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Annual Report

July 2009 - December 2010





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Chairman's Letter

December 2010

Dr. The Hon Navinchandra RAMGOOLAM, G.C.S.K, F.R.C.P
Prime Minister
Minister of Defence, Home Affairs
and External Communications
Republic of Mauritius

In accordance with the provision of the Mauritius Oceanography Institute Act of 1999, I am hereby submitting the Annual Report of activities and accounts of the Mauritius Oceanography Institute for the Financial Year which ended on 31 December 2010.

Yours sincerely,



Mr. S. C. Seeballuck, G.O.S.K
Chairman

Vision and Mission Statement

The Mauritius Oceanography Institute (MOI) was established under the Mauritius Oceanography Institute Act (Act No. 24 of 1999).

The objectives of the Mauritius Oceanography Institute, as spelt out in the Act, are:

- to foster interest in research and development in relation to oceanography,
- to advise Government on the formulation and implementation of policies and programs in respect to oceanography and related aspects,
- to coordinate, collaborate and co-operate with other institutions, agencies and persons on national, regional and global issues within its field of interest, and to assist any organisation, body or person in creating sustainable research and development programs in areas of interest and activity related to oceanography,
- to demonstrate and communicate to the scientific community and the public at large the results and the importance of oceanography in the conservation, maintenance, management, utilisation and development of resources based on marine and coastal ecosystems,
- to manage and optimise the use of funds and other resources for the purpose of this Act.

Our Vision

To become the centre of excellence in Oceanography in the Indian Ocean region by contributing towards the advancement of oceanography at the national, regional and international level for the welfare of the people of the Republic of Mauritius.

Our Mission

To develop and strengthen oceanographic research, using an integrated scientific approach, to enhance understanding of ocean and coastal processes, for rational development of marine resources, within the maritime zone of the Republic of Mauritius.

The Board

The Mauritius Oceanography Institute is managed by a Board, consisting of a Chairperson appointed by the Prime Minister and senior representatives of different ministries and institutions. Sections 8 to 10 of the MOI Act of 1999 lay down the overall responsibility of the Board.

The composition of the Board for the year 2008 - 2009 was as follows:

- (a) Chairman of the MOI Board:
 - Mr. S. C. Seeballuck
- (b) The Secretary for Home Affairs, Prime Minister's Office, or his representative:
 - Mr. S. C. Seeballuck, Secretary to Cabinet and Head of the Civil Service
- (c) A representative of the Ministry to which the responsibility for the subject of Foreign Affairs is assigned:
 - H.E. Mr. J. Koonjul, Ambassador
- (d) A representative of the Ministry to which the responsibility for the subject of Finance is assigned:
 - Mrs. S. Rama, Principal Financial Management Analyst
- (e) A representative of the Ministry to which the responsibility for the subject of Economic Development is assigned:
 - Vacant
- (f) A representative of the Ministry to which the responsibility for the subject of Environment is assigned:
 - Mr. S. Seebaluck, Supervising Officer
- (g) A representative of the Ministry to which the responsibility for the subject of Fisheries is assigned:
 - Mr. M. Munbodh, Director of Fisheries (up to November 2010)
 - Mr. A. Venkatasami (December 2010)

- (h) A representative of the Ministry to which the responsibility for the subject of Lands is assigned:
- Mr. M. Roojee, Ag. Chief Technical Officer (up to July 2010)
 - Mr. R. Hemoo, Chief Technical Officer (as from August 2010)
- (i) A representative of the Ministry to which the responsibility for the subject of Rodrigues is assigned:
- Mr. G. H. Jeanne (February 2010)
 - Mrs. M. D. Beeharry, Ag. Permanent Secretary (as from March 2010)
- (j) The Executive Director of the Mauritius Research Council or his representative:
- Dr. A. Suddhoo, Executive Director
- (k) The Vice Chancellor of the University of Mauritius or his representative:
- Dr. R. T. Ramessur, Associate Professor
- (l) The Director of the Mauritius Meteorological Services or his representative:
- Mr. Y. Boodhoo, Director (up to August 2010)
 - Mr. B. K. Dunpath, Ag. Director (as from September 2010)
- (m) The Director-General of the Mauritius Ports Authority or his representative:
- Captain P. Ponambalum, Deputy Director General
- (n) The General Manager of the Outer Islands Development Corporation or his representative:
- Mr. P. Davay, General Manager
- (o) Members having wide experience in oceanography or international law appointed by the Minister:
- Dr. A. Chan Chim Yuk, Associate Professor, University of Mauritius (up to September 2009)
 - Mr. S. Ho Man Cheong
 - Mrs. A. Narain, Assistant Solicitor General, Attorney General's Office
 - Mr. S. Ragoonaden

Corporate Governance Report

Statement of compliance

The Board of Directors of the MOI ensures that the principle of good corporate governance, as applicable in Mauritius, are fully adhered to and form an integral component in the manner the activities and projects of the Institute are conducted.

Board of Directors and Committees

The Board consists of fifteen Directors and is led by the Chairman with a non-executive Director. A list of Directors is on page 1 of the Annual Report. The Board meets every two months and on such occasion as may be required by the Chairperson. Its principal functions include the following:

- Ensuring that the institute has clear goals and policies in matter related to oceanography.
- Ensures institute objectives are adhered to and carried out efficiently.
- Approve acquisition and disposal as appropriate to the institute.

The Board has established a Research Advisory Council to assist in the discharge of its research functions. A list of the Research Advisory Council's meetings held between July 2009 and December 2010 is provided at page 8.

The Board has also appointed a Staff and a Financial Committee. A list of both staff and financial committee's meetings are provided at page 9.

The Board of Directors of MOI acknowledge their responsibilities for:

1. Adequate accounting records and maintenance of effective control systems;
2. The preparation of the Financial Statements which fairly illustrates the state of affairs of the MOI as at the end of 18 months' period 31 Dec 2010 and the results of its operations and cash flows for that period and which complied with International Financial Reporting Standards and;
3. The selection of appropriate accounting policies supported by reasonable and prudent judgement.

The directors report that:

1. Adequate accounting record and effective system of internal controls have been maintained;
2. Appropriate accounting policies supported by reasonable and prudent judgement and estimates have been used consistently;
3. Appropriate Accounting Standards have adhered to and;
4. The code of corporate governance as applicable to state owned enterprises has been adhered to.

Health and Safety

MOI is committed to providing and maintaining a healthy, safe and secured working environment. It believes in raising awareness on health issues that are imperative in the prevention of accident and improving the well being of its staff.

The logo of the Mauritius Oceanography Institute (MOI) is centered on the page. It features a circular emblem with a stylized sun or wave pattern at the top, flanked by two fish. Below the emblem, the text "MAURITIUS OCEANOGRAPHY INSTITUTE" is written in a bold, sans-serif font, with horizontal lines above and below the text.

MAURITIUS OCEANOGRAPHY
INSTITUTE

Sub – Committees approved by the MOI Board

RESEARCH ADVISORY COUNCIL

Period	Name	Post Occupied	Date	No. of Meetings	Fees per Session
July 2009 - Dec 2009	Dr. B. Pathack (in replacement of Dr. Chan Chim Yuk)	Chairman	07/07/09	1	Rs. 840
	Mr. Y. Boodhoo	Chairman	11/09/09	1	Rs. 840
	Mrs. S. Rathacharen	Members	7/7/2009 11/09/0	2	Rs. 625
	Mr. S. Ragoonaden				Rs. 625
	Mr. D. Gangapersad				Rs. 625
Dr. M. Bhikajee	Rs. 625				
Jan 2010 - Dec 2010	Mr. Y. Boodhoo	Chairman	27/01/10, 09/02/10, 19/08/10, 31/08/10	4	Rs. 840
	Dr. B. Pathack	Members	21/01/10, 09/02/10, 19/08/10, 31/08/10	4	Rs. 625
	Mrs. S. Rathacharen				Rs. 625
	Mr. S. Ragoonaden				Rs. 625
	Mr. D. Gangapersad				Rs. 625
	Dr. M. Bhikajee				Rs. 625

STAFF COMMITTEE

Period	Name	Post Occupied	Date	No. of Meetings	Fees per Session
July 2009 - Dec 2009	Dr. R. T. Ramessur	Chairman	06/07/09, 22/07/09, 05/10/09, 17/11/09	4	Rs. 840
	Mr. Y. Boodhoo	Chairman	06/07/09, 22/07/09	2	Rs. 840
	Mr. M. Munbodh,	Members	06/07/09, 22/07/09, 05/10/09, 17/11/09	4	Rs. 625
	Mr. B. Boyramboli				Rs. 625
	Dr. M. Bhikajee				Rs. 625
	Mr. Ho Man Cheong				Rs. 625
Jan 2010 - Dec 2010	Dr. R. T. Ramessur	Chairman	27/01/10, 08/02/10, 29/06/10, 27/10/10	4	Rs. 840
	Mr. M. Munbodh,	Members	27/01/10, 08/02/10, 29/06/10, 27/10/10	4	Rs. 625
	Mr. Ho Man Cheong,				Rs. 625
	Dr. M. Bhikajee				Rs. 625
	Mr. R. Hemoo				Rs. 625
Mr. B. Boyramboli		27/10/10 27/01/10, 08/02/10	1 2	Rs. 625 Rs. 625	

FINANCIAL COMMITTEE

Period	Name	Post Occupied	Date	No. of Meetings	Fees per Session
July 2009 - Dec 2009	Mrs. S. Rama	Chairperson	16/11/09	1	Rs. 840
	Dr. M. Bhikajee	Members			
	Mrs. R. Sobha				
	Mrs. M. Joyram				
Jan 2010 - Dec 2010	Mrs. S. Rama	Chairperson	29/03/10	1	Rs. 840
	Dr. M. Bhikajee	Members			
	Mrs. R. Sobha				
	Mrs. M. Joyram				



Staff of the Institute

Dr. M. Bhikajee, B.Sc. [Zoology], M.Sc. [Fisheries Management], Ph.D. [Marine Biology] Director

Scientific Staff

Mr. M. R. Badal , Graduate Stat., M.Sc. [Applied Maths and Modelling], M.Sc. [Oceanography]	Principal Research Scientist
Dr. D. E. P. Marie , B.Sc. (Hons.) [Chemistry with Environmental Studies], Ph.D. [Chemistry], Post Doc. [Chemistry]	Principal Research Scientist
Dr. K. R. Moothien Pillay , B.Sc., M.Sc. [Marine Ecology and Fisheries Biology], Ph.D. [Fisheries Science]	Principal Research Scientist
Mr. E. Martial , B.Tech. (Hons.) [Computer Science and Engineering], M.Sc. [E-business]	Systems Administrator
Mr. J. I. Mosaheb , B.Sc. [Marine Biology and Biochemistry]	Research Scientist
Mr. M. Singh , B.Sc. [Physics and Geology], M.Sc. [Geology]	Research Scientist
Mr. B. A. Motah , B.Sc. (Hons.) [Physics with Environmental Science], M.Sc. [Sustainable Environmental Management]	Associate Research Scientist (on study leave-without-pay as from November 2010)
Mr. P. Mussai , B.Sc. [Zoology], M.Sc. [Marine Biology and Oceanography], M.Sc. [Project Management]	Associate Research Scientist
Mr. V. Ramchandur , B.Sc. (Hons.) [Physics], M.Sc. [Computer Security and Forensics]	Associate Research Scientist
Mr. O. Sadasing , B.Sc. (Hons.) [Biology with Environmental Science], M.Sc. [Marine Biology and Oceanography]	Associate Research Scientist
Mr. S. Bacha-Gian , B.Sc. (Hons.) [Biology with Plant Science]	Associate Research Scientist
Dr. H. Runghen , B.Sc. (Hons.) [Mathematics], Ph.D. [Numerical Modelling and G.I.S.]	Associate Research Scientist

Mr. A. Rawat , Ingénieur en Modélisation Mathématique et Mécanique	Associate Research Scientist
Mr. V. Bhojroo , B.Sc. Botany, M.Sc. Botany [Spec. in Plant Biotechnology]	Associate Research Scientist
Mr. G. Beedessee , B.Sc. [Chemistry, Zoology, Biotechnology], M.Sc. [Molecular Biology]	Associate Research Scientist
Mrs. R. Surnam-Boodhun , B.Sc. [Chemistry], M.Sc. [Quality Management]	Associate Research Scientist
Mr. A. Ramanjooloo , B.Sc. (Hons.) [Chemistry], M.Sc. [Chemistry]	Associate Research Scientist
Mr. S. Curpen , B.Sc. (Hons.) [Biology with Environmental Science], M.Sc. [Bioinformatics]	Associate Research Scientist
Mr. P. D. Bissessur , Master 2 Recherche, DESS [Télé-détection-Imagerie-Numérique]	Associate Research Scientist (On study-leave-without-pay)
Ms. N. Bukurally , B.Sc. (Hons.) [Computer Science and Engineering], PostGrad Certificate [Software Engineering]	IT Officer (On Contract, AMESD Project)

Technical Staff

Mr. C. Samyan [PADI Dive master]	Technical Assistant/Senior Technical Assistant
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Administrative Staff

Mrs. L. Kureeman , B.Sc. (Hons.) [Public Administration and Management]	Assistant Administrative Officer
Mrs. N. Tegally	Confidential Secretary
Ms. R. Boyjoonauth , B.Sc. (Hons.) [Communication Studies]	Acting Public Relations Officer
Mrs. A. Moonesawmy	Clerical Officer/Higher Clerical Officer
Ms. S. Moothosawmy	Clerical Officer/Higher Clerical Officer
Mrs. S. Sukai	Receptionist/Word Processing Operator

Accounts & Finance Department

Mr. I. Kalloo (Part time from PMO) [up to February 2011]	Senior Financial Operations Officer
Mrs. R. Sobha, FCCA	Accountant
Mrs. M. Joyram	Acting Accounts Clerk (as from 8 January 2009)
Ms. L. Nundram	Clerical Officer/Higher Clerical Officer
Mrs. N. Mudhoo	Accounts Clerk (On Contract, AMESD Project)

Support Staff

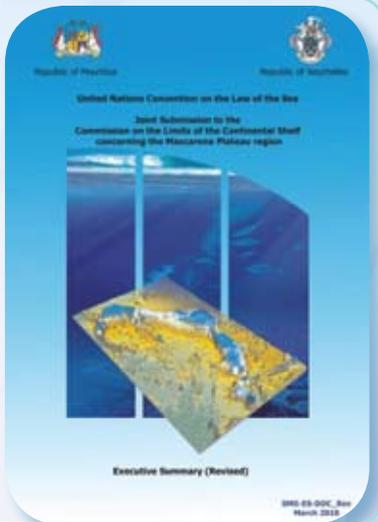
Mr. D. Munsah	Driver/Office Attendant
Mr. V. Coopen	Driver/Office Attendant
Mrs. M. Rajiah	Handy Worker

Trainees

Mr. Nicolas Arnaud	15 June 2009 up to 24 July 2009
Mr. Nadeem Nazurally	15 June 2009 up to 24 July 2009
Mr. Aftaab Meethoo	15 June 2009 up to 24 July 2009
Ms. Nitasha Baldew	15 June 2009 up to 24 July 2009
Ms. Poongavanam Pouveni	15 June 2009 up to 24 July 2009
Ms. Christina Devi Peron Engutsamy	29 June 2009 up to 11 September 2009
Mr. M. Wasiim Kader Bathia	18 January 2010 up to 16 April 2010
Ms. Chovina Ramsaha	30 June 2010 up to 31 December 2010
Ms. Katrin Lampe	6 August 2010 up to 31 December 2010
Ms. Perna Roy	29 September 2010 up to 31 December 2010

Ongoing Projects

Continental shelf project – Toward new frontiers



In the period between July 2009 and December 2010, the Mauritius Oceanography Institute pursued its important task of preparing for the defence of the Joint Submission for an Extended Continental Shelf (ECS) in the Region of the Mascarene Plateau.

Defence at the United Nations for the Joint Submission

Following the lodging to the United Nations (UN) of the Joint Submission in December 2008 and the official presentation of the submission in New York in March 2009, the two coastal states (the Republic of Mauritius and the Republic of

Seychelles) reached the defence phase of the submission. The two coastal states had the task of convincing the members of the UN Commission on the Limits of the Continental Shelf (CLCS) of the legitimacy and validity of the submission.

During the course of the preparation of the defence, the Republic of Mauritius received additional data on the bathymetry in the region of the Mascarene Plateau. These data were analysed by the two coastal states and used to further support the delimitation of the Extended Continental Shelf. In light of the analysis of the new data, an addendum to the main submission was prepared and submitted to the CLCS in March 2010.

In April 2010, a Sub-commission chaired by Professor K. Tamaki was appointed by the UN CLCS to examine the Joint Submission. The Sub-commission consequently started its examination and a first series of questions were addressed to the coastal states.

The Mauritius Oceanography Institute provided technical support in addressing the queries put forward by the Sub-commission. Both Mauritius and Seychelles worked together through several rounds of discussions to provide answers to the queries and supporting evidences to the Sub-commission. The teams, led jointly by his Excellency Ambassador Jagdish Koonjul, Ambassador, Ministry of Foreign Affairs, Regional Integration and International Trade and Mr. Raymond R. Chang-Tave, Special Adviser at the Ministry of National Development of Seychelles, attended the twenty-sixth session of the Commission in December 2010 to reply to the questions and provide clarifications on certain technical issues.

The technical part of the project on the Mauritius side was carried out by a team led by Mr. M. R. Badal, comprising of Mr. M. Singh, Mr. B. A. Motah, Mr. V. Ramchandur, Mr. A. Rawat and Dr. H. Runghen. The project committee was under the chairmanship of the Secretary to Cabinet and Head of Civil Service, Mr. S. C. Seeballuck.



Technical support was also provided by Mr. J. Brien, Legal Adviser, Commonwealth Secretariat, Dr. K. Hinz, Dr. A. Chan Chim Yuk, former commissioners to the UN_CLCS and Dr. H. Brekke, present Commissioner to the UN_CLCS.

During the period 2009–2010, several rounds of discussions on the ECS between the Republic of Seychelles and the Republic of Mauritius were held alternatively in Victoria, Seychelles and at the seat of the Mauritius Oceanography Institute in Quatre Bornes. The meetings were co-chaired by Mr. Raymond R. Chang-Tave, head of the Seychelles delegation and his Excellency Ambassador Jagdish Koonjul, head of the Mauritian delegation. The other members of the Mauritian delegation were Mr. D. Dabee, Solicitor General, Attorney General's Office (AGO) Mrs. A. Narain, Assistant Solicitor-General, (AGO), Dr. M. Bhikajee, Director, Mauritius Oceanography Institute, Mr. A. Pursunon, Principal Assistant Secretary, Prime Minister's Office (PMO), Dr. A. Chan Chim Yuk, former Mauritian Commissioner to the UN_CLCS, Mr. M. R. Badal, Principal Research Scientist from the MOI and Mrs. G. Topsy-Sonoo from the AGO.

Joint Management Committee



The Republic of Mauritius and the Republic of Seychelles made a Joint Submission to the UN CLCS concerning the Mascarene Plateau region. In this regard, the two coastal states have agreed to establish a Joint Management Committee (JMC) in 2008 in order to jointly manage and administer this common zone of ECS in the region of the Mascarene Plateau.

The JMC was co-chaired by Mr. S. Seeballuck, Secretary to Cabinet and Head of Civil Service and Dr. R. Payet, Adviser to the President of Seychelles. On the Mauritian side the JMC also comprised members from the Attorney General's Office and the Mauritius Oceanography Institute. It met on two occasions during 2009 and 2010. These meetings were held alternatively in Mauritius and Seychelles in order to consolidate our relationships and mutually support ongoing collaboration between the two coastal states. The two States agreed to work on a Terms of Reference for the JMC and start looking at the legal aspect of the respective States in order to formalise the management process.



Biological activities of marine natural substances from Mauritius waters

During the first phase of the project, much effort was devoted in the setting up of a chemistry laboratory with the necessary equipment which would allow extraction, separation, purification and isolation of compounds from marine sponges. At this present second phase, we are now focusing on the setting up of the cell culture facilities to fast track our research in the preliminary detection of anti-cancer extracts and/or compounds from marine sponges. Cell cultures are utilised in diagnostic as well as research studies.



Figure 1 Basic Requirement of a Cell Culture Facility



Figure 2 Main Instrumentation Unit



Figure 3 Cell Storage Facilities

The setting up of this laboratory is a long haul process requiring specialised instrumentations and high-tech facilities. The laboratory aimed at providing facilities which would probably be unique in Mauritius. It is dedicated to analyse biological activities as are currently undertaken in renown laboratories for the preliminary screening of new drug leads. This set-up would in addition enable more screening processes to be performed with regards to other diseases like Alzheimer's, AIDS and diabetes. The laboratory has been designed using norms that comply with international standards so as the results of our analysis are comparable worldwide.

The cell culture facilities became operational in June 2010. In November 2010, one scientist has been recruited to assist in the setting up and work in the cell culture laboratory facilities. The Mauritius Oceanography Institute

(MOI) built up its human capacity through the participation of the concerned scientist to a theoretical and practical course in Animal Cell Biotechnology. He also participated in another laboratory training at ICSN-CNRS regarding the manipulation of cancer cells and the protocols that are being used on biological testing of extracts on cervix, mammary gland, liver, buccal, leukaemia and pancreas cancerous cells. These six major cell lines are:

1. **HeLa cell line** (Cancer cells derived from cervix)
2. **MCF-7 cell line** (Cancer cells derived from mammary gland)
3. **HepG2 cell line** (Cancer cells derived from liver)
4. **HL-60 cell line** (promyelocytic leukaemia cells)
5. **MIA PaCa cell line** (Cancer cells derived from pancreas)
6. **KB cell line** (normal cells derived from buccal cells)

To date, the chemistry laboratory has produced 44 extracts/compounds from 18 marine sponge specimens tested on all six cancer cell lines. Twenty-five extracts/ molecules derived from 13 sponges showed statistical significant results (70% death) on specific cancer cells. Additionally, an inventory of marine sponges of Mauritius entitled the “Sponge guide of Mauritius” has been prepared by the MOI which has been submitted for review to the Head of the Zoological Museum of Amsterdam and co-editor of the “World Porifera Database”.

This project is being carried out by Dr. D. E. P. Marie with the assistance of Mr. G. Beedessee, Mr. A. Ramanjooloo, Mr. P. Mussai and Mrs. R. Surnam-Boodhun.

Genetic connectivity and its implication for the design and management of Marine Protected Areas (MPAs) in the East African Ecoregion



This three-year regional project funded by MASMA (Marine Science for Management Funds from WIOMSA) started its formal activity in March 2007 and ended in December 2009. The overall objective of the project was to investigate the genetic structure of reef fish along the East African Mainland as well as some Western Indian Ocean Islands (Mauritius, Rodrigues, Seychelles and Comoros) so as to generate background data on reef connectivity. Another objective was to gain a better understanding of the influence of the South Equatorial Current in dispersal of marine species in the region. Finally, the project also aimed at obtaining baseline information on stock structure of some commercially important fish species in the region.

During the first year (2007), a workshop was held at CORDIO, Kenya to plan the execution of the project. Field work started in June 2007 in each participating country. Due to non-availability of Genetics facility at that time at the Institute of Marine Science (IMS) and the Mauritius Oceanography Institute (MOI),

extraction and Polymerase Chain Reaction (PCR) of the samples were carried out by the three regional investigators at the Laboratory Facility of CORDIO in Kenya from July to August 2007. The products were then sent to overseas sequencing facilities.

During the second year of the project, infrastructure in terms of laboratory space and equipment was established at each of the regional nodes of the project. Extraction and PCR were then carried out within each country's new Genetics facility. The second Project meeting and workshop for the investigators were held at IMS in Zanzibar in March 2008. In 2008, sampling of *Siganus sutor* and of *Scarus ghobban*, DNA extraction and PCR were undertaken by each participating institution in the region. Amplified Fragment Length Polymorphism (AFLP) and sequencing were carried out at overseas facilities.

In the third year, samples of *S. sutor* and of *S. ghobban* were collected from Comores and Rodrigues. DNA extraction and PCR were undertaken for the Comores and Rodrigues samples by the IMS and MOI Genetics facilities respectively. Sequencing of the PCR products were carried out overseas. All mitochondrial and AFLP data were analysed during the last project workshop which was hosted by the MOI in August 2009. For Mauritius, the results showed that there are different genetic clusters (stocks) of *S. ghobban* and *S. sutor* with strong site affinity around the island. The following recommendations were made for the sustainable management of fish stock in Mauritius (1) fishing pressure be reduced to prevent collapse of locally adapted fish stocks and (2) small protected areas be designated around the island for protecting fish stocks.

A final project report was drafted and submitted to MASMA. During the workshop, the MOI had organised a seminar on 'Genetic connectivity in the Indian Ocean and its implications for management and conservation of marine biodiversity' at the University of Mauritius. The project's findings were presented at the 6th Western Indian Ocean Marine Science (WIOMSA) Symposium held in Reunion Island in August 2009. They were also published in a scientific paper entitled 'Genetic connectivity and historical demography of the blue barred parrotfish (*Scarus ghobban*) in the western Indian Ocean' in the journal of Marine Biology.

This project was carried out by Dr. R. K. Moothien Pillay with the assistance of Mr. V. Bhoyroo and Mr. S. Bacha Gian.

Development of a pilot project for coral farming for tourism, export, education, research and conservation



The main objective of this pilot project was to study the feasibility for coral culture in land-based nurseries (*ex-situ*). We had hypothesised that corals would grow well in *ex-situ* nurseries and at the same time they will be protected from the deleterious impacts of warm water anomalies, cyclones and pollution. Diverse species of corals would eventually be mass produced in nurseries to meet various conservation initiatives. Hence, this could be a wise long-term investment considering the economic benefits provided by healthy reefs (sustainable fish catch, tourism, biodiversity, coastal protection). Moreover, this project was in line with National policy of making marine resources one of the pillars of the Mauritian economy and could bring in foreign currency through export of aqua-cultured corals for a sustainable marine aquarium trade.

The pilot project which started in 2008 was completed in July 2010. The main findings have shown that the culture of corals in land-based nurseries was feasible. Such an initiative could be undertaken on a large scale at the National level as climate change is threatening marine habitats, with coral bleaching, loss of species and coral reef structure, and community shifts linked to increasing seawater temperatures and other stressors. Moreover, land-based coral

farming, besides having a great commercial potential, could be used to create sanctuaries for maintaining biodiversity, for propagating threatened coral species and rehabilitating degraded reefs for the ecosystem services they deliver to tourism, fisheries and coastline protection. The preliminary findings from this pilot project were presented at the 6th Western Indian Ocean Marine Science (WIOMSA) Symposium held in Reunion Island in August 2009. The final results will be published in a refereed scientific publication.

The second phase of the project (2011-2014) will build on results of the first phase and will focus on the (1) culture of coral species which are in high demand for the aquarium market (2) study of the abundance/ distribution of coral species that are threatened with local extinction (3) propagation of threatened species (4) mass culture of corals, including bleaching resistant species and strains for rehabilitating degraded sites (5) creation of a coral sanctuary/bank for preserving biodiversity and genetic resources (6) creation of land-based coral farms and coral gardens for hotel resorts in collaboration with the hotel industry (7) transfer of know-how to the private sector (8) strengthening of the environmental awareness of the community.

The project is carried out by Dr. R. K. Moothien Pillay with the assistance of Mr. S. Bacha Gian, Mr. V. Bhoyroo and Mr. S. Curpen.

Molecular Barcoding/ Characterisation of Marine Organisms in the Republic of Mauritius

Climate change is threatening the existence of species both inland and at sea. Species are going extinct before they have even been identified and documented. Collection of information on biodiversity (ecosystem, species and genetic) is of upmost importance for resource management, conservation of biodiversity,

protection of critical habitats and response to climate change.



Since species are the basic units of measurement of biodiversity, their accurate definition is critical in all studies of living systems. Identification of species has been traditionally based on morphological characters. However, using morphological features

to identify species is confounded

by the phenotypic plasticity of skeletal characters, lack of diagnostic features in larval forms, damaged or incomplete specimens and derived products. Over the years, allozyme and various DNA-based techniques have been used for species identification. More recently a short DNA sequence of 648bp, the mitochondrial 5' region of the Cytochrome c Oxidase subunit I (COI) gene is being used as a DNA barcode for distinguishing species, for the identification of specimens that are incomplete, damaged or immature and for assessing biodiversity. In addition DNA barcode is an essential tool for (a) the detection of mislabelled seafood products and market substitution (b) sea food authentication, food safety and certification of food products (c) traceability of exported seafood and seafood products (d) resource management, regulation and enforcement, and (e) protection of Intellectual Property Right (IPR).

In this project which started in February 2010, we are using the COI barcode and other markers to genetically characterize marine organisms of major importance (fish, soft corals, sponges and other invertebrates) in the waters

of Mauritius. During the first phase (2010 to 2011), our main aim is to assess the diversity of fish of commercial importance by combining both traditional taxonomic identification tools and molecular tools.

From February to December 2010, 104 fish have been sampled from fish markets and fish landing stations. A few fish was also sampled from St Brandon by MOI during the Tara expedition in May 2010. Morphological data as well as the sequence data of each species have been collected and uploaded onto the databases of the Barcode of Life and of the MOI (under construction). Whole fish samples preserved in 10% formalin along with the frozen tissue have been stored at MOI as voucher specimens. Up to December 2010, data from 67 species from 42 genera and 19 families have been collected.

This project is carried out by Dr. R. K. Moothien Pillay with the assistance of Mr. V. Bhoyroo, Mr. S. Curpen and Mr. S. Bacha Gian.



Bathymetric surveys of the shallow lagoons of Mauritius and Rodrigues

On 26 December 2004, a devastating tsunami, the deadliest in the Indian Ocean, killed about 250 000 people and destroyed numerous important infrastructures in countries bordering the Indian Ocean. Mauritius was fortunately spared but in Rodrigues, many fishing boats were damaged. This event demonstrates the widespread devastation that can occur in coastal areas due to lack of preparedness for such rare but powerful natural hazard.

One of the essential requirements in the modelling of inundation zones is precise and accurate bathymetric charts of the lagoons. This will help authorities to identify areas potentially at risk and delineate evacuation routes.

This is the first time that bathymetric maps of such accuracy, using specially-adapted equipment, have been prepared for several regions around Mauritius. Most of the charts cover areas from coral reefs to the beach and extending over many kilometres along the shallow lagoons.

The bathymetric data will be an important source of information for both operational and research purposes. It will help significantly to investigate the distribution of marine flora and fauna in the lagoons around Mauritius. It will also contribute in the understanding of coastal processes and beach erosion, which is ubiquitous around the island and finding remedial measures. The charts can be used as guidance to fishermen and tourists for snorkelling and diving.

The surveys consisted of running closely-spaced transect lines in the lagoon using an appropriate vessel on which a single beam echosounder with a range of 0.2–600m, was mounted. The collection of data by the sounder was real-time



Figure 1 Immersed Transducer

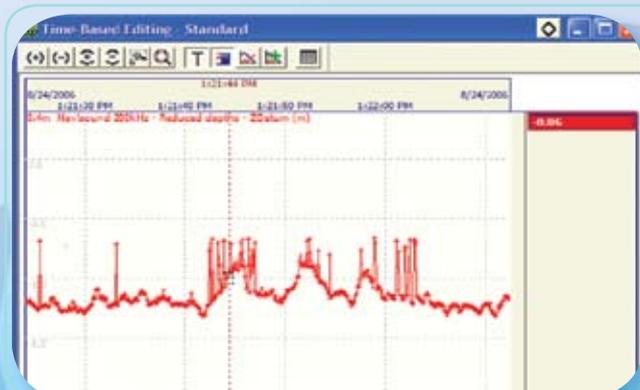


Figure 4 Data Showing Corresponding Depth and Time



Figure 5 Placing of the WTR for tide correction

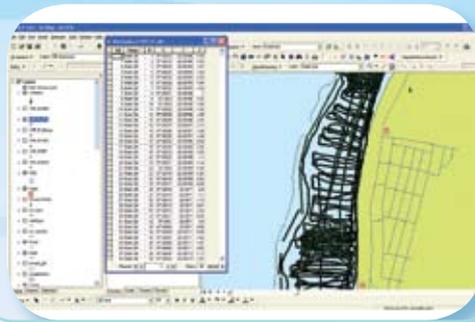


Figure 4 Transects, Lat/Long and Depth Data on the GIS Support

synchronized with a Global Positioning System (GPS). These data were also tide corrected using a Wave Tide Recorder (WTR) placed at the site of survey. Further processing was done by using Geographical Information System (GIS) software. For ease of reference, various landmarks were also included in the charts.

In the period between July 2009 and December 2010, surveys in the lagoons of Poudre D'Or, Pointe Des Lascars, Roches Noires, Albion, Blue Bay and adjoining regions were completed. Surveys have now started in the vast lagoon of Rivière Noire in the South-West Region.

The MOI is now in the process of publishing the charts of the regions already covered. The bathymetric maps of various sites would be on sale in 2011.

The project is led by Mr J. I. Mosaheb and involves a technical team comprising of Mr. V. Ramchandur, Dr. H. Runghen and Mr. C. Samyan.

African Monitoring of the Environment for Sustainable Development (AMESD)

The African Monitoring of the Environment for Sustainable Development (AMESD) program aims at extending the operational use of Earth observation technologies and data to environmental and climate monitoring applications in order to provide African countries with the necessary resources to manage their environment more effectively and to ensure long-term sustainable development in the region.

It has received funding from the European Union's European Development Fund and is being implemented by the African Union Commission, with international technical assistance and the support of five Regional Implementation Centres, EUMETSAT and the European Commission Joint Research Centre.

AMESD is expected to result in the establishment of five operational regional information services to support and improve environmental management decision making. The Commission de l'Océan Indien (COI) with other stakeholders have decided to look at the thematic action (THEMA) related to "Coastal and Marine Management". The Mauritius Oceanography Institute (MOI) was tasked with the responsibility to implement the thematic action within the region, at the signature of the grant to the tune of Euro 1.2 million between the, European Union Commission and the African Union in September 2009. MOI was designated as the Regional Implementation Centre (RIC) for the AMESD Project in the South West Indian Ocean.

The overall objective of this THEMA is to help the governments and institutions of the IOC member states (Mauritius, Seychelles, Comoros, Madagascar) and the neighbouring countries of the Mozambique Canal (Kenya, Tanzania, Mozambique), to make better use of environmental observation data, obtained from satellites, to define and follow-up marine and coastal management. Two western African coastal states, Sao-Tomé and Cabo-Verde, have also been associated with this THEMA.

MOI has been working on the development of two main services that concern the Marine and Coastal Resource Management. With regard to these services, MOI is processing and developing a list of products that will be made available on an operational basis. These will comprise information bulletins on biological and physical oceanographic parameters. The information bulletin will include mainly products on chlorophyll, sea surface temperature, wave and current.

Within this thematic action, MOI along with its technical partners is developing an electronic tool that concerns the detection of potential fishing zones. This tool is being integrated in the receiving station (Environment-Station) and will then be installed on all AMESD stations.

Data Access and Equipment

MOI started negotiations with data providers (AVISO, Mercator & OSI-SAF) to have access to their databases. Discussions were also held with the Plymouth Marine Laboratory for the provision of ocean colour data and products under the EAMNET program. This concerned the extension of the area coverage so as to include the COI region. Ultimately all these data would be made accessible onto the EUMET Cast network and to MOI and its regional partners.



Furthermore the AMESD 'E-Station' was installed at the MOI in June 2010 while the Mauritius Meteorological Service received 14 new computers for its Regional Training Centre in Vacoas. An updated PUMA station was also installed at the Meteorological services.

A separate IT and back up system has been set up by the MOI to cater for the large volume of data, processing power and performance needed for the successful development and implementation of the AMESD products.

Political and Policy Development Frameworks

Both the MOI-AMESD technical counterpart and the AMESD technical assistant participated at EUMETSAT FORUM which was held in Burkina Faso in October 2010. The technical counterpart gave a presentation on the AMESD/COI Theme.

This event brought together several African policy and decision makers and provided a platform to inform about AMESD/COI operational services related to ocean resources management and monitoring system.

The Mauritius Oceanography Institute through its AMESD technical counterpart also participated in the different AMESD technical meetings to discuss on technical issues and inform the AMESD Technical Assistance team in Addis Ababa on the progress of the AMESD program for the COI region.

Capacity Building

Strengthening the capacities of the Mauritius Oceanography Institute and its regional technical partners in the processing and analysis of Earth observation



ocean data for the management of marine and coastal resources is an important component of the AMESD-COI THEMA. In this respect a series of training on 'Satellite Oceanography', 'Ocean Colour', 'Remote Sensing and Fisheries' were organised in 2009 and 2010. A total of 60 scientists from partner countries and local institutions were trained.

In addition MOI permanent staff have benefited from in-house training for the development of a first version of AMESD-COI products in France and Italy.

Visibility

As part of its visibility strategy for the AMESD program, the Mauritius Oceanography Institute participated in the 6th Western Indian Ocean Marine Science Association (WIOMSA) Symposium in Réunion Island. This event was attended by more than 400 international and regional scientists of the region. The COI-theme was presented during the symposium and a poster that detailed the objectives and products was prepared for the event.

The AMESD-COI project is managed by a team led by Mr. M. R. Badal and consisting of Mr. E. Martial, Mr. B. A. Motah, Mr. V. Ramchandur, Dr. H. Runghen, Mr. A. Rawat and Ms. N. Bukurally. Technical assistance is provided by Mr. F. Carnus from BRL Ingénierie.

Ballast Water Management



In the early time, shipping vessels used rocks, sandbags, seashells and lumps of metal in order to weight their vessels. Today, most ships use water, as it is quicker and easier to load and off-load, making it more economical. According to the International Maritime Organisation, shipping moves over 80% of the world's commodities and

transfers approximately 3 to 5 billion tons of ballast water internationally each year.

Ballast water is absolutely essential to the safe and efficient operation of modern shipping, providing balance and stability to un-laden ships. The primary function of ballast is to keep the ship balanced when there is insufficient cargo weight. A ship also takes on extra ballast when sailing through rough seas in order to increase its stability.



It is estimated that at least 7,000 different species are being transported in ships' ballast tanks around the world which consequently introduced into new environments where they may have not been previously. Although the vast majority of marine species carried in ballast water do not survive the journey in new environmental conditions, the new introduced species may become invasive, out-competing native species and multiplying into pest proportions. This may cause irreversible consequences to the receiving environment.

The ongoing transfer of organisms by shipping, especially via ballast water transport may therefore pose serious ecological, economic and health threats. The ballast water transport system and its management require a special attention particularly in the port area. In this regard, the Ministry of Public Infrastructure, National Development Unit, Land Transport and Shipping has asked for the assistance of the Mauritius Oceanography Institute to currently investigate the presence of marine invasive species in Port Louis harbour.

The main activities carried out during the initial stage of the project were:

- the acquisition of specialised equipment and tools;
- the procurement of an equipped mobile laboratory;
- the training of scientific staff in port diving by the National Coast Guard; and
- the development of a basemap of the harbour required for the operational component.



The next phase of the project consists of two main components which are initiation of bid process for professional services and the conduct of survey of Port Louis harbour.

The ballast water project is carried out by Mr. P. Mussai with the assistance of Dr. D. E. P. Marie, Dr. H. Runghen and Mr. V. Ramchandur.

Feasibility of Pearl Culture in Mauritius

Pearl oysters have been exploited for thousands of years for its natural pearls and mother of pearl. Nevertheless, it was in the early 1900s that there was a breakthrough in the production of pearls.

The Mauritius Oceanography Institute is presently studying the potential of pearl oyster culture in the lagoon of Mauritius. At its initial phase, a feasibility study is being conducted to determine the optimum conditions for pearl oyster farming.



Two species of pearl oyster which may have commercial value are present in the waters of Mauritius, namely the *Pinctada maculata* and the *Pinctada margaritifera*.

These two oysters are being studied through the following processes: collection of young oysters in natural environment and culturing.

Before growing pearls, it is important to grow the oysters. This process begins with juvenile pearl oyster collection. The presence of large number of mature adult oysters, in close proximity, results in better synchronization of spawning,

higher fertilisation rates and far greater number of larvae and juvenile. In this respect, a survey was carried out to identify groups of adult pearl oysters and to locate potential sites for the setting up of spat collectors. The latter served as hard substratum thus facilitating the collection spats or juvenile oysters for pearl culture. The young oysters were allowed to grow on the spat collectors until they were suitable to be transferred onto protective culture cages. These were small rectangular cages, which provided maximum protection to the oysters until the oysters have developed to young adults. Studies have shown that out of every million pearl oysters born, just a few would survive till adulthood. On the other hand, in the presence of protective cage, about 80% of collected pearl oysters might reach adult stage. It would take two to three years, depending on species and environmental factors, for the oysters to become a size suitable to insert a pearl nucleus.

The project is carried out by Mr. O. Sadasing.



Study of the Quaternary Geomorphology of Mauritius and Rodrigues

The geological episodes of the island formation, in particular, between 1.8 million year (Quaternary) and Modern day can be studied by evolutionary signatures trapped in the coral layers, as is well explained by **Bradley (1985)** in his classic work *Quaternary Paleoclimatology-Methods of Paleoclimatic Reconstructions*. These signature data are 'embedded' in sedimentary sequences and are of significant importance to decipher the fluctuations of the sea and its impact on the coastal geomorphology. The entrapped ^{14}C ages of the sediment sequence can be used to assist in re-building the chrono-morphology of the coasts, especially coasts of islands that are most vulnerable to climate-influenced behaviours of the oceans.

Fossil corals offer a unique archive of tropical climate variability throughout the late Quaternary. They may be used to quantify the range of variability within the tropical climate system under conditions of relatively uniform climate forcing (e.g., the late Holocene), as well as investigate the influence of changing climatic boundary conditions (e.g., 'glacial–interglacial' changes in sea-level and global climate) on tropical climate. Furthermore, they may be used to identify leads and lags in the climate system, thereby helping elucidate the mechanisms of climate change and the role of the tropics in mediating global change on inter-annual through glacial–interglacial timescales.



This research aims at firstly assessing geomorphological and geological studies to decipher the signals trapped in the islands, secondly establishing a more precise chronology of the geologically young and poorly-defined raised reef terraces, shell and wood for a better stratigraphic assessment of these islands that would assist in deciphering the depositional ages of black-sands, including heavy minerals, useful both strategically and commercially and finally, using radiocarbon dates of the raised coral reefs, etc., their present altitude relative to mean sea-level to estimate the eustatic sea-level relative to present sea-level and depositional depth of corals relative to eustatic sea-level and the average uplift/subsidence rate of many raised coral reefs from the Islands during Quaternary period.

For the same purpose, two cores of 40 and 20m respectively were drilled in order to study the fossil corals from the atoll Ile Marianne, Mauritius.

This geological project is carried out by Mr. M. Singh.



Staff Training

Workshop on Digital Certificates, Mauritius

Mr. E. Martial participated in a workshop on the “Implementation of Digital Certificates at Enterprise Level” on the 16th July 2009 at Swami Vivekananda International Conference Centre in Pailles, Mauritius. This workshop was hosted by CERT-MU in collaboration with Microsoft.

The objective of the workshop was to explain the concept of Digital Certificates and ensure that organisations understand the growing importance of this technology. The topics discussed were the security requirements to be considered when implementing Digital Certificates, investment considerations, infrastructure requirements and policies and procedures to be introduced within enterprises.

Bioinformatics Workshop, Mauritius

Dr. R. K. Moothien Pillay and Mr. G. Beedessee attended a Bioinformatics Workshop on 27th July 2009 which was organised by the Mauritius Research Council in collaboration with the University of Mauritius. The main objective of the workshop was to create awareness on the importance of bioinformatics and to discuss on the way forward for Mauritius.

Capacity Building Workshop on “use of integrated assessment methodology in Policy Formulation”, Mauritius

Mr. V. Bhoyroo participated in a capacity building workshop on “Use of Integrated Assessment Methodology in Policy Formulation” organised by the Agricultural Research and Extension Unit (AREU) in collaboration with the Ministry of Agro Industry, Food Production and Security with the support of the United Nations Environment Program (UNEP) on 12th August 2009. Emphasis was given on the integrated assessment carried out to study the impacts of trade related policies on the agricultural sector namely on Biodiversity.

Implementation of a water quality monitoring system for lagoons of Mauritius

Dr. D. E. P. Marie and Mrs. R. Surnam-Boodhun, attended a training workshop on “Implementation of a Water Quality Index (WQI) system for lagoons in Mauritius” organised by the Ministry of Environment and NDU which was held between 14th and 15th September 2009 at the Gold Crest Hotel in Quatre Bornes. The main objectives of the study were to design a Comprehensive Monitoring Program and to develop a Lagoonal Water Quality

Index (LWQI) for Mauritius. The two-day training was aimed principally at (1) making stakeholders aware of the objectives of the LWQI (2) presenting the proposed monitoring program and sampling plan/methodology and (3) familiarizing relevant stakeholders to work with the LWQI.

Training workshop on 'Network Forensics', Mauritius

Mr. E. Martial participated in a training workshop on "Network Forensics" from 27th to 29th October 2009 at the University of Mauritius, Réduit. This workshop was organised by the C-DAC School of Advanced Computing in collaboration with the University of Mauritius and the Resource Centre for Cyber Forensics-India.

The main objective of this training workshop was to bring together IT and security professionals, industry experts, academicians and analysts to share their experiences, acquire knowledge and gain an understanding of the key tools, techniques and strategies needed to safe-guard organisation's information. A mix of lectures, hands-on sessions, demonstrations, and case studies was employed during this training.

Intellectual Property Forum, Ministry of Foreign Affairs, International Trade and Regional Cooperation, Mauritius

In view of promoting the Intellectual Property Policy and to update IP legislation and build the capacity of officials for the enforcement of IPRs in Mauritius, **Dr. D. E. P. Marie and Mr. V. Bhoyroo** attended a National Intellectual Property Forum organised by the Ministry of Foreign Affairs, International Trade and Regional Cooperation on 25th November 2009.

Specific panels were conducted to discuss the role of Intellectual Property in promoting economic development of SMEs and economic growth; the role of Intellectual Property Law in promoting Agriculture, Biotechnology/Bio-security and Digital Industries; the role of Intellectual Property law in promoting research and education and cultural creativity; and methodologies for enforcing IP rights in Mauritius through the set up of necessary institutions and enforcement capacity. Accent was also given on patents, protection of industrial designs and inventions and the use of trade marks.

Workshop on "Biomaterials: Perspectives and Possibilities", University of Mauritius

Dr. D. E. P. Marie, Mr. G. Beedessee, Mr. S. Curpen, Mrs. R. Surnam-Boodhun and Mr. A. Ramanjooloo attended a workshop on "Biomaterials: Perspectives and Possibilities" which was held from 30th November 2009 to 4th December 2009 at the University of Mauritius. The objective of the workshop was to gain an overview of how biomaterials and nanomaterials can revolutionise health care, diagnosis and treatment of disease.

Bio-Health Mauritius 2009 Conference, Mauritius

Dr. R. K. Moothien Pillay and Dr. D. E. P. Marie participated in a conference on 'Bio-Health Mauritius 2009' held on the 7th and 8th December 2009 which was organised by the Board of Investment. The main focus of the conference was on the latest developments in the healthcare and life science industries, the challenges and investment opportunities.

Bioinformatics Workshop, University of Mauritius

Mr. S. Curpen attended a 'Bioinformatics Workshop' from 22nd to 26th February 2010 at the University of Réduit. The aim of the workshop was to gain an insight of how the eBiokit can aid in carrying out DNA and Protein analysis and how to use several bioinformatics tools for analysis of DNA and Protein.

Mauritius Marine Conservation Society (MMCS) Final Evaluation Workshop

Dr. R. K. Moothien Pillay and Mr. S. Curpen participated in Mauritius Marine Conservation Society (MMCS) Final Evaluation Workshop from 13th to 15th April 2010 which was aimed at providing a review on the management of whale watching on an international, regional and Mauritian scale as well as discussing the results obtained on cetacean studies in the Indian Ocean.

Workshop "Connecting the Innovation Eco-System"

In view of the crucial need for development and implementation of Innovation and Intellectual Property (IP) at a national level, **Dr. D. E. P. Marie**, participated in a two-day workshop entitled "Connecting the Innovation Eco-System" organised jointly by the Ministry of Tertiary Education, Science, Research & Technology and Mauritius Research Council which was held on the 26th and 27th August 2010.

Global Environment Facility - Western Indian Ocean Marine Highway Development and Project: National Oil Spill Contingency Plan Training

Dr. H. Runghen participated in a training entitled "the onsite responders and on scene commanders" and "the personnel of the national incident management organisation" which was organised by the Indian Ocean Commission and hosted by the Ministry of Environment and Sustainable Development from the 21st to the 23rd September 2010.

The main objectives of the training were to familiarize the participants with the National Oil Spill Contingency Plan (NOSCP) and the incident management response organisation; train the participants on the main types of response techniques offshore and onshore, safety during the operations, set-up of a clean-up site, waste management and maintenance of the equipment; and train

the participants on the incident management procedures for each Cell of the National Organisation (Evaluation/ Planning, Operations, Logistics, Finance). The training also consisted of a practical exercise.

Workshop on Data Loss Prevention, Mauritius

Mr. E. Martial participated in a workshop organised by the National Computer Board and CERT-MU on “Data Loss Prevention” on the 30th September 2010 at Domaine Les Pailles.

The objective of the workshop was to enable participants to understand the concepts of data loss prevention and allow them to successfully manage the data of their enterprise. Issues pertaining to Data Loss Prevention Requirements, Data Loss Prevention Discovery Assessment, Data Loss Prevention Policy Design and Data Loss Prevention Implementation were highlighted during the workshop.

Attachment at the Frontier Research Center for Energy and Resources (FRCER) and Earthquake Research Institute (ERI), University of Tokyo, Japan

Following participation in the cruise on the Japanese Vessel “R/V Yokosuka” in October 2009, **Mr. M. Singh** undertook, under the supervision of Prof. K. Tamaki and Dr. Y. Orihashi, an in-house training at the Frontier Research Center for Energy and Resources (FRCER) and Earthquake Research Institute (ERI) from 18th to 29th October 2010 at the University of Tokyo, Japan for post-cruise analysis of the collected geological data and rocks samples.

Theoretical and Practical Course in Animal Cell Biotechnology, Institut Pasteur de Montevideo, Uruguay

Mr. G. Beedessee, participated in a theoretical and practical course in “Animal Cell Biotechnology”, organised by Prof Ricardo Kratje of Universidad Nacional de Litoral, Argentina and Dr. Mariela Bollati of Institut Pasteur de Montevideo in Uruguay from 10th to 19th November 2010. The aim of the course was to train young scientists working in the field of animal biotechnology.

Attachment at Laboratoire Ciblotheque Cellulaire Institut de Chimies des Substances Naturelles, ICSN-CNRS, France

Mr. G. Beedessee attended a hands-on training in the lab of Dr. Thierry Cresteil at ICSN-CNRS from 25th November to 1st December 2010 in order to standardize the cell culture facility at MOI. He had an opportunity to observe the running of the testing platform, how extracts are handled and performed some detailed analysis on some extracts from Mauritian sponges.

Participation in International Conferences and Meetings

3rd Meeting of the scientists of the WIO-Magnet Group, Mauritius

Dr. R. K. Moothien Pillay, coordinated and participated in the third meeting of the Genetics Connectivity Project entitled 'Genetic connectivity and its implications for the design and management of Marine Protected Areas in the East Africa Ecoregion (MASMA Grant 2007-2009)' hosted by the MOI, from 10th to 20th August 2009. She also presented a paper entitled 'Population genetic variation of *Pavona decussata* (Cnidaria; Scleractinia) in the Indian and West Pacific Ocean inferred from the ribosomal ITS DNA sequences' at the WIO-Magnet seminar on 'Genetic connectivity in the Indian Ocean and its implications for management and conservation of marine biodiversity' held at the University of Mauritius at the end of the project meeting.

Regional Meeting of Technical Coordinating Groups and Third Regional Meeting of the Agulhas and Somali Current Large Marine Ecosystem (ASCLME) Cruise Coordination, Reunion Island.

Dr. M. Bhikajee attended a regional meeting of Technical Coordinating Groups of the Agulhas and Somali Current Large Marine Ecosystem (ASCLME) which was held on the 20th and 21st August 2009 at St. Denis Hotel in Réunion Island. The purpose of the meeting was to plan and coordinate the work of the Capacity Building and Training Coordinator (CB&TC), the Data and Information Coordinator (D&IC) and the Cruise Coordinator (CC) of the nine participating countries, namely Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, South Africa and Tanzania.

6th Western Indian Ocean Marine Science Association (WIOMSA) Symposium, Reunion Island

Dr. R. K. Moothien Pillay, Dr. D. E. P. Marie and Mr. A. Rawat attended the 6th WIOMSA symposium which was held at Reunion Island from 23rd to 30th August 2009. The findings of the Genetics Connectivity Project were presented at the Symposium in two papers entitled 'Genetic Connectivity of two species of coral reef associated fish, *Scarus ghobban* and *Siganus sutor*, from the western Indian Ocean' and 'Population genetic structure of the endemic *Siganus sutor*

reveals levels of genetic differentiation'. She presented the preliminary findings of the Land-based coral farming project in a paper entitled 'Coral farming: comparison of growth on land and at sea'.

Dr. D. E. P. Marie made a presentation about the sponges of Mauritius and their biologically active compounds and Mr. A. Rawat presented a poster on the AMESD project.

The cost of participation for Dr. R. K. Moothien Pillay and Dr. D. E. P. Marie were borne by WIOMSA and Mr. A. Rawat was sponsored by AMESD.

OceanObs'09, an international conference on Ocean Observation, Venice, Italy

Dr. M. Bhikajee attended the OceanObs'09 Conference which was held at the Venice Convention Centre in Italy from 21st to 25th September 2009. The purpose of the meeting was to develop a process for building consensus for sustaining and evolving systematic and routine global ocean observations over the next ten years in support of societal benefits. About six hundred participants from thirty six countries attended conference.

The participation of Dr. M. Bhikajee in the conference was sponsored by WMO's Voluntary Cooperation Program and the MOI.

Marine Pearl Oyster Training Program at the Central Marine Fisheries Research Institute (CMFRI), Tuticorin, India.

Mr. O. Sadasing participated in the Marine Pearl Oyster Training Program which was held at the Central Marine Fisheries Research Institute (CMFRI) in Tuticorin, India from 20th October to 3rd November 2009.

The Central Marine Fisheries Research Institute (CMFRI) is the main centre of pearl culture technology in India. In accordance with the policy of the Indian Council of Agricultural Research on transfer of technology, the technologies developed by the Central Marine Fisheries Research Institute have been disseminated through training courses offered to candidates sponsored by different governments, universities and other agencies. The aim of the training programs has been to extend the technical know-how to end-users. The course curriculum is confined to mother-oyster culture, pearl oyster surgery and pearl collection. The trainees were given inputs on pearl formation and the faculty members demonstrated their skills in pearl surgery to implant nucleus in the oyster. Hands-on training was given on all aspects relating to pearl oyster culture. The trainees were also taken on field visit to the Gulf of Mannar Islands.

IOC Workshop on 'Drafting Project Proposal to International Financial Agencies', Hyderabad, India

Mr. J. I. Mosaheb attended the IOC Workshop on 'Drafting Project Proposal to International Financial Agencies' which was held from 4th to 7th November 2009 in Hyderabad, India. The objective of the workshop was to develop bid-writing skills of in developing project proposals. The overall goal was the development of a meaningful cooperative relationship with funding agencies and community organisations. The cost of participation for Mr. J. I. Mosaheb to the workshop was borne by IOC.

West Indian Ocean Marine Ecoregion Workshop (WIOMER), Antananarivo, Madagascar

Dr. R. K. Moothien Pillay participated in the WIOMER Prioritisation and Strategy Workshop from 24th to 27th November 2009 in Antananarivo, Madagascar. The objective of the workshop was to undertake an eco-regional analysis of WIOMER for identifying a network of priority zones of marine biodiversity and resources and to develop a regional strategy for their conservation. The WIOMER project was supervised by the Indian Ocean Commission (IOC) and implemented by World Wildlife Fund (WWF)-Madagascar and the West Indian Ocean Program. The cost of participation for Dr. R. K. Moothien Pillay to the workshop was borne by the Marine Protected Areas Network-Indian Ocean Commission (MPAN-IOC)

Societal Application in Fisheries and Aquaculture using Remotely-sensed Imagery (SAFARI) and meeting at the Chlorophyll Global Integrated Network (ChloroGIN), Kochi, India

Mr. M. R. Badal participated in an international symposium organised by the Societal Applications in Fisheries & Aquaculture using Remote Sensing Imagery (SAFARI) from 11th to 19th February 2010 in Kochi, India. The main objective was to promote the assimilation of Earth Observation (EO) into fisheries research and ecosystem-based fisheries management on a global scale.

The symposium was held back to back with training in Ocean Colour and a Regional Meeting of ChloroGiN, an Indian Ocean network for Chlorophyll data reception and processing in view of promoting access to EO facilities to the coastal & marine research community

The participation of Mr. R. M. Badal was borne by the AMESD program.

Sixth Conference of Parties Meeting for the Nairobi Convention; and the Conference of Plenipotentiaries for the Nairobi Convention, Nairobi, Kenya

Dr. D. E. P. Marie attended the Sixth Conference of Parties (COP6) to the Nairobi Convention which was held by the Nairobi Convention Secretariat at the United Nations Environment Program (UNEP) Headquarters at Gigiri in Nairobi Kenya from 29th March to 1st April 2010. This Conference of Parties was organised by the United Nations Environment Program in close collaboration with the Government of Kenya, the host and the Government of Mauritius as the Chair of the Bureau of the Nairobi Convention. The theme of the COP6 meeting was “Sustaining Progress”.

First IOC-WMO Data Buoy Cooperation Panel In-Region Workshop, Cape Town, South Africa

Dr. M. Bhikajee attended the first IOC-WMO Data Buoy Cooperation Panel In-Region (Western Indian Ocean) Capacity Building Workshop which was held from 19th to 23rd April 2010 in Cape Town, South Africa from 19th to 23rd April 2010. The workshop was attended by more than 40 participants from the Eastern African and Western Indian Ocean region.

The main purpose of the workshop was to bring together scientists, directors of oceanographic research institutes and meteorologists in order to create a network of data buoy users. This workshop has been extremely useful in getting better acquainted with the way for obtaining buoy data for validation and calibration of satellite images and for networking with fellow oceanographers from the region.

Forty-third session of Executive Council of the Intergovernmental Oceanographic Commission, Paris, France

Dr. M. Bhikajee participated in the Forty-third session of the Executive Council of the Intergovernmental Oceanographic Commission (IOC) of UNESCO from 8th to 16th June 2010 at UNESCO Headquarters in Paris.

Topics discussed included ‘Mitigation of and Adaptation to Climate Change and Variability: Research and Observations for Climate’, ‘Organisation of the Global Ocean Observing System, Cooperation with WMO’, ‘Prevention and Reduction of the Impacts of Natural Hazards: Warning and Mitigation Systems for Ocean Hazards’, ‘Regional Tsunami Warning Systems’, ‘Shallow Water Bathymetric Data for Digital elevation models’, ‘Safeguarding the health of ocean ecosystems: The joint IOC–ICES study group on nutrient standards’, ‘Ocean fertilisation, Capacity development’, ‘Management procedures and policies leading to the sustainability of coastal & ocean environment & resources: Global reporting and assessment

of the state of the marine environment’, ‘Administration and management: The future of IOC, Higher level objectives for 2012–2013’.

IOGOOS Seventh Meeting, Perth, Australia

Dr. M. Bhikajee attended the Seventh Annual Meeting of the Indian Ocean component of the Global Ocean Observing System (IOGOOS) which was held from 12th to 16th July 2010 in Perth, Australia. Delegates from Australia, India, China, Germany, Indonesia, Iran, Italy, Japan, Kenya, Mauritius, Oman, South Africa, Sri Lanka, Thailand, UK, USA, IOC Head Office (Paris) and IOC Perth Office also attended the meeting. Participation was partly sponsored by the IOC.

First meeting of the Europe Africa Marine (Earth Observation) Network (EAMNet), Plymouth Marine Laboratory (PML), UK

Mr. M. R. Badal attended the First Meeting of the Europe Africa Marine (Earth Observation) Network (EAMNet) in the capacity of Advisor on the 20th and 21st July 2010 at the Plymouth Marine Laboratory (PML) in UK. The objective of EAMNet was to construct a network linking Earth Observation (EO) information providers, user networks and centres of excellence in Europe and Africa in the area of coastal and marine observations towards sustainable development in Africa. The network would undertake capacity building and maintenance as well as build upon existing infrastructure and expertise in Africa. While the overall aim would be to improve the exploitation of EO data for coastal and oceanic monitoring towards an Africa-wide observation system (Global Ocean Observation System-Africa), it would also provide an interface between European GMES (Global Monitoring for Environment and Security)-related core and downstream services and Research and Development projects (notably MyOcean) and African initiatives (e.g. African Monitoring of the Environment for Sustainable Development) with the emerging GMES-Africa initiative. All costs for the participation of Mr. R. M. Badal were borne by Plymouth Marine Laboratories.

Training Workshop on “Introduction to Marine Data for Young Scientists”, UNESCO/IOC, Belgium

Mr. O. Sadasing participated in a training workshop on “Introduction to Marine Data for Young Scientists” held at UNESCO/IOC in Belgium from 6th to 10th September 2010. The major objective of the course was to assist in strengthening the capacity of oceanographers to manage oceanographic data and information, such as ASCLME Meta data. The training course introduced oceanographers to special topics and tools related to ocean data management, including data formats, published data resources, and the software applications available to manage, analyse and display these Meta data. The participation of Mr. O. Sadasing was fully funded by IOC/IODE.

Agulhas and Somali Current Large Marine Ecosystems (ASCLME) Steering Committee Meeting, Dar es Salaam, Tanzania

Dr. D. E. P. Marie attended the third committee meeting of the Agulhas and Somali Current Large Marine Ecosystems (ASCLME) from 13th to 17th September 2010 in Dar es Salaam, Tanzania.

Joint sessions were held with the Project Steering Committee members of the South West Indian Ocean Fisheries Project (SWIOFP), which is a parallel project supported by the Global Environment Facility (GEF) as a contribution to its international waters program. The ASCLME Project is concerned with introducing an ecosystem-based approach to managing marine resources, while the SWIOFP is focused on improving the management of commercial fisheries in the region. Together the two projects are providing a platform for the ten countries of the western Indian Ocean region to work together to better manage their valuable and unique marine and coastal resources, for the benefit of their people. They form part of a three-pronged intervention by the GEF to develop an ecosystem approach to marine resource management in the region. A third project, WIO-LaB, which focused on land-based sources of marine and coastal pollution and which was implemented by the United Nations Environment Program (UNEP), is now complete.

Training on financial and contractual procedures in the framework of the 10th EDF, Addis Ababa, Ethiopia

Mr. I. Kalloo, Mrs. N. Mudhoo and Mrs. M. Joyram participated in a training program on “Financial and Contractual Procedures in the Framework of the 10th EDF from 13th to 23rd September 2010 held in Addis Ababa, Ethiopia.

The objectives were (1) to know the background and principles of European Union – ACP Cooperation Partnership, (2) to know the legal basis of the 10th EDF and which organisations and people are involved, (3) to understand the different management modes the EC has put into place to implement its development cooperation policy, (4) to understand the sequence of programming and financing for projects and programs to be implemented and (5) to know the implications of new regulations on the implementation of the 10th EDF in comparison with past programs.

The participation of Mr. I. Kalloo, Mrs. N. Mudhoo and Mrs. M. Joyram was fully sponsored by the AMESD program.

AMESD Training

AMESD Program Third Steering Committee Meeting at the Economic Community of West African States (ECOWAS) Commission, Abuja, Nigeria.

Mr. B. A. Motah attended the third meeting of the AMESD Program Steering Committee which was held in Abuja, Nigeria at the Economic Community of West African States (ECOWAS) Commission from 7th to 9th October 2009. The five Regional Economic Community (RECs) and the five Regional Implementation Centres (RICs) were represented at the meeting. The meeting was also the opportunity to present participants with the activities and achievements of the AMESD Program for the period 1st February 2009 to 20th September 2009.

The participation of Mr. B.A. Motah was sponsored by the AMESD Program.

“Methods and Applications of Ocean Colour Remote Sensing in African Coastal and Regional Seas”, Zanzibar, Tanzania

Dr. H. Runghen, Mr. V. Ramchandur and Mr. A. Rawat participated in a training course on “Methods and Applications of Ocean Colour Remote Sensing in African Coastal and Regional Seas” from 12th to 23rd October 2009 in Zanzibar, Tanzania.

The training course had been designed to provide the theoretical basis of ocean colour satellite measurements, as well as key applications in monitoring and managing the coastal zone, in protecting marine ecosystems and resources.

Participants included representatives from South Africa, Mozambique, Kenya, Madagascar, Tanzania, Nigeria, Ivory Coast, Togo and Mauritius. The cost of participation for Dr. H. Runghen, Mr. V. Ramchandur and Mr. A. Rawat in the training course was fully sponsored by the AMESD project.

Fourth Meeting of the AMESD Steering Committee, Gaborone, Botswana

Dr. M. Bhikajee participated in the fourth meeting of the African Monitoring of Environment for Sustainable Development (AMESD) Steering Committee which was held from 3rd to 5th May 2010 at the South African Development Community (SADC) Secretariat Headquarters in Gaborone, Botswana. The meeting was attended by all the Steering Committee members, namely the representatives of the Regional Economic Centres: Communauté Économique et Monétaire de l’Afrique Centrale (CEMAC), Economic Community of West African States

(ECOWAS), Indian Ocean Commission (IOC), South African Development Community (SADC), Intergovernmental Authority on Development (IGAD) and the directors of the Regional Implementation Centres.

Internship at Mercator Ocean for AMESD Product Development, Toulouse, France

Mr. A. Rawat undertook an internship at Mercator Ocean for AMESD Product Development from 17th May to 9th July 2010 in Toulouse, France. The objective of the mission was to get direct insight into the Mercator model runs and outputs which are to be used for both of these products. During the mission an atlas of the south-western Indian Ocean was produced. This atlas could be considered as a window on the database which was compiled using Mercator Ocean's GLORYS reanalysis database. Insights for the development of additional products from Mercator outputs were also covered such as: Upwelling Index Charts, Tropical Cyclone Heat Potential and Oceanic Thermal Energy Potentials. The availability of forecast data from Mercator also paved the way for the setting up of an operational service at the MOI. Participation of Mr. A. Rawat to the mission was fully sponsored by AMESD.

Training course on “Using the Hydrodynamic Model, Regional Ocean Modelling Systems (ROMS) to set up an operational forecasting system for the Exclusive Economic Zone of Mauritius”, Toulouse, France

Dr. H. Runghen, participated in a training program on “Using the Hydrodynamic Model, Regional Ocean Modelling Systems (ROMS) to set up an operational forecasting system for the Exclusive Economic Zone of Mauritius” which was held from 17th May to 9th July 2010 at Laboratoires d'Etudes Géophysique et Océanographie Spatiales (LEGOS) in Toulouse, France. The program described the first step towards the implementation of the Regional Ocean Modelling Systems (ROMS) in order to carry out forecasts of oceanic processes and disseminating the results on an operational basis. All costs for the participation of Dr. H. Runghen were borne by AMESD.

Training on Initiation to AMESD E-Stations, Joint Research Centre, Ispra, Italy

In the context of the African Monitoring of Environment for Sustainable Development (AMESD) program, **Mr. E. Martial** participated in a four-day training “Stages d'initiation sur les e-stations” at the European Commission Joint Research Centre from 22nd to 25th June 2010 in Ispra Italy. The purpose of the training was to give the participants an overview of the main aspects of the e-Station (Environmental Station) and the customisation of products of interest for the Coastal and Marine Management Thema of Indian Ocean Commission.

The participation of Mr. E. Martial in this four-day training conducted by Mr. Marco Clerici of the European Commission Joint Research Centre was sponsored by the AMESD program.

Training of Trainers on AMESD System Administration, Toulouse, France

In the framework of the African Monitoring of Environment for Sustainable Development (AMESD) Pan-African Program, **Mr. E. Martial** attended the Training of Trainers entitled “AMESD System Administration” which was held from 28th June to 2nd July 2010 at Météo France International in Toulouse, France. The aim of the course was to train representatives from different Regional Implementation Centres (RIC) and partner institutions so that they could convey the training to their regional level or to the users in the countries of their regional network in order to create capacity building within the different thematic regions. The participation of Mr. E. Martial was fully sponsored by the AMESD program.

Regional Training Course on “Environment, Living Resources, Remote Sensing and Fisheries in the South West Indian Ocean”, Reunion Island

Mr. E. Martial, Mr. B. A. Motah, Mr. V. Ramchandur, Dr. H. Runghen and Mr. A. Rawat participated in a Regional Training Course on “Environment, Living Resources, Remote Sensing and Fisheries” jointly organised by the MESOscale dynamics on BIOlogical productivity (MESOBIO) project, Institut pour la Recherche et le Developpement (IRD), l’Université de la Réunion and the African Monitoring of Environment for Sustainable Development (AMESD) from the 12th to 17th July 2010 at L’Université de la Réunion in Reunion Island.

The objectives this training course was to explore relationships between the environment and living resources in the context of the SWIO and Mozambique Channel ecosystems.

The participation of Mr. E. Martial, Mr. B. A. Motah, Mr. V. Ramchandur, Dr. H. Runghen and Mr. A. Rawat MOI staff was fully sponsored by the AMESD program.

AMESD System Administrator Training Course, Kenya Meteorological Department, Nairobi, Kenya

In the context of the African Monitoring of Environment for Sustainable Development (AMESD) Pan-African Program, **Mr. E. Martial** acted as trainer in the “AMESD System Administration Training Course” held at the Kenya Meteorological Department (KMD) in Nairobi, Kenya from 9th to 13th August 2010.

The purpose of the training was to provide participants with the knowledge necessary to install and manage AMESD stations, and to acquire the capability to transfer this knowledge to the local System Administrators in the National Centres. A batch of 12 participants from different African countries was trained on the AMESD Environmental Station (e-Station) system administration.

The participation of Mr. E. Martial as a resource person for this training was fully sponsored by the main AMESD Program.

Conference on Space for the African Citizen, Brussels, Belgium

Dr. M. Bhikajee attended a high level conference on “Space for the African Citizen” organised by the Belgian presidency of the European Union on 16th September 2010 in Brussels, Belgium. The aim of the conference was to demonstrate the contribution of space to the general development of Africa and its citizens as well as to confirm the usefulness of space tools for the African continent’s socio-economic development and resources management.

The conference was attended by 300 invited European and African participants likely to increase the support to the conference goals; African participants included space tool users communities; European participants were those involved in the cooperation to development with Africa; were also present, representatives of the African and European space sector (EU, AU, ESA, Eumetsat, Member States, regional organisations, national agencies, scientists, industries, etc.).

The participation of Dr. M. Bhikajee was sponsored by AMESD and EUMETSAT.

8th AMESD Technical Experts Meeting and Peer Review of AMESD/COI Thema, Ouagadougou, Burkina Faso

Mr. M. R. Badal attended the eighth Technical Experts’ Meeting and the Peer Review of AMESD/COI Thema that was held from 1st to 3rd October 2010 in Ouagadougou, Burkina Faso. Topics discussed during the meeting included (1) Communication Strategies, (2) Short term experts’ requirement, (3) Project Management- Principles & Reporting, (4) Training plan, (5) Continentalisation of AMESD, (6) Data Needs & Procurement and (7) Project deliverables.

The first peer review committee was organised on the 3rd October 2010 to study the product and services document and to make subsequent remarks. In brief, the review commented on the MoU to be signed with regional partners and the inclusion of a cost estimate for each service. The sustainability of the services was also discussed. It was suggested that the MOI should consider the recruitment of technical officers to ensure daily operations of the two services. The RIC was requested to implement, in the future, a user feedback mechanism so as to ensure the efficiency of the service.

8th African Association of Remote Sensing of the Environment Conference AMESD workshop, Addis Ababa, Ethiopia

Mr. M. R. Badal attended the eighth African Association of Remote Sensing of the Environment Conference AMESD Workshop that was held at the United Nations Conference Centre in Addis Ababa, Ethiopia from 25th to 29th October 2010. The purpose of this bi-annual event is to bring together African Remote Sensing scientists and researchers to share findings in areas of ocean remote sensing, land mapping, GIS and coastal and marine related issues.

A special session on the African Monitoring of the Environment for Sustainable Development (AMESD) project was organised on Tuesday 26th October 2010, where Mr. R. M. Badal gave a presentation on the thematic actions that were being implemented for the COI region that comprised of the two main services that are being implemented by MOI within the AMESD/COI Thema, that is (1) Marine Resources Management, and (2) Climate Change & Marine Hazards Mitigation using satellite observations of the ocean.

Over one hundred participants from the African and European countries attended the conference.

Training on the eStation the Joint Research Centre European Commission, Ispra, ITALY

Mr E. Martial and Mr. V. Ramchandur participated in a training program on the eStation which was held at the Joint Research Centre European Commission in Ispra, Italy from 17th October to 17th December 2010.

The goal of the 'on-the-job' training was the implementation of methodologies to generate products to support the African Monitoring of the Environment for Sustainable Development (AMESD) Thema: "Oceanographic Charts for Detection of Potential Fishing Zone" and "Biological Oceanography Indicators". Mr. E. Martial has been working on the eStation using GDAL and python environment, to input the Sea Surface Temperature and chlorophyll data by automation. Mr. V. Ramchandur has been mainly working on the IDL and ArcGIS environment, supporting the testing of the outcomes of the eStation algorithms as well.

The participation of Mr. E. Martial and Mr. V. Ramchandur was sponsored by the AMESD program.

Cruises

R/V Yokosuka (YK09-13) Cruise: First Leg on the east of Rodrigues Island

Dr. D. E. P. Marie, Mr. M. Singh, and Mr. G. Beedessee participated in the first leg of the scientific research cruise on board R/V Yokosuka (YK09-13) on the east of Rodrigues Island from 10th to 29th October 2009. The purpose of the 2009 cruise was to locate and study the hydrothermal vents that were detected in 2006.

Further to the objectives set, some rock samples and deep sea organisms were collected. The biological samples show some new species around the chimneys. The life around chimneys and at a depth of more than 2700m below sea level is of great importance as it will open new venues for various researches in the region. Possibilities of bringing new collaboration and funding have also increased. The Rock samples collected during this leg show indication of interaction between Reunion hotspot and Central Indian Ridge, which is of importance for our Extended Continental Shelf claim in the Rodrigues region. Rock analysis will start by next year.

R/V Yokosuka (YK09-13) Cruise: Second Leg – Shinkai 6500 Dive

Mr. G. Beedessee participated in the second leg of the R/V Yokosuka (YK09-13) Cruise from 2nd to 18th November 2009.

Different types of samples were collected and shared between Mauritian and Japanese scientists during this expedition. Animal samples included shrimps, crabs, mussels, alviniconcha, sea anemones. Analysis by microscopy revealed the presence of juvenile scaly foot. This is the first time such juveniles were collected and they show operculum instead of scales. Vent fluid were collected from Kali vent site. Chimney structures were collected from Kali as well as from Daikoku. These samples were provided to the Japanese scientists as they had requested sampling at these sites.

Tara Expedition off St. Brandon

Dr. R. K. Moothien Pillay joined the Tara Ocean's expedition to St. Brandon from 24th April to 4th May 2010 as an observer. She also carried out a coral biodiversity and health survey of the St. Brandon reefs. In addition she collected fish samples for the MOI's ongoing DNA Barcode project of marine organisms in the Republic of Mauritius.

R/V Hakuho-Maru Cruise (KH-09-5 Leg 5): “Spawning and Migratory Ecology of anguillid eels in the Indian Ocean”

Mr. P. Mussai participated in the fifth leg of the R/V Hakuho-Maru cruise (KH-09-5) from 28th January to 10th February 2010 organised by the Ocean Research Institute (ORI), University of Tokyo, under the supervision of Ministry of Education, Culture, Sports, Science and Technology of Japan in order to conduct marine scientific research in Mauritius waters.

The main objectives of the scientific cruise were (1) to determine the spawning areas for the anguillid eels in the Indian Ocean (2) to determine the distribution of animals belonging to group leptocephali in the Indian Ocean (3) to carry out studies on migration of amphidromous Sicydinae gobies and (4) to carry out studies on biological diversity in the Indian Ocean.

Attachment to Japan Agency for Marine-Earth Sciences and Technology (JAMSTEC), Japan

Mr. G. Beedessee was invited by Late Prof. K. Tamaki to participate in the YK09-13 post cruise biological data generation at the Japan Agency for Marine-Earth Sciences and Technology (JAMSTEC) from 26th July 2010 to 19th August 2010.

NANSEN Expedition - Survey along the Mascarene Plateau for fish stock assessment and eco sounding purposes

Mr. V. Bhoyroo participated in the NANSEN Expedition which was set to survey the Mascarene plateau to assess the productivity of our EEZ with the support of the South West Indian Ocean Fisheries Program (SWIOFP) from 6th to 21st December 2010. Acoustics surveys and Trawls (Pelagic and Demersal) were carried out to estimate the productivity. Acoustics data were used to assess the plankton level as well as fish quantity. Several fish species both Demersal and Pelagic were identified and recorded. Birds' watch and cetaceans' record were also carried out to understand the dynamics of the ocean. CTD data and plankton were also collected at different depth at specific ecological spots. As part of the ongoing Barcoding Project of the MOI, samples were collected for genetic analysis, and also for part of the AMESD project regarding the Potential Fishing Zones (PFZ), ground data (Acoustics and Fish catch) were also collected and submitted.

Events

Inauguration of the AMESD Satellite receiving Station in Mauritius

On 26th June 2009, the 2nd AMESD-EUMETCast satellite receiving station was officially inaugurated on the roof of the Mauritius Oceanography Institute (MOI), AMESD Regional Implementation Center (RIC) for the Indian Ocean Commission region, in Quatre Bornes, Mauritius. This inauguration has been done as part of the closure of the 5th AMESD Technical Expert Meeting which was hosted by the MOI from 23rd to 25th June 2009.

1st SADC SET Week from 22nd to 25th October 2009

Following an invitation of the Ministry of Industry, Science and Research, the MOI participated in the first SADC Science Engineering and Technology (SET) week from 22nd to 25th October 2009 at the Swami Vivekananda International Conference Centre, Pailles.

The objectives of the participation of MOI in the exhibition were:

- to foster interest in research and development in relation to oceanography;
- to demonstrate and communicate to the scientific community and the public at large the results of research and the importance of oceanography in the conservation, maintenance, management, utilisation and development of resources based on marine and coastal ecosystems;
- to communicate new marine research and ocean development activities to the scientific community and interested public

World Ocean Day – Flic en Flac Public Beach

Involving young people in environmental protection projects is one way of getting them better sensitised about the ocean. To celebrate World Ocean Day, the Mauritius Oceanography Institute organised a beach and lagoon clean-up on 8th June 2010 at the Flic en Flac public beach. The objectives of this campaign were to sensitise young people about the importance of our lagoons and to create awareness for protection as well as preservation of our oceans for future generations. Students from Le Bocage International School, BPS College, MOI staff members and Atlantis Diving Centre actively participated in the activity.

Caravane de la Science – Bel Air, 21st to 22nd July 2010

Following an invitation of the Rajiv Gandhi Science Centre, the Mauritius Oceanography Institute participated in the “Caravane de la Science” on 21st and 22nd July 2010 at Bel Air Rivière Sèche. The objective was to popularise and disseminate of marine science among the student community and the public in general as well as to create better awareness of the institute.

2nd SET Week – Cyber Tower I, Ebene – 2nd to 4th December 2010

The Mauritius Oceanography Institute participated in the Second SET Week organised by the Ministry of Tertiary Education, Science, Research and Technology and the Mauritius Research Council (MRC) from 2nd to 4th December 2010 at Cyber Tower I in Ebène.

The main objective of the SET week was to sensitise the public in general, on the importance of Science, Engineering and Technology for socio economic development.

The theme for the National SET week was “Biodiversity” in line with the UN year on Biodiversity. However, other relevant themes of national importance, such as, Renewable Energy, Food Security and Agro Industry and Tourism and Sustainable Development were also included.

REPORT OF THE DIRECTOR OF AUDIT TO THE CHAIRPERSON OF THE THE MAURITIUS OCEANOGRAPHY INSTITUTE

Report on the Financial Statements

I have audited the accompanying financial statements of the Mauritius Oceanography Institute, which comprise the Statement of Financial Position as at 31 December 2010, the Statement of Comprehensive Income and Cash Flow Statement for the 18 month period then ended, and a summary of significant accounting policies and other explanatory notes.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in compliance with the Statutory Bodies (Accounts and Audit) Act, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error..

Auditor's Responsibility

My responsibility is to express an opinion on these financial statements based on my audit. I conducted my audit in accordance with International Standards of Supreme Audit Institutions. Those Standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall statement presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Opinion

In my opinion, the financial statements give a true and fair view of the financial position of the Mauritius Oceanography Institute as of 31 December 2010, and of its financial performance and its cash flows for the 18 month period then ended in accordance with the Financial Reporting and Accounting Standards issued under Section 72 of the Financial Reporting Act.

Report on Other Legal and Regulatory Requirements

Statutory Bodies (Accounts and Audit) Act

I have obtained all information and explanations I have required for the purpose of my audit.

In my opinion, the Mauritius Oceanography Institute has complied with the provisions of the Statutory Bodies (Account and Audit) Act, in so far as they relate to the accounts.

Public Procurement Act

The Mauritius Oceanography Institute is responsible for the planning and conduct of its procurement. It is also responsible for defining and choosing the appropriate method of procurement and conduct type in accordance with the provisions of the Act and relevant Regulations. My responsibility is to report on whether the provisions of Part V of the Act regarding the Bidding Process have been complied with.

In my opinion, the provisions of Part V of the Act have been complied with as far as it appears from my examination of the relevant records.



Dr. R. JUGURNATH
Director of Audit

National Audit Office
Level 14, Air Mauritius Centre
PORT LOUIS

24 November 2011

The background features a light blue gradient with a large, faint circular structure in the center. Inside this circle, there is a stylized illustration of a building or structure. Below the circle, there are several small, stylized fish swimming in different directions. At the bottom of the page, there are stylized coral or seaweed plants.

FINANCIAL STATEMENTS

FOR THE 18 MONTHS' PERIOD
ENDED 31 DECEMBER 2010

STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 2010

	Notes	2010 Rs	2009 Rs
ASSETS			
Non Current Assets			
Property, plant and equipment	2	10,857,149	9,152,721
Long term Car loan receivable	3	3,876,980	593,881
		<u>14,734,129</u>	<u>9,746,602</u>
Current Assets			
Trade and other receivables	4	302,386	166,980
Car loan		826,286	269,257
Cash and Cash equivalents	5	10,236,301	2,682,370
		<u>11,364,973</u>	<u>3,118,607</u>
Total Assets		<u>26,099,102</u>	<u>12,865,209</u>
EQUITY AND LIABILITIES			
General Fund	6	6,129,269	3,111,902
Donation	7	103,500	207,000
		<u>6,232,769</u>	<u>3,318,902</u>
NON CURRENT LIABILITIES			
Employees' Benefits	8	3,655,175	3,126,856
Car loan		3,876,980	593,881
Total non current liabilities		<u>7,532,155</u>	<u>3,720,737</u>
Current Liabilities			
Trade and other payables	9	12,334,178	5,825,570
		<u>12,334,178</u>	<u>5,825,570</u>
TOTAL EQUITY AND LIABILITIES		<u>26,099,102</u>	<u>12,865,209</u>



Mr. M.R. BADAL
Officer-in-Charge



Mr. S. C. SEEBALLUCK
Chairman

Approved by the Board on 17 November 2011

STATEMENT OF COMPREHENSIVE INCOME
FOR THE 18 MONTHS PERIOD ENDED 31 DECEMBER 2010

	Notes	2010 Rs	2009 Rs
REVENUE			
Income	10	32,736,165	18,458,401
Deferred Income		7,612,700	3,432,921
Research	11	10,931,425	7,968,429
		<u>51,280,290</u>	<u>29,859,751</u>
EXPENDITURE			
Salaries and Allowances	12	24,232,650	13,786,938
Office and Administrative	13	7,921,918	5,222,072
Legal and Professional fees	14	59,500	104,525
Training and Seminars	15	1,035,847	1,186,919
Depreciation		6,589,509	3,432,921
Research Work		10,931,425	7,968,429
Total expenses		<u>50,770,849</u>	<u>31,701,804</u>
SURPLUS/(DEFICIT) FOR THE YEAR		<u>509,441</u>	<u>(1,842,053)</u>

STATEMENT OF COMPREHENSIVE INCOME FOR THE 18 MONTHS PERIOD ENDED 31 DECEMBER 2010

	2010 Rs	2009 Rs
Surplus/(Deficit) for the period	509,441	(1,842,053)
Adjustment for:		
Deferred income	(7,612,700)	(3,432,921)
Interest income	(411,107)	
Profit of disposal	(24,810)	(194,051)
Depreciation charges	6,589,509	3,432,921
Retirement benefits	(618,887)	
Employee benefits	1,147,206	252,981
	(421,348)	(1,783,123)
(Increase)/Decrease in receivables	(135,406)	(47,703)
(Decrease)/Increase in payables	105,517	736,303
Cash generated from operations	(29,889)	688,600
Investing activities		
Payment to acquire non current assets	(9,157,127)	(4,296,989)
Research Work	(10,931,425)	
Proceed from disposal	888,000	(7,968,429)
Interest income	411,107	194,051
	(18,789,444)	(12,071,367)
Financing Activities		
Grant	26,794,612	13,459,353
Repayment of car loan to staff	1,123,871	735,098
Car Loan refunded to PMO	(1,123,871)	(735,098)
	(26,794,612)	13,459,353
Net change in cash and cash equivalent	7,553,931	293,463
Cash and cash equivalent at beginning of period/year	2,682,370	2,388,907
Cash and cash equivalent at end of period/year	10,236,301	2,682,370

NOTES TO THE ACCOUNTS FOR THE 18 MONTHS PERIOD ENDED 31 DECEMBER 2010

I ACCOUNTING POLICIES

The principle accounting policies adopted by the Mauritius Oceanography Institute (MOI) are set below:

I.1 Basis of preparation

The financial statements have been prepared under the historical cost convention and in accordance with Accounting Framework for Statutory Bodies. The going concern basis has been adopted.

I.2 Revenue Recognition

Recurrent government grants are recognised on a cash basis as income and are matched against the recurrent expenses of the entity.

Interests and other income are recognised on an accrual basis.

I.3 Property, plant and equipment

Property, Plant and Equipment are stated at cost or valuation, net of accumulated depreciation. These estimated useful lives of plant and equipment are as follows:

- Depreciation is the systematic allocation of funds representing the use of an asset over its useful life.
- The depreciation charged for each item and for each period shall be recognised in the Statement of Financial Performance for the period.
- Depreciation is provided on the straight line basis so as to write off the depreciable value of the assets over their expected useful economic lives.

The annual rates of depreciation used for the purpose are as follows:

	No of years
Equipment (Scientific)	5
Furniture and Fittings	10
Office Equipment	6-7
Computer Equipment	4
Motor Vehicle	5
Container	10

NOTES TO THE ACCOUNTS FOR THE 18 MONTHS PERIOD ENDED 31 DECEMBER 2010

1.4 Cash and cash equivalents

Cash and cash equivalents comprise cash at bank and cash in hand.

1.5 Provisions

A provision is recognised when there is present obligation (legal or constructive) as a result of a past event and it is an outflow of resources embodying economic benefits will be required to settle the obligation. And a reliable estimate can be made of the amount of the obligation.

Provisions are reviewed at each balance sheet date and adjusted to reflect the current best estimate.

1.6 Comparative Figures

Current paid figures are for 18 months ended 31 December 2010. The prior year figures are for the year ended 30 June 2009. The Statement of Financial Performance, Statement of Comprehensive Income and Cash Flow statement are not comparable.

1.7 Retirement Benefit Obligation

Defined Benefit Plan

Provisions for retirement benefits for the entity are made in accordance with the Statutory Bodies Pension Act of 1978 as amended and in accordance with the IAS 19 (Employee Benefits).

The MOI assets are managed by the State Insurance Company of Mauritius Ltd (SICOM Ltd). The cost of providing the benefit is determined in accordance with the actuarial valuation.

1.8 Provision for sick leave

MOI accrues the accumulated sick leave payable to its employees. Provision for sick leave has been made for 18 month period.

2 Property, Plant and Equipment

	Scientific Equipment	Furniture & Fittings	Office Equipment	Computer	Motor Vehicle	Container	TOTAL
Cost	Rs	Rs	Rs	Rs	Rs	Rs	Rs
Balance at 1 July 2009	13,501,824	2,162,180	1,657,660	5,007,718	637,149	279,797	23,246,328
Additions	5,902,267	217,047	100,481	908,232	2,029,100		9,157,1277
Disposal					(959,100)		(959,100)
As at 31 December 2010	19,404,091	2,379,227	1,758,141	5,915,950	1,707,149	279,797	31,444,355
Accumulated Dep'n	Rs	Rs	Rs	Rs	Rs	Rs	Rs
At 1 July 2009	6,939,495	1,112,341	1,338,492	4,037,700	637,149	27,980	14,093,607
Charge for the period	4,866,946	272,389	145,695	845,600	416,910	41,969	6,589,509
Disposal					(95,910)		(95,910)
As at 31 December 2010	11,806,441	1,384,730	1,484,637	4,883,300	958,149	69,949	20,587,206
Carrying amount at 31 December 2010	7,597,650	994,497	273,504	1,032,650	749,000	09,848	10,857,149
30 June 2009	6,562,239	1,049,839	318,718	970,018	-	251,817	9,152,721

3 Long and Short Term Receivables – staff car loan

	2010 Rs	2009 Rs
Amount due at 31 December 2010	4,703,266	863,138
Amount falling due within 1 year	(826,286)	(269,257)
Amount falling due more than 1 year	3,876,980	593,881
Car loans bear interest at the rate of 7.5%		

4 Trade and other receivables

	2010 Rs	2009 Rs
Prepayments	287,691	122,031
Other debtor	14,695	44,949
	302,386	166,980

5 Cash & Cash equivalents

	2010 Rs	2009 Rs
Bank	10,229,301	2,677,370
Cash	7,000	5,000
	10,236,301	2,682,370

6 General Fund

Capital Fund

	2010 Rs	2009 Rs
Balance as at 1 July	8,945,721	8,012,653
Grants	10,017,126	4,296,989
	18,962,847	12,309,642
Less: Deferred Income	(7,509,200)	(3,363,921)
Balance at 30 June/31 December	11,453,647	8,945,721

Accumulated Fund

	2010 Rs	2009 Rs
Balance as at 1 July	(5,833,819)	(3,991,766)
Surplus/Deficit for the period	509,441	(1,842,053)
Balance as at 30 June/31 December	(5324,378)	(5,833,819)
Total	6,129,269	3,111,902

7 Donation

	2010 Rs	2009 Rs
At July	207,000	276,000
Donation		
Less: Deferred Income	(103,500)	(69,000)
Balance at 30 June/31 December	103,500	207,000

8 Employee Benefits

	2010 Rs	2009 Rs
Provision for Passage Benefits	566,769	419,810
Provision for Sick leave	2,664,979	1,664,732
Retirement Benefits obligations	423,427	1,042,314
	3,655,175	3,126,856

(i) Passage Benefits

	2010 Rs	2009 Rs
At 1 July	520,310	428,538
Provision for the period	590,789	275,626
Paid during the period	(443,830)	(183,854)
At 31 December	667,269	520,310
Less than 1 year	100,500	100,500
More than 1 year	566,769	419,810
Balance at 30 June	667,269	520,310

9 Trade and other payables

	2010 Rs	2009 Rs
Projects	9,996,509	4,150,447
Creditors	43,726	967,362
Accruals	1,175,437	145,049
Provision for sick leave	191,720	192,955
Passage Benefit	100,500	100,500
Car loan	826,286	269,257
	12,334,178	5,825,570

10 Grant – Recurrent

	2010 Rs	2009 Rs
Recurrent	33,100,000	19,300,000
Other income	76,922	
Profit on disposal	24,810	
Interest	411,107	194,051
Less	33,612,839	19,494,051
Recurrent Grant used to finance		
Purchase of Non current Assets	(876,674)	(1,035,650)
	32,736,165	18,458,401