically decreased and the fishermen of the area will be better served.

"The advisor will deal mainly with technical problems such as the carrying out of large-scale projects. He will assist in implementing some fisheries programs and strategies in the Northern District of the country. Our goal is to encourage the necessary skills to assist our fishermen in benefitting from the offshore fisheries." ○

Neil Crysler



Training boats - Fisheries Department, Santo.

Neil Crysler



Fisheries Department Wharf - Luganville, Santo.

OCEAN CURRENTS

New and Recently Approved Projects in Brief

SOUTH PACIFIC AND CARIBBEAN BASIN

Addressing the Driftnet Fishing Issue

ICOD assisted representatives from Forum Fisheries Agency member countries to attend a meeting, held in Noumea in late 1990, to consider international arrangements regarding the management and conservation of albacore tuna stocks in the South Pacific. The meeting was one of several held to further the region's November 1989 ban on driftnet fishing adopted to end the economic and environmental damage caused by the practice.

Funding National Port Safety Seminars

The South Pacific Forum (SPF) will engage a Canadian consultant and a regional consultant to design and deliver a one-month course on port safety. The seminar, to be delivered in all thirteen SPF countries, will focus on safe stevedoring and cargo handling and the handling and storage of dangerous cargoes.

Improving Fish Handling and Marketing

A six-week course will be held in Suva, Fiji, to train twenty instructors to teach post-harvest fish-handling techniques and marketing skills to local fisherfolk and plant workers. The need for fish products to be of high quality has become particularly important since the recent commercialization of South Pacific fisheries and the increasing export markets. During the project, training materials will also be produced

to enable the trainees to conduct their own in-country courses.

Supporting a Fisheries Management Newsletter

ICOD is continuing to provide funding for *On Board*, the OECS Fisheries Unit's newsletter. Established in 1988 with ICOD support, *On Board* addresses fisheries management issues in the Eastern Caribbean. The newsletter is published every two months and is available by subscription from the Fisheries Unit, Organisation of Eastern Caribbean States, P.O. Box 846, Cane Garden, Kingstown, St. Vincent and the Grenadines.

WEST AFRICA AND INDIAN OCEAN

Improving the Economic Standing of Fisherwomen

In cooperation with the Worldview International Foundation, ICOD will provide twenty Sri Lankan women involved in fisheries with training in leadership, community development, and communication. A revolving fund will also be established as a source of initial financing for income-generating activities. The long-term goal of the project is to increase employment opportunities and access to credit for women in the Sri Lankan fisheries sector.

Support for Multidisciplinary Course in Fisheries Management

To encourage broader approaches to fisheries management, ICOD will support a three-week, multidisciplinary course in fisheries assessment and planning for twenty-two

senior francophone fisheries scientists from West African and Indian Ocean countries. This project builds on a course on fish stock assessment offered in West Africa in 1988 but goes beyond the biological aspects of fisheries to include sociological, economic, and ecological factors.

Mitigating Accidental Marine Pollution

Representatives from Morocco, Mauritania, Senegal, and Cape Verde will spend several weeks in Canada learning about emergency plans and intervention measures used when accidental marine pollution occurs. Each country will send an expert in the field of marine pollution and a person charged with coordinating relief efforts during marine environmental emergencies. Particular emphasis will be on those measures applicable to potential accidents in West African waters.

INTER-REGIONAL ACTIVITIES

Providing Scholarships for Ocean Managers

ICOD is continuing to provide scholarship assistance enabling ocean managers to attend Marine Affairs courses offered by the International Ocean Institute. The most recent course, "Class B 1990: The Exclusive Economic Zone", was held in Malta late last year and will be offered again this summer in Halifax, N.S. The ten-week course addresses a broad range of marine affairs issues relevant to managing and developing the ocean resources within exclusive economic zones. ○



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otherwise stated



January 1991 Signing Ceremony in Belize:

CARICOM Countries Embark on Major Fisheries Initiative

Improving fisheries management is an important component of the overall development of ocean resources now being considered by Caribbean countries. New fisheries initiatives must be balanced with other development priorities such as tourism and protection of the environment, which may affect the traditional lifestyles of fishing communities. Resource assessment is required to manage resources properly and to avoid declines in catch levels. In summary, a well-balanced regional management plan is necessary.

Caribbean governments recently took a major step towards increased cooperation in the management of their fisheries resources.

In Belmopan, the capital of Belize, representatives of the Caribbean Community and Common Market (CARICOM) and ICOD officials signed agreements valued at about \$20 million to strengthen the regional management of fisheries in the Commonwealth Caribbean.

Over the next eight years, the CARICOM Fisheries Resource Assessment and Management (CFRAM) Program will evaluate all major stocks and underexploited species in the region, provide training opportunities, and establish fisheries management systems. Once completed, the Program will have promoted the management and conservation of fisheries resources of the CARICOM countries and contributed to their careful exploitation.

CARICOM Deputy Secretary-General Frank Abdulah and ICOD President Gary Vernon signed the CFRAM Program agreement. At the same time, Prime Minister George Price and Minister of Agriculture and Fisheries Michael Espot of Belize signed an agreement with Mr. Abdulah to establish the site of the CFRAM Program coordination office

in Belize City.

Stronger management of the Caribbean fisheries is essential to protect the resource against such threats as overexploitation and pollution. By focus-



Canadian High Commissioner to Belize Jennifer McQueen, ICOD President Gary Vernon, CARICOM Deputy Secretary-General Frank Abdulah, and Belize Minister of Agriculture and Fisheries Michael Espot at the Belize signing ceremony.

ing on training human resources, collecting information on the stocks, and strengthening fisheries institutions, the CFRAM Program will encourage a broadly based sustainable management approach. The program will ensure that national governments have a strong voice in the collective management of the resource.

Canada will provide a majority of the funding through the Canadian International Development Agency (CIDA) and ICOD, with contributions from CARICOM and its members. The Program coordination office in Belize City will employ three CARICOM and three Canadian professionals.



The International Centre for Ocean Development was established as a federal Crown Corporation in February 1985 with a mandate to initiate, encourage, and support cooperation between Canada and developing countries in the field of ocean resource management and development. Under the guidance of a fourteen-member Board of Directors including four international members, ICOD initiates and supports programs for the development of indigenous expertise and institutions in developing countries for the improved management and utilization of ocean resources, particularly as a source of food.

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Également disponible en une version française.

...Major Fisheries Initiative

The CFRAM Program represents an expansion of ICOD's involvement in the Caribbean, which began in 1985. Since that time, the Centre has supported 46 projects valued at \$8 million.

Planning for the current CFRAM Program began two years ago by a joint Canadian-Caribbean team working under ICOD supervision. The Program is expected to generate a series of sub-projects involving regional ocean management organizations and educational institutions. All projects will attempt to build up the national and regional capabilities of CARICOM member countries in fisheries management.

The Program will strengthen relationships between fisheries management units and regional and subregional initiatives in environmental management related to safeguarding of coastal habitats.

Caribbean countries recognize that the oceans are rich in resources; but awareness is also growing that the delicate marine environment requires thoughtful stewardship to remain productive. Through regional cooperation and partnerships with developed fishing nations such as Canada, Caribbean countries are able to address their needs for the sustainable harvesting of fisheries resources.

The following is an excerpt of an address presented at the January 1991 CFRAM Program signing ceremony in Belmopan, Belize, by the Hon. Michael Espat, Minister of Agriculture and Fisheries of Belize.

"As Minister of Fisheries, I am party to an event that will be of considerable benefit to the fishing industry of Belize and other territories within the CARICOM group.

"The Government of Belize, like all other governments in the region, realizes that our coastal and ocean resources can no longer be placed on the back burner. The development of our coastal resources will only occur if we develop proper management strategies that aim at careful, sustainable development. Our governments are now

ready to set in motion programs that will promote management and conservation of our fisheries resources. At the same time, we must ensure that new initiatives are balanced with other development projects which impinge upon coastal resources and may have a critical impact upon them.

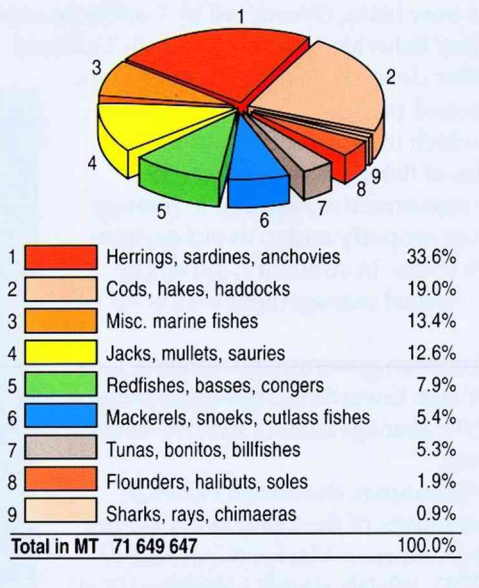
"Our governments also agree that the issue of ocean development and development of fisheries resources cuts across national boundaries. By operating in isolation we will accomplish very little; working as a group, within CARICOM, will undoubtedly enable us to

achieve our objectives. As a regional body, we can pool our resources and more effectively achieve our common goals.

"In Belize, this oneness of purpose is recognized to the extent that ministers and departments are working more closely together, sharing expertise and scarce human resources. Government is also working more closely with non-governmental organizations. CIDA and ICOD have encouraged us in this direction. This is the direction that CARICOM has so willingly adopted over the years.

"Over the next eight years, the CARICOM Fisheries Resource Assessment and Management Program will provide us with an opportunity to act as one. Collectively gathering data, analyzing data, identifying resources, training people — these activities further emphasize the need for cooperative management within the Caribbean sister states. This signing ceremony also represents an historic first for Belize in that the headquarters for a CARICOM project will be located here."

Total world catch of marine fish for 1988^{1a}



Detail from ICOD's newly released World Fisheries Map.

Information Management in the South Pacific:

**From
library
to**



**the
shelf
the**

Accessing information two ways at the FFA Library in Honiara.

hands of users

Practical information — everything from statistics, data, and research to history and the oral tradition — is vital to good ocean management.

In fisheries, for example, information relates to determining the health and size of the resource, predicting its whereabouts, forecasting the allowable catch, controlling the access of domestic and foreign fleets, evaluating fishing methods, and many other important management questions.

Canadian fisheries consultant Dr. Mike Shepard suggests that a central role for regional organizations is to assist small island countries in collecting information (Shepard, 1990)*. He cites ten major areas where information is required, which range from "the state of the resources and the biological effects of fishing upon them," to "techniques for consultation and participatory management at the village level."

Among South Pacific island nations, the need to support fisheries officers gave rise to a regional effort to improve the management of information. An organization like the Forum Fisheries Agency (FFA), for example, relies on the sharing of technical information among its member states. This process is made more difficult by the great distances between the states and the vast ocean jurisdictions they must administer. Staffs are small, and to exchange views they must engage in costly and time-consuming travel. Fisheries officers have difficulty keeping abreast of new developments and research,

and, as a result, duplication of research occurs, even within individual countries.

One of the steps taken to address these issues is the Pacific Islands Marine Resource Information System (PIMRIS). To provide useful information, the PIMRIS data base links up four regional organizations: the University of the South Pacific (USP), FFA, South Pacific Applied Geoscience Commission (SOPAC), and the South Pacific Commission (SPC). ICOD funding assists USP, FFA, and SOPAC to participate in PIMRIS.

The PIMRIS database has also been installed in the Cook Islands, Niue, Kiribati, Palau, Western Samoa, American Samoa, and Tonga. The databases of national fisheries departments in these countries have been included in the PIMRIS database.

In many places in the South Pacific, information is generated in terms of surveys, studies, consultancy reports, national plans, etc. In most cases, these reports are not easily accessible and are scattered through departments in filing cabinets, closed files, personal residences, etc. In some cases, whole collections of documents have been destroyed by cyclones and other natural disasters.

PIMRIS helps to eliminate this haphazard quality by encouraging standardized data collection and the bibliographic control of the published and non-published material related to the marine sector in the region. Other PIMRIS-related activities include the repackaging, interpretation, and distribution of information in a variety of forms for scientists, researchers, managers, fishermen, and others.

Within the regional centres, PIMRIS provides for the establishment and improvement of libraries and information services. At FFA, for example, the implementation of the PIMRIS project resulted in the upgrading of the library, training of library staff, and improved access to information and information services for FFA staff and FFA member countries.

The PIMRIS regional centres have been active in providing assistance to national centres in developing their information resources and services. USP, SOPAC, and FFA receive requests from national governments for assistance in

establishing libraries and managing information resources.

Close cooperation among the regional organizations ensures the implementation of predetermined library standards and compatibility of bibliographic databases. Local staff are trained in information services. Expatriate and local researchers are encouraged to deposit one copy of all documents produced at the PIMRIS Coordinating Centre at USP in Fiji.

One of the Canadian advisers involved in the PIMRIS project is Bette Kirchner, who is the FFA information officer. "In the short time that PIMRIS has been functioning," she says, "the flow of marine information in the region has increased substantially. USP, SPC, FFA, and SOPAC have been active in gathering and disseminating information. All four publish newsletters on marine-related issues relevant to the region. Each newsletter has a different focus, providing comprehensive information without duplication."

The *FFA News Digest*, for example, is a summary of articles from numerous journals, newsletters, and other sources which concentrates information on tuna markets, legal issues in fisheries, FFA activities, and so on. Fisheries departments of member countries and other organizations are encouraged to submit articles and to use the newsletter as a vehicle to disseminate information. The SOPAC newsletter, on the other hand, provides information on non-living resources.

Another facet of the PIMRIS project is to train South Pacific

An Interview with Barney Smith:

At the Centre of Cooperative Growth

Barney Smith is the former fisheries coordinator of the South Pacific Commission (SPC), an intergovernmental technical assistance agency consisting of 22 Pacific Island nations and 6 developed nations with interests in the region. Before taking up his new posting as research programme coordinator (fisheries) with the Australian Centre for International Agricultural Research, Mr. Smith directed a staff of 36 within SPC's Fisheries Division. He recently visited ICOD in Halifax to discuss cooperative projects and was interviewed by ICOD Info.

Info: The high degree of cooperation among the South Pacific countries is an impressive achievement. How would you explain it?

Barney Smith: There are very close cultural associations within the Pacific island countries; they identify with each other. Historically, the colonial powers can take credit for fostering an environment that built on this and encouraged countries to work together on common problems, helping to create organizations like the South Pacific Commission as early as 1947. The reality is that the Pacific Island countries are small and spread out over vast areas, so they have a stronger voice in world affairs if they work together.

Info: Can you briefly describe some of the major challenges facing your organization right now?

Smith: The most pressing issue is workload. As time passes, the tasks assigned by member countries to regional organizations are steadily increasing rather than diminishing. In 1953, there were no fisheries departments in the Pacific Islands. As the countries gained independence from the colonial powers, which were largely agricultural in outlook, fisheries finally received due recognition. This was enhanced by the Law of the Sea process. Following the adoption of the United Nations Law of the Sea Convention in 1982 (UNCLOS III), Pacific island countries suddenly acquired very large offshore jurisdictions and responsibility for new resources within them. They lacked the manpower for managing them, suggesting the need for support at a regional level. This gave rise to the expansion of dedicated fisheries assistance programs at SPC, and, later, to the establish-

ment and growth of the Forum Fisheries Agency (FFA).

We originally anticipated that many aspects of the work of these organizations would diminish as national organizations grew stronger, but this hasn't happened as quickly as projected, mainly because of the shortage of trained manpower, and the complexity of regional fisheries issues and concerns. Good people are in strong

scratch. Right now, the competence of fisheries officers at the top level is very high. Many of them have years of experience in international conferences and in participating in fisheries treaties and access negotiations. If a country loses that person, it loses all that investment in his or her experience.

SPC is now helping countries structure their training to develop a cadre of people with the skills

A major challenge...is to identify...where human resources could be strengthened.

demand in many areas beyond fisheries.

Thus, senior fisheries personnel, for example, because they are trained, move around the national infrastructure; they are also recruited into regional organizations, become involved in further training, or leave the country in pursuit of better opportunities. In the last three years, there has been an almost total turnover among the directors of national fisheries administrations in the region. A major challenge now is to identify those areas in-country where human resources could be strengthened to provide more management depth within national staffing components.

Info: How is it possible to administer regional fisheries programs with that kind of turnover?

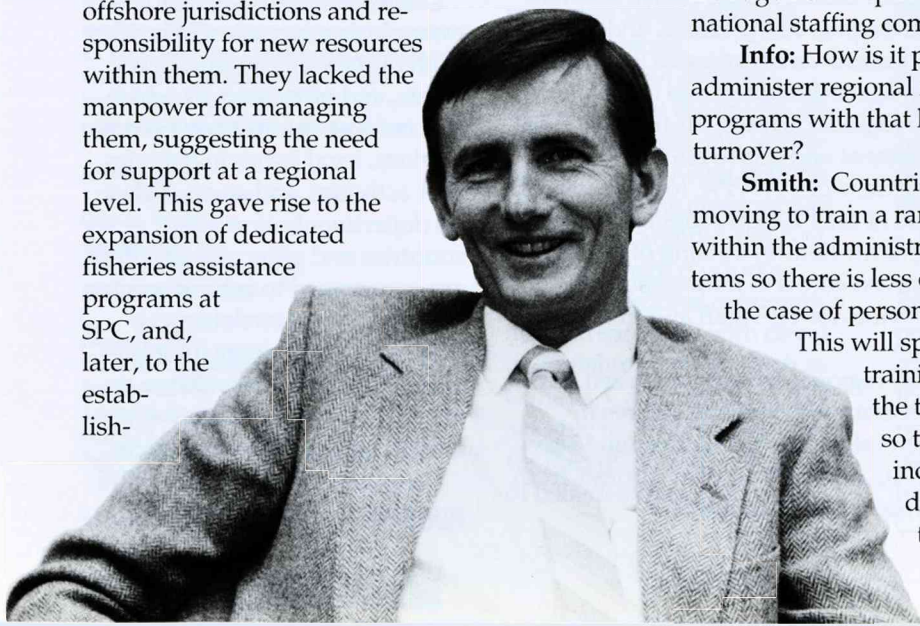
Smith: Countries are now moving to train a range of people within the administrative systems so there is less of a gap in the case of personnel changes.

This will spread the training among the top echelons so that the new incumbent does not have to start from

necessary to meet their specific needs, both now and in the future. In terms of research, however, much of the work directed at species like tuna will always be done on a regional level. Increasingly, though, countries are looking at research directed to their specific concerns.

Historically, we in the Pacific were very fortunate to discuss a program for regional tuna management well before the adoption of UNCLOS III. As early as 1975, we started out with a very good idea of our resource base and were quick to realize the kind of data base required to manage it properly. Individual countries feel very strongly about the kind of information they need to determine what part of the catch within their EEZ belongs to them.

SPC is helping individual countries set up their own data bases and consolidate that information into a regional data base. In some respects, the amount of energy that has gone into this research activity is quite extraordinary, the kind of effort that is usually only mounted when a resource is in trouble. At a very basic level, Pacific island-



From the Library Shelf...

(continued from page 3)

ers are very conservation-minded. While they want an economic benefit from the resource, they are committed to ensuring that it will be there for future generations.

Info: One of the SPC's new projects has to do with a Women's Fisheries Coordinator under the Canada-South Pacific Ocean Development (CSPOD) Project. Can you describe what inspired the project?

Smith: This project arises from a workshop that we ran with ICOD in Papua New Guinea (PNG) where we provided some basic training to women's groups.

Generally, fishing is a community activity in the Pacific islands. We are getting involved helping women on the ground level, introducing such elements as simple technology, improved handling, and better preservation techniques for use in remote situations. These will result in increased consumption and better marketing. There's also the potential in many areas to develop speciality products for some application in niche markets around the region. Marinated snacks is one example. In Tokelau, for instance, the tuna catch is larger than can be consumed or preserved. So we are looking at a way to process this excess tuna for retailing.

We decided to expand on the idea of women's training with CSPOD Project funding. We hope to establish a dedicated officer to look after a women's program, starting with Melanesia, with the potential to expand to Polynesia and Micronesia. The first phase of the two-year project will involve designing a work plan and implementing a broad range of initiatives in this area. Subsequent programs developed in-country will involve additional staff.

We can use our experience in the PNG region to determine how we could go in other areas. Dealing with women's groups is

not easy because for the most part they do not have the formal networks in place to easily define what their needs are. You have to do a lot of legwork to bring people together to identify the grass roots needs and address them. It's a process that involves talking to the different groups and getting them talking to each other.

Info: It sounds similar to other ICOD projects in the region.

Smith: ICOD has also been helping us with training in fisheries extension programs within the Pacific Islands which has been highly successful. The training followed a very logical process that became a model of its kind.

ICOD offered to support one and in some cases two potential trainers from each country in a four-week program providing training in extension principles and incidentally, but very importantly, to build the communication skills of the personnel involved. Next, the students went back to their countries to run in-country training courses using materials they developed themselves.

During this second phase program they had the support of one of the tutors from the first course. They are now running courses themselves. We also arranged for the exchange of tutors among various countries to build experience and run other "train the trainers" programs.

Our intention is to use this same broad self-help approach in the women's program. What makes it successful is the maximum participation of individuals; they work very hard in developing their skills but in turn take growing responsibility for how the course and training materials evolve, as well as the decision making. By getting involved, we hope women will actually take over training other women at a local level, which is the long-range goal.



Ganeshan Rao

islanders to manage key functions in the system. With ICOD assistance, Dilley George of Papua New Guinea completed her masters degree in library sciences at Dalhousie University in Canada and is now acting as a counterpart librarian to Canadian Heather

Creech at SOPAC. Another ICOD-sponsored student is Ganeshan Rao, a thirty-year old graduate in biology (marine and fisheries) from Fiji. Mr. Rao has recently completed a masters degree in library sciences at the University of British Columbia and took up the key position of PIMRIS coordinator on returning in July 1991.

"What I am learning about information technology, exchange, and networking," says Mr. Rao, "could be used anywhere in the world. Our aim is to adapt the advances developed since the 1960's to meet the particular needs of the management of marine resources and marine environment in the South Pacific."

Mr. Rao explains that the information management system at PIMRIS is the CDS/ISIS system, designed by UNESCO for developing countries and widely used in developed countries for managing special library collections. International acceptance and use of CDS/ISIS means that PIMRIS is able to exchange information with other networks and libraries using CDS/ISIS. It also ensures that UNESCO will continue to update and improve the program.

Through his study, Ganeshan Rao has come to appreciate the role that practical information can play in assisting the region to make the best use of its marine resources. A key concern is ensuring that information is not only catalogued but used.

"For any system to be effective," he says, "it has to go through an establishment stage which involves a lot of coordination, planning, and effort. During this stage, the dissemination of information is generally low. Once established, the dissemination of information will increase for the benefit of researchers, planners, fisheries officers, and fishermen."

Mr. Rao is anxious for PIMRIS to move into the phase where it will more strongly support its clients, but he is also cautious to ensure that its clients are able to define their specific needs. "The first thing I'll do is to get a good feel for what has been done. Based on that, I will do a survey of the people whom the system serves. Then we will direct our resources to fulfilling those needs."

* Shepard, M.P. 1990. Fisheries Research Needs of Small Island Countries. Halifax, N.S.; International Centre for Ocean Development: 72 pp.

Ocean Management Cooperation in the Caribbean:

CCA and ICOD Sign Marine Parks Agreement

Marine reserves and parks encourage tourism, contribute to marine resource conservation, and provide a focus for education and public awareness programs related to the marine environment.

Recognition of the value of marine parks has led to the rapid growth in their number in the Caribbean and, recently, to the adoption of a regional management approach. These ecologically important protected areas, however, face serious management constraints. Budgets are often limited and park managers find it difficult to share information with their colleagues in other Caribbean countries. Suitable regional training for managers and technical staff is also limited.

To address these issues, representatives of the Caribbean Conservation Association (CCA) and ICOD recently signed an agreement to strengthen the management of marine parks and protected areas in the Caribbean.

The \$1 million, 3.5 year project will initially involve eight island states of the Caribbean Com-

munity and Common Market (CARICOM) — Barbados, Dominica, Grenada, Jamaica, Montserrat, St. Lucia, St. Kitts and Nevis, and Trinidad and Tobago — as well as Anguilla and the British Virgin Islands.

The project will assist the CCA, a regional non-governmental organization, to encourage, coordinate, and support participating countries in establishing and maintaining a network of marine parks.

CCA's Acting Executive Director Calvin Howell explained that ICOD support will enhance his organization's ability to provide regional leadership. "The challenge we face is to establish an effective network of park managers and local resource

people. A functioning 'people-network' will help our marine parks contribute as they should to marine resource conservation, tourism, and the growth in public awareness of our marine heritage."

Specifically, ICOD support will strengthen CCA's ability to encourage cooperation, mutual assistance, and the sharing of information among the region's managers of marine parks and protected areas.

CCA will focus on nurturing the growth of national management capabilities by providing essential training and information. A small project fund will help to launch strategic marine parks projects identified by the ten participating countries.

Park managers will take part in appropriate seminars and training organized at the national, regional, and international levels; they will also receive technical assistance through working with consultants.

The information component of the project will update and expand the Caribbean Parks Areas Bibliography, and broaden the information data base on protected areas in the region. Additional management-related information will be carried in CCA's regional newsletter.

ICOD President Gary Vernon was present at the signing. He observed that the CCA project is an indication of the growing cooperation among Caribbean countries in the area of ocean management. "The establishment of an active marine park management network will result in the efficient sharing of costs, information and expertise; it will also help to ensure that large areas of the marine environment will be protected for the benefit of present and future generations."

Simultaneous Translation



ICOD scholars seen from a translator's perspective. Simultaneous translation was a feature of the March 1991 consultation workshop sponsored by ICOD's Interregional and Cooperative Activities Division. The workshop brought together 30 ICOD scholarship recipients studying in Canada. The ICOD scholars discussed such topics as award guidelines, the management of scholarships, course relevancy, alumni tracking, and follow-up activities in the four regions where ICOD is active: the Caribbean Basin, South Pacific, South and West Indian Ocean, and West Africa.

Fisheries Awareness

At the Forum Fisheries Agency's Tenth Anniversary Conference in 1989, the research group observed that there was a poor general awareness of fisheries development and administration in the South Pacific Region, and specifically of the role played by research. One of the reasons was that there were few publications available to explain the relationships between fisheries development, management, and conservation.

As well, the group noted that a career in fisheries was not considered as attractive as other careers. Sufficient numbers of students were not applying to fill the available spaces in fisheries-oriented university courses. This was also due in part to a lack of information that might encourage a deeper appreciation of the role of fisheries management in the national and regional economies.

To remedy this situation, the FFA, in collaboration with the Commonwealth Fund for Technical Cooperation and ICOD, embarked on a fisheries awareness project involving a poster encouraging a career in fisheries and two booklets: "Understanding Fisheries in the South Pacific" for distribution to the schools in the region, and "Fisheries in the Economy" for general distribution and specific targeting to both the civil service and the fisheries sector. The poster has recently been released and the two booklets are expected to be ready this summer.

The project and its impact will be of interest to many developing countries. *ICOD Info* will follow its progress and present a more comprehensive article as more information becomes available.



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Sustainable Development Planning in the Seychelles

Maryse Roberts, senior economic cooperation officer at the Seychelles Ministry of Planning and External Relations, is justifiably enthusiastic about the Seychelles' newly-drafted Environmental Management Plan (EMPS): "For the first time, the Seychelles government is striving to take an integrated approach to development based on environmental considerations. As a result, our natural beauty and our marine and land resources will not be compromised for developmental

ends. We have been praised for our initiatives and our plan will be used as a model by the World Bank, the United Nations Environment Programme (UNEP), and the United Nations Development Programme (UNDP) for other developing countries."

The EMPS is a fully-integrated component of the country's five year National Development Plan (NDP) and is designed to put the Seychelles on the path to sustainable development.

The land mass of the Seychelles islands — approximately 455 km² — is quite small in proportion to its EEZ of about 1,000,000 km². The magnitude of the offshore jurisdiction makes environmental management a challenging task for the country's 70,000 people. The government recognizes the importance of long-term planning to the continued good health of the country's primary industries, fisheries and tourism, both of which are



The land tortoise is one of the unique creatures that inhabit the pristine Seychelles environment.

dependent on sound environmental management.

Dr. Patricia Lane, a Canadian environmental consultant, recently visited the Seychelles to assist ICOD in identifying components of the EMPS in which it could participate. While in the Seychelles, Lane met with a variety of representatives from government agencies, UNEP, local NGOs, and members of the private sector.

Her comments reflect the importance of the EMPS and its potential for success in the Seychelles: "I think this is really an exciting example of a country trying to play a leadership role

in environmental concerns. One thing that impressed me was the generally high quality of the Seychelles environment."

One of the areas facing the greatest challenge is the coastal zone. The islands have a small land mass with much of the interior dominated by granite mountains. As a result, most development occurs on a small coastal plane fringing the mountains. Both land and sea in these areas are vulnerable and, without proper planning, could experience serious degradation.

The EMPS is wide-ranging, cutting across the fisheries, forestry, tourism, and agriculture sectors and also touching on community development. The Seychelles already has an enviable track record in conservation of wildlife and will consolidate its successes in this area.

There are other considerations related to the physical habitat. A primary example is coastal erosion and the wholesale use of sand for construction purposes. The nation's coastal strip will comprise a major focus of the EMPS. Aside from a beach erosion protection plan, the country will also be under-

Marine Analytical Chemistry Standards Program:

Expertise in assessing the ocean environment

taking a coastal and marine environmental baseline study, formulating a marine resources management plan, and developing a preventative marine pollution plan.

With large offshore areas of the Seychelles being leased to oil firms, there is a recognized need for spill contingency planning. ICOD previously assisted in sponsoring the preparation of a Seychelles National Oil Spill Contingency Plan which could be expanded to include other hazardous goods and chemicals.

Other projects of mutual interest to the Seychelles and ICOD include the Environmental Guidelines and Assessment Program, Pollution Monitoring and Control Program, Environmental Law and Enforcement Program, and Environmental Information, Education and Training Programs.

The recognition of sustainable development as a top priority for the government has necessitated embracing many new sciences and technologies such as those related to pollution monitoring and waste management. But, recognizing the need is only the first step toward implementing a successful management program.

Two key elements to ensure success are education and training programs for Seychellois. A major component of the EMPS calls for 'environmental training' of its technical personnel and more education within the school system.

The EMPS addresses a significant number of important concerns. For Dr. Lane, one of its weaknesses is the failure to explicitly recognize what she terms the cumulative effects, the regional and global events that impact on all nations, such as ozone depletion and rising sea levels. However, she also adds that "very, very few members of the world community have come to grips with this concept."

Dr. Lane is pleased that the Seychelles was able to develop such a strong EMPS with the resources at its command and commends the Department of Environment (DOE) for what it has accomplished in its first two years:

"The DOE is really a shoestring operation right now and badly needs strengthening. I think this is a critical aspect of their needs as it will influence what happens with all the environmental work in the country."

A program developed by Canada's National Research Council is a potential resource for developing nations requiring expertise in the environmental assessment of their oceans.

With the protection of the marine environment becoming increasingly important, many assessments of conditions and impacts in the oceans rely on the validity of measurements of the presence of chemicals, especially chemical contaminants in seawater, marine sediments, and marine organisms.

Improving the validity of such data is the objective of the Marine Analytical Chemistry Standards Program (MACSP), which is designed for scientists working in ocean-related fields. Developing nations, in particular, may find that MACSP products and methods are potentially useful in their national or regional environmental assessment programs.

MACSP capabilities include:

- developing a series of instrument calibration solutions and certified reference materials designed to aid analysts in obtaining more accurate determinations of trace organic and inorganic chemicals in marine samples;

- developing analytical methodologies for reliable analyses of marine sediments, marine biological tissues, and seawater and transferring these technologies to users;

- organizing domestic and international intercalibration exercises dealing with analyses of marine materials; and

- applying analytical expertise to assist with emergency situations, such as outbreaks of marine toxins.

To date, MACSP has issued 25 reference materials and instrument calibration solutions. These include:

- natural waters with varying salinity for standardizing determinations of trace elements;

- marine sediments for standardizing determinations of trace elements and butyl compounds;

- marine biological tissues (lobster tomalley, dogfish muscle and liver) for standardizing determinations for trace elements and organomercury;

- marine sediments for standardizing determinations of polychlorinated biphenyls (PCB);

- marine sediments for standardizing determinations of polycyclic aromatic hydrocarbons (PAH);

- instrument calibration for solutions containing 51 pure, individually synthesized PCB compounds and another containing a single ¹³C labelled PCB (IUPAC#153);

- an instrument calibration solution containing the naturally-derived marine toxin domoic acid; and

- a marine biological tissue (blue mussel) reference material containing domoic acid.

All these materials are available and are being used throughout the world both for marine research investigations and for standardizing data collected for the purposes of regional and other international agreements.

Further information about MACSP and its products may be obtained from the:

National Research Council of Canada
Institute for Marine Biosciences
Marine Analytical Chemistry Standards Program
1411 Oxford Street
Halifax, Nova Scotia, Canada B3H 3Z1

Telephone: (902) 426-8280
Fax: (902) 426-9413

**New and
Recently
Approved
Projects**

**SOUTH PACIFIC AND
CARIBBEAN BASIN**

**Sustaining the Trochus Shell
Resource**

With ICOD funding, Vanuatu's Fisheries Department hosted a three-week workshop to promote effective management of the region's valuable trochus shell industry. Increasing off-shore demand for the shell, which is often used in button-making, has resulted in rising prices and more interest in harvesting and export activity. Approximately 31 participants from 14 South Pacific countries attended the workshop to encourage the sustainable use of the resource. An additional two-day seminar was provided for ni-Vanuatu trochus harvesters.

Teaching Tropical Stock Assessment

A ten-day training workshop on tropical fish stock assessment techniques will be offered by the Caribbean Community and Common Market (CARICOM) in an effort to increase the ability of its fisheries officers and researchers to analyze and interpret fisheries data. Topics to be addressed include cohort analysis, yield-per-recruit analysis, and biostatistics. Further training in stock assessment techniques will be provided through ICOD's Caribbean Fisheries Resource Assessment and Management Program.

**WEST AFRICA AND
INDIAN OCEAN**

**Preparing for Accidental Oil
Spills**

In 1990, an ICOD project provided the Government of the

Seychelles with a plan for responding to oil and chemical spills that may threaten its marine environment. That plan will now be made operational through a hands-on course which covers such topics as the operation of harbour booms and portable skimmers, the application of dispersants, and beach and coral clean-up procedures. The ten-day course will be offered to the relevant countermeasure personnel and will include on-site simulation exercises.

Disposing of Fish ByProducts

An ICOD-funded study will assess alternatives to the current practice of disposing of fish by-products and fish waste in the waters surrounding the Seychelles' main port, Victoria. In particular, a fish offal specialist will identify the specific effects that the dumping practices have on the area's marine environment. Environmentally-sound disposal methods will be recommended, along with ways to make use of the fish waste as a source of protein and nutrients.

**Identifying Marine Resources
for the Seychellois Industry**

In light of recent Seychellois legislation against the use of over-exploited marine resources, a research team will identify alternative coastal and marine materials available in the Indian Ocean for commercial use. For example, certain underutilized species, such as crustaceans, sea grasses, and marine algae, will be considered for their potential as food products. This project will complement the goals of the Government of the Seychelles to

encourage the development of sustainable income-generating activities by the private sector.

**Improving Port-Related Training
in West Africa**

A pilot project will help the staff of Benin's Centre de formation des mécaniciens des équipements portuaires (CFMEP) revise its training course for fork-lift operators. The course's curriculum will be amended and tested, the instructors will receive training to upgrade their teaching skills, and office equipment, such as a photocopier, will be provided. The purpose is to help the CFMEP ensure the safe and efficient operation of fork-lift operators at West Africa's sea ports.

**INTERREGIONAL AND
COOPERATIVE ACTIVITIES**

**Scholarships for Women in
Development**

Up to four full scholarships have been provided to enable women from ICOD target countries to attend the one-month Summer Institute on Gender and Development, offered annually in Halifax at Saint Mary's University in cooperation with Dalhousie University. The program is delivered by women for women. Along with approximately twenty-one other participants, the ICOD-funded group will acquire skills relevant to increasing the role of women in development activities, particularly in marine-related fields.

ICOD Products and Publications

Software

DELMAR

A portable information tool for use in delimiting maritime boundaries.

The user may select from a number of options that provide valuable information relevant to the preparation, actual negotiation, and verification of international boundary agreements. DELMAR may also be useful for investigating the technical nature of existing agreements.

Designed for use on IBM or compatible personal computers. Available in English, French, and Spanish versions.

How-to Publication

A Guide to the Management and Operation of Marine Research and Survey Vessels

An 18-volume publication designed for use by senior decision makers, staff of marine laboratories, scientists, hydrographers, crew members, and others. Also a reference work for libraries and ship's users.

Based on the experience of several countries and many individuals and organizations, the *Guide* was written and edited by experts and use-tested in a workshop situation. The *Guide's* training modules provide a basis for a teaching course on the essential aspects

of research vessel operations.

Four principal volumes, fourteen resource chapters, eight training modules, and an index. Each volume and training module is bound separately. The entire 1,441 page publication is packaged in its own container for convenient placement on a reference shelf. Available in English.

Educational Material

World Fisheries Map

A full-colour wall map designed to bring world fisheries information into context and to facilitate comparisons on a regional basis.

The World Fisheries Map is an excellent educational or reference tool that provides a wealth of information and comparative data on the com-

mercial fishing activities of all countries and territories for the 1988 calendar year. Available free of charge in bilingual form with English on one side, French on the other.

Building Partnerships in Ocean Development

A Profile of the International Centre for Ocean Development.

A newly-published perspective on ICOD as an organization, its development themes, policies, and program development. Available free of charge in separate English and French versions.

Project Summaries

A listing and abstract of each project supported by ICOD from its inception in 1985.

For further information contact:

International Centre for Ocean Development
176 Gloucester Street, Suite 400
Ottawa, Ontario, Canada
K2P 0A6

Tel: (613) 954-1920
Fax: (613) 954-1398



Course participants, lecturers, and friends at Arno Fishing Project, Ocean Resources Management Program, In-Service Course, Republic of the Marshall Islands, January 21 to February 8, 1991. The course, conducted for Forum Fisheries Agency member country officials, was sponsored by the Canada-South Pacific Ocean Development Project.

ICOD Ocean Forum:

Seeking Sustainable Development of the Oceans

How can sustainable development concepts improve approaches to marine and coastal use?

Now is an opportune time to examine these concepts — as the preparation for the Earth Summit on environment and development to be held in June 1992 in Brazil is in full swing.

Drawing together leaders in the field of sustainable development and specialists in ocean development, the meeting will address two central themes: (1) the need for a new relationship between the environment and economy of the oceans, and (2) improved methods for ocean development to prepare us for the transition to the twenty-first century.

To take advantage of this propitious time, ICOD will sponsor a November 1991 Ocean Forum to address such questions as:

What is meant by "sustainable development" of the oceans? Is it a practical and achievable goal?

How can we successfully develop ocean resources to expand national economies while demanding that growth be sustainable and environmentally sound?

If ocean management is a global concern, how can local communities play a more active role?

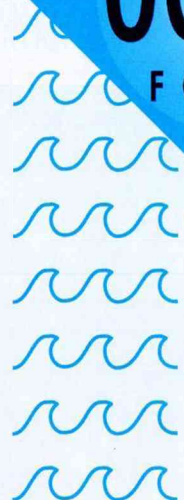
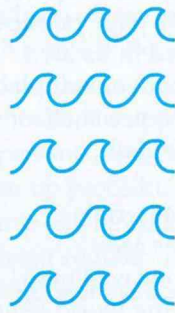
What research, policies, programs, and institutions are required as part of an action plan to promote sustainable development of the oceans?

How can international and national development agencies incorporate sustainable development into their ocean projects and programs?

What are the funding, investment, and technology transfer needs to be met for sustainable development?

How can we monitor progress towards sustainable development?

How can people be made more aware of the importance of our oceans in the context of worldwide sustainable development?



A synthesis of emerging concepts and recommendations from the Ocean Forum will be made available to the Secretariat of the United Nations Conference on the Environment and Development, delegates at the Earth Summit, developing nations, and other interested parties in order to facilitate a wider dialogue of key issues relating to sustainable development of the oceans.

Day One of the Forum will offer open sessions devoted to a discussion of the concepts and principles of sustainable development as well as case studies. These sessions will cover the political, economic, and institutional dimensions of sustainable ocean development, examine sustainable livelihoods from the oceans, and examine different elements of integrated ocean planning and management.

A luncheon address on Canada's commitment to sustainable development in developing nations and an evening public panel session on the Earth Summit are other features of Day One.

Day Two will involve workshops drawing upon the expertise of specialists invited to develop recommendations on the strategies, policies, and programs that will be required to achieve sustainable ocean development.

Sustainable development is an explicit and overriding priority of Canada's Official Development Assistance policy, and ICOD's Ocean Forum stems directly from this emphasis. The Forum will assist in promoting public awareness about ocean development issues and help identify specific actions required to assure sustainable development of the oceans. It will also help promote a wider appreciation of the crucial role of the oceans in sustaining our global environment. The Forum deliberations are expected to impact positively on ICOD's future programming.

The Ocean Forum will be held at the World Trade and Convention Centre, Halifax, Nova Scotia, Canada, November 20-21 1991. More information and a copy of the first announcement can be obtained by contacting:

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International Centre for Ocean Development
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