

ICLARM NEWSBRIEFS

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ICLARM Newsbriefs is an occasional, informal news medium of the International Center for Living Aquatic Resources Management for staff, friends and donors interested in the Center's activities. Information herein may be freely quoted.

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External Review by CGIAR

One of the requirements set by the Consultative Group on International Agricultural Research (CGIAR) for admission of ICLARM into the CGIAR system was for a positive assessment of the Center by an External Program and Management Review Panel. This panel has now been formed.

The Panel members, who serve in their individual capacity, are: Dr. Laurence Stifel, Cornell International Institute for Food, Agriculture and Development, New York; Dr. Mike Collinson, CGIAR Secretariat; Dr. Samuel Paul, World Bank;

Dr. Harald Rosenthal, Institut für Meereskunde an der Universität Kiel, Germany; Dr. Selcuk Ozgediz, Management Advisor, CGIAR Secretariat; Dr. John Caddy, Chief, Marine Resources Service, Fishery Resources and Environment Division, United Nations Food and Agriculture Organization; and Dr. Peter Burbridge, Consultant from Scotland, UK.

The Panel group spent several days at ICLARM during the week 2-6 December 1991 to familiarize themselves with ICLARM staff and programs. Subsequently

they split into two groups. Drs. Stifel, Caddy and Ozgediz visited ICLARM's South Pacific Office and Coastal Aquaculture Centre in the Solomon Islands, while the others visited our collaborative aquaculture work with the Malaŵi Fisheries Department and University of Malaŵi.

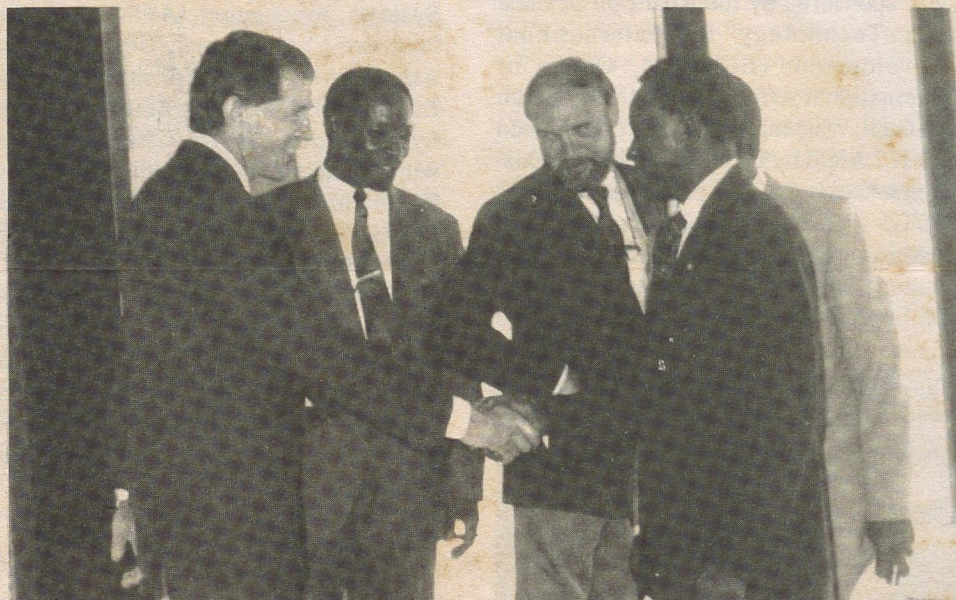
The Review Panel returns to ICLARM headquarters for three weeks in January 1992 for an in-depth review of the Center. They will present their findings to the ICLARM Board of Trustees which meets on 27-31 January 1992.

ISTA III Held in Abidjan, Côte d'Ivoire

The Third International Symposium on Tilapia in Aquaculture (ISTA III) was held in Abidjan, Côte d'Ivoire in 11-16 November 1991, organized by the Centre de Recherches Oceanographiques (CRO) under the Ministère Ivoirien de la Recherche Scientifique et de l'Enseignement Professionnel et Technique (MRSEPT) and ICLARM. ISTA III was sponsored by the Ministère Français de la Coopération et du Développement; ORSTOM; l'Agence de Coopération Culturelle et Technique (ACCT); le Centre Technique Forestier Tropical (CTFT-CIRAD); le Centre Technique de Coopération Agricole et Rurale (CTA); and l'Institut de Recherche Agronomique (INRA).

There were 182 participants from 38 countries. Over 90 papers were presented

(Turn to p. 2)



Prof. Alassane Salif N' Diaye, Minister of Scientific Research and Professional and Technical Education of the Ivorian government, arrives to open ISTA III at the Hotel Ivoire, Abidjan, on 11 November. Standing (left to right) are Dr. Roger Pullin (Aquaculture Program Director, ICLARM); M. Albert Kouassi (Counseiller Technique); Dr. Kenneth MacKay (Director General, ICLARM); Prof. Alassane Salif N'Diaye; and M. Jean-Baptiste Amon Kothias (Director General, Centre de Recherches Océanologiques, Abidjan - partly hidden).

ICLARM staff by the ISTA III registration desk at Hotel Ivoire. From left to right, Barry Costa-Pierce, Catherine Lhomme-Binudin (ISTA III Organizing Committee member), Reg Noble, Belen Acosta, and Josie Capili. At extreme right is Bong Tayamen of the Central Luzon State University, Philippines.



and there was a lively poster session and field trips to the Institut des Savannes (IDESSA), Bouaké and lagoon aquaculture research projects and farms near Abidjan. The conference was bilingual with

simultaneous interpretation in of all sessions. The proceedings will also be published in English and French. This was one of the largest and most successful aquaculture conferences held in Africa.

ICLARM Hosts BOSTID/ PSTC Aquaculture Workshop

A workshop for the scientists of the USAID-funded Program for Science and Technology Cooperation (PSTC) was held at the ICLARM headquarters in Manila, Philippines, on 6-10 August 1991. This was sponsored by the Board on Science and Technology for International Development (BOSTID), Office of International Affairs, National Research Council, Washington DC, and coordinated for ICLARM by Dr. Roger Pullin and Ms. Belen Acosta. Some 38 participants, mainly PSTC grantees from Africa, Asia and Latin America attended the workshop. Included also as participants were some Philippine scientists and representatives from ICLARM and BOSTID. The presentations and associated study tours were organized into two main sessions,

1) aquaculture and fisheries and 2) public health focusing on schistosomiasis or bilharzia. The proceedings of the workshop will be published by BOSTID in 1992.

New Farming Systems Journal Launched

The recently formed Asian Farming Systems Association (AFSA) has just launched a new journal, "Journal of the Asian Farming Systems Association". The Executive Editor is ICLARM's Farming Systems Specialist Dr. Clive Lightfoot, while Aquaculture Program Director Dr. Roger Pullin is a member of the Editorial Board. Volume 1, issue no. 1 is now available from the AFSA at ICLARM's address. The new journal will foster a multisectoral approach to development so that fish farming enterprises, integrated with crop, tree, vegetable and livestock raising will gain much wider acceptance as a source of improved nutrition and livelihood.

AFSSRN-CLSU Study Reveals Rice-Fish is Better

Initial findings of the AFSSRN (Asian Fisheries Social Science Research Network)-Central Luzon State University's "Financial Feasibility of Rice-Fish Farming

Systems" Project at the Freshwater Aquaculture Center in Muñoz, Nueva Ecija, Philippines, reveal that more financial returns are obtained from rice-fish farming system than rice monoculture. Preliminary analysis, however, shows that rice monoculture is more efficient than rice-fish trench system as far as returns to labor, material and variable costs are concerned.

This was gathered by AFSSRN Research Associate Hermie Montalvo when he visited the project in October and met with farmer/cooperators. He also learned from the visit that the rice-fish pond refuge system performed better and farmers adopting this system are better off than those engaged in rice monoculture.

The project is an economic study to determine financial indicators for measuring and comparing the viability of various existing rice-fish farming technologies adopted by farmers in some Asian countries. It is now in its 13th month and is headed by Mr. Ruben Sevilleja, AFSSRN-CLSU Team Leader. This study will also develop an analytical framework for the assessment of rice-fish systems, indirectly linked with an ICLARM Project, the FARMBASE software development.

The project's output by end of February 1992 will serve as basis for developing policies and programs geared towards providing alternatives for improving land productivity and increasing the income of rice-based farmers in Asia.



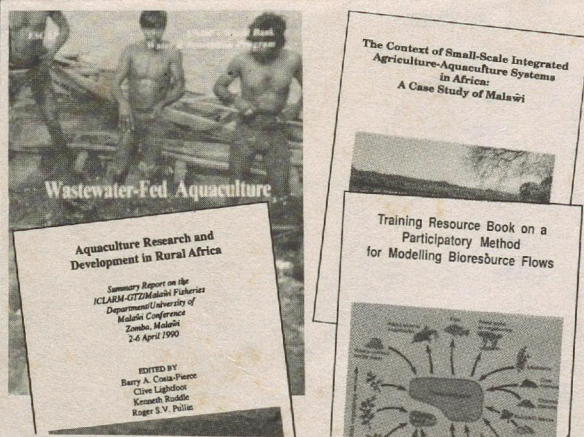
AFSSRN Research Associate Hermie Montalvo and AFSSRN-CLSU Team Leader Mr. Ruben Sevilleja with Mang Dionisio, a rice-fish farmer-cooperator.



Workshop participants with ICLARM and BOSTID representatives.

New Aquaculture Publications Off the Press

Four new aquaculture publications have recently come hot off the press. Three have been prepared from activities of the ICLARM-GTZ project in Malaŵi "Research for the Development of Tropical Aquaculture Technology Appropriate for Implementation in Rural Africa". One is a substantial ICLARM-GTZ book entitled "The Context of Small-Scale Integrated Agriculture-Aquaculture Systems in Africa: A Case Study of Malaŵi". It contains a wealth of data and discussion on future approaches to aquaculture research and development in Africa, especially on socioeconomic and cultural aspects. The second is a summary of the

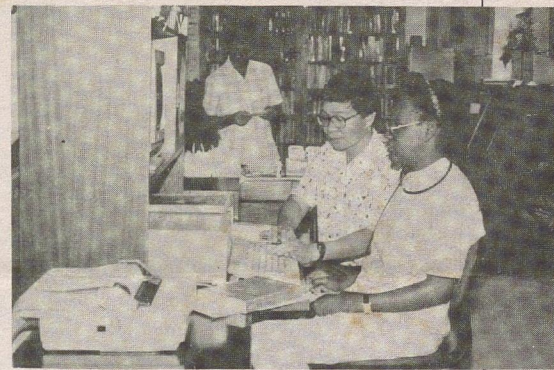


proceedings of a conference, "Aquaculture Research and Development in Rural Africa" held at Chancellor College, University of Malaŵi, on 2-6 April 1990. The third is a "Training Resource Book on a Participatory Method for Modelling Bioresource Flows" in integrated crop-livestock-fish farming systems. This book accompanies two videos - "Aquaculture and the Rural African Farmer" and "Pictorial Modelling: A Farmer-Participatory Method for Modelling Bioresource Flows in Farming Systems". All are available from ICLARM.

Dr. Peter Edwards of the Asian Institute of Technology (AIT), Bangkok, Thailand and Dr. Roger Pullin of ICLARM have just completed editing the book "Wastewater-Fed Aquaculture": the Proceedings of the International Seminar on Wastewater Reclamation on Reuse, 6-9 December 1988, Calcutta, India. It contains experience and review papers on the safe reuse through aquaculture of the valuable water and nutrients in wastewater treatment and disposal. Copies are available from the Environmental Sanitation Information Center of AIT. This publication was funded by the World Bank.

Library Intern from Angola

Ms. Beryl Cita Makondekwa, Biologist/Head of Library from the Centro de Investigacao Pesqueira, Ministerio das Pescas, Luanda, Angola, finished her one-month internship at the ICLARM Library and Documentation Center on 25 November. Her training, supervised by Chief Librarian Rosalinda Temprosa,



Joey Vega, Research Assistant at ICLARM Library, demonstrates how to do literature search on CD-ROM version of Aquatic Sciences and Fisheries Abstracts (ASFA). Mr. Rey Damalerio, Library Aide, is in the background.

was on Database Management using UNESCO's Micro CDS-ISIS System Package. Beryl said she also learned other basic functions in a library's operation, i.e., acquisition, organization and dissemination of materials. Her internship was made possible by the Swedish Centre for Coastal Development and Management of Aquatic Resources (SWEDMAR). Beryl is now back at her home country to apply what she learned at ICLARM, and hopes to produce soon a computerized book catalog and a list of serial holdings.

Former IRRI DG wins Honda Award

Dr. M.S. Swaminathan, a member of ICLARM's Board of Trustees, was awarded the 1991 Honda Prize in Tokyo on 15 November for his achievements in plant genetics and environmental protection, and for his leading role in resolving the global food crisis. The Honda Prize is granted to individuals or groups that promote "eco-technology", or processes that realize efficiency and profit yet remain in harmony with human activities and the environment.



Dr. Swaminathan

The 12th winner of the Honda prize, Dr. Swaminathan will also receive a cash

prize of 10 million yen (US\$76,000). He was also the first awardee for the World Food Prize in 1987, the cash prize of which he used to fund the nonprofit Trust M.S. Swaminathan Research Foundation in 1988. In 1990, the Foundation established a Centre for Research on Sustainable Agriculture and Rural Development in Madras, India. The Centre aims to develop and disseminate farm technologies that are profitable, socially equitable, and ecologically sound; increase job opportunities in rural areas; and improve the lives of disadvantaged sectors of rural communities, especially women.

Swaminathan recently shared the 1991 Tyler Prize for Environmental Achievement, which cited him for his 40 years of work as a pioneer in economic ecology and sustainable agricultural development, and his contributions to the conservation of threatened plant genetic material. He received the Albert Einstein World Science Award in 1986.

Correction for Reg Noble

Last issue (No. 21, Sept. 1991), we reported that Dr. Reg Noble from the University of Malaŵi had joined the integrated farming project in which the Center is involved in Malaŵi.

We inadvertently described his previous positions at the Universities of Malaŵi and Edinburgh as "readerships" instead of "lectureships". Our apologies.

Neither did we have a photo of Reg last issue. However, he attended the ISTA III symposium in November and appears in the group photo on page 2.

HQ Seminars

A new seminar series has started up at the Headquarters. The purpose of the seminars is to provide a forum for exchange of ideas and information of what is going on at ICLARM, what our numerous visitors are doing, and what is happening in the world around us. In addition to in-house participants, various institutions, agencies, and NGOs in Metro Manila are invited to participate.

The first seminar was held on 30 August 1991, and was attended by some 30 persons. The speaker, Dr. Jacques Moreau of ENSAT, Laboratoire d'Ichtyologie Applique, Toulouse, France, is a specialist in population dynamics and quantitative analysis of freshwater systems, with experience from Africa and Latin America, and who has worked on tilapia, Nile perch and carp. Over the years he has worked closely with a number of ICLARM staff in fisheries management, modelling and aquaculture, and is a regular visitor at the ICLARM HQ. His talk was featured in the last issue (No. 22) of *ICLARM Newsbriefs*.

The second seminar was conducted on 24 September 1991. Ms. Gabriella Bianchi of Bergen, Norway, presented the Dr. Fridtjof Nansen Project, and described her own research with demersal assemblages in the intertropical belt.

Ms. Bianchi is a leading expert on demersal fish communities in the intertropical belt, and is associated with the Fridtjof Nansen Project at the Marine Science Institute, Bergen, Norway, a FAO-Trust-in-Funds project funded by NORAD. The major component of the project consists of performing combined acoustic/trawl surveys in tropical areas at the request of, and in cooperation with developing countries. The survey results (species compositions and abundances) are thoroughly analyzed, documented and made available through timely reports and through the Fridtjof Nansen database. The result represents a major source of information on tropical fish stocks. The completion of a new research vessel (*Fridtjof Nansen II*) for the project will ensure that the project will continue to deliver essential information.

Several more seminars are planned over the next few months.

New AFSSRN Coordinator Appointed

Dr. Robert S. Pomeroy, an Associate Professor and Extension Agricultural Economist of Clemson University (USA), has been appointed as the new AFSSRN Coordinator. He succeeds Dr. Louise Fallon-Scura who resigned in May this year and is now connected with the World Bank in Washington, DC.

Dr. Pomeroy holds a Ph.D. in Resource Economics, Marketing and International Agriculture from Cornell University which he obtained in 1989. His dissertation research, which he undertook for 11 months in the Philippines, examines production and marketing economics in a small-scale fishery in the Philippines. His varied research interests include international small-scale fisheries, marine fisheries economics and management, aquaculture and coastal zone management. Dr. Pomeroy will assume his duties at ICLARM in January 1992.

The appointment of Dr. Pomeroy comes after a 3 1/2-month search which began shortly after Dr. Scura's departure. At that time, too, the network was officially transferred to the Office of the Director General. Before this, it was housed under the Coastal Area Management Program.

Since the coordinator position was vacated, Mr. Hermie M. Montalvo, Research Associate, has been acting in an interim capacity and liaising with Network members and IDRC.

Dr. Pomeroy will meet the AFSSRN Team Leaders at their meeting on 22-24 January 1992 in Manila. Some 14 member-institutions will be represented.

GIS Project to Begin in 1992

A two-year collaborative project on Geographic Information System for Coastal Area Management and Planning (GISCAMP) between ICLARM and the National Economic Development Authority (NEDA) of Region I (NRO), Philippines, was recently approved for implementation. The project is funded by the International Development Research Centre of Canada (IDRC). A memorandum of Grant Conditions was signed by ICLARM Director General Kenneth T.

MacKay and Dr. Jinghai Hanchanlash, Director of IDRC's Regional Office for Southeast and East Asia. The overall objective of the project is to upgrade regional capabilities in coastal area planning and to establish an information system for geographical data using GIS. The Lingayen Gulf area in northwestern Luzon will be the pilot site.

Preparations are underway for the implementation of project activities beginning January 1992. An initial activity will be the training of NRO staff on the use of GIS software called Spatial Analysis System (SPANS). Succeeding activities will be on the application of GIS in the coastal zone.

The project will establish a databank on geographical information useful for planning purposes and integrate remote sensing technology into the GIS using Landsat Thematic Mapper (TM), SPOT and aerial photographs.



A Manila hospital proved to be no refuge from ICLARM for Dr. Pullin. Confined for a week in October, he was obliged, nonetheless, to sign checks and screen outgoing documents from his bedside. He returned to the office fit and well upon release from the hospital.

FOR MORE INFORMATION ON NEWSBRIEFS, WRITE TO THE EDITOR, ICLARM, MC P.O. BOX 1501, MAKATI, METRO MANILA, PHILIPPINES.



Seven Meetings held in Okinawa

27 June to 3 July 1993

The months of June and July 1993 were particularly busy for ISME. Back to back with the VII Pacific Science Inter-Congress that brought about 500 scientists to Okinawa between June 27 and July 3, ISME held six formal and a few informal meetings. The Concluding Workshop of the ITTO funded and ISME implemented project; the 9th meeting of the Executive Committee; the 2nd General Assembly took place; Interim Council of ISME; The Mangrove Session of the VII PSIC and the UNEP/UNESCO Task Team on the Impact of Expected Climatic Change on Mangroves to which ISME is associated. An informal meeting convened by Prof. Colin D. Field drew a large number of participants; the gathering addressed matters relating to a project approved by to be funded by ITTO and implemented by ISME. The continuous and unflinching support of the Prefectural Government of Okinawa is acknowledged with gratitude.

2nd General Assembly

The 2nd General Assembly of ISME was held on 30 June 1993 in Okinawa, Japan, with the presence of Their Imperial Highnesses Prince and Princess Hitachi, scientists, students, trainees, policy-makers, and chairmen of National Mangrove Committee from over 25 countries participated.

His Imperial Highness Prince Hitachi congratulated the successful years of ISME and encouraged the Prefectural Government for further cooperation with ISME. Governor of Okinawa Prefecture, Prof. Ota, welcomed ISME General Assembly and expressed his long-term commitment to work cooperatively with ISME. Dr. Swaminathan, President of ISME, in his address thanked the officials for having made it possible for ISME to accomplish many of its goals. Dr. Swaminathan especially thanked the Okinawa Prefectural Government for helping ISME to become an official Foundation with its headquarters in Okinawa, further he noted in his address "Okinawa has become the Mangrove Capital of the World." Dr. Marc Steyaert (UNESCO), Dr. Margarita Astrálaga (UNEP), Prof. Jiro Sugi (JIAM), and Prof. Koshiro Kizaki (OKINAM) also addressed the ceremonial session of the General Assembly.

The lunch party was held from 12:00-13:00 hrs, under the auspices of the Prefectural Government of Okinawa. Appreciation was expressed by ISME President, Dr. M.S. Swaminathan, and the further remarks were made by ISME Vice-President Prof. Sanga Sabhasri.

In the business session of the General Assembly, held in the afternoon of 30 June, the Executive Secretary, Prof. Y. Kohda, reported on the status of procedures for the election of the Executive Committee and Council members. The postal ballot papers for the election of Vice-Presidents, Treasurer and Council members for the period of 1993-1996 are being mailed to the members of the Society, the Secretariat will count the votes on 24 August 1993, and the result will be announced in a newsletter that will be distributed to the members as soon as possible after the counting will be completed.

The Treasurer, Prof. C.D. Field, reported on the financial report of 1990-1993. The programme of work and budget for 1993-1995 and fund raising were discussed. The revision of Statutes of the Society was ratified by the participants.

The 3rd General Assembly will be held in 1996, the venue of which will be Thailand.

- from the General Assembly, ceremonial session -

**Address by
His Imperial Highness
Prince Hitachi**

Dr. M. S. Swaminathan, President of ISME; distinguished guests, ladies and gentlemen.

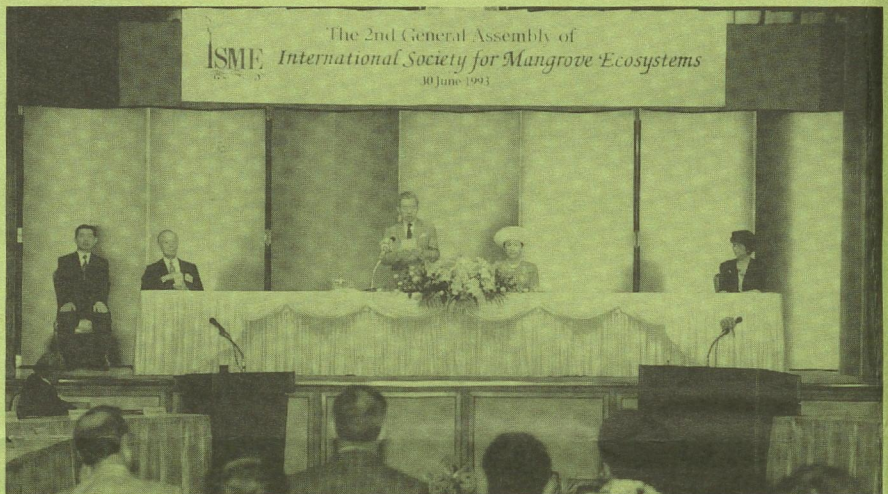
It is my great pleasure to be here on this occasion of the 2nd General Assembly of ISME and to meet all of you again after 3 years. You have contributed very much to the conservation of mangrove ecosystems.

From of old, mangroves have sustained the lives of the people that inhabit the coastal regions. Together with the tropical forests, the mangroves have played an important role in conserving a healthy environment of the earth.

However, the extent of the mangrove forests is decreasing as a result of non-sustainable use and over-exploitation. The conservation of the earth's environment has come to be recognised as the utmost urgent task today. Destruction and degradation of tropical forests are now a worldwide problem.

In recognition of the need for an international organization to promote and coordinate single individual and national studies and projects, the International Society for Mangrove Ecosystems was inaugurated in 1990 and its headquarters are in Okinawa Prefecture.

Since its inauguration, ISME carried out various projects in Asia and the Pacific, in Latin America and Africa, and also has successfully organized a network of mangrove scientists. The Society participated in the UNCED (United Nation Conference on Environment and Development) held in 1992 in Rio de Janeiro a year ago. At the Conference it had an NGO (Non Governmental Organization) status, and contributed to incorporate the importance of mangrove preservation in Agenda 21 that was adopted at the UNCED. ISME is achieving many of



Their Imperial Highness Prince and Princess Hitachi had attended the Inaugural General Assembly of ISME in 1990, three years ago, and again the 2nd General Assembly in 1993. His Highness Prince Hitachi gave his address and congratulated ISME for its achievements during the last three years and encouraged the Prefectural Government to continue their cooperation with ISME. (photo by Okinawa Prefectural Government)

its goals, and I would like to congratulate you for the successful start and express my sincere congratulation to all of you on this occasion.

I understand that ISME will go on, with cooperation of worldwide governmental agencies, scientists and researchers to make guidelines for mangrove conservation, to structure a network of mangroves information, to draw an up-to-date mangrove world map, and promote projects for the conservation and sustainable utilization of mangroves. Since comprehensive and wide range cooperation of various fields as biology, ecology, oceanography, and socio-economy is indispensable for mangrove research and works to utilise the outcome, I would like to ask all the learned societies and agencies of Japan and especially Okinawa Prefecture, where the headquarters of ISME is located, to give all the help and cooperation needed.

In conclusion I express my warm congratulation for the achievements and I wish good success for all the activities of ISME.

**Welcoming Address by
Governor, Prof. Ota of
Okinawa Prefecture**

Your Imperial Highnesses Prince and Princess Hitachi and ladies and gentlemen.

It is my greatest honour to congratulate you on the occasion of the second general meeting of the International Society for Mangrove Ecosystems being held here in Okinawa in the presence of Their imperial Highnesses Prince and Princess Hitachi.

As is well known, Okinawa is the only prefecture in Japan, which is located in a semitropical region that has an oceanic climate. Many plants peculiar to such semitropical regions grow naturally here where a rich diversity of flora and fauna may be observed, including such characteristic species as the Iriomoteyamaneko, a wild cat found only in the island of Iriomote.

These small islands of ours, however, have been regularly victimized by such natural disasters as typhoons and droughts.

Our natural environment, especially its oceanic ecology, has always been a

major concern of the people in Okinawa. During the era of the ancient Ryukyuan Dynasty, Okinawa engaged in trade with neighboring Asian countries and, as a result, we may observe many similarities between the cultures and customs of those countries and of ours.

Taking advantage of the knowledge and experience fostered by our predecessors, we have been actively working to form an "academic and cultural international key station" here in Okinawa.

Recently, the protection of the earth's environment has become a global concern. Mangrove forests, which thrive between the two ecosystems of the land and the sea, plays an important role in the production of forest resources and in fostering marine resources, in addition to protecting human life from natural disaster. It is of the utmost importance that we act immediately to preserve the mangrove ecosystem which is now rapidly vanishing from the earth.

We feel it is most appropriate that the International Society for Mangrove Ecosystems was established in Okinawa in August 1990 where mangrove forests still remain.

And we shall make our utmost effort to work cooperatively with the Society.

This is a wonderful occasion for like-minded colleagues to gather here with communities from overseas as well as from other prefectures throughout Japan to engage in fruitful inter-



ISME's 2nd General Assembly was broadcasted widely.

changes on the common subject of the mangrove ecosystems.

Our wishes are for the future prosperity of the International Society for Mangrove Ecosystems and for the sound health of Your Imperial Highnesses Prince and Princess Hitachi and for all of our guests.

Thank you very much.

Presidential Address by Dr. M.S. Swaminathan

Today is like a dream come true. Four years ago, a group of dedicated Mangrove Research workers met here at Okinawa and decided that the formation of an International Society for Mangrove Ecosystems is an idea whose time has come. The result was ISME and I had the great privilege of being invited to serve as its first President. Your Imperial Highness accompanied by Her Imperial Highness Princess Hitachi graced our first General Assembly held at Yokohama on 23 August 1990 and blessed our goals and efforts. We are doubly blessed today that you have graciously come to our Second General Assembly, accompanied by Her Imperial Highness, to hear about the progress we have made during the last three years in realizing ISME's major goals in promoting the conservation, sustainable management, rational utilization and rehabilitation of Mangrove ecosystems. We are deeply grateful for your gracious presence and for your agreeing to address us again.

Your imperial Highness, a little over a year ago, an unprecedented gathering of Heads of State and Governments pledged at Rio de Janeiro that all governments will work together to restore harmony between humankind and nature and to promote a new paradigm of economic development rooted in the principles of ecology and equity. ISME, for its part, prepared a charter for Mangroves for being

incorporated in Agenda 21 of UNCED and in the forestry principles.

Within a short span of 3 years, ISME has achieved a global presence. It has now 325 members belonging to 58 centres drawn from all continents. It has received affiliation to the ICSU family as well as to the United Nations as a non-governmental professional organisation. Thanks to generous support from JIAM, the Government of Japan and the International Tropical Timber Organization, ISME has undertaken projects in the Asia - Pacific Region, Africa and Latin America. It has stimulated a wide range of research, training and



Participants from over 25 countries came to attend the 2nd General Assembly of ISME. (photo by *The Ryukyu Shimpo*)

awareness generation programmes. It is now poised for undertaking a broad spectrum of activities related to its mission and mandate in all parts of the world.

All these accomplishments would not have been possible but for the generous support of the scientific community of Japan represented through JIAM and OKINAM as well as the Government of Japan, ITTO, UNESCO, UNEP and other international and bilateral agencies. Above all, we own a particular debt of gratitude to the Governor and Officers of the Okinawa Prefectural Government and the Ministry of Foreign Affairs, Japan, for helping ISME to become an official Foundation on 23 October 1992, with its headquarters at Okinawa. Okinawa has thus become the Mangrove Capital of the world. We are grateful to Governor Ota for the endowment of thirty million yen and for his tireless efforts to provide ISME with a

headquarters building which will enable it to undertake effectively its global responsibility in research, training, technology transfer, eco-redevelopment and awareness generation. We hope before the next General Assembly meeting in 1996, ISME will be functioning in its own building graciously provided by the Okinawa Prefectural Government and the Government of Japan. Meanwhile, we are deeply indebted to the President and authorities of the University of the Ryukyus for the space and other facilities they have so generously provided for ISME during the past 3 years and to OKINAM for its administrative and logistic support.

Your Imperial Highness, as we approach the 21st Century, we find over 65% of the human population will live within 60 kms of the sea shore. The livelihood security of coastal communities will depend on the ecological security of coastal ecosystems. The Mangrove ecosystem is a unique one protecting coastal

populations from the adverse impact of coastal storms and promoting sustainable fisheries and livelihood. Unfortunately, unsustainable fisheries development, unsustainable exploitation of the physical and biological endowments of the coastal zone and thoughtless destruction of mangrove forests along with coral reefs and sea grasses is leading to a situation where the future well being of coastal communities is under severe threat. The establishment of ISME and the development of Charter for Mangroves are hence timely initiatives. ISME is fortunate to have both committed membership and leadership. Our particular gratitude goes to the Members of the Executive Committee who have spared time to attend 9 meetings during the last 3 years and have participated actively in the implementation of ISME's programmes and projects. Our coordinators Drs. Barry Clough, Salif Diop and Luiz Drude de Lacerda have rendered invaluable service. The

continued guidance and support of Prof. Jiro Sugi, Vice President of JIAM and Dr. Marc Steyaert of UNESCO have been of immense value. We are also indebted to UNEP, whose distinguished representative, Ms. Margarita Astrálaga is here, for their support. It is obvious that such an impressive record of work could not have been accomplished but for the hard, sustained and dedicated work of our Executive Secretary Prof. Yoshihiro Kohda and the guidance and efforts of our Vice President Prof. Shizuo Saito. We own a deep debt of gratitude of Prof. Saito, Prof. Kohda, Dr. Baba, Miss Nozomi Oshiro and their colleagues for their tireless striving to make ISME a dynamic and successful organisation.

Above all, it is your blessings and encouragement, Your Imperial Highness, that have provided the stimulus for our work and I now request you to address us.

Workshop on Mangroves in Latin America and Africa Regions

The 3rd and the concluding workshop of the ISME/ITTO Project "Conservation and Sustainable Utilization of Mangrove Forests in Latin America and Africa Regions (PD114/90(F))" was held on 27 and 28 June 1993 in Okinawa, Japan, with the participation of representative of UNESCO, UNEP, International Tropical Timber Organization (ITTO), Ministry of Foreign Affairs, and mangrove experts, scientists and foresters from Latin America, Africa, Asia and the Pacific. The Project Coordinator Dr. L.D. Lacerda, and the Project Vice-Coordinator Dr. E.S. Diop, reported on the project. Dr. J.E. Conde of Venezuela and Dr. A.K. Semesi of Tanzania represented the regions of Latin America and Africa regions respectively and presented their reports. Representatives of interrelated projects, ITTO/JIAM/ISME Project on South-East Asia (Dr. Barry Clough), UNEP/UNESCO Task Team on the Impact of Expected Climatic Change on Mangroves (Prof. Colin D. Field), UNDP/UNESCO Maranhão GEF Project (Drs. Marc

Steyaert and Björn Kjerfve) also contributed to the workshop.

The Workshop recommendations have been divided into three main categories: a) General, for the project as a whole; b) Specifically for Latin America; c) Specifically for Africa. Each recommendation was discussed in detail. The general recommendation is as follows (summarised by the secretariat): 1) site/subject specific projects should be implemented instead of general survey projects; 2) before initiation of any further project, contacts governments and with local projects/programmes should be made to ensure better coordination of projects and prevent any duplication; 3) the major aim of new projects should be in accordance to the priorities identified in PD114/90(F); 4) effective training should be carried out within current research programmes or through existing research institutions.

Meeting of UNEP/UNESCO Task Force Team

The meeting of UNEP/UNESCO Task Team on the Impact of Expected Climatic Change on Mangroves was held on 2 and 3 July. Members were: Prof. C. Field (Hong Kong), Prof. S. Sabhasri (Thailand), Prof. S. Diop (Senegal), Prof. B. Kjerfve (U.S.A.), Dr. H. T. Chan (Malaysia), Dr. E. Joanna (Bermuda), Dr. B. Clough (Australia), Prof. L.D. Lacerda (Brazil), Dr. D. Macintosh (UK), Dr. M. Vannucci (India), with the participation of the representative of UNEP, Dr. M. Astráraga and the representative of UNESCO, Dr. M. Steyaert. Mr. M. Jaffar (Fiji), Dr. A. Untawale (India), Mr. M. Kogo (Japan), Dr. M. Qureshi (Pakistan), Prof. P. N. Hong (Vietnam), Prof. Y. Kohda and Dr. S. Baba (ISME) were active observers at the Meeting.

9th Meeting of the Executive Committee

The 9th meeting of ISME's Executive Committee was held from 09:00 to 12:00, and from 16:00 to 18:00 on 29 June 1993 in Okinawa, Japan. The Committee

discussed ISME's new projects to be started soon, and several project proposals to be submitted for funding agencies.

The status of the election of the New Executive Committee and Council were reported by the Executive Secretary Prof. Kohda. President Dr. Swaminathan expressed farewell to all members, for he had declined nomination and wished success for the new President Prof. Sanga for the next three year period of 24 August 1993 - 23 August 1996. Members of the Committee expressed appreciation to President Dr. M. S. Swaminathan for his tireless contribution to the Society.

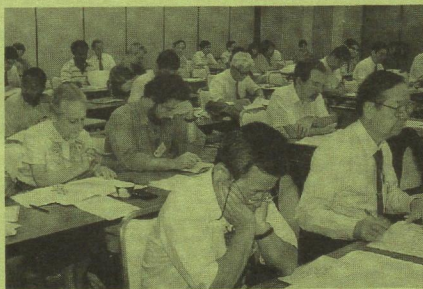
Meeting of Interim Members of the Council

The meeting of Interim Members of the Council was held from 13:00-15:00 on 29 June 1993 in Okinawa, Japan. Nominees of the Council, from 23 countries participated, and discussed on the future activities of ISME and exchanged their views on the future of ISME.

Mangrove Session of VII Pacific Science Inter-Congress

VII Pacific Science Inter-Congress (PSIC), was organized into several scientific sessions of specific studies, took place in Okinawa from 27 June to 3 July 1993. The "Mangrove Session" was held on 1 and 2 July, attracted the largest number of participants, approximately 80 persons, from approximately 25 countries. The Mangrove Session was started with an introductory note by ISME Vice-President, Dr. Vannucci, "Significance of mangrove ecosystems", it was followed by presentations of scientists from Australia, Bangladesh, Brazil, China, India, Japan, Pakistan, Papua New Guinea, Senegal, Tanzania, U.S.A., and Vietnam on the roles of mangroves in the life of local peoples. The Session concluded with a general discussion on the needs for research and training. The recommendations are: 1) Greater

effort should be made, and mechanisms should be put in place, to ensure that new projects do not overlap with, or duplicate past and existing projects dealing with research and management of mangrove ecosystems; 2) Greater emphasis should be placed on less-costly, more site- and problem-specific projects that address the needs of developing countries or particular areas. Proposals for such projects should originate from developing countries; 3) Attention and support should be given to strengthening regional and global networks for collaboration, cooperation and the exchange of information between scientists and



agencies; 4) Funding preference should be given to training programmes that are carried out in developing countries as part of site- or problem-specific studies; 5) Specific provision should be made by donor countries to provide ongoing support for young scientist from developing countries when they return to their native country. This support should be need-based and could include laboratory facilities, specialised equipment and/or support for continuing collaborative interaction with experienced scientists from other countries.



Scientists presented their researches and exchanged information. Photo by *The Ryukyu Shimpō* (left) and ISME Secretariat (above).

News from Members

Management plan of the mangroves of Mainland Tanzania, East Africa

by Prof. A.K. Semesi
University of Dar es Salaam, Tanzania

The Forest and Beekeeping Division (FBD) of the Ministry of Tourism, Natural Resources and Environment is the institution empowered to manage the mangrove Forest Reserves of Tanzania. In many places in Tanzania the mangrove resource has been over-utilized although all mangrove forests are gazetted as "Mangrove Forest Reserves". For many years these received insufficient attention with respect to both biological investigation and management. There has been also no multiple use policy incorporating commercial and traditional user interests. As a result, there was little appreciation for the complexity and importance of this resource. Emphasis was placed largely on the harvesting of mangrove trees for poles and not on the essential role of mangroves in supplying the basic needs of coastal communities or their important value to fisheries.

In 1988 the FBD requested Prof. A. K. Semesi to prepare a management plan for the Mangrove Forest Reserves of mainland Tanzania. The management plan is based on extensive field work in the mangroves and the surrounding communities dependent on them. Aerial photography especially commissioned as part of the study enabled assessment of their status. The aerial photography included a total of 854 photos, all of which were clear and colour-coded, which reduced uncertainty in the photo-interpretation process. Discussions with many individuals and representatives of organizations led to the recommendations presented in the management plan. An outstanding contribution was made by participants of a Mangrove Workshop held in August 1989 at Dar es Salaam; composed of policy makers, scientists and coastal Regional Development Directors.

The study revealed that the mangrove forests of mainland Tanzania cover about 115,500 ha and there are eight common species of mangrove trees in Tanzania. Mangroves are valuable for their wood and non-wood products: timber, building poles, fuelwood, charcoal, fishing stakes, local medicines, and as animal fodder and vegetables. The management plan therefore provide an overview of the mangroves and of strategies and approaches considered essential for the implementation of the plan and the background

information on the social and economic aspects of coastal residents and users and physical characteristics of each mangrove forest reserve.

The mangroves have been mapped into 30 map sheets and this set of maps is complemented by a list showing characteristics of each compartment. These have been computerized making it possible to pick out various types of information very quickly. This computerized system also acts as a planning and monitoring tool, as various proposed treatments can be entered and summarized, thus providing useful, simple overviews for planning, implementation and follow-up. The information provided by the map set and the computer system appears to be much more detailed than is available for any other mangrove forest in the world. This will enable easy planning and follow-up of all field activities. The entire data set is deposited in the FBD, Dar es Salaam. The costs for this work was met by the Norwegian Agency for Development Cooperation (NORAD).

A multidisciplinary approach has been adopted and the mangroves are zoned for various uses rather than emphasizing wood products alone, as was done in the past. The survival of the mangrove ecosystem and therefore the livelihood of those associated with it depends on successful implementation of this management plan. The implementation of the management plan is now underway.

Because Mangrove Forest Reserves and adjacent marine habitats are sites of potential resource conflicts and are influenced by activities outside the reserve boundaries, management must involve intersectoral coordination and participation of coastal communities.

Introduction of the Author - Adelaida K. Semesi is a professor of the Department of Botany, University of Dar es Salaam, Tanzania. She has carried out ecological studies



Prof. A. K. Semesi

on the mangroves and seagrasses along the coast of Tanzania. She is currently a member of the Research and Development Committee in Tanzania Commission for Science and Technology (COSTECH), International Seaweed Association Council, International Society for Mangrove Ecosystems, Tanzania Wildlife Society and National Coordinator of the SAREC funded regional marine project. She has provided consultancy services to the International Union for Conservation of Nature and Natural Resources, Tanzania National Environment Management Council, the Forest and Beekeeping Division and NORAD.

Contribution by the audience of Mr. Kina's music concert

Mr. Kina, whose songs are well known in Japan and Europe, is a unique musician who does not only sing but is active in the environmental movement. He composed a song "Save the Mangroves" an expression of his deep feelings and concern with the future of mangroves and his unflinching intention to save the mangrove ecosystems. In December 1993, at Mr. Kina's "Coming Year Concert", donation of ¥11,073 was made to ISME by the audience.

Contribution by Okinawa Tele Message Co., Ltd.

Contribution ¥200,000 was given to ISME by Mr. Koichiro Kokuba, the President of the Okinawa Tele Message Co., Ltd. on 29 March 1993.

Contribution by Daiei Finance, Inc.

Twice-a-year contribution is given to ISME by Daiei Finance through the Defence of Green Earth Foundation. "The Ecology Card - Mangroves" of the Daiei Finance is a credit card, but 0.5% of the amount spent with the card by 1,134 card holders is donated to ISME. The recent donations are: ¥374,000 on 25 May 1992, ¥319,000 on 20 November 1992, and ¥374,000 on 21 May 1993.

How to become a member of ISME

Please send ISME Secretariat your application form (or write us a simple letter) together with your membership payment. **International postal money order** and **UNESCO coupons** are welcome. Please avoid cheques because bank charges for a cheque are very high in Japan.

Individual membership: ¥2,000 (approx. US\$19), annually; **Life membership:** ¥20,000 (approx. US\$190); **Institutional membership:** ¥25,000 (approx. US\$238), annually.

Visa, MasterCard and American Express are acceptable. Let us know the followings: a) your name; b) type of credit card used (Visa, MasterCard or American Express only); c) credit card number; d) card expiration date; e) amount of payment; f) type of ISME membership for which you are applying (Individual, Life, or Institutional).

Members Forum

This column is for the direct exchange of information and requests among members. Although the space is limited, we would like to introduce all members of ISME in this column through our newsletter. We would be grateful if all members would indicate to us what professional details they would like to see covered in this space.

Qureshi, Mohummad Tahir, Divisional Forest Officer, Coastal Forest Division, Sindh Forests, Fisheries and Livestock Department, Government of Sindh, Jinnah Avenue, Model Colony, Malir, Karachi 27, Pakistan. One of his specialized fields is to study the structure & composition of mangrove vegetation in the Indus delta and Baluchistan Coast.

Funk, Evangeline J., is a botanist, Botanical Consultants, PO Box 90765, Honolulu, Hawaii 96835 USA. His specific interests are world mangrove distribution and on-going management of mangrove forests.

Kadi, Khalid Abdullah, Geologist, Directorate General of Mineral Resources, P.O. Box 345, Jeddah-21191, Saudi Arabia. His specific interests are economic evaluation of mangrove forests and salinity responses of mangrove species. His specialized fields are marine geology; marine pollution; and chemical oceanography.

Govindan, Ajit, Lecturer, Department of Bioscience, Saurashtra University, Rajkot 360005, Gujarat, India. He is specifically interest in ecology of mangrove ecosystems, fauna, and his research interest is the role of the fauna in the mangrove ecosystem.

Mutwalli, Samir Abdulwahab, Marine Geochemist, Directorat General of Mineral Resources, P.O. Box 345, Jeddah 21191, Saudi Arabian Kingdom. His specialized field and research interests are: nutrient cycling in the Red Sea and water exchange; Hydrographic future of the Red Sea; chemistry of nutrient and distribution in the Red Sea.

Siddiqi, Neaz Ahmad, Senior Research Officer, Mangrove Silviculture Division, Bangladesh Forest Research Institute, P.O. Box 273, Chittagong 4000, Bangladesh. His specific interests are mangrove silviculture, management of forests and wildlife conservation, along the coastal belt of Bangladesh, and Sundarbans natural mangroves and coastal plantations.

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News from your country

If you have any news from your country or your work concerning mangrove ecosystems that you wish to see published in the ISME newsletter, please forward it to ISME Secretariat.

Send articles/publications of mangroves to ISME Secretariat

ISME is organizing a data-base and list of publication on mangroves. Please send all articles/publications concerning mangroves and mangrove ecosystems to ISME Secretariat.

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CLIMATE ALERT

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Recognition Grows of Perils of Urban Summer Hot Spells

The summer heat that led to more than 700 deaths in Chicago this year was not unique to that city or to the US and raised questions anew of whether climate change might bring more such deadly events. Laurence Kalkstein, a professor of geography at the University of Delaware Center for Climatic Research, has estimated more than 1,000 people die of heat-related causes in the nation's 15 largest cities in an average summer. Health experts are now warning that heat is a public health hazard that is deadlier than most people realize.

The siege in Chicago broke records. The dead were found in closed, stifling apartments. Many

of them had temperatures of 105°F, according to the medical examiner's office. The morgue was so full it had to use refrigerated trucks to hold the overflow. Funeral homes were overwhelmed. Coffins were in short supply. Hospital emergency rooms had to divert ambulances because they didn't have enough ventilators. When the city developed a heat plan and the next heat wave arrived a few days later, an army of city workers knocked on the doors of the elderly, delivered food, water and ice and transported people to cooling centers.

Deaths during unusually hot spells can rise over 50 percent, says Kalkstein. In Chicago the final total (Continued on page 4)

Institute Honors Dr. Swaminathan

Till now, climate change discussions have centered on national or international policy, yet success in averting adverse consequences of climate change will depend largely on innovations at the local level. This year, the Climate Institute has chosen for its annual award Dr. M. S. Swaminathan for his outstanding initiative in translating climate change response actions down to the municipal or village level.

Chairman of the M.S. Swaminathan Research Foundation, Dr. Swaminathan is widely known for his work promoting the green revolution in agriculture, especially through his service as Director General of the International Rice Research Institute. He has been a catalyst in international efforts to promote global food security through agricultural innovation and has pioneered the concept of rural sustainable development, receiving numerous international prizes for his efforts. He has invested significant resources from those prizes to promote sustainable development at the village level, principally through his research foundation established in his home city of Madras, India. Dr. Swaminathan first focused the attention of South (Continued on page 6)



M.S. Swaminathan

Climate Change Workshop on Action Plans for Developing World Villages to be Held in Madras

In a very practical approach aimed at the impact of climate change on local communities, particularly in the developing world, the M.S. Swaminathan Research Foundation and the Climate Institute are holding a workshop in Madras, India in early December to draw up precise action plans. The plans will cover specific measures to ensure adequate food, clean water, efficient energy production and protection of ways to earn a living, especially in coastal regions.

Representatives of the International Geosphere/Biosphere Program; the Tata Energy Research Institute; the National Commission for Women in India and many Indian Government ministries will participate in stimulating a dialogue on response strategies to climate change. The workshop discussions will focus on food security, coastal livelihoods, energy security, and the supply and quality of water and will translate the broader national and regional goals addressed at the Manila Conference and the Berlin Conference of the Parties into a blueprint for the individual and local level.

Report Assesses Plight of Refugees Fleeing Drought, Erosion, Expanding Deserts and Shrinking Forests in Alarming Numbers

A Climate Institute study by Norman Myers with Jennifer Kent

A final assessment of the growing legions abandoning their homelands because of drought, erosion, spreading deserts and shrinking forests was released by the Climate Institute in July, 1995 at the Embassy of Sweden in Washington, DC. These "environmental refugees" are among the nearly one billion in the world struggling to survive on a cash income of less than one dollar a day, fleeing intolerable conditions in the hope of better prospects elsewhere. Marginal people driven into marginal environments is how Dr. Norman Myers of Green College, University of Oxford, the project's principal investigator, describes them in this report, **Environmental Exodus: An Emergent Crisis in the Global Arena**. The two-year project was conducted by the Climate Institute.

Although there is no official recognition of their existence, today there are nearly 25 million environmental refugees, compared to 22 million traditional refugees according to Myers' study. The numbers of environmental refugees are expected to double by 2010. Global change, bringing sea level rise, flooding, droughts and disruption of monsoon, could raise the numbers still higher, eventually reaching 200 million, Myers estimates.

Population in the 90s, Myers asserts, is likely to grow in places least able to sustain it, in the regions where the poorest people are already overloading environmentally fragile areas. In Africa these areas are home to 50 percent of the poorest, in Asia — 60 percent, in Latin America — 80 percent.

Once in their new homes, the refugees are likely to find and aggravate the problems they left behind: poverty, malnutrition, shortage of land, unemployment, huge cities unable to cope even with existing residents, pandemic

disease, government mismanagement, ethnic strife, conventional conflicts.

Although destitution drives many refugees from their homelands, the available areas where they seek a new livelihood are too wet, too dry, or too steep for agriculture, and the newcomers are likely to cause a further round of deforestation, desertification, soil erosion and environmental decline.

Unless action is taken, the "plateauing" of food and agriculture yields which began in 1985 will lead to more widespread shortfalls with international trade surpluses unable to make up the default, Myers warns. Adding to the prospect of food shortages will be a looming water shortage, more loss of forests and further desertification. By 2025, the earth's population will have grown by 2.5 billion, a 55 percent increase in 30 years. Cities in the developing world, with clearly inadequate facilities, will struggle with four billion residents. The world's coastal zones will contain two-thirds of the earth's inhabitants, vulnerable to sea level rise, surges and tidal waves. There will be a squeeze on grainlands, and tropical forests will be almost gone. The number of people living with insufficient water supplies will have increased 10-fold since 1990.

The best way to deal with the emerging environmental refugee problem is to pre-empt it, Myers advises, decreasing the motivation to migrate by improving livelihoods in homelands. Both donor countries and developing countries should target development aid to the factors contributing to creating environmental refugees, emphasizing primary human needs: basic nutrition, health, water and sanitation, primary

education and family planning. If funding were doubled to \$25 billion a year, the challenge would be largely surmounted, Myers asserts, (and only one-third of that sum needs to come from developed countries).

Myers lists initiatives developing countries themselves could take to stem the flow of environmental refugees, and their price tags. (Please see box.)

He also recommends greatly expanding tree planting and shifting health expenditures from curative to preventive disease. The sums are not large when compared with

Initiative	Cost (\$billion/year)
Eliminate deaths from famine	\$0.5
Cut malnutrition of women & children	less than 2
Reduce hunger among the poorest	a little over 6
TOTAL	less than 9

military expenditures in many developing countries, he points out. In the long run, enhanced management of relief efforts should be inaugurated, but Myers feels relief organization difficulties have

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become so entrenched and gained so much momentum that it will take a decade to slow them down. He suggests for these organizations more funds, improved staffing and planning for relief food and refugee camps, and better programs for the refugees unable to return home.

There is only one choice for the developed countries, says Myers. "Export the wherewithal for sustainable development for communities at risk — or import growing numbers of refugees."

Project Reviews at Oxford and UN

The over-all thrust of the project was reviewed in late February by about 40 experts at a scientific conference at Oxford University, hosted by Sir Crispin Tickell. Sir Crispin chaired a symposium at the United Nations on March 28 attended by 30 representatives of UN missions and agencies to discuss issues and raise last-minute questions before publication of the final report.

Dr. Nafis Sadik, executive director of the United Nations Population Fund (UNFPA), described the movement of people around the world "[o]n a scale unknown in history — and certain to grow." The World Refugee Survey in 1992 calculated there were nearly 17 million refugees in need of protection and assistance in December 1991. In 1994, it is estimated 22 million fled across international borders from political, ethnic and religious persecution. Five million more "unrecognized" refugees crossed international borders, and 30 million were displaced in their own countries, bringing the total to 57 million.

While political instability and ethnic conflict account for much of the refugee movement attracting headlines in the press, there is far less publicity on population movements caused by environmental disruption, including changes in climate. The term "environmental refugees" has come into usage only recently because "migration caused by ecological disasters increases gradually, over extended periods, as conditions deteriorate, often

under the combined action of environmental distress and high levels of population growth."

Dr. Sadik stressed that population is a prominent factor in many cases of environmental decline and unsustainable development, although many other variables, including imprudent technologies, defective markets, inefficient economies and faulty policies are at work. Population pressures have been a leading cause in the expansion of arable lands, in turn exacerbating desertification, deforestation and deterioration of the natural environment. Population growth has led to an increase in livestock, rising methane emissions, and has also aggravated tropical deforestation and growth in carbon dioxide emissions from fossil fuels. The Myers' environmental refugee assessment, she concluded, is an important contribution to placing human beings and their needs at the center of population and development activities.

The people who migrate are politically, economically and socially invisible, participants pointed out in the discussion following Myers' presentation. They have no clout, and they have lost their ability to cope in an environmentally stressed situation. Three-fourths of them are women and children.

**The people who
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They have lost their
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stressed situation.
Three fourths of them
are women and
children.**

How many refugees return to their homeland? The answer varies according to time and location. In some cases, those who migrated into West Africa because of drought in the late 60s stayed on. In the Cote d'Ivoire, e.g., there is partial evidence that they stayed and adopted a slash and burn life style. In Morocco, no one knows how many stayed. Among those that migrate to the U.S. from Mexico, about half stay, according to Myers. In Africa, large numbers eventually return home.

Ecosystems do not coincide with political boundaries and neither do forced migrations. The huge migration problems of environmental refugees differ from those of the traditional political refugees; they are very widespread, reaching way beyond the local arena.

Forests Are Dumping Grounds

People have been driven into the forest, since the 50s, Myers noted. The forest has been the dumping ground for no one knows how many millions. There is a gross lack of attention to the migrants. No one has a handle on the scope of the problem; it is not on the agenda of any international agency or government.

The same mechanisms that are influencing climate change are contributing to forced migration, said Anthony Edwards of UNEP, and we have less time than we thought to manage environmental change. The "suicidal degradation, destruction of soil and surface cover," with increasing global impact, could lead all of us to become environmental refugees. It is in our enlightened self interest as well as our humanitarian concern to attempt to deal with the problem. However, our response to the environmental refugee problem, even if it were perfect, would be woefully inadequate, commented Edwards. To give people money to stay home would require huge sums. But even if we cannot solve the problem, we should make every effort to persuade the potential refugees to stay home. If we continue on our present course,

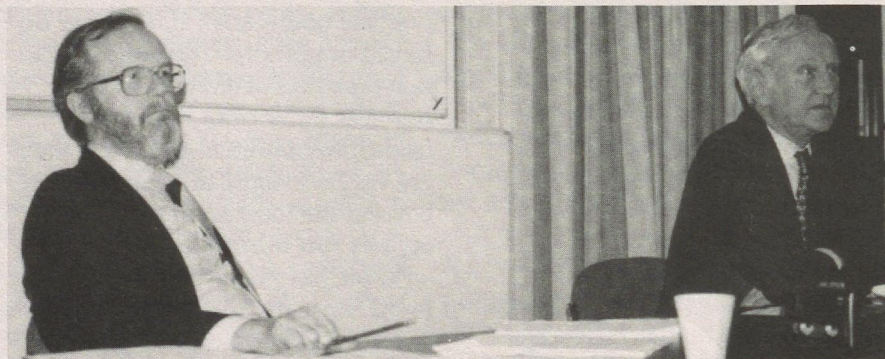
(Continued on page 4)

Refugees

(Continued from page 5)

nothing will happen until the refugees land on the shores of the developed countries in unacceptable numbers.

Dr. Arnfinn Jorgensen-Dahl of the Population Fund suggested periodic reports on the number of people who have been displaced by severe environmental degradation in an attempt to get political attention. Short-term dramatic events, such as the gassing in the Japanese subway,



Scott Stefanski Photo

Dr. Norman Myers and Sir Crispin Tickell at meeting at Green College, Oxford University

affecting relatively many fewer people, get a huge amount of coverage while the tremendous long-term problems of the refugees are considered less newsworthy.

Suggestions were made to involve the whole UN family of agencies in ameliorating the problems; nearly all are involved in some capacity — UNDP, UNEP, UNICEF, the Department of Human Affairs of the UN Secretariat. There are a great many small programs that work, but small scale activity is not enough. Perhaps we can channel activity to the local level, such as the Grameen Bank, and then figure how to build their capacity to “go to scale.”

Sponsorship for the environmental refugee project came from the United Kingdom Overseas Development Administration, the United Nations Population Fund, the Moriah Fund, the following U.S. Government agencies: Department of State, Environmental Protection Agency,

National Aeronautics and Space Administration and National Oceanic and Atmospheric Administration; the Rockefeller Foundation, the Swedish International Development Authority, and the United Nations Environment Programme.

For information on how to order the report, please see the publications order form on page 7. Dr. Norman Myers can be reached at Upper Meadow, Old Road, Headington, Oxford OX3 852, UK. FAX: 44-1865-741538.

Heat Stress

(Continued from page 1)

reached 733 (according to a report released by the Chicago Health Department on September 22 — nearly 200 more than the Cook County medical examiner’s earlier count of 536 which had shocked officials and the rest of the country. The Health Department report said that in July there were normally 72 deaths a day in the city, for a monthly total of 2,232. But this year there were 2,965 deaths during the month, totaling 733 “excess deaths.”)

Although the body can adapt to persistent oppressive weather over several days, it cannot cope indefinitely. The number of deaths starts to rise after a certain local threshold has been passed, a critical temperature exceeded for several days in succession. The effect on the mortality rate does not occur in a uniform way. The

number of deaths in Philadelphia, Boston and New York may rise while — because the local population has become acclimatized — death rates in Dallas and New Orleans may show no change. This phenomenon has shown up in Canada, the Netherlands, China and the Middle East. The critical temperature varies: it may be 29° C in Montreal, 30° in New York City, 33° in Shanghai, 38° in St Louis, 39° in Dallas — in general increasing toward the equator.

Historically, health officials searching records have found heat-related deaths amounted to 1,265 in the US in 1980 in a “heat storm” that killed dozens of people in St. Louis and Kansas City, MO. The average summer temperature variation of 4° C was associated with a much larger variation in the number of days above the tolerance threshold and a 20-fold variation in heat-related deaths. The Chicago Public Health Department found there were 232 excess deaths in a 1988 city heat wave and 885 deaths in July and August 1955, previously the city’s hottest summer on record.

The elderly and the very young are particularly at risk. Heat wears down the body’s defenses, putting more stress on weak hearts and bodies less capable of controlling internal temperatures. For some reason, males make up 55 percent of the heat-related deaths, perhaps because they are more active and more likely to take risks, perhaps because they are less in touch with their families. Hot weather deaths are also associated with preexisting cardiovascular, respiratory and immune system disorders as well as accidents.

Architecture can be a contributing factor. Many inner city buildings are constructed to hold in warmth in winter but not to let it escape on a hot summer day. The red brick tenements with flat, black roofs in more northern cities are more lethal

than the white frame shacks farther south. Top floors with tar roofs can be 10° F hotter than the floors below. In the suburbs where air conditioning was much more readily available, Chicago had

People living in poverty, including many urban populations in developing countries, are particularly susceptible to heat stress.

many fewer deaths. In sub-tropical cities, where people have become more acclimatized, the number of hot days are more constant and the urban structure is different, the local tolerance threshold is higher and there are fewer deaths.

People living in poverty, including many urban populations in developing countries, are particularly susceptible to heat stress. Poor housing, exacerbated by the "urban heat island" effect are risk factors. Immigrants, moving from a rural to urban environment, are vulnerable to weather extremes for a considerable time as people acclimate gradually when they move to a new locale. Acclimatization takes a few days to gear up and in some cases takes several years to complete. With the rapid increase in urbanization of the world's population, the number of vulnerable urban dwellers will also rise. Temperature is not the only factor in the rise of heat-related deaths; air quality and humidity also play a part. Exposure to air pollutants is a public health concern and the presence of fine particles can cause excess deaths. Ozone exacerbates asthma and damages lung function in children and the elderly.

Although there is no Federal definition of a heat-related death, a standard has been a body temperature of 104° F or more. Previously the National Weather Service has issued excessive heat warnings when the temperature reaches 105° F (a somewhat arbitrary figure) for three hours for two consecutive days. However, "there is no established relationship between outdoor temperature of 105° F and human health," Kalkstein has said.

Excess deaths can be calculated by identifying when daily mortality levels are significantly higher than average. The difference between the daily level of mortality and the average level equals the excess deaths. The figure for the physiologic tolerance level is unique to each locality.

Based on 20 years of research on weather and mortality statistics, Kalkstein has developed a formula to predict when potentially deadly heat will arrive in an area. He has now devised a three-tier early warning system for responding to heat waves and is working with the City of Philadelphia on a pilot program to put it into practice. Based on studies funded by EPA and two NOAA climate centers, a hot weather health watch/warning system has been developed to warn the public a potentially hazardous situation is imminent. The duration, timing and type of air mass causing the heat are all important factors; a confluence of factors can make the heat wave especially dangerous. Six forecasting variables are monitored four times during a 24-hour period for identification of "high risk/offensive air masses" associated with increased mortality. Low wind, high humidity and intense solar radiation — mixed in "oppressive" air masses —

make a deadly combination. When the dimensions of a high risk air mass appear, the days within the mass which will have elevated mortality are determined by a statistical procedure which considers the number of consecutive days the air mass is expected to last, the date in the season (whether it is early or late in the summer) and the maximum temperature.

Using National Weather Service forecast data, it is possible to predict the arrival of a high risk mass up to two days before it arrives. Coordinating with the NWS, the City Health Commissioner will issue first a **health watch** two days ahead of time. Next day conditions are re-evaluated and the watch is either canceled or elevated to a **health alert**. A re-evaluation the following day leads either to a cancellation or an upgrade to a **health warning**.

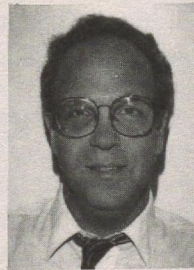
The warning system then identifies the days most likely to be associated with high daily mortality. Depending on the number of excess deaths predicted, one of three levels of health warning will be issued:

- 1) 1 - 4 deaths predicted
- 2) 5-14 deaths predicted
- 3) 15 or more deaths predicted

Philadelphia suffered 118 deaths in a June 1993 hot spell which prompted initiation of this project. Most of the dead were residents aged 60 or older. The new early warning system, based on the actual physical response of people to oppressive weather and including the two-day advance warning, allows more time for preventive measures. Philadelphia's pilot plan includes home visits by special teams, inspections of nursing and boarding homes, water deliveries to the homeless, and a buddy system to check on neighbors and relatives.

The summer of 1995 provided a taste of what steamier summers may be like although to date no one has calculated the excess deaths worldwide. Europe and the

(Continued on page 6)



Laurence Kalkstein

Heat Stress

(Continued from page 5)

Middle East endured some of the hottest weather in more than 110 years. Headlines reported on the "sweltering Britons," the Irish "stunned" by a heat wave, a pollution alert in Paris. Temperatures rose to dangerous levels in the Middle East, sparking forest fires that ravaged the eastern foothills of Jerusalem and forced closure of Israel's main highway. In Asia, Indian weather experts say it has been 50 years since there has been such sustained, blasting heat, sweeping 1500 miles from the Arabian Sea to the Bay of Bengal, home to a population of more than 500 million. New Delhi, "in the heart of the furnace," had nearly two weeks of temperatures above 110 degrees. In Japan the mercury topped 30° C (86° F) for 32 consecutive days, surpassing a record of more than 60 years. Canada reported the third warmest summer on record. Thousands of cattle died in the heat in Iowa. Unusual tides and hot weather killed an estimated 50 million fish in a Texas river. Record heat smothered New England.

The NWS is working with EPA to establish a national system of warnings over the next several years. Scientists now have greater confidence that predictions of a global temperature rise are more reliable, and a policymakers draft of a working group of the Second Assessment Report of the Intergovernmental Panel on Climate Change speaks of an anticipated increase in the intensity and duration of heat waves. It is estimated that the frequency of extremely hot days in temperate climates, such as the US, UK, and Australia, would double if average summer temperatures rose 2 - 3° C. More heat waves will bring more danger and more deaths unless actions such as those in Philadelphia are taken to forestall them.

Would some who die during heat waves have succumbed soon afterward? Time series analysis indicates that mortality rates up to a month after heat waves are frequently below the long-term base level, suggesting 20 - 40 percent of deaths would have occurred within several weeks.

Would a succession of more frequent heat waves cause constant excess mortality? Studies suggest that successive heat waves in a season are associated with diminished mortality as the season progresses, but an increase in the frequency of heat waves should still lead to an overall increase in total mortality.

Would there be a reduction of winter deaths under global warming? Evidence indicates the sensitivity of mortality to hotter summers is substantially greater than to warmer winters. It seems likely that global warming would cause a clear net increase in mortality.

Scientists are making model-based predictions of probable additional deaths during future summers in a warmer world. Using climate change scenarios, they calculate the number of days each year that are expected to have "offensive" air mass situations. The sum of the number of offensive days and average daily excess mortality yields an annual estimate of excess deaths. The modelers have used two sets of estimates: 1) assumes the population cannot acclimatize to increasing warmth, 2) assumes the population acclimatizes physiologically, but socio-economic conditions do not improve enough to keep pace, e.g. sufficient housing amenable to heat for the rising population will not be built. Under the second assumption, extra deaths would occur even with some acclimatization.

Dr. Kalkstein can be reached at the Center for Climatic Research, Department of Geography, University of Delaware, Newark, DE 19716. FAX: 302/831-6054.

Award

(Continued from page 1)

Asian policy-makers on the potential implications of climate change when he served as chairman of a February 1989 conference in New Delhi.

The award will be presented at a dinner the evening of Monday, December 4 during a workshop on climate change which he is chairing, December 4-6, 1995 in Madras. It will draw ministers, scientific and civil leaders from throughout India to develop a village-level strategy to protect the most vulnerable people against the detrimental effects of climate change.

Ozone Losses Continue in Antarctic and Arctic

The 1992 and '93 ozone holes were the most severe on record, according to Dan Albritton, director of the Aeronomy Laboratory, a National Oceanic and Atmospheric Administration installation in Boulder, Colorado, focused on the chemistry and dynamics of the atmosphere. The '94 hole covered 3.86 million square miles, about the size of Europe, and was as deep and extensive as the extremes of the two previous years, the World Meteorological Organization has reported. At the end of September and early October, ozone loss was about 60 percent of pre-hole averages and during a few days reached 70 percent. There were losses of 100 percent at some altitudes.

The ozone layer over the Arctic also shrank by a record amount this year, and ozone levels in the Arctic were down about a third of normal levels, according to a Finnish institute meteorologist. Ozone over Europe and North America has declined 10 percent since the late 1950s, meaning that about 15 percent more radiation is hitting the earth's surface, and the Northern Hemisphere's ozone layer thinned by 25 - 30 percent in

1991 and 93. Substantial Arctic ozone losses may occur for short spells during very cold stratospheric periods in sun-lit upper-middle latitudes. Examples were episodes of extremely low ozone levels (deficiencies of more than 20 percent) in 1992, 93 and early 95.

Peak global losses are still to come, according to Albritton, topping off around the year 2000. By then the losses would reach 12 to 13 percent in winter in northern mid-latitudes. As long as the atmospheric levels of chlorine and bromine compounds continue to increase, greater ozone losses at polar and mid-latitudes can be expected. After 2000, although the losses will shrink, they will continue for several decades, because of the long life of the chemicals which react with ozone. All of these estimates presume

there will not be a volcanic eruption which throws sulfate aerosols into the lower stratosphere, causing additional ozone destruction for up to a year or more, as the Mt. Pinatubo outburst did in 1992. The passage of the 1987 Montreal Protocol and its London and Copenhagen Amendments in 1990 and 1992 have slowed the growth of ozone-depleting gases, encouraging scientists and public officials that the protocol is having its desired effect. Full compliance with a strengthened Montreal Protocol by all nations would allow chlorine levels to return to 1970 amounts of 2 ppbv by 2060-70, according to a WMO/UNEP publication.

Recent research increases our understanding of the role of particles in accelerating ozone loss by chlorine/bromine. A small amount of CFC particles may go

into reactive chlorine, larger amounts into unreactive. But if there is ice or sulfate present, providing a surface, the particles may shift the process from unreactive to reactive, increasing ozone destruction.

Methyl bromide in the atmosphere is very efficient at destroying ozone, and 40 percent of the sources of bromide are human. It is used as a fumigant for soils and commodities, including the quarantine treatment of some products for international trade, and as a transport fuel additive, and to kill pests in houses. It is also released in biomass burning and in use of leaded gasoline. More than half the methyl bromide released in to the atmosphere comes from natural sources in the ocean. There is good news and bad news about this chemical. New findings show that oceans remove some methyl bro-
(Continued on page 8)

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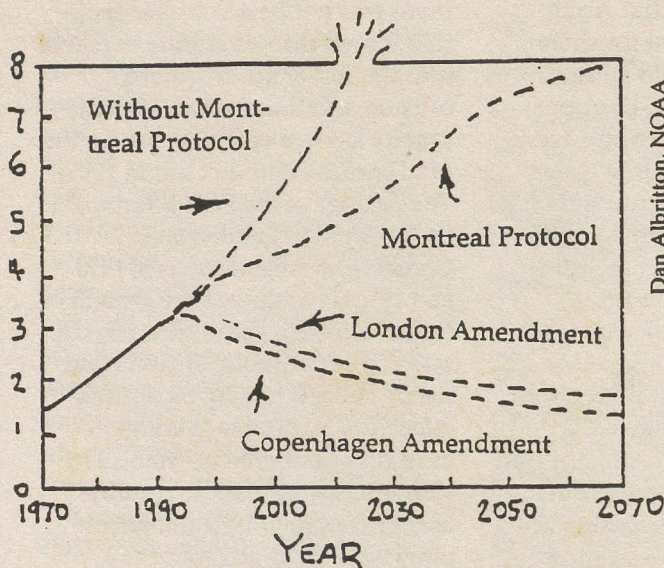
Ozone

(Continued from page 7)

mide but that stratospheric bromine chemistry has been found to be more potent against ozone. Its ozone depleting potential is some where between 0.3 and 0.9. There is no single alternative chemical to substitute for all its uses. "The ozone layer will never recover if the developing countries do not adopt some control measures for HCFCs and methyl bromide and if they increase their consumption of these substances at any significant rate," says a UNEP release.

It has also now been found that subsonic aircraft emissions may alter clouds and hence climate; an extremely difficult research problem to sort out.

TOTAL STRATOSPHERIC CHLORINE LEVEL (PPB)



Dan Albritton, NOAA

A SUCCESS STORY

New research also shows CFCs and other gases are causing lower stratospheric ozone loss which leads to a local cooling. If there is a local cooling, less heat is radiated downward. In this case, ozone

"sustain for decades unprecedented levels of stratospheric chlorine," suggesting there should be a "dialogue" between backers of the protocol and the convention.

depletion introduces surface cooling, complicating detection of greenhouse warming from CO².

There is also a conflict between using HFCs to advance the Montreal Protocol and adherence to the climate convention. HFCs have a global warming potential. More than modest substitutions of HCFCs for CFCs could increase peak chlorine levels and

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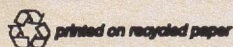
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Inside

**A Report on
Environmental Refugees
by Norman Myers**

The Climate Institute is a private nonprofit organization formed to advance public understanding of climate change including the greenhouse effect and of strategies to avert stratospheric ozone depletion.



Iwokrama

Bulletin

Volume 4 Issue 1

August 1, 1999

To Prof. M.S. Swaminathan
with compliments
from David Cassells
DCL
2/11/99

Professor Swaminathan retires from the Iwokrama Board of Trustees

Participants at the Recent Iwokrama Board of Trustees Meeting: From the left—David Cassells; Dr. Bishnodat Persaud; Dr. Henrique Calvacanti; Hon. Minister Vibert de Souza; Doorga Persaud; Chandrashekhar Krishnan; Sydney Allicock; Vice Chair Navin Chandarpal; Incoming Chair Angela Cropper; Prof. M. Swaminathan, and Vice Chair Dame Veronica Sutherland.



The Fourth Meeting of the Iwokrama International Board of Trustees, held in Georgetown from May 4th to 8th, 1999, saw the retirement of the Centre's inaugural Chairperson, Professor M. S. Swaminathan. The Board thanked Prof. Swaminathan for the visionary leadership he had given to the development of the Centre and its programmes and expressed the hope that he would maintain a keen interest in the ongoing development of the Centre and its work.

Prof. Swaminathan has been involved with Iwokrama since its inception. He led the 1990 Commonwealth group who worked with the Guyana Inter-Agency Committee to develop the initial project ideas for Iwokrama. This work provided a basis to realize the vision of the Government of Guyana when it offered to dedicate a substantial area of tropical rain forest to the world to demonstrate how tropical rain forests could be conserved and sustainably managed while still contributing to local and national economic development.

Prof. Swaminathan became the chair of the interim Board of Trustees during the national GEF/UNDP funded project that helped establish the Iwokrama Centre as a legal entity in 1996. In January 1997, he became the inaugural Chair of the Board of Trustees for the Iwokrama International Centre and oversaw the development of the Centre's Operational Plan 1998-2002 and the Centre's ten year Business Plan that aims to move the Centre and its work onto a financially self sufficient basis.

(Continued on page 2)

Professor Swaminathan retires from the Iwokrama Board of Trustees (continued)

(Continued from page 1)

The Centre's Operational Plan has maintained and developed key aspects of the Iwokrama vision that were first articulated in Prof. Swaminathan's 1990 report. These elements include:

- A substantial Wilderness Preserve to help protect Bio-Diversity;
- A Sustainable Use Area to test sustainable forms of forest utilization and income generation;
- An international research and development Centre to develop economically, socially and environmentally sustainable forms of tropical forest conservation, management and development.
- An environmental information and communication unit; and
- Partnerships that link local, national, and international efforts to conserve and sustainably manage tropical forests.

It was fitting that Prof. Swaminathan's last Board meeting focused on the Centre's first detailed work plan since coming into effective operation as an autonomous Centre in July, 1998.

At the Board meeting, the Director General—David Cassells—explained to the Board's Programme Committee the background to the Centre's Operational Plan 1998-2002 and the various elements of project funding that have been secured to implement the Plan.

The Committee then reviewed the process staff had used to compile a work plan that reflected both the structure of the Operational Plan and the separate project documents for the elements that had secured funding. The Committee noted that Centre staff had put a major effort into refining the Centre's costing and accounting systems to allow efficient reporting on progress with the implementation of the Operational plan; project implementation for donors; and accurate costing of activities for future project planning.

The Board subsequently endorsed the work plan but asked the Director General and his staff to give priority to the following areas:

- Immediate initiation of the consultancy work on intellectual property rights and benefit sharing;
- Early presentation of a Board discussion paper on research policies to guide the evaluation of proposals received from external researchers and research institutions;
- Completion of the zoning of the Iwokrama Forest in the time frame outlined in the work plan because of its pivotal role as a prerequisite to other activities including the seeking of commercial partners for the development of the Sustainable Utilization Area;
- Early initiation of the Young professional programme; and
- Initiation of the EU funded project on the Conservation and the Sustainable and Equitable Utilization of Bio-Diversity in accord with the work plan.

The Board welcomed the active work being done under the Centre's Sustainable Human Development Programme. The Board particularly welcomed the approach being taken to develop skill-based, competency training for rangers though it asked staff to ensure that the rangers also understood the conceptual background to conservation and sustainable development. The Board also welcomed emphasis being given to professional capacity building at both the national and regional level through targeted technical workshops and the Centre's regular lunch time seminar series.

The Board endorsed the use of international technical workshops to distill the best practice for direct input into Centre programmes and policy relevant material for national and regional professional capacity building. The Board recognized the opportunities these

workshops provide for constructive interaction with national and regional professionals and welcomed the recent workshop on Reduced Impact Logging and the proposed workshops on Environmentally, Economically and Socially Sustainable Malaria Control and Forest Resources/Concession Allocation Processes.

The Board welcomed the active programme of training and development work being undertaken with local communities. They appreciated that the focus of this work on developing comparative advantage from forest-based activities and the solving of mutual problems such as malaria control was in accord with their previous decisions. However, the Board urged staff to ensure that local communities were equally involved in the development of commercial activities in the Iwokrama Forest itself. The Board therefore suggested that the inclusion of equity arrangements with local communities should be a key criterion for the selection of commercial partners. The Board suggested that the proposed technical workshop on forest resource allocation processes be used to investigate possible mechanisms for involving local communities in commercial partnerships.

The work programme is a tangible response to the vision of Prof. Swaminathan and successive governments in Guyana. Prof. Swaminathan was fond of quoting Shakespeare

*"there is a tide in the affairs of men
which taken at the flood leads on to
fortune"*

Professor Swaminathan fervently believes that Iwokrama represents such a potential fortune, fortune not just in economic terms, but in terms of leaving a better world for our children and the generations yet to come.

The Board's new Chair is Ms. Angela Cropper. Ms. Cropper is an experienced natural resources management specialist who is a citizen of Trinidad and Tobago. Ms. Cropper was the inaugural Executive Secretary of the Convention on Biological Diversity (see page 5 in this issue).

George Woodwell delivers the Iwokrama Foundation Day Lecture



The 1999 Iwokrama Foundation Day Lecture was delivered by leading global systems ecologist, Dr. George M. Woodwell

Dr. Woodwell was the founder, and remains the Director, of the Woods Hole Research Centre in Woods Hole Massachusetts. His research has been on the structure and function of natural communities and their role as segments of the biosphere. He has worked extensively in forests and estuaries in North America and has made well-known studies of the ecological effects of ionizing radiation and the circulation and effects of pesticides and other toxins. He has, for many years, studied the biotic interactions associated with the warming of the earth.

He has published more than 300 papers in ecology and has contributed articles to *Science*, *Scientific American*, *BioScience*, *Ecology* and the *Journal of Ecology*, among many. He has edited books on the effects of nuclear war, the global carbon cycle, biotic impoverishment, and satellite imagery used in measuring the area of forests globally.

Dr. Woodwell delivered the 1999 Iwokrama Foundation Day Lecture in the Rupununi Room of the Tower Hotel on Monday June 28th at 7:30 pm. His topic was "Forests in a Full World."

The Iwokrama Foundation Day Lecture "Forests in a Full World"

George M. Woodwell
The Woods Hole Research Center
Woods Hole, Massachusetts

The implications of the transition from an empty world to a full world are profound. It is the transition from a world of abundant natural resources to a world of limits; from easy access to land and water and air and fish and public space to continuously intensified competition for all essentials.

The transition comes on us with the extraordinary speed inherent in exponential growth. The doubling time of the human population has been three to four decades over the latter part of the 20th century. That speed is rapid enough, but the doubling time for the spread of technology around the world has been far less, perhaps a decade or two. The two interact to present pressures on environment that double in years to a decade. A world that is relaxed at a mere "half full" in one year, just few years later, finds itself more than full, overwhelmed with competing demands on all resources.

Such is the state of the world at the moment, pressed throughout to meet immediate and urgent demands to solve the shorter term problems while the longer term problems join them also as immediate crises whose solutions require fundamental changes that seem beyond reach. The issue has been joined in a flood of books over the last decades that span the full gamut from population through economics to attempts to visualize the future under various circumstances.

In contrast, a century and a half ago, Henry David Thoreau wandered across the towns of Concord and Lexington and Carlisle in Massachusetts, just west of Boston and had the vision to write into his abundant notes the suggestion that:

"Each town should have...a primitive forest, of five hundred or a thousand acres, where a stick should never be cut for fuel, a common possession forever, for instruction and recreation.... Let us keep the New World new....."

The land had been settled by Europeans two hundred years before. Before that it had been for a mere ten thousand years, or twelve, out from under the ice of the Wisconsin Glaciation and for all that time the home of American aborigines, the Amerindians, who had lived with a light hand on a rich, forested landscape. He observed that the forest maintained the landscape; it ran itself and restored itself after wind or fires or human disturbance. And it was potentially instructive, if preserved and if its lessons were read properly. It was, in his view, an essential part of the landscape and to be preserved as an integral part of the human habitat and of the human experience. Over much of the world forests are large, very large in their role in maintaining a place suitable for life and especially, for people.

Thoreau did not anticipate that a mere century and a half later, as the millennium came to a close, the whole world would be considering global issues of human-caused climatic change and edaphic and human stability all tied to questions of whether the landscape globally could be maintained in the longer term successfully as a human habitat before the crushing, continued expansion of human demands.

"Let us keep the New World new..." was a reasonable hope a century and a half ago. We look now at the world and ask whether we can expect the bickering tribes to join sufficiently to keep an earth sufficiently stable and intact as a biophysical system to support ten or a hundred times the number of people of Thoreau's time and an explosively expanding technology whose whole purpose is the exploitation of the earth for human use.

It is this dual challenge, the growth of the human enterprise and the erosion of essential resources, that has dominated the discussions leading to the report of the World Commission on Forests and Sustainable Development, recently published by the Cambridge University Press and the most recent and comprehensive review of the status of forests globally.

(Continued on page 4)

Iwokrama Foundation Day Lecture *"Forests in a Full World" (continued)*

(Continued from page 3)

Forests are large in the world, large in area, large in stature, large in carbon content, large in their influence on water and energy and life and climate. Prior to the expansion of human influences, forests covered about 44% of the 13.5 billion ha of land. At present forests are restricted to about 28%, a 40% reduction due to human activities.

The world has changed and the rate of change is accelerating. The greatest change globally is the warming of the earth due to the accumulation of heat-trapping gases in the atmosphere, evidence that the world is not working properly.

The most important of these gases is carbon dioxide whose concentration has increased in the past century by more than 30%. The cause of the increase is the use of fossil fuels and the destruction of forests. The combination introduces an imbalance into the global carbon budget of nearly 8 billion tons of carbon annually released as carbon dioxide into the atmosphere. About 6.5 billion tons is due to the combustion of oil and coal and gas. The remainder is due to the replacement of forests by agriculture and the release of the carbon stored in the trees and soil as carbon dioxide gas into the atmosphere.

The change in the atmosphere is serious because, apart from water vapor, carbon dioxide is the principal heat trapping gas in the atmosphere. Its concentration is very low, about 0.04 % by volume. The atmosphere is about 80% nitrogen and 20% oxygen. Carbon dioxide's low concentration means that a significant change in its total concentration can be made by small total releases if there is no parallel mechanism removing the carbon dioxide from the atmosphere as rapidly as it is released.

There are mechanisms that remove carbon dioxide from the atmosphere. One of these is simple diffusion into the oceans, which have large capacity for accumulating carbon in the complicated carbonate-bicarbonate system. Another is the accumulation of carbon into the

plants and soil of expanding forests. The difficulty is that while some forests are expanding in area, there is a global reduction in the distribution of forests that continues. Some forests are also expanding in stature and in carbon storage in soils; but others are losing carbon to decay as climate warms and as diseases including insects find larger ranges on a warmer earth.

The effect is a net annual accumulation in the atmosphere of 3-4 billion tons of carbon as carbon dioxide. The current atmospheric concentration is about 365 ppm, more than 30% above the highest concentration over the last 400,000 years, the period for which we have a good record. It continues to rise at about 1.5 -2.0 parts per million per year.

The World Commission on Forests and Sustainable Development in its recent Report has called attention to the simple fact that there can be no solution to the warming of the earth without a cessation of destruction of forests and that the earth's remaining primary forests should be preserved intact. The Commission also observes that industrial demands on forests can be met from plantations.

Careful analyses of the implications of the warming of the earth show that scientists are reasonably confident of predictions of the effects of an average warming globally of the order of 1-2 degrees C. Above that, the effects on climates are guesswork with the possibility of profound effects including abrupt changes in global and regional climates, sudden increases in sea level, a weakening of oceanic circulation including the Gulf Stream, and the potential opening of the Arctic Ocean during summer among other disruptions.

The earth is already committed to a warming of 2 degrees C or more and no steps have been taken to reduce future commitments to much greater warming. The Kyoto Protocol is far too little and far too late to implement the objectives stated in the Framework Convention on Climate Change which sets the

purpose as protecting the integrity of both human interests and nature. The Convention has been ratified by more than 175 nations and provides ample basis for action by all the nations globally in defending their mutual interests in the stability of the human habitat.

While forests have a very large and important role as cause and potential cure of the global climate problem, they also have a large role in regional climates through influences on evaporation and precipitation, and through effects on albedo and energy budgets.

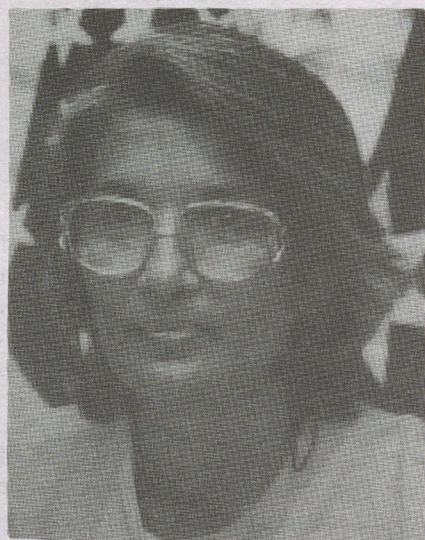
They influence water flows and water quality in every drainage basin in the forested parts of the world. In the Amazon Basin for example the water that falls as precipitation in the upper reaches of the rivers on the flanks of the Andes may have been evaporated and re-precipitated as many as five times in the transit of the Basin. And they have profound influences on the biotic resources available regionally and locally.

There is little question that forests determine the major environmental features of landscapes and are intrinsic to the functional integrity of much of the human habitat. They are an essential element in planning for life in a Full World.

Iwokrama with its able and vigorous and experienced leadership in science offers a remarkable and important new opportunity in research and in the conservation of forests globally.

In the Full World of the present and the foreseeable future, the value of forests as human habitat and for the public services of nature, both global and local, soar in value relative to the classical commercial values from timber and fiber. It is a major challenge now to find ways of realizing those communal values in societies long attuned to exploitation for narrowly focused commercial profits. It is a long-standing challenge but one that is suddenly acute ... and with a new, last chance element of global as well as local proportions.

Angela Cropper Becomes the New Chair of the Iwokrama Board of Trustees



The new Chair of the Iwokrama International Board of Trustees will be Trinidadian economist and lawyer Ms. Angela Cropper.

Angela was previously Senior Advisor in Environment and Development at the Bureau for Development Policy for the UNDP in New York. Prior to this, she was the Executive Secretary to the United Nations Convention on Biological Diversity. Before joining the Convention Secretariat, Angela was Head of Governance at IUCN in Switzerland and an Advisor in Environment and Education to the Secretary General of CARICOM.

Angela brings to the Iwokrama Board a wealth of experience in environmental and developmental issues and has particular strengths in Forest Conservation and Use. Angela was a main author on the recently released Report of the World Commission on Forests and Sustainable Development—"Our Forests—Our Future."

Iwokrama Brown Bag Lunch Time Seminar Series

On Thursday, February 11, Iwokrama launched its fortnightly Brown Bag Lunch Seminar Series on the Conservation, Management and Sustainable Development of Tropical Rain Forest Ecosystems. In this seminar series, staff of the Centre and professional colleagues from the University of Guyana, national environmental and resource management agencies and other research institutes and development agencies working in Guyana are invited to bring a packed lunch (hence the brown bag) to the Centre to participate in an informal seminar and technical discussion on issues related to rain forest conservation, management and sustainable development. The following brown bag lunch seminars have been held during 1999:

February 11: Beyond the Biophysical – A Social science Perspective on Ecosystem Management. Dr. Lea Scherl, Principal Fellow (Social Sciences), Iwokrama International Centre.

February 25: The Commonwealth Biological Resources and Genetics Diversity (GBDR) Programme. Prof. J.H. Seyani, Head of GBDR Programme, Commonwealth Secretariat.

March 11: Economic Evaluation and Land Use Planning – A Case Study From Panama. Dr. Bruce Aylward, Principal Economist, Iwokrama.

March 25: Increment and Growth Modeling in Uneven Age Fir Forests of the Black Sea Region. Prof. Omer Saracoglu, UNESCO/UNITWIN Chair in Sustainable Development of the Rainforest, University of Guyana.

April 8: Issues for the 1999 Meeting of the Commission on Sustainable Development. Navin Chandarpal, Advisor to the President on Science, Technology and the Environment, Office of the President, Government of Guyana.

April 22: A Population Model for Greenheart Forests. Dr. Roderick Zagt, Team Leader, TROPENBOS Guyana Programme.

May 20: The Propensity for Fire in Guyana's Rainforests. Dr. David Hammond, Principal Forest Ecologist, Iwokrama

June 3: Sustained Yield Timber Harvesting in Belize and Its Relevance for Guyana. Neil Bird, Technical Advisor Silviculture, Guyana Forestry Commission.

June 17: Bangladesh's Biodiversity Survey and its Application in the Development of a National Network of Protected Areas. Dr. David Hughell, GIS Specialist, Iwokrama International Centre.

July 1: Key Issues from the Third Meeting of the Intergovernmental Forum on Forests. Clayton Hall, Head of the Government of Guyana Delegation and Chair of the Group of 77 and China.

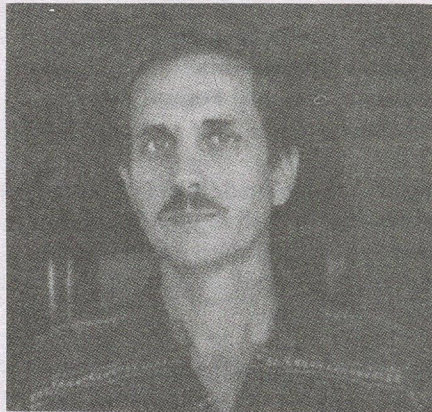
July 15: The Iwokrama Fauna Surveys - Lessons learned for Research and Biodiversity Planning. Dr. Graham Watkins, Wildlife Biologist, Iwokrama International Centre.

July 29: Lessons Learned from Bolivia's National Protected Areas System Programme. Dr. Gary Hunnisett, Principal Human Resources Development Specialist, Iwokrama International Centre.

August 12: Insights, Lessons and Challenges Arising from the Development of a National Biodiversity Action Plan for Guyana. Macsood Hoosein, Training Coordinator, Iwokrama.

August 26: The Economics of Chain Saw Logging in Guyana. William Grisley, Sectoral Specialist, Inter-American Development Bank, IDB, Guyana Office.

Two New Staff Members Join Iwokrama Under the DFID Sustainable Human Development Project



Iwokrama welcomes Dr. David Hughell who will occupy the position of GIS/Information Management Specialist. Dr. Hughell is a United States Citizen who is accompanied by his wife (from Costa Rica) and their two children.

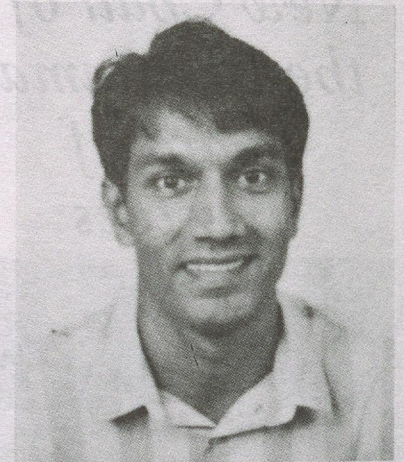
David has a B.A. in Environmental Biology from the University of California, BS and MS degrees in Forestry from Humboldt State University (California), and a Ph.D. in Forest Management and Operations Research from North Carolina State University. His dissertation research involved the application of spatial simulation and optimization models to manage for timber and wildlife resources.

David's overseas career began as a Peace Corps Volunteer in Honduras, where he was assigned to an FAO watershed conservation project. This was followed by six months in Bangladesh to develop their national Forest Information System. He later spent four years with the Center for Tropical Agricultural Research and Education (CATIE) in Costa Rica developing growth and yield models for multi-purpose tree species. David also taught CATIE's MS level course in forest growth and yield and participated in workshops throughout Central America to train foresters in the measurement and data analysis of permanent forest growth plots.

David brings with him broad expertise in the areas of quantitative analysis and computer applications to support natural resource management. He programmed and implemented the computerized information management system used to record and analyze national biodiversity surveys carried-out in Sri Lanka and Bangladesh, providing the basic data used for selecting areas to be incorporated into national protection area networks. As a consultant with Bolivia's Sustainable Forestry Management Project (BOLFOR), David prepared the initial strategy for their environmental monitoring and evaluation system, and (three years later) returned to BOLFOR to apply simulation to improve the efficiency of their natural forest inventories.

Most recently, David has been assisting private forest management companies, such as Cartón de Venezuela, Pulsar Desarrollo Forestal in Mexico, Stone Forestal, and Flor y Fauna Inc. in Costa Rica, to utilize computerized information technologies to support their forest management planning. This includes forest growth modeling, implementation of geographic information systems (GIS) and the programming of integrated decision support systems for forest management.

In addition, the first internationally recruited Guyanese staff member joined Iwokrama in July, 1999. Macsood has been hired as the Training Coordinator and will work closely with Dr. Gary Hunnisett. Macsood Hoosein is not a stranger to the work of Iwokrama, having previously served as an instructor at Iwokrama courses in Ranger Training and in Community Wildlife Management. He has spent significant periods of up to several months in various hinterland locations in Guyana, including the Kanuku Mountains and the Corentyne River.



Macsood is from the Corentyne coast of Guyana, and received a B.Sc. from the University of Guyana and a M.S. from the West Virginia University. Prior to going to the USA he was an Assistant Lecturer in the Biology Department of the University of Guyana. Upon his return he joined the staff of the Forestry Unit of U.G. and, while there, contributed towards the development of both the Degree and Diploma programmes.

Macsood also served as Project Manager for a 1992 Biology expedition of Raleigh International to Brunei. He was later a Junior Professional of the Inter-American Institute for Cooperation on Agriculture in Costa Rica during 1994/95 where he was attached to the National Parks Foundation.

Outside of his teaching positions, Macsood has worked as an Environmental Officer with the Guyana EPA Project Preparation Unit and as Project Officer during the Guyana National Protected Areas System project preparation phase. Macsood's more recent contributions were as Technical Adviser to the National Commission of the Treaty of Amazonian Cooperation and as Biodiversity Planner for the National Biodiversity Action Plan. As part of his work in public agencies Macsood had represented Guyana at a number of regional and international fora on protected areas and biodiversity.

The Burro-Burro River Trip - An Invitation

The Burro-Burro River bisects the Iwokrama Forest. This slow moving river meanders into the Siparuni, and then on to the Essequibo, Guyana's largest river. The Burro-Burro is a paradise for the wildlife biologist, naturalist, camper and canoeist.

The Burro-Burro is not a large river among Guyana's giant rivers. Anyone could throw a fair sized rock across the river. The Burro-Burro is, however, a delight for those who like to getaway from it all. This river is as remote and as isolated as it is possible to get! There are no roads. There are no paths. There is no noise from traffic, no pollution, and only a few scattered, palm thatched roof campsites along its shores. The occasional fisherman from the Makushi Amerindian village of Surama is the most common visitor to the river. Even these fishermen are sometimes daunted by the series of deadfalls that block the river. Chainsaws and axes are necessary tools for navigation on the upper stretches of the Burro-Burro.

However, the remoteness brings its rewards. The secrets of this isolated river are shared only among those who canoe peacefully down river. The currents are moderate, with several short and friendly chutes and rapids to make it interesting. These rapids are often associated with the intrusive volcanic dykes that diagonal across the river every kilometer or so, and make for nice pullout sites.

The enormous *kumaka*, or silk-cotton trees (*Ceiba pentandra*) stand along the banks as silent forest guardians. The distinctive calls of the *bunia*, or crested oropendolas, as they emerge from their well-woven hanging nests, breaks the quiet fluttering of wind through the hand like leaves of the canopy. Along the river one sometimes enters cathedral-like tunnels of overhanging vegetation, the understorey alive with the movement and sounds of ant-birds and ant wrens. Silvery splashes from one of the hundreds of species of fish break the marble-smooth waters.



From time to time, one passes the legendary *lana* tree. The fruits of this tree have been used for ages to produce a dark purple dye. The fruits are also a favorite of the *paku* fish that disperses the seeds along the river's banks. Though the fruits are harmless, touching the *lana* fruit produces an instantaneous and dramatic blackening of the skin that lasts for up to a week.

The true mystery and uniqueness of the trip however lies with the wildlife that can be seen and heard. Toucans, blue and gold macaws, scarlet macaws, red and green macaws and several species of parrots and hawks fly overhead. The roars of Howler Monkeys and the screams of the ubiquitous screaming pihas are experiences not soon forgotten. In the evening the wails of tinamous and haunting calls of potoos are mixed with constant croaks of the large tree frog. Over four hundred and fifty bird species have been recorded so far in the Iwokrama Forest. Opportunities for both the ornithologist and the casual sightseer are almost limitless.

Those interested in large mammals will also not be disappointed. Giant River Otters and Giant River Turtles are common. The bright eyes of three-meter Black Caiman are reflected from spotlights at night along the riverbanks. On some occasions their presence is much more dramatic, when they leave a favorite land spot and thrash into the protection and safety of the coffee colored waters. White Lipped Peccaries can be seen or smelled along the river as they roam in flocks of up to a few hundred. The largest mammal in the forest - the horse like Brazilian Tapir is also a common visitor to the Burro-Burro and

can be seen on land or swimming. When disturbed they often dive to the river bottom and continue walking along the bottom.

For the casual fisherman and dedicated food lover, the prospect of catching one of the innumerable piranhas is something to make one dream about. Roasted whole over a grill on an evening campfire, and accompanied by local fruit will make for one of life's more pleasurable eating experiences. Mosquitoes and other insects are unlikely to ruin the experience for they are almost non-existent for much of the year.

For the nature lover interested in seeing fish more than eating or catching them, there are huge fish eating species to be seen either in the smooth glides near the chutes, or lying in wait of falling fruit under trees. Among these fish are the giant *Lao-lao* catfish and the enormous *Arapaima*; both of these species may reach three metres in length. Local people sometimes come to harvest these surface dwellers using bows and barbed arrowheads attached to 100-lb. test.

For the catch and release fly fisherman using a barbless hook, the lower stretches of the Burro-Burro offer the chance of catching the tackle smashing *Lukanani* or Peacock Bass arguably one of the world's best fighting fish. Its iridescent blue body and brilliant tail spot ("Peacock") certainly makes the *Lukanani* one of the most beautiful of tropical fish. Equally likely however, is the possibility that the large black piranha will see the offering first and strip the fly of all its tail feathers/or slash the leader. The *Arawana* is another famous forest river denizen that jumps like the tarpon when hooked; the *Arawana* also uses this jumping skill to pick long-nosed bats from the bottom of tree trunks that overhang the river.

(Continued on page 8)

Burro-Burro River Trip - An Invitation (continued)

(Continued from page 7)

Access to the Burro-Burro is relatively straightforward. A 35 minute drive from the Annai airstrip or a two-hour drive from the field station in the Iwokrama Center's 4WD vehicles takes you to just outside the Iwokrama Forest and an idyllic village called Surama. Surama lies near the upper reaches of the Burro-Burro. In Surama, you can pick up a trained local guide who will assist with your trip through the Burro-Burro.

At the set off point there is a pleasant, open walled field camp constructed by the villagers, where one can spend the evening before pushing off. Alternatively, the village offers a tour and a presentation on Amerindian life that is well worth considering. The Burro-Burro can also be accessed using Iwokrama's twin 35 hp outboards. It's a pleasant two-hour boat trip down the Essequibo and up to the Siparuni from the field station to the mouth of the Burro-Burro.

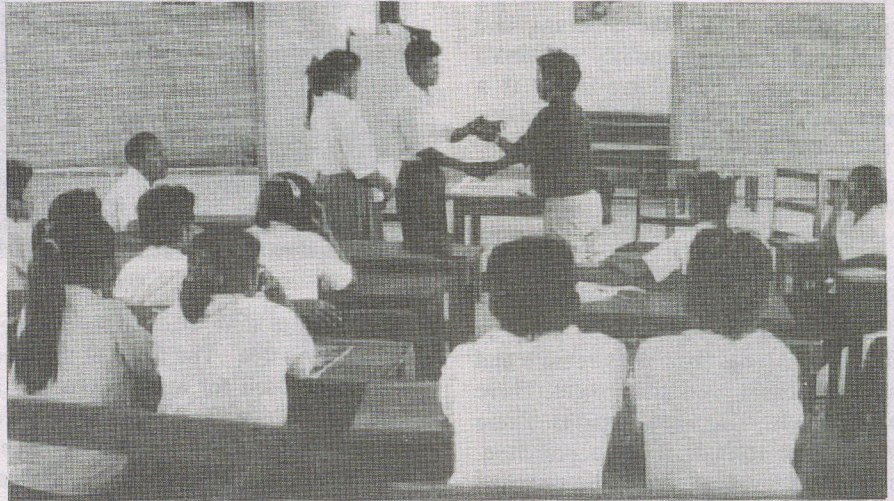
Between the headwaters near Surama and the confluence of the Burro-Burro and the Siparuni rivers there are at least three days of moderate effort but relaxing paddling. Pickup locations can be easily modified to allow for changes in the length of the trip.

We plan to add this tour to our package of ecotourism offerings by the end of this year. We feel the best time for this trip is the beginning of October, when water is at its lowest and clearest. We've got the canoes lined up, the knowledgeable and professional local guides who can interpret and assist you, and the raw material for a memorable trip. What are you waiting for?

If you are interested in visiting us, please contact Iwokrama via Email (Iwokrama@guyana.net.gy) or Fax (592-2-59199) and we will send you more information. Also check out our home page at <http://www.sdn.org.gy/iwokrama>

We look forward to hearing from you.

Wildlife Clubs Developing in the North Rupununi



Zacharias Norman, Iwokrama Forest Ranger, handing over the binoculars donated by the Chase Wildlife Foundation and the book—"Birds of Venezuela" donated by Columbus Zoo to the President of the Kwatamang Wildlife Club—Ricky Moses.

Junior wildlife and conservation clubs are blossoming in the North Rupununi. Eight clubs have now formed in the twelve North Rupununi communities. The clubs have all been formed in the last year after visits from an Iwokrama environmental education volunteer Hannah Fairbanks (see Bulletin Issue 3.4). The clubs are modelled on the successful Santa Rosa Conservation Club in Moruka which has been supported by Conservation International and the British High Commission.

The eight junior wildlife and conservation clubs are in Annai, Aranaputa, Kwatamang, Toka, Massara, Apoteri, Wowetta, and Surama. The clubs have a total membership of over 180 and have already undertaken activities such as collecting local plants, building their own club house, writing stories and producing art work on local wildlife, developing nature trails and visiting local ecotourism and conservation sites.

The clubs have many future plans that include inventorying natural resources, developing their animal

and plant identification skills, and helping their communities with the further development of nature trails for ecotourism.

So far, the development of the clubs has been helped substantially by contributions from the Chase Wildlife Foundation and Columbus and Philadelphia Zoos. The Chase Wildlife Foundation recently provided funds for the purchase of waterproof Nikon Monarch 7 by 42 binoculars. The binoculars have been delivered to active clubs and are now being used for the young people of the Rupununi to improve their animal identification skills. Columbus and Philadelphia Zoo have aided with donations of mammal and bird identification books. Clubs are now equipped with copies of the "Birds of Venezuela" and "Neotropical Mammals."

Over the next year, Iwokrama will be offering grants for the further development of wildlife clubs in the North Rupununi. Anyone interested in finding out more about the clubs should contact Graham Watkins or Deirdre Jafferally at 592-2-51504 or g Watkins@guyana.net.gy.

Flora and Fauna of the Iwokrama Forest Update

In the past three years, a substantial amount of effort has been expended to find out what plants and animals are in the Iwokrama Forest. Over thirty months were spent in the field by thirty researchers from more than ten research institutes to carry out the phase II floral and faunal surveys of the Iwokrama Forest. The Smithsonian - Biodiversity of the Guiana's Programme, managed the floral surveys. The faunal surveys were managed by the Academy of Natural Sciences of Philadelphia and involved the Royal Ontario Museum, Florida International University, and the University of Kansas.

This work has made the vertebrate fauna of the Iwokrama Forest one of the best documented in Northern South America. However, much more work remains to be done as the researchers have only scratched the biodiversity surface of Iwokrama. So far, researchers have only looked at higher plants and vertebrates in any detail. This leaves insects and other invertebrates for later research. Within the groups studied so far, it is estimated that as many as 30% of the species in the Iwokrama Forest remain unrecorded.

The goals of the floral and faunal surveys were to provide the baseline information necessary for the development of research and management in the Iwokrama Forest. In the process, the surveys have considerably enlarged the Guyanese national specimen collections held at the Centre for the Study of Biological Diversity at the University of Guyana. In addition, the surveys trained 16 Guyanese and international students and over 20 local community members in floral and faunal survey techniques.

Table 1 summarizes the results of the faunal and floral surveys in the Iwokrama Forest. During the surveys, 114 species of reptiles and amphibians were recorded in the forest. Eleven of the species collected (10%) were new to

Table 1. Species Richness in the Iwokrama Forest and Guyana

<i>Taxonomic Group</i>	<i>Recorded Species Richness in Iwokrama</i>	<i>Estimated Species Richness in Iwokrama</i>	<i>Estimated Species Richness in Guyana</i>
Birds	450	>480	>800 ¹
Mammals	127	>180	>220 ²
Fish	420	>500	>800 ³
Reptiles and Amphibians	114	>180	>200 ⁴
Plants	1175	>2000	>6,000 ⁵

¹Total based on combined work of several institutes in Guyana

²From Lim and Engstrom 1999

³Arjoon et al. in preparation

⁴Hammond and Forget 1999

⁵Funk et al. 1999

science, illustrating the need for more research to complete description of even the more intensively studied taxonomic groups in Guyana.

Four hundred and twenty fish species were recorded in the Burro-burro, Siparuni, and Essequibo rivers in or adjoining the Iwokrama Forest. An interesting comparison in species numbers can be made with the whole of North America where there are only 700 freshwater species. Four new species of fish were found and the visiting ichthyologists were particularly impressed by the continued presence of the large predators such as Arapaima, Baiara, Lao lao, Siana, Blinka, and Dawalu in the rivers. These fish have been all but extirpated in many other areas through commercial over fishing and fisheries management will be a priority for the Iwokrama Centre in the coming years.

The 450 bird species recorded by ornithologists far exceeded their expectations. They originally estimated there would be only 350 species in the Iwokrama Forest. As with the fish, visiting ornithologists were impressed by the abundance of normally over-hunted birds such as Powis and Maam and noted the presence of several species such as potoos, cotingas, and Harpy

Eagles potentially important for ecotourism.

One hundred and twenty seven species of mammals were recorded in the Iwokrama Forest. The mammalogists expect that further research will reveal up to 180 mammal species. The diversity of bats in the Iwokrama Forest (83 species) is the highest recorded to date in South America. We expect the number of bat species to reach as many as 106 after future research. In addition to the high bat species richness, 20 of the 27 CITES protected species found in Guyana have been found in the Iwokrama Forest despite a depauperate primate fauna (only five species). Many of these larger mammals, including Jaguars and Giant Otters, are important ecotourism draws.

The botanists have now identified more than 1175 species of plants from collections in the Iwokrama Forest. The major plant families in Iwokrama are the bean family (Fabaceae) and the coffee plant family (Rubiaceae). The researchers estimate that further sampling will reveal over 2000 plant species in the Iwokrama Forest. However, much more work is needed, especially in the Iwokrama Mountains. The plant lists created by the botanists are a necessary first step towards the development of

(Continued on page 11)

International Workshop on Reduced Impact Logging



Hon. Sataydeo Sawh, Minister of Fisheries, Crops and Livestock addressing participants of the workshop on reduced impact logging.

From April 26-30 the Iwokrama International Centre, TROPENBOS-GUYANA and the Guyana Forestry Commission hosted an international technical workshop to examine the global experience with reduced-impact logging practices (RIL) and how this might contribute to better forest management in Guyana. More specifically, the workshop aimed to enhance local understanding of the possibilities and constraints associated with RIL and how best to address these in an upcoming feasibility study to be carried out in the south of Mabura Hill concession by TROPENBOS-GUYANA, Iwokrama International Centre and Demerara Timbers Ltd.

The workshop brought together staff from various national agencies, private companies in the forest sector and staff from overseas research institutes, university forestry departments, NGOs and retail firms. The first two days consisted of a series of presentations and public lectures by workshop participants in order to share experiences with RIL from locations in Malaysia, Indonesia, Brazil, Cameroon, Suriname, Australia and Guyana. The two evening public lectures provided a perspective

on how high standards of forest stewardship could lead to improved market access for timber and wood product exporters.

A presentation on the second night by the UK Co-ordinator for the Forest Stewardship Council (FSC), Ms. Hannah Scrase, explained how the FSC works and how timber producers in Guyana seeking certification for their products could pursue this aim. Currently, local producers interested in pursuing FSC certification must hire one of several FSC-accredited certifying agencies which would conduct an evaluation based on the principles and criteria of the FSC and existing Guyana Forestry Commission regulations.

Ms Scrase emphasized that in the longer term the forest sector in Guyana may wish to develop a national stakeholder process to draft a national certification plan for approval by the FSC assembly. A final option for improving local access to FSC certification would be the establishment of an FSC-accredited, local body that could certify Guyanese (and regional) timbers in line with the FSC-approved guidelines.

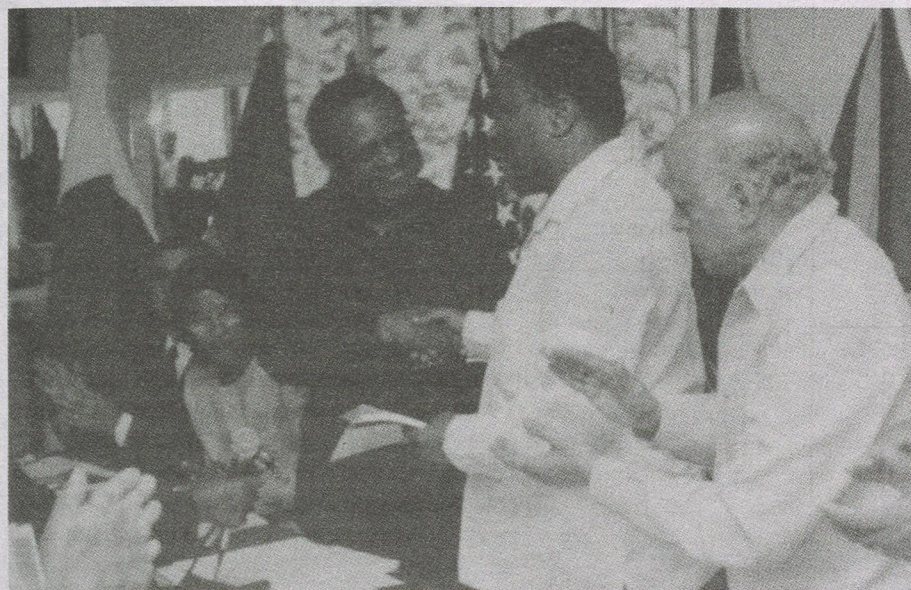
During the discussion, the point was made that while certification would not necessarily lead to premiums in the market, the excess of demand over supply for certified wood currently observed in high-value markets for wood in, for example, Europe suggest that certification may lead to increased market access and the opportunity to garner premiums in niche markets. The public lectures facilitated debate and consideration of these issues, while pinpointing the need for a more thorough assessment of the costs and benefits of certifying Guyanese timbers.

The final three days of the workshop consisted of a series of working group sessions with several aims. Firstly, an effort was made to come up with a set of key elements involved in good forest management in the tropics. On the second day, participants were asked to focus on defining best practice in RIL based on the outcomes achieved at the various sites where trials have been undertaken. On the final day, the working groups examined the outputs of the week within the context of Guyana's forests and forestry sector. This discussion highlighted aspects of RIL which have widespread support as well as those areas which remain uncertain or encompass considerable site to site variation.

Most of the operational aspects of employing RIL techniques were considered to be achievable within the framework of good forest management planning. Many issues related to harvest planning and stand manipulation as well as monitoring the environmental impact of the harvest did not produce clear outcomes, suggesting that these areas may need greater attention during the RIL feasibility study. Again, the issues and points raised in the workshop will inform the objectives and methods to be applied in the upcoming feasibility study.

The proceedings of the presentations and the working group discussions will be published later this year. It will be made available to those interested in RIL and its application in Guyana.

Iwokrama Hosts Caribbean Launching of the Report of the World Commission on Forests and Sustainable Development



Chief Emeka Anyaoku, Secretary General of the Commonwealth, handing the Report of the World Commission on Forests and Sustainable Development - "Our Forests - Our Future" to the Prime Minister of Guyana—The Hon. Mr. Samuel Hinds. Also pictured are Ms. Angela Cropper (future Chair of the Iwokrama Board of Trustees), Prof. Swaminathan (Chair of the Iwokrama Board of trustees), and Mr. Navin Chandarpal (Advisor to the President of Guyana on Science and the Environment).

The Iwokrama International Centre held a one-day workshop on May 7th, 1999 to host the Caribbean Launch of the Report of the World Commission on Forests and Sustainable Development - "Our Forests - Our Future."

The Launch was held in conjunction with the Meeting of the Iwokrama Board of Trustees because several of the members of the Board were also members of the World Commission. The launch was attended by representatives from the Forest Services of Guyana, St. Lucia, the Commonwealth of Dominica, Trinidad and Tobago and Suriname. The attendance of these representatives was made possible by financial assistance from the United Nations Development Programme.

The World Commission's Report chronicles the alarming degradation of the world's forests. It notes that the world's forests are continuing to be cut and burnt at such a rapid rate that if action is not taken soon, there is a real risk of undermining their function in maintaining a habitable planet.

The Commission noted that forest loss is already contributing to the extinction of plants and animals, the growth in the concentration of carbon dioxide and the loss of important watershed services. In many parts of the world, forest decline adds to people's social and economic distress.

After holding public hearings on five continents to give voice to those who depend on forest for their livelihoods, the World Commission concluded "We must choose a path that respects the ecological values of forests while recognizing their role in social and economic development." Key recommendations in the report include:

- The nature of the global forest crisis requires decisive international leadership and action;
- Governments must ensure that public interest prevails over private interest;
- Prices and policies that truly reflect all the benefits provided by forests are needed to change wasteful production and consumption patterns;

- Protection of the remaining primary forests requires that future demand for wood production must be met through plantations and secondary forests; and
- Community involvement in decision-making is, essential for the sustainable management of forests.

Copies of the Commissions Report are being held in the Iwokrama Information and Communication Unit so that members of the public in Guyana can have easy access to its findings.

Flora and Fauna of the Iwokrama Forest Update (continued)

(Continued from page 9)

Iwokrama's Programme on the Conservation and Utilization of Biodiversity. Researchers are now filing final reports with the Iwokrama International Centre. In these reports they have noted the high species richness found in the Iwokrama and Pakatau mountain areas. This information will help with the zonation of the Iwokrama Forest into the sustainable use and wilderness preserve zones.

The information from the surveys is helping create field guides for use in the development of ecotourism and biodiversity monitoring programmes. A prototype mammal guide will be printed later this year as pocket guide for tourists and Iwokrama's rangers.

Iwokrama will be working with the Dutch nature photographers - FOTO-NATURA - over the coming years to produce quality photographic images of the major animal and plant groups of the Iwokrama Forest. These photographs will be used to produce guide-books for fish, amphibians and reptiles.

The Iwokrama faunal and floral surveys were funded under the GEF-UNDP Assistance to the Iwokrama International Rain Forest Programme during the preparatory phase for the Iwokrama International Centre for Rain Forest Conservation and Development.



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Iwokrama's Mission Statement

To promote the conservation and the sustainable and equitable use of tropical rain forests in a manner that will lead to lasting ecological, economic, and social benefits to the people of Guyana and to the world in general, by undertaking research, training, and the development and dissemination of technologies

Check out our Web Site
<http://www.sdn.org.gy/iwokrama>



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Makushi Research Unit

Edited by Janette Forte

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