ANNUAL REPORT & ACCOUNTS

2007

NATIONAL AQUATIC RESOURCES, RESEARCH AND DEVELOPMENT AGENCY
CROW ISLAND, MATTAKKULIYA, COLOMBO 15

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Contents

GENERAL ADMINISTRATION

The National Aquatic Resources Research and Development Agency (NARA) is the principal national institution charged with the responsibility of carrying out and co-coordinating research development and management activities on the subject of Aquatic Resources in Sri Lanka. NARA was established in the year 1981 by restructuring the Research Division of the Department of fisheries. In the restructuring process Research Division was amalgamated with the institute of Fish Technology which existed in the present premises of NARA at Crow Island, Mattakkuliya, to establish a full fledged research agency, under an Act of Parliament, National Aquatic Resources Agency Act No. 54 of 1981 and amended subsequently by National Aquatic Resources Research and Development Agency Act No. 32 of 1996. NARA functions as a statutory body under the Ministry of Fisheries and Aquatic Resources.

OUR VISION

To be the premier institution for Scientific Research in Conservation, Management and Development of Aquatic Resources in the Region.

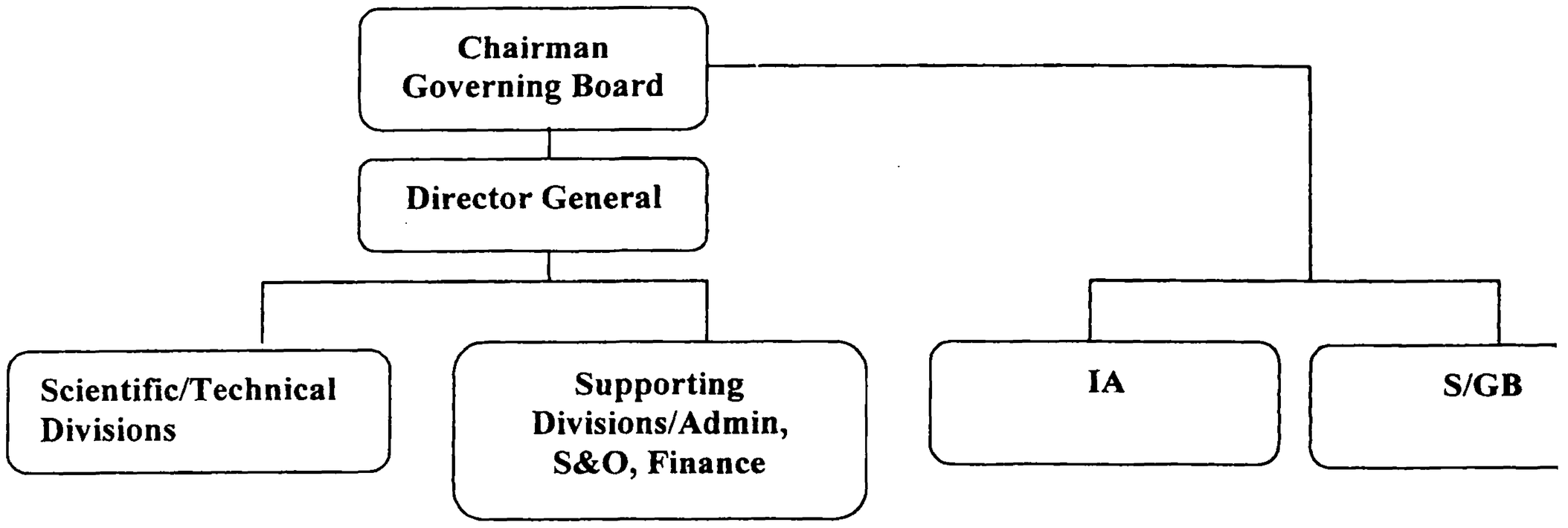
OUR MISSION

To provide innovative solutions for national development issues in the aquatic resources sector utilizing scientific and technological knowledge & resource base.

The main objectives and functions of the Agency are as follows:

- To ensure application and utilization of Scientific and Technological expertise for the implementation of national development programmes.
- To promote and conduct research activities directed at identification, assessment, management and development of living and non-living aquatic resources.
- To co-ordinate and provide advisory and consultancy services on matters relating to exploitation, management and development of aquatic resources.
- To undertake collection, dissemination and publication of scientific research information on aquatic resources & related subjects.
- To provide training.

1. Organizational Structure



(IA – Internal Auditor, S/GB – Secretary to the Governing Board, S & O – Service & Operations)

2. General Performance

Year 2007 can be considered as difficult year for NARA, another year that of reconstruction, after the devastating tsunami and several storms thereafter. Being located proximity to the ocean a considerable damage was caused to the infrastructure facilities during Tsunami. Hence the performance of the year 2007 too should be viewed accordingly.

With all such difficulties at hand there had been certain improvements in both financial and physical performance during the year 2007.

Stringent management measures taken were able to deliver salutary results. As per the final accounts a significant improvement in the financial result has been observed during the year under review. The financial deficit for the year was only Rs. 106,748,390.03 as against the Rs 95,402,909.00 for the previous year amounting to only a slight increase of 1.4% despite the 105% increase of personnel emoluments and rapid increase of costs in almost all inputs. The deficit would have been even higher if not for the significant improvements in the self income for the year. We were able to generate Rs: 20.4 million as self income as against the target of Rs: 8 million.

The measures taken to control finances and maintenance of financial discipline during the period under review further supported this improvement. The measures include:

a) Centralization of procurement and adoption of transparent procurement guidelines.
b) Suspension of vehicle hiring system and maximum utilization of its own vehicles
c) Abandoning of the system of granting ad-hoc advances for R&D work
d) Rationalization of overtime payments
e) Suspension of issuing cash advances for fuel and streamlining of procurement of fuel for vehicles
f) Measures taken to improve self income and collection of dues

g) Minimization of wastage
h) Continuous monitoring of expenditure and progress
i) Constant consultation with Post Observation Committee (Pasu Viparam Kamituwa) and support from the staff and
j) Expeditious & judicious handing of disciplinary cases

The management wishes to place on record the continuous support extended by the Hon Minister, the Deputy Minister, the Secretary, the Governing Council, Trade Unions , Stakeholders in the fisheries industry and all our staff in achieving the above targets under difficult conditions.

3. Governing Board

The Governing Board constitutes seven (08) appointed members and eight (08) Ex Officio Members in accordance of the provisions of the Act. Following members served as the members of the Governing Board.

Appointed Members

1. Mr K Haputantri
2. Mr J N Liyanage
3. Dr (Mrs) P S R Amaratunga
4. Mr M N D Peiris
5. Dr S H K Samaraweera
6. Mr Priyantha R Morapitiya
7. Mr R D Pradeep Sanjeewa
8. Mr H A W M J Senviratne

Ex Officio Members

1.	Mr A Hettiarachchi	}	Director General (Development) MFARD
	Mr H S G Fernando		Dep.Director – Department of Fisheries
2.	Mr A Kumarasiri	-	Director-Department of External Resources
3.	Mr K V P Ranjith de Silva	-	Addl. Sec - Ministry of Ports & Aviation
4.	Rear Admiral S M B Wickramasekera Rear Admiral J S K Colombage	}	Director General(Operations)Sri Lanka Navy
5.	Mr B J P Mendis	-	Surveyor General
6.	Ms A M N Wijerathne	-	SAS - Ministry of Science & Technology
7.	Mr G Piyasena Mr S W Pathirana	}	Director General-Department of Fisheries
8.	Ms K T R Prathapasinghe	-	Director General/NARA

4. Organization

Mr K Haputhantri continued as the Chairman. Mrs K T R Prathapasirghe functioned as the Director General .

In order to perform the mandated functions of the Agency the organization had been designed to constitute ten Research and Technical/Services Divisions ie. Environmental Studies. Fishing

Technology, Hydrographic Office, Information and Technology Division, Inland Aquatic Resources & Aquaculture, Library & Information, Marine Biological Resources, Oceanography, Socio-Economic and Market Research, Post Harvest Technology supported by Administration, Services & Operations, Finance Division and Purchasing & Supplies Division

5. Heads of Divisions

Following officials officiated as Heads of Divisions during the year

Research Divisions

Mr N Sureshkumar Mr S A M Azmy	}	Environmental Studies
Mr N B P Punyadeva	-	Fishing Technology
Mr M A Ariyawansa	-	Hydrographic Office
Mr A B A K Gunaratne	-	Information Technology
Ms M H S Ariyaratne	-	Inland Aquatic Resources & Aquaculture
Mrs V Rupasinghe (Actg)	-	Library & Information
Dr (Mrs) C Amarasiri	-	Marine Biological Resources
Dr K Arulananthan	-	Oceanography
Dr E M B R K Edirisinghe	-	Post Harvest Technology
Dr (Mrs) S C Jayamanne (Actg)	-	Socio Economics & Marketing Research

Support Services Divisions

Mr Sumedha Jayasinghe	-	Administration
Mrs L G N Perera	-	Finance
Mr D A Karunasena	-	Services & Operations
Ananda Amarasinghe	-	Purchasing & Supplies

Recruitments within the year - 2007

Name	Designation	Date of appoint
Mr. S.A. Rajith Rasanga	Clerk – VIII	09.01.2007
Ms. C. Hettiarachchi	Research Officer - IV	01.03.2007
Mrs. K.A.W.S. Weerasekara	Research Officer – IV	01.03.2007
Ms. K.M.B.C. Karunathilaka	Research Officer – IV	01.03.2007
Mr. R.P.P.K. Jayasinghe	Research Officer – IV	01.03.2007
Ms.R.R.A.R. Shirantha	Research Officer – IV	01.03.2007
Mrs. R.H.S.P. Ranasinghe	Accountant	03.05.2007
Mr. M. Ruchitha Perera	Research Assistant	05.06.2007
Ms. M.T.N.K. Ananda	Clerk	09.07.2007
Ms. K.S.K. Dahanayaka	Word processing Operator – VIII	09.07.2007
Ms. G.N.S. Priyangika	Work Clerk - VII	01.11.2007
Ms. W.A.H.P. Wettasinghe	Lab Attendant – VIII	01.11.2007
Mr. H.D. Sunil Shantha	Unskilled Labourer - X	22.11.2007
Mrs. G.L. Anusha Nilmini	Clerk – VIII	29.11.2007

Departures from the service within the year - 2007

Name	Designation	Effective Date	Reason for the Departure
Dr. D.S. Jayakody	Research Officer	02.01.2007	Resignation
Mr. W.G. Anura	Research Assistant	03.04.2007	Resignation
Mr. Aruna Priyashantha	W.P.O.	15.05.2007	Vacation of post
Ms. M.T.N.K. Ananda	Clerk	13.11.2007	Resignation
Mrs. M.G.I.U. Kariyawasam	Research Officer	26.11.2007	Vacation of post
Mr. M.S. Junaideen	Sampler	31.12.2007	Resignation

Vacancies as at 31/12/2007

Post	Vacant
Boatswain/Samudramaru	1
Caretaker	1
Chief Administrative Officer	1
Chief Cartographer	1
Chief Hydrographic Surveyor	1
Chief Land Surveyor	1
Chief Librarian	1
Chief Officer/Samudramaru	1
Cook - Samudramaru	1
Coxwain	1
Draughtsman	2
Driver	5
Dy. Chief Cartographer	1
Dy.Director/Hydrographer	1
Economist	1
EDP Asst.	1
Electrician	1
Electronics Engineer	1
ERA/Samudramaru	2
Hydrographic Surveyor	4
Instrument Technician	1
Land Surveyor	2
Maintenance Engineer	1
Mason	1
Mechanical Engineer	1
Pro.Asst.(Data Base)	1
Pro.Asst.(GIS/RS)	1
Research Asst.	5

Research Officer	13
Sampler	2
Sanitory labourer	2
Sec. to the G.B./ Legal Officer	1
Senior Draughtsman	1
Skipper/FTD	1
Skipper/Samudramaru	1
Total	**79**

Promotions in – 2007

Name	Date	Grade (From)	Grade (To)
Mr. A.J. Jayathissa	16.05.2007	VI	V
Mr. G.H.K. Godagedara	16.05.2007	VI	V
Mr. A.P. Upali Dharmasiri	03.10.2007	VII	VI
Ms. K.C. De Silva	16.09.2007	VII	VI
Mr. K.U.D. Anura Priyashantha	05.12.2007	VII	VI
Mr. T.S. Madapatha	05.12.2007	VII	VI
Mr. W.D.M. De Mel	15.10.2007	VI	V
Mr. R.A.D. Piyadasa	06.12.2007	VII	VI
Mr. K.M. Mudithasena	02.05.2007	IX	VIII
Mr. J.A.C. Prasad (Promoted to RA)	01.07.2007	VI	VI
Mr. A.M. Rathnapala	21.09.2007	IX	VIII
Mr. D.H.T. Ajithwansha	23.10.2007	IX	VIII
Mr. A.K. Wickramarathna (Promoted to Office Aide)	18.12.2007	IX	VIII
Ms D.R.Herath (Research Officer)	30.10.2007	IV	III
Mr J .K.Rajapakshe	15.08.2006 implemented in 2007	III	II

Foreign travel in – 2007

PERIOD	COUNTRY	PURPOSE	NAME
22/01/2007-08/02/2007	Italy	Training programme for mitigation of Natural Disasters	Dr K Arulananthan Research Officer
22/02/2007-02/03/2007	Kenya	4th Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami warning & mitigation System	Dr. E M S Wijerathne Research Officer
28/06/2007-06/07/2007	Thailand	UNESCO-IOC Training course on Tsunami numerical modeling course II-Tsunami Inundation modeling.	

15/09/2007-15/12/2007	England	Indian Ocean Tsunami warning system fellowship programme in sea level science & application.	
28/02/2007-02/03/2007	Thailand	7th North Indian Ocean Hydrographic Commission(NIOHC)	Mr A N D Perera Senior Hydrographic Surveyor
12-17/03/2007	Norway	44th Ocean Mapping Group-Multibeam course	
28/02/2007-02/03/2007	Thailand	7th North Indian Ocean Hydrographic Commission(NIOHC)	Mr M A Ariyawansa Hydrographer
13-14/03/2007	Japan	International Symposium on improvement of ENC coverage and Availability.	
24-26/09/2007	Thailand	Coast Map Kick-off meeting	
07-11/05/2007	Monaco	17th International Hydrographic Conference(IHC)	
15-16/03/2007	Thailand	The 1st Meeting of the JFWG Between Thailand-Sri Lanka	Dr S C Jayamanne Research Officer
16/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	
17-29/03/2007	Iceland	ICE/SL/FIS/2007/01 Short training course on project cycle management for managers in the public fisheries sector	Mr N Sureshkumar Research Officer
17-29/03/2007	Iceland	ICE/SL/FIS/2007/01 Short training course on project cycle management for managers in the public fisheries sector	Mr A B A K Gunarathne Information Officer
09-14/12/2007	Japan	Training on "Marine Explorer GIS for Fish Forecasting.	
19-23/03/2007	Belgium	IODE/MarBEF Biodiversity Data Management Course	Ms.E K V Samaraweera Research Officer
16/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Ms M H S Ariyarathne Research Officer
01/09/2007-04/03/2007	Iceland	Fisheries Policy & Planning specialist Training.	
16/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Mr U S P K Liyanage Research Officer
22/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Dr E M R K B Edirisinghe Research Officer
22/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Ms. G J Ganegamaarachchi Research Officer
22/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Ms. M G I U Kariyawasam Research Officer
22/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Mr B K K K Jinadasa Research Officer
22/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Ms. K S Hettiarachchi Research Assistant
05-16/11/2007	Iceland	On-Job training programme in Iceland (ICEIDA)	
22/-4/2007-05/05/2007	Spain	Improvement of Technical & Training capacities of NARA and NAQDA	Ms. J F Nisreena Research Assistant

08-10/05/2007	Thailand	BIMSTEC Workshop on Fisheries Cooperation	Dr S S K Haputhanthri Research Officer
01/09/2007-04/03/2007	Iceland	Fisheries Policy & Planning specialist Training.	
04-09/06/2007	Belgium	Young Scientists Data Management Training	Miss K M B C Karunathilake Research Officer
17-28/06/2007	France	24th General Assembly & 14th Session of Executive council of the Intergovernmental Oceanographic Commission	Mrs.K.T. R.Prathapasinghe Director General
17-28/06/2007	France	24th General Assembly & 14th Session of Executive council of the Intergovernmental Oceanographic Commission	Dr T K D Tennakoon Research Officer
30/11/2007-03/12/2007	Thailand	IOGOOS Workshop & 5th Annual Meeting and 2nd high level meeting of Indian Ocean Panel(IOP)	
09/07/2007-10/08/2007	UK	Marine Cartography course	Ms. B H B Jayamalee Silva Cartographic Draughman
18-23/06/2007	Mauritius	IOC/FAO IOTC International symposium and workshop on part State measures in the Indian Ocean.	Dr Champa Amarasiri Research Officer Actg. Director (Research & Development)
05-09/11/2007	Seychelles	10th Scientific Session of IOTC	
11-13/12/2007	Seychelles	Meeting to identify and elaborate an option for international cooperation on migratory sharks under the convention on migratory species.	
16-24/06/2007	Philippines	Multi-Agency Coordination for restoration of coastal tourism sites to achieve sustainable development	Ms.D.C.T.Dissanayake Research Officer
22/09/2007-13/10/2007	Iceland	For PhD Studies	
24-29/06/2007	Germany	Training on sub bottom profiler SES 2007.	Mr S U P Jinadasa Research Officer
22/08/2007-29/08/2008	U.K.	Postgraduate certificate in Ocean Bathy Metry.	
24-29/06/2007	Germany	Training on sub bottom profiler SES 2007	Mr W K Senewirathne Electronics Assistant
09-20/07/2007 (No-pay leave)	Portugal	To attend final examination(M.Sc)	Mr.R.P.P.K Jayasinghe Research Officer
25/10/2007-16/12/2007	Thailand	Ecosystem based fishery management in the Bay of Bengal under the framework of BIMSTEC	
08/07/2007-26/08/2007	China	Training on Marine Organism culture Technology	Mr N W Janaka Pushpakumara Research Officer

12/09/2007-31/12/2008 (NOPAY)	UK	For M Sc studies	Ms D N A Ranmadugala Research Officer
25/10/2007-16/12/2007	Thailand	Ecosystem based fishery management in the Bay of Bengal under the framework of BIMSTEC	Mr K S D Chinthaka Research Officer
19/10/2007-06/11/2007	Goa-India & Mahe-Seychelles	R/V Revelle – Research Cruise	Mr A Rajasooriya Research Officer
07-09/11/2007	Thailand	TELRA 2007- To present a paper	Mr H B Jayasiri Research Officer
21-23/11/2007	India	International conference on Biodiversity.- To present a paper	
05-16/11/2007	Iceland	On-Job training programme in Iceland (ICEIDA)	Ms. T S Dassanayake Research Assistant
12-26/11/2007	India	Training on Biodiversity in Mangrove Ecosystems.	Mr D D G L Dahanayake Research Officer
20-23/11/2007	India	08th Fisheries Forum- To present a paper	Ms P S Jayasinghe Research Officer
09-14/12/2007	Japan	Training on "Marine Explorer GIS for Fish Forecasting.	Mr J K Rajapakshe Research Officer

Court Cases and Disciplinary Inquiries

Labour Tribunal Cases

(i) Court Case of Mr J K Balapatabendi at the labour courts is in progress.

(ii) Court Case related to land at Kadolkelle Regional Research Centre (6137/L) is in progress at Negombo District Court.

(iii) Court Case of Mr D A Karunasena at Supreme Court was ended (SC/FR/57/04) and he was re appointed as the Chief Engineer and Head/Service and Operations with all the related privileges.

(iv) According to the appeals of Mr G Lamahewa and Mr J B A Magammana at Additional Labour Tribunal two cases are in progress seperately.

Court Cases

1. Mr N H Dassanayake, Research Officer who went abroad on study leave for Post Graduate Studies had not reported for duty at the end of approved leave period and it has been referred to Attorney Generals Department to take necessary legal action against him

2. Chief Librarian Ms S Thalakada who went abroad on no-pay leave has not reported for duty at the end of the approved leave period and has been referred to Attorney Generals Department to take necessary legal action against her.

3. Legal action has been initiated against Dr C V L Jayasinghe for breach of contract which she signed with NARA to pursue her Doctoral Degree by tendering her resignation without serving NARA for the period contracted nor paying the contracted value to NARA

Formal Disciplinary Investigations

(i) According to results of Formal Disciplinary Investigations against Dr (Mrs) R R P Maldeniya, Mr H M Wasantha Bandara and Mr W G Anura they have appealed and the punishments were reduced according to 322 Board Decisions

(ii) Formal Disciplinary Investigations ended against Mr D A Karunasena regarding some NARA construction activities. As the charges were not proved beyond doubt against him he was released from all charges

(iii) Formal Disciplinary Investigations against Assistant Accountant Mr M D Senaratne and Librarian Mrs S R V Rupasinghe on the charge sheet issued dated 25/04/2007 is in progress

(iv) Formal Disciplinary Investigation against Research Officer Mr N B P Punyadewa and Transport Officer Mr B L S Wimalasinghe on the charge sheet issued dated 27/07/2007 is in progress

Welfare Activities

Following Welfare Activities were conducted in collaboration with NARA Welfare Association

Transport Service to :

NARA	-	FORT
NARA	-	BORELLA
NARA	-	MAHARAGAMA
NARA	-	NEGOMBO
NARA	-	GAMPAHA
NARA	-	KOTTAWA
NARA	-	KELANIYA

Participated in Local Trainings/Seminars/Workshops within the year – 2007

Name	Participated Local trainings/Seminars/Workshops	Institute	Fees (Rs.)
Mr B L J Perera/Driver Mr W A Rathnasiri/Driver	Prime Mover Course	Sri Lanka Ports Authority Mahapola Training Institute	8,000/= per head
Dr K Arulananthan/RO Dr E M S Wijerathne/RO Mr N Sureshkumar/RO	Scoping facilitation of appropriate interventions on Adaptation to climate change	South Asia Co-operative Environment Programme	-
Dr T K D Tennakoon/RO	Report Writing Presentation Skills	British Council	6,500/= 18,500/=
Mr P Jayasooriya/RA	Diploma in Digital Animation Diploma in Graphic Design	Televiev Technology Academy	31,920/=

Ms A M A S K Wijesinghe/DA to Chairman and Actg. Secretary to the Governing Board	Seminar on DIRECTORS DUTIES- legal & financial implications under the new Companies Act.	The Institute of Chartered Secretaries.	1,500/=
Ms.S.R.V Rupasinghe/ Librarian Ms S Ilvanmarachchi/ Librarian Mr O K P Nandana/Librarian	Training Session on SCOPUS & Science Direct Database	National Science Foundation	-
Ms.L.G.N Perera/Accountant	Post-Graduate Diploma in Business and Financial Administration	Institute of Chartered Accountants	Course fee 50,000/= paid by NARA 25,000/= only
Dr.(Mrs) Gnanapala/RO Mr W A Surasinghe/Sr.	Nature conservation and eco tourism workshop	Leaders in eco tourism	US $ 60 per head
Mr H D Wimalasena/RO(Sociologist)	Seminar on "The many steps to commercialized an Invention"	National Science Foundation	-
Mr P S Ranaweera/Clerk assistant	Training on "Commercial Air Conditioning, Refrigeration system and Energy saving methods".	Institute of Industrial Techno-Management (Pvt.) Ltd.	5,200/= + 15% VAT
Ms.S.Liyanaarachchi/Librarian Mr O K P Nandana/Librarian	Course on Library Automation(COLA)	Sri Lanka Library Association	15,000/= per head
Dr B M R K B Bandaranayake/RO	Short training course on Project Cycle Management for Manager in the Public Fisheries Sector.	ICEIDA	-
Dr C Amarasiri/RO Mr T A Rajapakshe/RA Mr A B A K Gunaratne/information Officer Mr M A Ariyawansa/Hydrographer Dr S C Jayamanne/RO Mr W D M de Mel/AI Dr.K Arulanantham/RO Mr D T Meedin/RA Mr N Sureshkumar/RO Mr R W Fernando/RA Ms M H S Ariyaratna/RO Mr P N R Dassayake/AI Dr E M S K B Edirisinghe/RO Ms K S Hettiarachchi/RA Mr N D P Punyadeera/RO Mr S S C Fonseka/RA Mr Ananda Amarasinghe/Purchasing Officer Mr O K P Nandana/Librarian Mr S P Wijesinghe/Photo-Photocopy Machine Operator Mr M H S K Abeyrathne/IA	Workshop on Fisheries institutional Analysis and Capacity Assessment.	FAO	-

Mr A A D Amaratunge/RO Ms A S L E Corea/RO	Project for Identifying and Protecting of Important Plant Areas in Sri Lanka.	IUCN/Ministry of Environment & Natural Resources.	-
Ms S Liyanaarachchi/ Librarian	Seminar on Preservation of Documentary Heritage in Sri Lanka.	National Library & Documentation Services Board.	2,500/=
Mr A B A K Gunarathne/Information Officer	Cost & Time Management of Project using computer Tool.	University of Moratuwa	18,000/=+vat
Mr J P Lokugamage/Asst. network Administrator Mr U W S Adikari/Data Entry Operator/W.P.O.	Oracle Training for Data Management.	DMS	62,000/= + vat per head
Mr J P Lokugamage/Asst. network Administrator Mr U W S Adikari/Data Entry Operator/W.P.O.	Oracle 10 g	DO	28,750/= (both)
Dr H M P Kithsir/RO Ms K W S Arirawansa/RO	3rd Short Training course in project cycle management in the Public Fisheries Sector.	Ministry of Fisheries , ICEIDA & UNU-FTP	-
Mr D A Athukorala/RO Ms K A W S Weerasekara/RO Mr B K K K Jinadasa/RO	Workshop on Proper use and management of High end Analytical Instruments.	Industrial Technology Institute.	20,000/= + vat per head
Dr E M R K B Edirisinghe/RO	Workshop on Implementation of the Chemical weapons convention in Sri Lanka.	Ministry of Industrial Development.	-
Mr D M N Dissanayake/Skilled Labourer	Workshop on Modern Vehicle Technology	ICTARD	2,000/=
Ms L G N Perera/Accountant Ms.R H S P Ranasinghe/Accountant	Workshop on Financial Reporting	Dept. of Public Enterprises.	2,000/= per head
Ms.C Hettiarachchi/RO Mr W A Lalith Wickramasinghe/RA	Advanced course in PCR Technology	GEENTEC	25,000/=+ vat per head
Mr G A A Rathnayake/Lab attendent	Certificate course in Computer Networking & Administration	NIBM	23,350/=
Mr W A L Wickramasinghe/RA	M Sc degree in Molecular Biology & Biotechnology	University of Ruhuna	Partially payment of 50,000/=

Environmental Studies Division

Head of the Division N.Sureshkumar / S.A.M. Azmy

Overview of the year

The main function of the division is to conduct studies related to environmental aspects of aquatic resources with special reference to water pollution and assessment on environmental impacts and provide technical advice to government and other oragnisations on environmental management aspects. The staff strength during the period includes five Research Officers, two Research Assistants, a Word Processing Operator and three Laborers. During this period, division implemented executed two projects related to pollution studies, a study programme to cater emergency situations such as fish kills and pollution and a programme to improve the quality of the laboratory. Latter part of the year, Mr. S.A.M. Azmy, Research Officer assumed duties as the new Head of the Division as Mr. N.Sureshkumar, Research Officer completed his tenure as Head of the Division.

Activities undertaken

Programme		Project		Allocation (Rs / M)	Officer Responsible	Period	
						from	To
1	Environment	4.4.1.	Assessment of Environmental impacts in selected water bodies and streams of upper catchments of Mahaweli Ganga	0.7	S.A.M.Azmy / A.A.D. Amaratunga / K.A.W. Shyamalee Weerasekara / N.Sureshkumar/	Jan, 2007	Dec, 2007
2	Environment	4.6.1.	Assessment of present pollution levels and management aspects related to Hikkaduwa NP.	0.2	W.D.N. Wickramaarachchi / N.Sureshkumar	Jan, 2007	Dec, 2007
3	Hydrography, Oceanography, Disaster Management, Early Response	5.4.2.	Water pollution, Oil spills and Fish kill incidents		S.A.M. Azmy / N.Sureshkumar / W.D.N. Wickramaarachchi/ A.A.D. Amaratunga /K.A.W. Shyamalee Weerasekara	Jan, 2007	Dec, 2007
4	Capacity Building and Human Resource Development	7.3.2.	Quality improvements to ESD Laboratory.	0.75	S.A.M. Azmy, N.Sureshkumar, W.D.N. Wickramaarachchi A.A.D. Amaratunga / K.A.W. Shyamalee Weerasekara /	Jan, 2007	Dec, 2007
5	Purchase of equipments	4.1	Purchase of equipments	1.2	S.A. M. Azmy / N.Sureshkumar	Jan, 2007	Dec, 2007

Progress

Project 1

The objective of the study was to assess the aquatic health of streams and water bodies within the upper catchment of Mahaweli Ganga. The study was initiated based on the request of Mahaweli Authority of Sri Lanka and considering the importance to assess the upper reaches of Mahaweli ganga. As an initial study aquatic pollution levels in selected streams within the Upper Catchments of Mahaweli area was assessed. In order to cater study objectives, three sub catchments were selected based on intensity of anthropogenic activities. In this regard Hatton sub catchment (*consist of Atabage Oya, Goraka Oya, Kaddiyan Ella, Kahawatura Gange and main stream of Mahaweli Ganga*), Kotmale sub-catchment (*consists of Puna Oya, Nanu Oya, Dabagasthalawa Oya, Agara Oya, Kotmale Oya,Garandi Ella and Pundalu Oya*) and Uma Oya & Badullu Oya sub catchment (*consists of Kuda Oya, Mahathotilla Oya etc*) were selected to study water pollution levels and trends.

Sampling was carried on monthly basis in above streams for a period of eight months from April to November. Altogether 35 sample locations were selected to monitor the surface water quality to assess pollution levels and twelve water quality parameters were employed for analysis. Kotmale Oya sub catchment consists with intensive annual crop cultivation. tea cultivation and dense home gardens with sparse forest patches. Badulla Oya sub catchment was observed with medium population density and forest cover. However main land use pattern is annual crops and small amount of tea plantations. Hatton sub catchment consists of Kaddiyanella, Goraka Oya, Kahawatura Ganga, Atabage Oya, Malliyapoo watte, Watawala, Rozella and Rambukpitiya.

Results for most of surface water quality parameters confined to the acceptable limits for fish & aquatic life. However nutrient levels in Nanu oya were found to be slightly higher than Agara Oya and Dabagasthalawa Oya. Concentrations of total suspended solids and electrical conductivity were found to be high in certain locations of streams studied as a result of agricultural practices from surrounding lands.

The values of nitrate nitrogen, nitrite nitrogen, ammonical nitrogen and dissolve phosphate in Kotmale sub catchment were 0.0019 mg/l to 3.0792 mg/l, 0.0006 mg/l to 1.0056 mg/l, 0.0003mg/l to 1.1776 mg/l, and 0.0033 mg/l to 0.3298 mg/l. Total suspended sediment in above sub-catchment was observed in the range of 1.0 mg/l to 810.0 mg/l and turbidity levels were varied from 3.49 NTU to 1126 NTU. Chemical oxygen demand and biochemical oxygen demand were varied between 9.0 mg/l to 54.0 mg/l and 1.0 to 24.0 mg/l. The pH, dissolve oxygen and electrical conductivity in Kotmale sub catchment were 5.75 to 7.95, 1.67 mg/l to 11.38 mg/l, and 7.3 µS to 153 µS. The chlorophyll content in above streams was varied between 0.008 mg/m^3 to 52.403 mg/m^3

Nitrate, nitrite, phosphate and ammonia values obtained for Uma Oya & Badulu Oya Sub Catchment were in the range of 0.030 to 2.634 mg/l, 0.0003 – 0.421 mg/l, 0.003- 0.122 mg/l and 0.005 – 2.586 mg/l respectively. Electrical Conductivity values were ranging from 61.4µS - 318 µS. However parameters mainly Turbidity & TSS, recorded high values during certain times of the year, especially during the rainy season. Turbidity values ranged from 1.46 – 706 NTU whereas TSS values ranged from 1.50 to 1025 mg/l. Dissolved Oxygen levels were ranged from 2.80 – 10.40 mg/L.Chlorophyll values obtained were in the range of 1.18 – 42.07mg/m^3 and the surface water temperature values in the sub catchment were ranged from 15.7-30.0°C

As the study will be continued towards next year and final assessment of the streams will be attempted by ranking them in terms of water quality and biological communities with DPSIR frame

work. Further the cause and effect relationship for selected common environmental impacts to be studied in coming year..

Progress (%) :-

Physical:- %	Cumulative target	100 %	Cumulative achieved	97%
Financial:- %	Cumulative target	100 %	Cumulative achieved	98%

Project 2

The objective of the project was to study the pollution levels within the Hikkaduwa National Park (HNP) and to review the environmental management process implemented for HNP in the past to understand the constraints and underlying causes that have impacted the implementation of recommendations evolved through the management processes. This study was implemented in collaboration with Oceanography Division and Coral Unit.

Monitoring of Surface water quality of Hikkaduwa National Park (HNP) and major outlets falling into HNP was carried out in 25 sampling locations January to March 2007 to cover northeast monsoon. Survey of illegal discharges into HNP was carried out to assess the point pollution sources. A questionnaire survey was carried out to understand the effluent disposal and treatment facilities available within the tourist establishments in the vicinity of HNP. Participatory community appraisal (PCA) was carried out to obtain views of members of the community who are depending upon the HNP for their livelihood. Literature survey was carried out to understand the special area management processes implemented in the past. Based on literature survey, a review on the management process implemented was prepared.

During field sampling, it was observed that heavy sedimentation due to sand deposit within the coral lagoon. Total suspended solids and turbidity levels were found to be significantly high in coral lagoon and also within wave breaking zone of HNP during certain months of the year, which is a stress condition to coral reefs Further during the survey, local people stated that over the last decade beach within the HNP has expanded considerably, which confirms the elevated TSS and turbidity levels.

According to the results of water quality analysis, surface water temperature varies between 27.6 to 31.2 °C. The levels of pH and dissolved oxygen are 4.22 to 8.41 and 3.07 mg/l to 8.33 mg/l during the study period respectively. Turbidity and total suspended solids in the national park lies between 0.8 NTU to 17.4 NTU and 0.8 mg/l to 148mg/l which are the most important parameters for optimal growth of corals. Pollution parameters such as biochemical oxygen demand(BOD), oil & grease and chlorophyll values identified as 0.64mg/l to 54mg/l, 5mg/l to 20.5mg/l, and 0(mg/m^3) to 30.57(mg/m^3) respectively. The levels of nutrients found to be very minimal. Nitrogen levels vary as nitrate nitrogen (NO_3) 0 mg/l to 0.61mg/l, nitrite nitrogen (NO_2) 0 mg/l to 0.044mg/l and ammoniacal nitrogen (NH_4) 0.002mg/l to 0.477mg/l.the level of phosphate is varied between 0.001mg/l to 0.177mg/l.

The study concludes that the HNP is significantly affected by surface water pollution mainly by total suspended solids and turbidity levels. Therefore special attention is required to remove the accumulated sand particles within the Hikkaduwa National Park specially within the coral lagoons of the Park. Project completion report is being drafted.

Progress (%) :-

Physical:- %	Cumulative target	100 %	Cumulative achieved	97%
Financial:- %	Cumulative target	100 %	Cumulative achieved	98%

Project 3

This project was implemented to cater emergency situations related to water quality incidents such as fish kills and pollution reported to NARA for necessary investigation and also to provide facilitation for advisory activities and test services. This project was a part of the, Disaster Management and Early Response project implemented by the Oceanography Division.

Test service was offered to seven clients to test water samples for drinking water quality as well as discharge water quality and a cumulative total of Rs. 53, 229.00 was earned during the year.

During this period, two incidents of mass fish mortality at Garanduwa lagoon and Moragalle beach were referred for investigations. Director General/NAQDA informed of water pollution and frequent fish kill incidents reported in Garanduwa lagoon, Matara in May 2007. Preliminary investigation was carried out and increased nutrient levels were observed. Although it was revealed in the preliminary investigations that water quality was conducive to sustain aquatic life, a detail study was proposed to investigate the frequent fish kills reported. Other incident was referred by Department of Fisheries & Aquatic Resources about fish kill in Moragalle beach, Beruwala in June 2007. Investigation carried out revealed that fish kill actually occurred in Kaluwamodara canal due to low dissolved oxygen levels. Further investigation revealed that Kaluwamodara canal and Moragalle beach were subjected to various environmental pressures from discharges of waste water from the hotels and distillery plants, which could have attributed to fishkill incident reported.

Project 4

The objective of the project was to cater the improvement of laboratory facilities of the division. According to the allocation of the funds as a major activity, it was planned to rebuild the laboratory cupboards since laboratory infrastructure of the division was rendered to a dilapidated condition as a result of the tsunami in December 2004. In this regard, all activities connected to tender procedure were completed and purchasing order was placed to deliver the laboratory cupboards. However the laboratory cupboards were not delivered before end of the year.

Progress (%) :-

Physical:- %	Cumulative target	100 %	Cumulative achieved	70%
Financial:- %	Cumulative target	100 %	Cumulative achieved	

Project 5

In order to facilitate the research projects that were implemented during the year and to manage the laboratory, several instruments and apparatus were identified for purchase. These were potable turbidity meter, potable spectrophotometer, potable conductivity meter, flow meter, Global positioning system. In this regard, required tender procedures were initiated for purchase.

Progress (%) :-

Physical:- %	Cumulative target	100 %	Cumulative achieved	70%
Financial:- %	Cumulative target	100 %	Cumulative achieved	

Other activities:

During this period, Research Officers participated at several scoping meetings related to EIA and IEE projects conducted by Central Environmental authority and Coast Conservation Department to advise on management and conservation of aquatic resources.

- Meeting on cross country pipeline project at CEA
- Preliminary discussion meeting to consider the project proposal for proposed project to manufacturing of solar salt- Wayamba Salterns (PVT) LTD at Puttalam and Wanathavilluwa.
- Field inspection on illegal salt production (saltern) at Pulidivasal in Periya theevu.
- Meeting on Coastal water quality monitoring programme
- Development of Galle Port EIA monitoring
- The proposed reclamation project at Prima Ceylon Limited, Trincomalee
- Scoping committee meeting on Environmental Impact Assessment on proposed small luxury hotel project at Karukkupani, Chilaw.
- TEC meeting on proposed luxury hotel project at Seeduwa (Project No.1250)
- Field inspection on proposed Ceylon Petroleum Storage Terminal limited (CPSTL) Cross- Country pipeline project
- EIA on mining and mineral processing of Garnet and ilmanite from Mordaragoda to Welipathanwila coastal stretch in Ambalantota
- Investigation of the fish kill incident at Garanduwa lagoon
- Investigation of the Fishkill incident at "Kaluwamordara Canal",Kalutara district
- Scoping committee meeting on proposed apartment complex at No.602,606,Galle road Colombo 04 for Ocean view towers
- Scoping committee meeting on development of port of Galle as regional port
- EIA meeting on proposal to setup a luxury hotel at Kalutara
- EIA meeting on mining and mineral processing of Garnet and Ilmanite from Mordaragoda to Welipathanwila coastal stretch in Ambalantota
- Scoping committee meeting on Negombo water project
- Eco tourism hotel project at Tissamaharama,

Officers participated at a national workshop on Revision of National Oil Spill Contingency plan (NOSCOP) and meetings organised by the Marine Pollution Prevention Authority.

Mr. N.Sureshkumar, Research Officer participated as a resource person in three workshops conducted in May, June and September 2007 in collaboration with Ministry of Fisheries and Aquatic Resources and Icelandic International Development Agency (ICEIDA) to train executive officers in institutions coming under the Ministry of Fisheries and Aquatic Resources in project cycle management to improve the quality of designing projects for the fisheries sector.

Publications:

- Internal Report on field investigations on the hot springs at Kanniyai in Trincomalee S.A.M Azmy, W.D.N.Wickramaarachchi (April 2007)

- Internal Report on fish kill incident at Garanduwa lagoon S.A.M Azmy, W.D.N.Wickramaarachchi (May 2007)

Fishing Technology Division.

Head of the Division – Mr N B P Punyadewa

1. Over view of the year 2007:

Proposed project of the Fishing Technology Division was, to develop an experimental fishing gear to exploit large exotic cyprinids in inland reservoirs of Sri Lanka. Exotic large cyprinid fish species (*Catla catla*) were stocked by MOFAR in major perennial reservoirs some times ago. However these fish species could be caught only during a certain period of the year. It is observed that the mesh sizes and hanging ratios of the existing fishing gears used in the reservoir by the fishermen are not suitable for a sustainable harvest. Further, catching efficiency of the existing nets are not sufficient and the fish caught from these nets were not fully grown. Therefore, the development of a suitable fishing gear to catch these fish species throughout the year is beneficial to the fisherman.

2. Activities undertaken.

Construct the experimental fishing gear to exploit the *catla catla* with fishing community participation. Data collection through experimental fishing trials and sampling of other commercial catches. Data analysis and report writing.

Programme	Project	Allocation (Rs.)	Officer/s responsible	Period from
Development of New Fishing Techniques.	Development of effective fishing gear to exploit large exotic cyprinids in inland reservoirs of Sri Lanka.	0.85 Million	NBP Punyadeva KSD Chinthaka	2007 January to December

3. Performance

The project activities (experimental fishing) were started in May 2007. Under this project experimental fishing gears were constructed and fishing trials were carried out with community participation. It was observed from the catch composition from the experimental nets that large size of *Catla catla* fish were present in the reservoir. From the experimental fishing operations it was observed that catching efficiency of the large *Catla catla* fish from the gear was sufficient.

The availability of the *Catla catla* fish in the experimental fishing area were changed due to environmental condition of the reservoir in certain periods. Therefore, the catching efficiency of the

experimental gears were poor. However, further alterations is needed to the experimental gear to enhance its efficiency.

Physical Achievement: Cumulative target Cumulative Achievement

* Cumulative target - 100 %
* Achievement - 92 %

Financial Achievement:

* Financial target - 100 %
* Achievement - 108 %

4. Publications

4.1 Research papers : Nil

4.2 Research Reports : Under preparation

4.3 Booklets / Leaflets : Nil

5. Training / Awareness programmes conducted: Meetings were arranged with, Fisheries Inspectors and fishermen of respective areas. Experimental fishing trails were conducted with fishing community participation to solve fishing disputes at Chilaw.

Hydrographic Division –Hydrographic Office

Head of the Division : Mr M.A. Ariyawansa

1. Overview of the Year

National Hydrographic Office provides services to assist safe and efficient navigation of ships. The principal service is the provision of nautical information, which includes nautical charts, data for coastal zone management, environmental protection and other related products and services. The provision of accurate and up to date charts offer significant economic and commercial benefits through facilitation of maritime trade and other marine activities.

Under the National Charting Programme for the year 2007 the following surveys were conducted.

1. **Bathymetric survey of Tangalle to Hambantota including the land survey of the relevant coastal stretch.**

2. Activities undertaken :

Programme	Project	Officer Responsible	Period From To
National Charting Programme			
1.Bathymetric Survey of Tangalle to Hambantota	1.1 Data Acquisition of Tangalle to Hambantota	S.R.C. Ranaweera R.H.P. Weligodapitiya (Hyd. Surveyor)	Jan. Dec.
2. Land Survey	2.1 Relevant Land Surveys of Tangalle to Hambantota	C.K. Amarasinghe (Chief Land Surveyor)	Jan. Dec.

Additional Programme

3 Preparation of charts for offshore seismic survey and participation for discussions and meetings organized by President's committee.	DEOCOM Project	M.A. Ariyawansa S.W.S. Weerasinghe	Jan Dec.

3. Performance

Progress - National Charting Programme

Physical : 95 Financial : 100

Project 1.1

Data Acquisition

Progress : (%) Physical : 95

Project 2.1

Land Surveys

Progress : (%) Physical : 95

4. Training Recived / Awareness Programmes conducted :

Foreign Training

43rd Multibeam Sonar Training course, Norway - 01 officer
45th Multibeam Sonar Training,Australia - 01 officer
Hydrographic Data Processing and Marine Cartography course, UK Hydrographic Office -01 officer

Awareness Programmes
Routine awareness programs in Hydrographic surveying and Chart production for Naval Officers and Seamen.

5. Non scheduled activities undertaken as consultancy work

(a) Hydrographic survey for Hikkaduwa & Puranawella Fishery Harbour (Post dredging & Pre dredging)
(b) Bathymetric survey for Lanka Transformers at Kerawalapitiya
(c) Bathymetric survey for CCD at Kelani river mouth
(d) Bathymetric survey for Landing site at Godawaya & Welipatanwila-CRMP
(e) Bathymetric survey for CCD at Wennapuwa to Chilaw
(f) Bathymetric survey for CCD at Kenniya, Trincomalee
(g) Installation of Marker Buoys for CRMP in Hikkaduwa, Bar Reef

Inland Aquatic Resources and Aquaculture Division

Head of the Division : Ms M.H.S. Ariyaratne

1.Over view of the year :

The Inland aquatic resources and aquaculture division is responsible for carrying out research on all aquaculture activities and on management of Inland aquatic resources. During the year 2007 this division has undertaken 6 projects on aquatic resource management and sustainable utilization and 10 projects on aquaculture and aquaculture management aspects. All activities undertaken were successfully carried out even though there were several constraints. The constraint was the lack of vehicles for research work. Some of the work could not be completed to the expected level as the bacteriological lab and the general lab of this division were severely damaged due to torrential rains. The renovation work of these two labs were completed and the renovation of the PCR lab was completed during the year. However due to procurement delays in providing necessary chemicals etc the PCR lab could not be operated.

The division was also able to participate and provide valuable inputs in several important technical committees including shrimp culture technical committee, aquaculture technical committee, national committee on important plant areas and their conservation, Ornamental fish advisory committee. Providing necessary inputs to the Ministry of Fisheries and Aquatic Resources and aquaculture specially on culture of species other than shrimp, in coastal areas.;

Several officers were trained locally and abroad to develop their skills in undertaking research. One officer returned after completing his PhD.

3.Activities undertaken

Projects	Allocation (Rs. Million)	Officers responsible
3.1.2 Study the reproductive biology of *Catla catla* and other dominant species in Udawalawe reservoir	0.550	N.B.P. Punyadewa (Project Leader) D. A. Athukorala
3.2 : Stock assessment and determination of optimum exploitation levels for the fishery	0.30	D.A. Athukorala
3.3. Induced breeding of native fish species (Clarias clarias and Opheocephalus sp.)	0.65	M.H.S. Ariyaratne
3.4.1 Development of high quality high demand broodstocks of export oriented ornamental fish industry in Sri Lanka	0.965	Dr. S.C. Jayamanna (Project leader) Dr. Palitha Kithsiri P.P.M. Heenatigala R.R.A.R. Shirantha
3.4.2. Increased diversity of live feed used in exportoriented ornamental fish industry in Sri Lanka (based at RRC Kadolkele)	0.320	Dr. S.C. Jayamanna (Project leader) M. Gammanpila
3.4.3 A survey of chemotherapeutants used in commercial ornamental fish farms and to formulate a database of their efficacy.	0.765	Dr. S.C. Jayamanna (Project leader) P.K.M. Wijegunewardene C. Hettiarachchi
3.5 Investigations on Ecology and propagation techniques of ornamental aquatic plants.	0.25	A.S.L.E. Corea

3.6 Examine the suitability of Puttalam lagoon for Euchema culture (based in RRC Kalpitiya.)	0.55	P.A.D. Ajith Kumara
3.7.3 Evaluation of viral diversity of *P. monodon* and the extent of vertical and horizontal transmission of WSSV with special emphasis on the potential risk posed using marine crabs as broodstock feed.	4.5	P.K.M. Wijegunewardene
3.7.4 Shrimp health and environmental monitoring	1.0	P.K.M. Wijegunewardene (Project leader) A.S.L.E. Corea
3.7.5 Investigation on shrimp bacterial disease in shrimp hatcheries and antibiotic sensitivity tests for selected bacterial pathogens.	1.45	P.K.M. Wijegunewardene (Project leader) P.P.M. Heenatigla
3.7.6 Identification and histopatho- logical study of farmed shrimp pathogens	1.0	P.K.M. Wijegunewardene (Project leader) C. Hettiarachchi
4.4.2 Study the abundance of native /endemic /threatened fish species in the streams and the co relation of the species with water quality and environmental factors	0.2	N. Sureshkumar (Project leader) M.H.S. Ariyaratne R.R.A.R. Shirantha
4.5.1 Feasibility of utilizing mangrove ecosystems for improvement of the livelihood of coastal communities	0.65	Dr. S.C. Jayamanna (Project leader) D.D.G.L. Dahahanayaka
4.5.2 Development of strategies for seascape management	4.46	Dr. S.C. Jayamanna (Project leader) D.D.G.L. Dahahanayaka A. Rajasooriya A.B.A.K. Gunarathna
4.53 Development of strategies for management of mangrove reserve at Kadolkele	1.04	Dr. S.C. Jayamanna (Project leader) D.D.G.L. Dahahanayaka M. Gammanpila

1.Component 3.1.2 : Study the reproductive biology of *Catla catla* and other dominant species in Udawalawe reservoir.

2. Objectives , activities carried out and results

Objectives:

- Investigate the following aspects of the reproductive biology of *Catla catla* and *Labeo rohita*

  1. The time and duration of the spawning season
  2. The annual reproductive cycle
  3. The sex ratio
  4. The size at first sexual maturity
  5. The fecundity
  6. The recruitment pattern

- Recommend suitable management strategies for sustainable optimum utilization of exotic cyprinid fish resources in the reservoir

Activities carried out:

- Fish egg samples were collected
- Fish eggs were analysed in the laboratory
- Reproductive biology parameters were estimated
- Water quality parameters were monitored

Results:

- *Catla catla* was the most dominant exotic carp species in the fish catches
- Contribution of *Catla catla* to the fish catches was higher than previously recorded.

Progress(%) Physical: 95% Financial : 37%

3.Constraints :

No vehicles in some months for field work

1. Component 3.2 : Stock assessment and determination of optimum exploitation levels for the fishery

2. Objectives , activities carried out and results

Objectives:

- Study the present status of the fishery of selected two reservoirs
- Assess the fish yield of two reservoirs
- Assess the fishing intensity of two reservoirs
- Determine the optimum exploitation levels for the fishery using standard stock assessment tools
- Disseminating the findings to the Ministry of fisheries for policy making

Activities carried out:

- Collection of fish length frequency data of two reservoirs
- Collection of fish catch data of two reservoirs
- Collection of fishing effort data of two reservoirs
- Feed data to the computers and standard stock assessment tools
- Manipulation of entered data

Results:

- Manipulation of entered data was finished

Data analysis are in progress Pl. give the conclusions according to objectives.

Progress(%) Physical: 94% Financial : 94%

3. Constraints :

No vehicles in some months for field work

1. Project and component 3.3 : Induced breeding of native fish species (*Clarias clarias* and Opheocephalus sp.)

Objectives, activities carried out and results

Objectives

produce fingerlings for stocking seasonal tanks and minor perennial reservoirs through mud ponds and minor nurseries to enhance the overall yield (final harvest) in the seasonal tanks/Mini perennial, reservoirs

Use induced breeding techniques to breed indigenous fish species.

activities carried

Completed construction of hatchery and brought samples brooder Clarius. Sp.

results

Progress(%) Physical: 80% Financial : 74%

1. Project and component 3.4: Development of technology for improving export oriented ornamental fish industry

Component 3.4.1 Development of high quality high demand broodstocks of export oriented ornamental fish industry in Sri Lanka

2. Objectives, activities carried out and results

Objectives :

- To develop technology for production of high quality broodstocks of endemic and exotic fish through selective breeding, management of environment and feeding strategy.
- To study the factors affecting the growth and export quality of exotic fish
- Introduce new varieties to market (continuation of experiments form 2006)
- Increase production of ornamental fish for export market.
- Ex-situ and In-situ Conservation of local wild fish stocks.
- Reduce poverty levels of rural communities by introducing new technology
- Evaluation of performance of new entrants to the industry.
- Identify problems facing the ornamental fish culturist in the country.
- Determine abundance and distribution patterns of endemic fish especially in the Kalu Ganga catchments area

Identify preferable habitat quality to develop brood stock quality to improve captivity breeding technology.

- Collection of brood stocks of highly threatened endemic fish species

Activities carried out:

1. Captive Breeding (from September to December - (Dr. H.M.P Kithsiri)

a. Factors affecting the reproductive performance of some endemic and exotic fish species were studied

2. Addressing problems of fish culturists (Mrs. P.P.M Heenatigala)

a. Questioner was developed to collect the data from ornamental fish cululturist.

b. Field visits were done for the ornamental fish farms and data were collected by interviewing the farmers with the help of questioner.

c. Field visits were carried out in the districts where the ornamental fish farms are available. The districts covered were Colombo, Polonnaruwa, Gampaha, Kaluthara, Kandy, Kegalle, Rthnapura and Puttalam.

3. Field Resource survey (Miss. R.R.A.R. Shirantha)

a. Field survey on the distribution, population sizes and habitat preferences of endemic fish in Kalu ganga catchments was initiated in July 2007.

b. A total of 25 streams flow through the Kaluthara and Ratnapura districts havebeen surveyed. A total of 5 streams in the Knuckle mountain region in the Matale district were surveyed.

c. At each stream approximate population sizes of each of the recorded endemic fish species were determined using *in situ* visual counting, 10 times hauling a 1 cm stretched mesh cast net and a scooped net.

d. At the same time some water quality parameters and other co-occurring fish species were also recorded.

Results:

A. Breeding

1. It was observed that the hatching rate of the eggs of oscar fish can be improved if the eggs are hatched in 3 ppm methylene blue and 27˚C water temperature.

2. High reproductive performance of *Puntius titteya, Puntiys nigrofaciatus* and *Puntius cumingii* were observed with coir breeding substrates.

3. High survival(%?) of gold fish and carp fish fry can be achieved with providing live feed such as *Moina*

B. Addressing problems of fish culturists

- According to the collected data from farmers the identified problems were

- The cost of production (Polythene, Feed, and Transport cost, Labor chargers, Cement and sand ect.) has been increased, but still the prices given for the product (fish) has not been changed.
- Difficulty to find market
- Difficulty to enter the export market.
- Difficult to survive in off season
- Difficulty to find good quality brooders and high price.
- Lack of good quality feed for fish.
- Lack of knowledge in disease and water quality management.
- Less government involvement
- Difficulty to get financial support to expand farms (Bank loans ect.)
- Difficulty to find labors

c. Field Resource survey

During the present survey 15 different endemic fish belong to five different families were recorded. However, endemic cyprinids were found to more abundant and widely distributed in the Horana, Matugama area within the Kalu river basin. The abundance and distribution of the endemic **killi** fish and belontid were also found to high in these areas. Few young individuals of endemic snakehead were recorded at the few streams in Padukka area. There were small fragmented populations (~1 individuals/m^2) of *Rasbora vaterifloris* in Baduraliya area indicating there low abundance than earlier recorded.

A significant number of individuals of *Puntius martenstyni* were recorded at the Kalu Ganga and Aban Ganga, tributaries of the Mahaweli River. However, population size of *P. srilankensis* was very poor (0.2 individuals/m^2) indicates its low abundance. It was found only at Knuckle mountain region in the Matale district. They were found to prefer comparatively cool waters (18-20 °C).

No any individuals of endemic gobies were recorded in the studied streams in the Kalu basin area. This indicates their very low abundance.

Most of endemic fish found to prefer more sheltered, shady streams with sandy to rocky substrates and good dissolved oxygen level.

3. Constraints:

Lack of labourers to maintain fish breeding tanks

- Lack of vehicles.
- The appropriate sampling could not be carried at some area due to rainy condition and unavailability of the suitable fishing traps.
- From November to December sampling and brooders collecting were temporarily stopped due to prevailing diseases condition.

Progress (%): **Physical:** 85% **Financial:** 100%

Component 3.4.2 : Increase diversity of live feed used in export oriented ornamental fish industry in Sri Lanka.

Objectives : Development of mass production techniques of highly nutritious live feed species/ water flea - *Moina micrura* in ornamental fish industry.

Activities carried out :

Indoor culture of micro algae - *Chlorella* sp. and *Tetraselmis* sp.

Out door mass culture of micro algae – *Chlorella* sp.
Comparable study of mass production of *Moina micrura* a by using micro algae and organic manure.
Monitoring water quality parameters
Development of algal culture unit at Kadolkele/RRC

Results : Significantly higher density (6.5 cells/ml) of water flea – *Moina micrura* obtained in media fed with unicellular micro algae – *Chlorella* sp. Present study indicated that micro algae with inorganic fertilizer media is more suitable for rapid reproduction and growth of the *Moina* than organic cow manure.

Progress : Physical : 75% Financial : 81%

Constraints : Delay of construction of tank facility in Kadolkele/RRC

1. Component 3.4.3 : A survey of chemotherapeutants used in commercial ornamental fish farms and to formulate a database of their efficacy.

2. Objectives, activities carried out and results:
Objectives :-

To develop a data base on chemotherapeutants used in commercial ornamental fish farms To recommend strategies for correct use of chemotherapeutants in aquaculture

Activities carried out and results :-

1. Preparation of the questionnaire
   A questionnaire was prepared to obtain information from ornamental fish farm owners specially about the diseases recorded in their farms and the chemotherapeutants used for those diseases as treatments.

2. Obtaining data
   About 125 ornamental fish farms were visited in the Colombo, Gampaha, Kalutara, Puttalam, Polonnaruwa, Kegalle, Ratnapura and Kandy districts and information were taken to fill the questionnaire.
   When particular disease symptoms were identified in some farms, fish and water samples were taken for further analysis.

3. Preparation of the database
   Based on the information collected during field circuits, a database was prepared with regard to the chemotherapeutants used in commercial ornamental fish farms. It includes data regarding

   a. Reported diseases in ornamental fish farms and Chemotherapeutants used to treat those diseases
   b. The dosage, duration and method of application for each chemotherapeutant
   c. Whether the chemotherapeutants are used as prophylactic or therapeutic treatments.
   d. The effectiveness of the chemotherapeutants

4. Analysis of samples

Fish samples and water samples were collected from the farms with reported disease symptoms (identified or unidentified diseases) and they were further analysed in the laboratory.
Identified fish diseases include 'carp sleeping disease', bacterial diseases such as Mycobacteriosis and parasitic diseases such as 'white spot disease'.

Progress %: Physical Progress : 90% **Financial Progress : 13 %**

3. Constrains :

As the field circuits are combined with other related projects of IARAD the financial progress is less. Most of the small scale ornamental fish farmers who are working as out-growers for large scale fish farms are having insufficient knowledge about the diseases of fish and chemotherapeutants used. This lack of knowledge was a restriction when obtaining data to fill the questionnaire

1. Project 3.5 : Investigations on Ecology and propagation techniques of ornamental aquatic plants

2. Objectives, activities carried out and results:
Objectives :

1. To study the Ecology and growth conditions of ornamental aquatic plants., and the resource availability and threats to their natural existence.

2. To Develop low cost technologies for mass production of commercially important aquatic plants., and improve their quality to suit the export market by using low cost methods.

Activities and Results

1. Growth conditions and ecology of plants.

2. Exotic plants were purchased and were grown using different fertilizers . No significant impact was observed between fertilizers but some fertilizers increased the snail attacks.

3. Study of conditions in field for indigenous plants were dependent on availability of vehicles for field studies. It was observed that some species of *Nymphea* were able to tolerate the pressure from aquatic weeds such as *Eichornia* and *Hydrilla*.

4. Two new species were introduced to NARA (One endemic species) depending on the vehicle availability for field work.

5. Production of maps and booklets

6. Maps on polonnaruwa plant distribution was completed on a 1: 50000 sheet and is being located in a digital map . Plants in Ampara were plotted on a 1:50000 sheet. Prepared text for booklet was lost due to the damage caused by heavy rains presently new text is being prepared on the plants in polonnaruwa area.

Discussion with AGA's on data collection

Galle and Matara districts did not show any response for this activity Some AGA divisions in the Kurunegala district provided some data but informed that they did not have sufficient time to go into details . They provided a list of places where aquatic plants could be observed and a list of places where aquatic weeds were observed.

Quality improvement in export oriented plants.
Use of minute doses of Copper sulphate helped in controlling snails in species with large leaves but plants with small or divided leaves were affected by the use of the chemical. Use of salt was not very successful as higher doses were required for a prolonged period which affected the plants too.

3. Constraints

Lack of vehicles , for field studies
Lack of necessary chemicals and other equipment for experiments
Delays in repairs after damage caused by heavy rains were some of the major constraints.

Progress %: Physical Progress : 80% Financial Progress : 99 %

1. Project 3.6

1. Component 3.6 : Feasibility of culture of introduced seaweed *Kapphycus alvarezii* (cottonii) in Puttalam lagoon.

Seaweed culture has a good market demand but is not a popular aquaculture practice in Sri Lanka. Of this world most popular sea weed species Cottonii species has a high demand. Therefore *Kappalycus alvarezii* (cottanii) was introduced for culture trials with the aim of popularizing seaweed culture in Sri Lanka and to introduce the species as an export oriented aquaculture practice.

Activities and Results :

Literature survey, Purchasing items required, Survey of sites, Collection of seaweeds, conducting trials, conducting workshops, Research reporting and preparation of a hand book were the activities planned.

2 exotic seaweed species and 2 local species were cultured in nursery plots at Kalpitiya Regional station. Grow out trials were carried out in Ethalai (20 km away from the Kalpitiya RRC). Some were stunted due to unfavourable conditions and as selected propagules were too old for culturing . At Ethalei growth rate was low (30%) but sea weed had good health.

Seaweeds were affected by ice- ice disease (rotting) epiphytes and by fish attacks. Juvenile parrot fish, rabbit fish and surgeon fish were observed to consume the seaweed (50- 80%) at depth less than 0.5 m.

After harvesting all rotten stems and foreign particles were removed and after washing with lagoon water seaweeds were dried at ground level and have been stored.

Constraints

1. Current knowledge on seaweed farming limited in Sri Lanka and capacity building is required.

2. No Research assistant at Kalpitiya to support the work.

3. Lack of communication and better understanding among government institution, NGOs which would enable team work.

4. Unavailability of vehicle and boat engine limiting mobilization of culture trials outside the station area.

5. Unavailability of refrigerator and oven causes problems in handling , storing and processing of seaweeds.

Progress %: Physical Progress : 90% **Financial Progress : 60 %**

1. Project: 3.7 Shrimp Health management Project

1. Component 3.7.3 : Evaluation of viral diversity of *P. monodon* and the extent of vertical and horizontal transmission of WSSV with special emphasis on the potential risk posed using marine crabs as broodstock feed.

Officer in Charge : P. K. M. Wijegunewardene

2. Objectives, activities carried out and results:

Objectives

- Investigations of viral diversity of different life stages of *P. monodon* in shrimp hatcheries and thereby evaluate the extent of vertical transmission of the disease.
- Screening of wild crustaceans (inhabitants around the grow-outs) for WSSV and other viruses to evaluate the diversity of the potential carriers impacting the shrimp farming industry.
- Investigation of the possibility of horizontal transmission of WSSV via infected crab meat fed to broodstock to formulate recommendations on feeding brooders with crab meat (next year).
- The results of the horizontal transmission via the broodstock feed will be validated with an experimental infectivity assay (next year).

Activities carried out

- Sampling was carried out from wild, hatcheries and farms
- Tender evaluation for procurement of chemicals, equipment and consumables were completed and purchasing is in progress.
- Arrangements were made to organize the infrastructure of the PCR laboratory and the work included setting up the lab cupboards, water systems, air-conditioning and electricity supply which were adversely affected by Tsunami in 2004 (after Tsunami this lab was out of function for several years.).

The lab work will commence as soon as the completion of the purchases requested.

Results

Analysis has not been done, as this is a two year project the collected samples will be analyzed in 2008.

Progress % **Physical : 85%** **Financial: 2 %**

3. Constrains

This project needs a PCR laboratory for analysis and it was destroyed due to Tsunami in 2004, which was not in operating condition to carry-out the project. Therefore the first year of the project was utilized to reorganize the facility. Also necessary equipment and chemicals were also not available to carry out the task.

1. Component : 3.7.4 Shrimp health and environmental monitoring

2. Objectives, activities carried out and results:
Objectives

Identify and find solutions to specific environmental issues caused by shrimp culture, study hydrobiological parameters in source , culture ponds and effleuents of shrimp culture in order to maintain good health in cultured shrimp, and study new additives to the shrimp industry and their impact on the industry as well as the surrounding coastal environment were the main objectives.

Activities & Results

Water sampling in culture ponds, effluent canals and estuarine system were carried out monthly. High loadings of Nitrite and ammonia observed some times.. Fish kills in estuarine system recorded during pond preparation periods Most problems were recorded after rains.During 2nd cycle and water quality changes with respect to salinity, pH, nitrite were observed in the estuarine system which may have affected cultured shrimp adversely.

Data collection on environmental changes, shrimp health and physical observation of cultured shrimp and information on disease spread was collected.
Growth retardation , low feed consumption , problems in developing algae, lethargic shrimp and some black gill conditions observed in some ponds Dead shrimp observed in harvested ponds in Southern Dutch canal and Mundel areas. During the 1st cycle. Confirmed WSSv infection. Farms operating Southt of Mundel affected by WSSV during the early parts of 2nd cycle. The environmental changes with the onset of rains contributed to poor health , which could be a result of any other disease condition.

Data collection on d artificial additives used in shrimp farms carried out during 2007
The chemical used by many farmers to treat ponds during pond preparation was the same that was used for killing shrimp in ponds during disease out breaks.s. Release of water containing the chemical may have resulted in the fish kills in the estuarine system.

Data collection on biodiversity in estuarine system, wild caught crustaceans and crab culture ponds for WSSV were carried out.

Results showed that cultured crab from ponds (sp – *Scylla serrata*) were negative for WSSV (PCR testing), before, during and after the WSSV in farms in adjacent areas.. Four commercially important species of shrimp were found in the estuarine system. From the wild caught shrimp samples *only Penaeus monodon,* was positive for WSSV, and this was during disease outbreaks in adjacent areas.

Progress % : **Physical** **75 %** **Financial 60%**

1. Component 3.7.5 : Investigation on shrimp bacterial disease in shrimp hatcheries and antibiotic sensitivity tests for selected bacterial pathogens

2.Objectives, activities carried out and results:

Objectives:

- Identify pathogenic bacterial flora in shrimp hatcheries.
- Evaluate the efficacy of presently used treatment systems to control bacteria
- Develop a data base of current usage of chemotherapeutant in shrimp hatcheries.
- Evaluate the efficacy of these drugs.
- Evaluate the most suitable antibiotic to treat different pathogenic bacterial species.

Activities carried out:

- Research assistant was trained to carry out the bacteriological analytical work of the project at University of Peradeniya.
- Work on Procumbent of chemicals, consumables and equipment has completed.
- Questioner was developed to collect the required data from hatcheries.
- Samples collected from hatcheries using different treatment systems were analysed for bacterial presence .
- Due to the monsoon rains, bacteriology laboratory of the division was damaged and instruments in the laboratory also damaged. Therefore analytical work of the project couldn't carried out as scheduled. How ever in hatcheries, water samples subjected for the different treatments (UV, Chlorination and filtration) in were collected and bacteriological analysis were carried out with available facilities.

Results:

- In some hatcheries bacteria were recorded in UV treated water.

Progress (%): **Physical:** 60 % **Financial:** 05%

3. Constraints:

- Delay of laboratory renovation work.
- Delay of equipment repairs.
- Lack of vehicles.

1. Component 3.7.6 : Identification and histopathological study of farmed shrimp pathogens

2. Objectives, activities carried out and results:

Objectives:

- To develop reference material which will be useful for the industry and also as teaching aid at NARA

- To upgrade the disease diagnostic capabilities at NARA

Activities carried out and results :

a. Lab development
The histopathology laboratory has been constructed with the essential requirements to carry out histopathological studies.

b. Procurement of chemicals and consumables
Essential chemicals and consumables for the histopathological preparations were taken from a special cash advance while the others were obtained through the tender procedures.

c. Sampling
Shrimp brooder samples were purchased during the field circuits to Chilaw, Negombo, Hendala and Kalutara areas. The size, behavioural patterns, external features and disease symptoms (if any) of the brooders were recorded. Also the area and the method of collection were recorded.

Shrimp postlarvae were sampled from the operating hatcheries (about 25) in Ambakandawila and Iranawila areas. Data were taken from hatchery owners regarding the disease, feed and water quality management in the hatcheries.

Shrimp sub-adults were sampled from Muthupanthiya, Vairankattuwa, Karukkupane, Udappuwa, Madurankuliya, Pinkattiya, Pulichchikulam, Manathivu, Mangalaeliya, Arachchikattuwa, Bogahawetiya and Palavi areas. Data were taken from the grow-out farmers with regard to the facilities in the farm, management strategy and records of any diseases.

d. Analysis of samples
Histopathological slides were prepared from the collected samples to diagnose any disease symptoms in the shrimp tissues. Characteristic features of White Spot Syndrome Virus (WSSV) were identified from several shrimp samples collected from Pulichchikulam, Pinkattiya, Udappuwa and Mangalaeliya areas in August – December time period. These slides are used as reference material for future studies.

Physical Progress : 85 % **Financial Progress : 14 %**

4. Constrains

Due to the constructions of the laboratory, some samples could not be analyzed. As this is a two year project those samples will be analyzed in 2008.

1. **Project and component:** Upper Mahaweli Project- component 4.4.2 (2007)

Component 4.4.2: Study abundance, diversity and feeding habits of native/endemic fish and other macro fauna in streams of the Mahaweli upper catchments and their co-relation to water quality and some other environment factors.

2. Objectives, activities carried out and results:

Objectives:

1. Determine abundance and feeding habits of endemic/native fish and diversity of aquatic macro fauna co-relation to water quality parameters in selected streams of the Mahaweli upper catchment area.
2. Identify suitable organisms which can be considered as bio-indicators.
3. Identify possible threats to the aquatic biodiversity in the streams of the Mahaweli upper catchments especially to endemic fish fauna.
4. Study the possibility in aquaculture practices in the Mahaweli upper catchments area.

Activities:

1. Sites selection was carried out in March 2007.
2. A total of 38 sampling covering 3 major sub catchments namely; Budullu-Oma Oya sub catchments, Agara, Nanu and Puna Oya sub catchments and Hatton-Kotmala Oya sub catchments have been selected.
3. Each sampling site was monthly visited from April 2007. *In situ* visual counting was made on some aquatic fauna within determined area and benthic samples were randomly collected following a stone lifting method 5 times and hauling/scooping a fine meshed scooped net 10 times.
   In the laboratory, collected faunal samples were identified as much as to possible taxa and then quantitative analyses (abundance) were performed.

Results:

During the present study different aquatic faunal taxa belong to five different phyla were recorded. However, the macro invertebrate diversity was found to be higher and widely distributed compare to that of vertebrate. The aquatic insects were found to more diverse and dominant.

A single turbellarian taxon (a triclad) was found beneath the stones and leaves in which leaf debris and other decaying vegetation matters were high.

Oligocheates were very little diverse and found to be inhabited the bottom ooze and debris.

Considerable number of individuals of plecopterans (two different taxa) and ephemeropterans (more than 10 taxa) were constantly recorded at most of the streams indicated their good water quality.

The diversity of odonata (dragonfly and damselfly), a moderate water quality indicator was evidently high and found to aggregated on exacting micro-habitats where aquatic vegetation cover densely clogged leaf debris and other decaying matters.

Three dipteran families were recorded and the Chironomid found at 10 sampling sites at the Budulu-OmaOya and Agara, Abewela-puna oya sub catchments. However, the uppermost outlet of the Abewela reservoir which is constantly contaminated with cow don and other poultry animal's don and empty into to the Abewala Oya recorded the highest density of chironomid larvae. It was 43.75 individuals/m^2 in May 2007.

The decapods crustaceans of the family Palaemonidae (*Macrobrachium* sp.) recorded at one sampling location at Budulu Oya mouth and the Atyidae shrimp *Caridina* recorded at five sampling locations indicating their moderately low distribution pattern within the upper Mahaweli catchment area.

The different taxa of hemipterans (water bugs), coeleoptérans (beetles), lepidopterans (moths and butterfiles), tricopterans (caddisfly), and aquatic arachnidans were recorded at different sampling locations indicating their diverse distribution patterns with the Mahaweli upper catchment area.

Garra ceylonensis was the only endemic fish species recorded at the sampling locations at the Nanu, Agara and Puna Oya and Abewela sub catchments. Few other endemic cyprinids namely, *Puntius nigrofasciatus*, *P. cumingii, P. singhala* and *Clarias bracysoma* were recorded at some streams in the Hatton-Kotmala Oya sub catchments. However, their population sizes and distribution were appeared to be very low and poor.

Present study clearly indicates that sand and gem mining, improper use of agrochemicals and soil erosion due to poor agricultural practices vigorously pose threats to aquatic biodiversity in the streams of the Mahaweli upper catchments especially to endemic fish fauna.

Progress (%) **Physical: 90 %** **Financial:55%**

Constraint:

1. The appropriate sampling could not be carried at the Uma oya mouth which empty into the Randenigala reservoir via wild life sanctuary due to security purpose.
2. In September and October 2007, proper sampling at few sampling sites at the Agara, Nanu and Puna Oya catchments could not be carried out due to rainy weather condition, high flow rate and high water turbidity at the sampling locations.
3. Taxonomic status of some benthic fauna colleted during the study period could not be confirmed due to lack of aquatic insect identification keys, exclusive studies on them and unavailability in literatures on local/regional basis bio-monitoring studies in rivrine habitats in Sri Lanka.
4. Due to very poor population sizes of the endemic fish at the studied sites, the gut content analysis was not carried out as it could directly lead to reduce/degradation their wild populations.

1. Project and component 4.5 : Development of Conservation strategies for mangroves through Integrated Management

Component 4.5.1 Feasibility of utilizing mangrove ecosystems for improvement of the livelihood of coastal communities

2. Objectives, activities carried out and results :

Objectives

- Conservation of mangrove ecosystems
- Utilization of unexploited natural resources for development
- To improve livelihood for coastal communities

Litreture survey was carried out. Rekawa-**Kahadamodara**, Maravila-**Nainamadama**, Ambalangoda-**Madampe Lake** were selected for study as a result of preliminary survey. Questionnaire survey for collection of data on indigenous knowledge on mangrove was carried out and completed in these 3 study sites. Monthly collection of data and samples were carried out in these sites. Results indicate the coastal communities in the above areas are not using the mangrove ecosystems to uplift their livelihoods. The benefits derived by coastal community of study sites from the mangrove ecosystems are limited to extraction of timber, firewood, construction of fish aggregation devices and extraction of molluscs, finfish and shellfish for food. Fruit of *Sonneratia* is used for making a cool

drink while leaves of *Acrostichum aureum* is used as vegetable. Toddy tapping is initiated using *Nypa fruticans* at experimental level in Nainamadama area. Arrangements were made to analyze palm toddy samples (Brix Index, known sugar contents and alcohol percentage) with ITI.

Reslts

In total, 29 mangrove species were recorded, including 18 considered as true mangroves (Table 1). Thirty three other types of vegetations including shrubs were noted. Families with highest abundance of mangroves were Rhizophoraceae, Avicenniaceae and Combretaceae with identical zonal distribution towards the inland, respectively. *Lumnitzera racemosa* and *Avicennia marina* were dominated in families of Combretaceae and Avicenniaceae, respectively. *Rhizophora apiculata* and *R. mucronata* were the most abundant in family Rhizophoraceae while other members included *Bruguiera gymnorhiza*, *B. sexangula* and *Ceriops tagal*. Mangrove associates were found towards landside with high abundance of *Premna integrifolia*, *Derris scandens* and *Acanthus ilicifolius*.

There is high population of low income families surrounding this ecosystem and are therefore vulnerable to destructive activities such as extraction of firewood for cooking purposes, cutting branches for attracting and trapping fish in "brush-pile fishing", extraction of poles and rafters for roof construction and timber to build cottages etc. Increasing of invasive alien floral species, deposition of the garbage such as polythene and plastics due to tidal activities of the estuary, found to be the other threats to this site.

*Endemic species † introduced species

The fish consisted of 35 Species belongs to 27 families. The fish include freshwater forms, brackish water forms, fresh-brackish water forms and marine- brackish migratory species. The typical fresh water species included Murrel (*Channa striata)*, Walking cat fish (*Clarias brachysoma*). Most of the fish species in Kadolkele are typical brackish water forms such as the ambassids (*Ambassis commersoni*), Mono (*Monodactylus argenteus*), Target fish (*Terapon jarbua*), Mud skipper (*Periopthalmus koelreuteri*), Milk fish (*Chanos chanos*). The migratory species include both "anadromous " species (marine species which move in to brackish water/fresh water for spawning or to spend their juvenile period) and "catadromous" species (species that migrate from fresh water to marine water for reproduction). The short-finned Eel (*Anguilla bicolor bicolor*) and Sea bass (*Lates calcarifer*) are major catadromous species, while anadromous species include snappers (*Lutjanus argentimaculaus*), Trevally (*Caranx spp.*), Silver biddy (*Gerres filamentosus*) barracuda (*Sphyraena jello*) (Bambaradeniya, 2002). *Oreochromis mossambicus* is the most abundant exotic species in the kadolkele mangrove reserve. Shellfish species representing 4 shrimp species, fresh water prawn (*Macrobrachium rosenbergii)* and crab species *Scylla serrata.*

3. Constrains : Process of tapping palm toddy (*Nypa fruticans*) failed in some months due to heavy rains and lack of skilled laborers/ tapers

Progress %: Physical Progress : 90% Financial Progress : 49

1. **Component 4.5.2 : Development of strategies for seascape management**

2. **Objectives, activities carried out and results :**

Objectives

- Integrated management of coastal ecosystems
- To improve livelihood for coastal communities

Literature survey was completed. Sea grass beds, Coral reefs & mangrove ecosystems are identified in Puttalam lagoon as interaction between fisheries.
Sampling of Sea grass beds was carried out using 1m X 1m quadrate to determine the spatial variations and present cover. Species of sea grasses were identified using available keys and associated other fauna and flora was also recorded. 12 locations of the lagoon were sampled including Sallianpiddi, Mottuwarama, Eramathiv, Picchankaliya and Anawasala. Geographical locations of sampling stations were recorded accurately using hand held GPS. Water depth and associated fauna also noted. Result indicate there is a patchy distribution of sea grasses and *Enhalus acroides, Cymodocea serrulata* and *Cymodocea rotundata* was the most abundant sea grasses.
Sampling of mangroves were carried out in Mottuwarama, Anawasala, Sotthupitivadiya, Narikuda, Anawasala and Palaviya areas.

Fish landing sites of the Puttalam lagoon were monitored for determine fish catch associated with sea grass beds and also determine seasonal changes of the catch.
Fishing gears operated at the area also monitored. Species data, total length data and gear types were recorded. Those areas were Anwasalai, Thorawadiya, Vannimudalama, Mandulakuda, Kurringanpitiya, Sotthupitiya and Plalaviya.

Reef component of the sea scape management project covered by Coral Reef Research Programme NARA. Please refer the report of Coral Reef Research Programme for detail. Bar reef survey were done for monitoring any coral bleaching.

Progress %: Physical Progress : 90 % Financial Progress : 08 %

1. **Project and component :**

Component 4.5.3 : Development of strategies for management of mangrove reserve at Kadolkele

2. **Objectives, activities carried out and results** :

Objectives

- Introduce a management plan for mangrove reserve at Kadolkele, Negombo
- To improve the knowledge on the biodiversity of mangrove reserve
- Provide information required to declare the mangrove reserve of Kadolkele as a conservation zone

activities carried

Mangrove nursery is maintained with 5000 mangroove plants belonging to different species. Collection of data on biodiversity of mangrove was carried out, sampling on microbenthic and epibenthic fauna was carried out. 35 fish Species belongs to 27 families have been identified, freshwater prawn and 4 species of shrimps were recorded. Vegetation data were collected in 100 m^2 (10 m x 10 m) plots along three transects. Each transects extended inland from the shoreline. A quantitative study of the vegetation (true mangroves, mangrove associates, other trees and shrubs, seedlings and saplings) was conducted and identified using the keys and descriptions given by Arulchelvam (1968), Pinto (1986), Tomlinson (1986), Senaratne (2001) and de Silva & de Silva (2006).

The anthropogenic activities carried out in the area were also noted. In total, 29 mangrove species were recorded, including 18 considered as true mangroves. Thirty three other types of vegetations including shrubs were noted. Families with highest abundance of mangroves were Rhizophoraceae, Avicenniaceae and Combretaceae with identical zonal distribution towards the inland, respectively. *Lumnitzera racemosa* and *Avicennia marina* were dominated in families of Combretaceae and Avicenniaceae, respectively. *Rhizophora apiculata* and *R. mucronata* were the most abundant in family Rhizophoraceae while other members included *Bruguiera gymnorhiza*, *B. sexangula* and *Ceriops tagal*. Mangrove associates were found towards landside with high abundance of *Premna integrifolia*, *Derris scandens* and *Acanthus ilicifolius*.

Progress %: Physical Progress : Financial Progress : 32 %

3. Extension work

1. Conducted lectures for the NARA training course on "Ornamental fish culture and management
2. Water quality testing services for Ornamental fish culture and food fish culture
3. Provided endemic and exotic fish broodstock for small scale and medium scale fish farmers
4. Provided live feed (*Moina*) samples for fish breeders
5. Participated as the Chair person of the National young scientists forum of the Ministry of science and Technology
6. Lecture and a practical session carried –out at the Aqua Services (Pvt) Ltd for Zoology special students at Rajarata University on PCR technology organized by NAQDA.
7. Participated as a resource person for NIFNE staff on introduction to ornamental fish diseases November 14-16th 2008.

8. Report prepared following an investigation conducted consequent to a request made to Director General, NARA by the Ministry of Sports and Public Recreation, dated 01.03.2007 on the fish kill at the National Zoological Gardens, Dehiwala. .

9. Training of undergraduates on introduction to ornamental fish diseases and PCR technology for disease identification.

10. Disease diagnosis of ornamental fish when samples were submitted to NARA and advice on prevention and control.

11. Provide samples and technology for several ornamental fish farmers
Provide information and assistance to Hambantota salt cooperation regarding *Artemia* culture.

12. Provide assistance and mangrove plants for re- plantation programmes (several government and non government organizations)
Delivered speech and contribution to Rupavahini programme "Thru mithuru"
Delivered speech to Net FM radio programme
Organized exhibition works

4. Other activities

1. Participated in the preparation of Monthly Progress Reports from May 2007, Performance
2. Report for the budget speech and Action Plan 2008 of NARA Institute.
3. Work at Ocean Observation Centre at NARA
4. Served as a EDB selection committee member to select participants for Interzoo 2008 (22.11.2007)
5. A fish toxicity study of a microbial control agent (*Bacillus thuringiensis*) was carried out for endemic and exotic ornamental fish species with Industrial Technology Institute
6. Participated as TEC member for more than 25 tender evaluations and reports were prepared on procurement of chemicals equipment and consumables.

7. Participated as TEC member for purchase of equipment for AIDA project (grant from Spain).

8. Member of the organizing committee of the 25th anniversary celebrations at NARA

9. Development of histopathology laboratory and PCR laboratory for IARAD.

10. Development of disease diagnostic skills of officers in IARAD (Microbiology and Biotechnology).

11. Actively participated in the development of infrastructure facilities in IARAD.

12. Providing comments and suggestions for the cooperate plan of NARA for the next 10 years and for proposals on NARA reforms.

13. Participated as a committee member in Technical committees for Shrimp culture, Shrimp farm authorization and hatchery authorization, Shrimp farmers loan evaluation committee, and meetings on shrimp farming.

14. Participated in Ornamental fish and aquatic plant exporters meetings at EDB

15. Providing reports on site feasibility studies , fish kills, etc on requests

16. Providing information on ornamental fish culture, Aquatic plants, shrimp culture, food fish culture, water quality management and disease management on request to Govt. Departments, Students, and farmers

17. Participated in formulation of Project proposal and work plan for important plant areas in Sri Lanka

18. Work at Fishery Forecasting Project

5. Awareness programmes

1. Two ten days ornamental fish breeding, culture and management trainings were conducted for small scale and medium scale ornamental fish farmers to provide technical and research findings achieved by NARA (January, November and December 2007)

2. Three days training programme on ornamental fish breeding and disease management was conducted for NIFNE officers (14, 15, 16 November 2007)

3. Ornamental fish breeding and culture training programme was conducted on 30.11.2007 for trainees at Vocational Training Authority of Sri Lanka.

4. Attended CARP livestock and aquaculture committees

5. A research project on endemic and exotic fish breeding and culture was submitted to CARP to explore the possibility to obtain external funding

6. Increase the awareness of associated fishing communities in selected sites about usage of mangroves and conservation of the ecosystem during the field visits.

7. Lectures and practical classes of ornamental fish culture and management training programmes conducted by NARA.

8. Awareness programmes for school/university students/government and non government organizations.

Field study camp

Publications/Abstracts

Wijegoonawardane P. K.M. , J. A. Cowley and Walker .P. J. (2007).Development of a consensus RT-nested PCR to detect genotypic variants of yellow head virus identified in geographically isolated populations of *Penaeus monodon*. In. Book of abstracts of International Conference on Tropical Aquatic Research Towards Sustainable Development. National Aquatic Resources Research and Development Agency Crow Island Mattakkuliya Colombo 15-16 February pp8

Corea A.S.L.E. Distribution of Aquatic weeds and its impact on selected natural water bodies in the Polonnaruwa and Ampara districts; In. Book of abstracts of International Conference on Tropical Aquatic Research Towards Sustainable Development. National Aquatic Resources Research and Development Agency Crow Island Mattakkuliya Colombo 15-16 February

Corea A.S.L.E. Recent trends in shrimp farm performanceand culture environment with special reference to shrimp health, In. Book of abstracts of International Conference on Tropical Aquatic Research Towards Sustainable Development. National Aquatic Resources Research and Development Agency Crow Island Mattakkuliya Colombo 15-16 February

Corea A.S.L.E. Comparison water quality changes and disease symptoms in shrimp culture observed during three major floods in the North western province, In. Book of abstracts of Annual sessions of Sri Lanka Association for fisheries and Aquatic resources

Heenatigala P. P. M, Pushpakumara, J., & L. Wickramasinghe A study of ectoparasitic infections related to environment conditions in fresh water ornamental fish culture systems at Kalutara area, In. Book of abstracts of International Conference on Tropical Aquatic Research Towards Sustainable Development. National Aquatic Resources Research and Development Agency Crow Island Mattakkuliya Colombo 15-16 February

Dahanayaka, D.D.G.L. & W.A. Sumanadasa (2007) Floral composition and vegetation structure of NARA mangrove reserve, Kadolkele, Sri Lanka .and guidelines for conservation, Proceedings of the International Forestry and Environment Symposium 2007 of the Department of Forestry and Environment Science, University of Sri Jayewardenepura, Sri Lanka: 25-26 pp.

Dahanayaka, D.D.G.L., S.C. Jayamanne & M.J.S. Wijeyaratne (2007) Polychaete Diversity in a Tropical Estuarine Ecosystem, Thirteenth Annual Scientific Sessions, Sri Lanka Association for Fisheries and Aquatic Resources (Abstract): p 8.

Jayamanne, S.C. & D.D.G.L. Dahanayaka (2007) Post tsunami recovery of fauna and flora of the Barberyn reef, Beruwala, Sri Lanka, Proceedings of the 25th Anniversary Scientific Conference of NARA on Tropical Aquatic Research Towards Sustainable Development, 15th to 16th February 2007 Sri Lanka: p 34.

M. Gammanpila (2008)Mass production of water flea – *Moina micrura* in fresh water ornamental fish culture. Abstract has been send for oral presentation of 64th annual scientific sessions of Sri Lanka Association for the Advancement of Science (SLAAS) held on 01st – 06th December, 2008.

Abstract has been send for oral presentation of 64th annual scientific sessions of Sri Lanka Association for the Advancement of Science (SLAAS) held on 01st – 06th December, 2008.

Research papers

1. Heenatigala P. P. M., Jayasinghe C. V. L. and Jayasinghe J. M. P. K. (2005) Development of a soup mix using *Leognathus splendenns*, Nelum and Kohila for pre school children. Jouranal of NARA, Volume 37

2. Dahanayaka, D.D.G.L. & S.C. Jayamanne & S.U.P. Jinadasa (2007) Preliminary investigations on the abundance, distribution and diversity of benthic invertebrates and sediment texture in marine environment of Palk Strait, off Jaffna, Sri Lanka. Journal of National Aquatic Resources Research and Development Agency (Accepted)

Complete paper already prepared for SLAAS annual publication.

Leaflets and Booklets

Leaflets and booklets – "Problems arising in ornamental fish culture" - (M.G. I S. Parakrama, P. P. M. Heenatigala)
Printing work of the above booklet was completed and 2000 Booklets were received to NARA

Digital display boards

- Reports

1. Report prepared on the fish kill at National Zoological Gardens, Dehiwala.
2. Report on the Reference Laboratory (RRL for white Tail Disease 2nd February 2007). Submitted to The Department of animal Production and Health.
3. A report on possible threats and feeding biology of a alien invasive fish species *Chitala ornata* was made and sent to the Wild Life Conservation Department of Sri Lanka.
4. Report on the Crab culture practices in North Western province and present status of White spot virus in cultured crab submitted to the ministry of fisheries and aquatic Resources.
5. Maintain mangrove reserve at Ranweli holiday village at Waikkal.
   Paper articles (Divaina, Meepura)

Participation at workshops

- Workshop on the Ocean Observation Center at NARA and its Contribution towards Ocean Research and Environmental Security held at NARA on 13th September 2007.
- Stakeholder Consultation Workshop for Preparation of Annual Research Programme held at NARA on 14th December 2007.
- Workshop on Use of internet for Research and Literature reviews (Scientific purposes) for young scientists organized by the Young scientists forum. 18th December 2007
- Workshop on skills development for young scientists organized by the Young Scientists Forum of National science and Technology commission at Peradeniya 25th july 2007

- Workshop on important plant area identification and evelopment of a projectproposal for their conservation at Kandy 4th to 6th July 2007

- Stake holder Workshop on research activities to be undertaken and capacity building of the Coast conservation department and National Aquaculture development autority.

- Participated international conference on " Mangrove Restoration, Livelihood Development and Eco-Tourism" organized by Global nature funds, EMACE Foundation and Nagenahiru Foundation at Bentota Beach Hotel, Bentota on 25-26th April 2007.

Trainings (Overseas)

- UNU-INWEH-UNESCO International Training Course on Coastal Biodiversity in Mangrove Ecosystems, Annamalai University, Centre of Advanced Study in Marine Biology, Parangipettai, India from 12-26, November 2007.

National

- A training programme on Disease Control in Ornamental / Food Fish Industry held by SLAFAR at Aquaculture Development Centre, Rambodagalla from 06-08th June.

- A training course in Project Cycle Management held by ICEIDA and Ministry of Fisheries and Aquatic Resources at Wadduwa from 27 – 30th September.

- A training programme on PCR technology held by GENETECH Institute at Colombo in October (18,19,24,26) and November (1,2,8,9)

- Training programme on laboratory diagnostic of bacterial disease in Aquatic animals University of Peradeniya 19th – 23rd September 2007

International symposium

National symposium

Participated in Annual sessions of Sri Lanka associations for advancement of science

Participated in Annual sessions of Sri Lanka Association for fisheries and Aquatic resources

Participated in Annual sessions of Institute of Biology – Sri Lanka

Information Technology Division

Head of the Division – Mr A B A K Gunarathne

1. Overview of the year:

The Information Technology Division is responsible to provide an IT platform for information gathering, processing, sharing and dissemination among all stakeholders for management, conservation and development of aquatic resources.

The Division working with computer application development, providing of Internet services, Geographic Information Systems (GIS), Remote Sensing, modeling and training in computer applications.

The division carried out two treasury funded projects and two external funded projects. Additions to those Division was participated to training of the ministry officers on Project Cycle Management, activities at Ocean Observation Centre and Potential Fishing Forecasting Project

Two staff members resigned from the division and no replacement for the officers allowed by the Treasury.

2. Activities undertaken:

Programme	Project	Allocation (Rs.M)	Officer Responsible	Period	
				From	To
1. IT Application Development and Support	1.1 Development and upgrading of NARA website and other Internet Services		A.B.A.K. Gunaratne	continuous	
2. GIS and Remote Sensing	2.1 Development of GIS and Remote Sensing strategies for the Management of sensitive coastal habitat with reference to Negombo Lagoon and Rekawa Lagoon		A.B.A.K. Gunaratne	2003	2007

3. Performance

NARA Projects

Project 1.1 Development and upgrading of NARA website and other Internet Services

Main objective of the project is to disseminate the information via World Wide Web and to provide other Internet services for scientific staff of NARA and its stakeholder with a view of facilitating information sharing. Expected Target was achieved (100 %) during the period. New e mail system, a FTP site, online sea level browsing facilities from Colombo, Kirinda and Trincomalee tide gauges were the major task completed. Establishment of central storage

system to address data recovery in a disaster also completed. Steps have been taken to modify the NARA website applying web tool 2.0 allowing stakeholder communities to participate for online discussion and publishing their information. Implementation of the upgraded version of the website is expected to finish by September 2008.

Staff engaged with PC repairing and upgrading work.. Inform Database that used to evaluate research cost of the institutions engaged in CARP network, was submitted to CARP.

The division involved with printing work for different workshop held at NARA during the year.

The division received recommendation to prepare IT Policy from Criminal Investigatation Department of the Sri Lanka Police. After investigation of the e mail fraud occurred regarding foreign training.

Progress (%) : Physical 100 Financial: 100

Project 2.1: Development of GIS and Remote Sensing strategies for the Management of

Sensitive area in the Negombo Lagoon

The main objective of the study is to develop methodologies that can be applied for coastal zone planning in Sri Lanka using Remote Sensing and GIS. The study was completed. The image classification conducted to identify elements in sub aquatic zone improved by introducing modification to water column correction methods.

Progress (%) : Physical 100 Financial: 100

Externally funded Projects:

1. NAQDA funded project on zoning for shrimp farm development in Batticaloa District;

The project was completed. Results showed the suitable area for shrimp culture development both to setup hatcheries and farms. It was identified 2186 hectares can be developed as shrimp farms. The final report submitted to the NAQDA

2. NAQDA funded project on zoning for shrimp farm development in Batticaloa District;

The project was initiated on month of July. Data collection was seriously affected with security condition. However at the end of the year the total project progress was 60 %

3. Publications:

A.B.A.K. Gunaratne, Zonal Plan for Development of Shrimp farm in Batticaloa District.14 October, 2007

4. Training / Awareness programmes conducted:

1. Mr. Janaka Lokugamage participated to the Network Administration certificate programme which was conducted by the National Institute of Business Management (NIBM)

2. Mr. A.B.A.K. Gunaratne attended to training on Project Cycle Management from 19th March to 04th April 2007 in Iceland.

3. Mr. A.B.A.K. Gunaratne participated to training on Marine Explorer (software on Marine GIS) from 9th to 14th December in Japan.

4. Participated to three training programme conducted to Senior Managers of Ministry of Fisheries and Aquatic Resources on Project Cycle management as a resource person

5. Two workshops were conducted to obtain views of the stakeholders and general public on finalization of the zonal plan on shrimp culture at Batticaloa District. The first workshop was held in Batticaloa for local administrators, stakeholders, NGOs, INGOs and shrimp farmers on 4th April 2007 and second workshop was conducted to official of the central government those involve with environment aspects and planners.

6. Ms. Neranga Kalasinghe participated to demonstration on Domino mail system on 14th May 2007 sponsered IBM.

7. Ms. Neranga Kalasinghe participated at the National workshop on Spatial Data Infrastructure on 18th May 2007 in BMICH, Colombo.

5. Other Activities

1. INFORM database was submitted to Council for Agriculture Research Policy. (CARP)

LIBRARY AND INFORMATION DIVISION

Head of the Division /Chief Librarian(Actg.): Ms. S.R.V. Rupasinghe

1. Overview of the year:

The Library and Information division plays a key role to ensure the collection, dissemination and publication of information useful for the research and development activities of the aquatic industry. The Library is mainly focused in collection, organizing and dissemination of information in complementing research studies by innovation and motivation of the scientist's mind through access to scientific knowledge disseminated through various information resources.

2. Activities undertaken:

Programme	Project	Allocation (Rs.M)	Officer Responsible	Period From To
1. Library and Information Division	1.1 Establishment of integrated Network Library & Information System to serve Aquatic Resources Sector in Sri Lanka	0.285	V. Rupasinghe O.K.P.Nandana S. Liyanarachchi	Jan. Dec. 2007
	1.2 Acquisition of Library Resources 2007	1.215	V. Rupasinghe O.K.P.Nandana S. Liyanarachchi	Jan. Dec. 2007
2. Publishing	2.1 Publishing Scientific Journal information related to Continuous Fisheries & Aquatic Resources NARA Journal	0.4	S.C.Jayamana N.Sureshkumar O.K.P. Nandana	

3. Performance :

Project 1.1

Objectives of the project were (a). To enable whoever interested to receive information on National Aquatic Resources and have access without visiting the NARA Library and (b) to make the available Library information in Multimedia fulfill their user needs and access information relevant to their specific needs.
Access to Computerized Bibliographical database provided through NARA web site for interested parties Web site : nara.ac.lk.

Library has provided services for the undergraduates and Scientist who came from different institution total numbers of users were 900.

Progress Physical – 60% Financial – 70%

Project 1.2 Acquisition of Library Resources

The List of Journals are given below:

Journals :

1 Aquaculture

2 Fisheries Research

3 National Geographic

4 Marine Pollution Bulletin

5 Estuarine Coastal and Shelf Science

6 Ocean and Coastal Management

Progress Physical – 50% Financial – 50%

Project 2.1 Publishing Scientific Journal.

(1) NARA Journal Volume 38:

Final draft of the vol.38 was prepared and forwarded to Prof. S.Ranaweera of Waymba University for final editing.

(2) NARA Journal Volume 39:

Editorial Committee of NARA Journal decided to issue special edition of NARA Journal based on proceedings of 25th Anniversary conference.

Authors were called to submit full papers of presentations.

Progress Physical – 70% Financial – 35%

Marine Biological Resources Division

Head of the Division: Dr. Champa Amarasiri

1. Overview of the year

The Marine Biology Resources Division (MBRD) is responsible to carry out research towards management, development and conservation of marine living resources. The research projects carried out by MBRD in 2007 included,

- Management oriented research projects on coastal and offshore fisheries
- Conservation of coral reefs and threatened marine fauna
- Genetic studies on marine fisheries

Nine research projects were conducted by MBRD in 2007. The division took part in providing recommendations in settlement of resource utilization related disputes. MBRD is in the process of capacity enhancement of the staff for marine resource survey which has been planned to conduct during 2008 - 2010. Undertaking this resource survey during this period is the main responsibility of MBRD.

2. Activities undertaken

Project	Allocation	Officer responsible	Period	
	Mn Rs.		From	To
1.1: Monitoring of offshore fisheries	1.50	C. Amarasiri	2007	(Continuous)
1.2.1: Monitoring of small pelagic fisheries in the western, north western, eastern & southern coasts	0.80	S.S.K. Haputhantri	2005	2008
1.2.2: Investigate the optimum fishing capacity for sustainable development of coastal resources in the Hambantota district	1.00	S.S.K. Haputhantri	2007	2007
1.3 Monitoring of lobster fisheries in southern and eastern coastal waters Based at RRC – Rekawa	0.450	U. Liyanage	2005	2010
3.7.1: Assessment of the availability and suitability of *P. monodon* brood stock resources for shrimp farming	0.80	C. Amarasiri (R.P.P.K. Jayasinghe)	2007	2008

industry and development of an efficient fishing gear for collection				
3.7.2: Investigation of genetic diviersity of *P. monodon* shrimp stocks captured in different geographical locations in Sri Lanka using gene segments of cytochrome c oxidase 1 (COI) in the mitochondrial control region.	2.50	D.N.A. Ranmadugala	2007	2008
4.2 Conservation and management of coral reefs	0.80	A. Rajasuriya	2006	2007
4.3 Rresearch and conservation of marine mammals	0.50	A. Rajasuriya	2007	2009
7.4 Upgrading of marine museum	1.00	C. Amarasiri	2007	2010

3. Performance

Project 1.1.Monitoring of offshore fisheries

The objective of this project was collection of fish landing data on large pelagic fishery for production estimation and stock assessment. The data collection was carried out at major landing sites in western, southern and eastern coasts from Kalpitiya to Trincomalee at six major landing sites. Catch and effort data for different craft types, length-frequency data, species composition and other fishery related biological information were collected and entered into the large pelagic database (Pelagos). In this process, offshore multiday and coastal longline fishery were considered separately and the data were analysed and production estimations were made for different species concerned in harbour wise, vessel wise and area wise. The production estimations show an increase in total large pelagic fish production with increased contribution from offshore fishery. Skipjack tuna is the major component for this increased offshore production. There is about 3200 multiday boats reported to be in operation. This includes more than 55 longliners owned by locals and the rest operates a combination of gears longline, gillnet and ring nets. The trip duration in most cases has been reduced considerably except in few areas in the southern. These local pure longliners use up to 1500 hooks per operation whereas others use 400 in average and maximum up to 1000 hooks. Annual data summaries were submitted to MFARD and IOTC. Apart from above, the joint survey of BIMSTEC member countries on assessment and management of marine resources in the Bay of Bengal was conducted from 25th October to 20th December 2007 from fishery research vessel M.V. SEAFDEC, of the Southeast Asia Fisheries Development Center (SEAFDEC). Two scientists from NARA (one from MBRD and one from FTD) participated for this survey. The survey provided greater opportunity to transfer technology, exchange of scientific information's, develop better understanding and relationship among the Fishery Scientists of BIMSTEC members.

Progress (%): Physical: 100% Financial: 90%

Project 1.2.1. Monitoring of small pelagic fisheries in the western, north western, eastern & southern coasts of Sri Lanka

Coastal fishing activities were monitored in the western, north western, eastern and southern coasts of Sri Lanka to investigate the status of the resources and their exploitation levels by paying a special emphasis on gillnet fishing operations. One of the objectives of this work was to examine the relative influence of various spatial, temporal and operational factors to change the catch rates of herring (*Amblygaster sirm*) (the key target species of small meshed gillnet fishery in Sri Lanka). A Gamma based Generalized Linear Model (GLM) was formulated to determine the relationship between the explanatory variables: year, month, craft type, fishing time, number of net pieces and total fishing time with the CPUE. The model explains 54.8 % of the deviance and craft type was found to be the most significant factor for determining the catch rates of *A. sirm*. Other measures of the effort (fishing time and number of net pieces used) can be employed to derive more precise CPUE indices were however found to be insignificant. A strong seasonal variation in the catch rates was also observed during the present investigation. Attention was paid by this study to review the status of herring and also to propose a better sampling strategy to obtain length frequency data for future stock assessments.

Progress (%): Physical: 93% Financial: 108%

Project 1.2.2. Investigate the optimum fishing capacity for sustainable development of coastal resources in the Hambantota district

MBRD conducted a study on coastal resources in Tangalle AD division (in the Hambantota district) during the period January – August, 2007. The main objective of the study was to propose management recommendations for sustainable development of coastal fishery resources in the Hambantota district. The coastal resources in the area are not managed at present. The heavily fished coastal fisheries resources were identified as requiring management owing to threats of resource depletion. Field visits were made to respective fish landing sites for collection of fisheries information /statistics. A craft survey was also conducted. The most important ten major fish landing sites of this AD division was further selected for collection of detail information, which was mainly used for this study. Rapid increase in the number of coastal fishing crafts within a short period after tsunami has adversely affected on coastal resources. Therefore, it was recommended to take necessary measures to control fishing effort in order to ease the fishing pressure on coastal resources in Tangalle AD division. Other initiatives such as enforcement of minimum mesh size regulations and encourage switching to under exploited resources from heavily fished coastal resources were also recommended.

Progress (%): Physical: 100% Financial: 78%

1.3 Monitoring of lobster fisheries in southern and eastern coastal waters Based at RRC – Rekawa

Lobster fishery has been identified as one of the major fishery for the small scale artisanal fishers in southern coast of Sri Lanka. It is supporting to earn reasonable amount of foreign exchange through the fisheries exports. Over ninety five percent of the lobster catch are being exported to foreign market. Lobster fishery was a thriving industry prior to tsunami. The study revealed that among six spiny lobsters found in the south coast from Kalutara to Amaduwa, one species (*Panulirus polyphagus*) has completely been exploited. *Panulirus homarus* (sand lobster) represented 85% of the catch. Other species individually represents 3 – 6% of the total catch. 31% of the average annual catch consists of undersize lobster. 7% - 20% of the total catch consists of spawners. Over 90% of lobster fishermen fish illegally without a license. The average catch per craft is 2.6 kg/day.

The study emphasizes the importance of enforcing existing regulations for sustainable utilization of the resource.
Progress (%): Physical: 93% Financial: 85%

3.7.1: Assessment of the availability and suitability of *Penaeus monodon* brood stock resources for shrimp farming industry and development of an efficient fishing gear for collection

P. monodon (Giant Tiger prawn) is the most economically important shrimp species in many countries including Sri Lanka due to its utility in coastal aquaculture. Wild brood stocks are frequently used in hatcheries to get the shrimp larvae. The fishing areas of these brooders are not documented well and there is no suitable fishing gear to collect them without any damage. Therefore, present study aimed to estimate the distribution and abundance of *P. monodon* in Sri Lankan coastal waters by mapping the fishing areas and also to design a suitable fishing gear/ or modify the exciting fishing practices to collect healthy (uninjured) brood stock. Monitoring of *P.monodon* catches was carried out in the West and South coasts of Sri Lanka to identify the fishing season and to estimate the shrimp abundance and distribution. Mapping of some fishing-grounds (eg. Negombo) has been completed. In most cases, *P. monodon* is caught as a bi-catch. Trammel nets are used for brood stock collection and gillnets, cast nets are also operated. The highest number of *P.monodon* individuals was observed among the trawl catches in Negombo and Handala areas (72 and 34 number per day respectively) during the observed perod.
Progress (%): Physical: 65% Financial: 42%

Project 3.7.2. Investigation of genetic diversity of *Penaeus monodon* shrimp stocks captured in different geographical locations in Sri Lanka using gene segments of cytochrome c oxidase I (COI) in the mitochondrial control region

This project was carried out to determine the genetic variations that exist between the stocks of *Penaeus monodon* in the different areas of Sri Lanka. *P. monodon* samples were collected from the areas of Hendela, Negombo, Chilaw, Kalpitiya and Beruwela. The DNA extracted from these samples were subject to PCR amplification using primers COI-P3/COI-P4 which target the gene segments of cytochrome c oxidase I (COI) in the mitochondrial control region. A region of 450 - 500 base pairs was amplified using this PCR amplification. The PCR products were purified and these purified products were subject to sequencing using an automated sequencer. 2 samples from Hendela, 2 samples from Negombo, 3 samples from Chilaw, 1 sample from Kalpitiya and 1 sample from Beruwela were sequenced. The sequences were analyzed using the CLC Bio sequence analysis software.The multiple alignment showed a region of 30 bp that is conserved in all the samples sequenced. The phylogenetic tree shows that the samples taken from Hendela, Negombo, Chilaw and Kalpitiya clustering together and the Beruwela sample being a separate clade. This could be some indication that the Beruwela stock is genetically distinct from the stocks in the western and north western regions but as only 1 Beruwela sample was sequenced more samples need to be analyzed to come to a final conclusion. 9 *Penaeus monodon* mitochondrial DNA control region sequences were submitted to GenBank NCBI database (National Center for Biotechnology Information).

Progress (%): Physical: 75% Financial: 60%

Project 4.2. Conservation and Management of Coral Reefs

Reef surveys were carried out in the northwest, west and southern coastal areas. Detailed surveys of benthic cover of corals and associated reef organisms were carried out at the Bar Reef Marine

Sanctuary, Talawila, The Hikkaduwa National Park, Rumassala Sanctuary, Aranwala near Ahangama, Kapparatota in Weligama and Kiralawella in Dondra. Biodiversity inventories were carried out at the above mentioned sites and several other locations where detailed studies were not conducted. These locations were Palutagaha in Habaraduwa, Talarambha in Kamburugamuwa and two offshore reef sites in Colombo. The highest live hard coral cover was recorded in the Bar Reef Marine Sanctuary followed by Kiralawella, Talawila, Aranwala, Hikkaduwa and Kapparatota (Table 1). The coral reference collection was also updated with additional specimens.

Table 1. Live hard coral cover at the surveyed sites

Reef site/location	Live hard coral cover	Comments
Bar Reef Marine Sanctuary	70%	Dominated by tabulate *Acropora cytherea* which consisted 75% of live corals
Talawila	44%	Dominated by massive corals of the family Faviidae
Hikkaduwa National Park	26%	Dominated by *Montipora aequituberculata* and *Pocillopora damicornis*
Kapparatota, Weligama	22%	Decline from 52% in 2006 due to boat anchoring and use of destructive collecting methods for aquarium fish
Aranwala	32%	Dominated by massive corals of family Faviidae
Kiralawella	46%	Dominated by massive corals of family Faviidae

Progress (%): Physical: 88% Financial: 52%

Project 4.3. Research and Management of Marine Mammals

Offshore observations on marine mammals were conducted in the Bar Reef Marine Sanctuary, off the coast of Colombo, Beruwala and Weligama/Mirisssa. Interviewed individuals engaged in marine mammal watching operations to obtain information on the occurrence of different species (Table 2).

Table 2. Information on the occurrence of different species in marine mammal watching operations

Species	Locations	Comments
Balaenoptera musculus (Blue whale)	Dondra, Near Bar Reef Marine Sanctuary	Occurs mainly before the southwest monsoon – around April and May
Physeter macrocephalus (Sperm whale)	Dondra	Occurs mainly before the southwest monsoon – around April and May
Stenella longirostris (Longnose spinner dolphin)	Colombo, Kandakuliya, Bar Reef, Galle, Weiligama, Mirissa, Dondra	Seems to be present throughout the year. But observations and records are mainly during the calm season (Nov to April)

Progress (%): Physical: 80% Financial: 34%

7.4 Upgrading of marine museum

The museum located in MBRD comprised of two main sections; fish and other specimens preserved in spirits and the cetacean museum. During 2007 number of new fish and other aquatic animals were collected and added to the museum collection. Existing specimens were updated with new preserving Medias. Considerable number of school children visited the museum when they visited NARA on educational tours.

Progress (%): Physical: 50% Financial: 59%

4. Publications

Abstracts

i. Haputhantri, S.S.K, 2007. Spatial, temporal and operational effects on the catch rates of Trenched Sardine *Amblygaster sirm,* the key target species of small meshed gillnet fishery in Sri Lanka. International Conference on Tropical Aquatic Research Towards Sustainable Development. NARA.

ii. Dissanayake, D.C.T, E.K.V. Samarawera and C. Amarasiri. 2007. Present status of coastal tuna fishery in eastern coast of Sri Lanka. International Conference on Tropical Aquatic Research Towards Sustainable Development.

iii. K.A.T. Dananjani, M.D.S.T. de Croos and D.C.T. Dissanayake, 2007. Comparative food and feeding analysis of four seleced schooling species from purse seine catches off Hikkaduwa, Sri Lanka. Thirteen Annual Scientific Session: Sri Lanka Association for Fisheries and Aquatic Resources, Foundation Institute of Sri Lanka, Colombo, Sri Lanka.

iv. Rajasuriya, A. 2007. *A revised and updated checklist of stony corals which includes eight species new to Sri Lanka.* Paper presented at the Annual Scientific Sessions of the Sri Lanka Association for the Advancement of Fisheries and Aquatic Resources.

Research papers

i. Haputhantri, S.S.K., M.C.S. Villanueva and J. Moreau, 2008. Trophic interactions in the coastal ecosystem of Sri Lanka: an ECOPATH preliminary approach. Estuarine, coastal and shelf science. 76: 304 – 318.

ii. Rajasuriya, A. A report on the status of selected coral reefs in the northern, western and southern coastal waters of Sri Lanka.CORDIO. University of Kalmar, Sweden. In press.

iii. Rajasuriya, A Coral reefs of the northern coast – NARA journal special edition. In press.

iv. Herath, D.R. 2007. Identification of a stranded whale by mitochondrial DNA analysis – www.DNA-surveillance program in action. Asian Fisheries Science, 20(3), 319-324.

Reports

i. Haputhantri, S.S.K. A data sampling strategy for coastal herring of Sri Lanka. Project Report. United Nations University Fisheries Training Programme. Marine Research Institute. Iceland.

ii. Prepared and submitted a report by Mr. Arjan Rajasuriya on the sensitive marine habitats in the Gulf of Mannar region in connection with Petroleum exploration. The repot was submitted to the Petroleum Resources Secretariat.

iii. A book was prepared by Mr. Arjan Rajasuriya in Sinhala Language on conservation matters on coral reefs. This was submitted to the Presidential Secretariat, Honorable Minister for Fisheries and Aquatic Resources, to the Secretary of the MFAR.

iv. Mr. Arjan Rajasuriya provided a report on MCPA sites to ICRAN - SACEP for project design on the management of marine and coastal protected areas.

v. Guidelines for marine mammal watching in the coastal waters of Sri Lanka was prepared by Mr. Arjan Rajasuriya and submitted to the Honorable Minister for Fisheries and Aquatic Resources, Secretary of the MFAR and Ceylon Fishery Harbours Corporation

vi. Dissanayake D.C.T., C. Amarasiri, E.K.V. Samaraweera and F. Poission, 2007. Summary report on annual large pelagic fish production - 2006

5. Trainings/workshops attended

Trainings

i. Ph.D. proposal writing and registration for the Ph.D in University of Iceland, 21st September to 15th October 2007. Marine Research Institute (MRI), Rekjavik, Iceland and University of Iceland - (01)

ii. Participated for United Nations University (UNU) Fisheries Training Programme (FTP), Marine Research Institute (MRI), Iceland - (01).

iii. In October and November 2007 one officer participated in a cruise of the R.V. Roger Revelle which is a scientific research vessel of the Scripps Institute of Oceanography, USA. The purpose of the cruise was to collect coral samples from the Macarene Plateau to understand past climate changes.

Workshops

i. BIMSTEC workshop on fisheries cooperation during 8-10 May 2007 at Phuket in Thailand (one officer).

ii. Participated in the Coral Reef Resilience Monitoring workshop in January 2007 in Bentota (1 officer).

iii. Workshop on scientific writing(Organized by CARP) on 26th March 2007, at service Training Institute, Peradeniya, Sri Lanka (1 officer).

Oceanography Division

Head of the Division - Dr K Arulananthan

1.4 Application of Remote sensing and GIS in forecasting pelagic fishing zones

Physical achievement: 95%

Sri Lanka's narrow continental shelf sustain limited habitat for coastal fishery, which is in optimal level of exploitation. However, offshore fishery resources are under exploited primarily due to high investments and uncertainty on its economic feasibility. According to the fisheries statistics, it is likely that the fisheries resources, beyond the continental shelf waters (within EEZ) are not fully exploited while some coastal fisheries resources are over exploited. Thus, it is essential to promote offshore fishing activities systematically. One of the alternatives available is to increase the fishing effort by providing information on potential fishing grounds. This will reduce their operational costs such as search time, fuel and increase the fish production.

The Oceanography division has been working on the developing a satellite based fishery forecasting system for large pelagic fisheries sector in Sri Lanka. The system provides information on favourable fishing grounds with relevant other oceanographic status useful for fishing operations.

MODIS and AMSRE satellite data being downloaded from world data bases to generate sea surface temperature, chlorophyll, surface temperature gradients etc. Fisheries data (catch and position) collection program was initiated with introducing a Fisheries Diary (logbook) and being analyzed for matching up with environmental parameters derived from satellite data. This process will be continued to interpret potential areas for fish aggregation by determining precise environmental parameters. Those parameters will be used to forecast potential fishing grounds using near real-time satellite data in the year 2008 and the forecast will be validated with feedback data from the selected fishermen prior to disseminate to others.

Physical achievement : 95%
(Referring to performance indicators
and expected out put) :

Financial achievement: allocated Rs 300,000.00, Spent Rs 291,326.00, (97%)

1.5. Impact of oceanic status on coastal fishery

Physical achievement: 95%

The physical, chemical and biological oceanographic studies were carried out in off Thalawila which is the main coastal tuna fishery ground of Kalpitiya. Under this project marine plankton distribution and diversity in relation to nutrient variation, Temperature, salinity, chlorophyll vertical profiling were carried out.

Results and Discussion :

Off Thalawila area was selected to study, as it is a major fishing ground for the tuna fishery. Field visits were carried out off Thalawila from January –November 2007. Data and samples were

collected at 7 locations off Thalawila, Kalpitiya using 15 feet fibre glass boat. Sampling was not carried out in May to October due to rough sea conditions. Samples were collected for phytoplankton, zooplankton, chlorophyll and nutrients (Nitrate, Nitrite, Ammonia and Phosphate) with CTD measurements.

The mixed layer depth varies by almost 10 m between the monsoon, deepen during the monsoon and shallows during the inter monsoon. The temperature and salinity also fluctuates by 2°Cand 0.2 PSU respectively. Enhanced chlorophyll content is recorded during the Northeast Monsoon at Kalpitya, indicating up-welling. Furthermore, chlorophyll maximum (1.5 mg/l), which is about four times higher than the surface water is recorded just above the thermocline, give an explanation for preferred location for large pelagic fish. In terms of phytoplankton and zooplankton density, highest primary and secondary productivities were observed in Noven[illegible] in off Thalawila in Kalpitiya.

The highest (1.0279µg/l) & the lowest (0.0656µg/l) PO_4^{3-} P concentrations are recorded in January and November respectively. During the month of April PO_4^{3-} P concentration is less than 0.2µg/l in all locations.
The highest (1.434µg/l) and the lowest (0.000µg/l) value of NO_2^- -N concentrations are reported during March and November respectively. Meanwhile NO_2^- -N concentration is less than 0.100µg/l among all the locations during the month of November. During the other months NO_2^- -N concentrations are remained between 0.0075µg/l – 1.161µg/l among all the locations. However the highest monthly average of NO_2^- -N concentration (0.634µg/l) is recorded in month of February while the lowest value (0.162µg/l) is recorded in April.

Physical achievement : 95%
(Referring to performance indicators and expected out put) :

Financial achievement: allocated Rs 900,000.00, Spent Rs 795,297.00, (88%)

4.1 Monitoring of Sethsamudraum Ship Canal Project

Physical achievement 50%

An Environmental monitoring plan is formulated to monitor the impacts arising from dredging and dumping activities in Adam's bridge area, Gulf of Mannar, Palk Strait, Palk Bay under Sethusamudram ship channel project implemented by Government of India. The aim of the plan is to monitor the critical indicative parameters comprises physico-chemical, biological, environmental and socioeconomic conditions to propose the strategies for the execution of environmental protection and/or mitigation measures and to monitor the significant environmental impacts. The Environmental Monitoring Plan is intended to;

- Eliminate, or mitigate any adverse environmental impacts
- Provide early warning facility on unanticipated adverse impacts or sudden changes in impact trends
- Provide immediate warning whenever a (preselected) impact indicator approaches a (preselected) critical level
- provide information for compensation for lost environmental resources
- Provide information for documentation of the impacts that result from SSCP activities

Furthermore, a "Guide to phytoplankton & zooplankton of Gulf of Mannar and Palk Strait" is prepared. The guide can be used to evaluate any environmental changes due to the implementation of the Sethsamudram Ship Canal Project. Phytoplankton and Zooplankton which are microscopic floating organisms are standing on first and second trophic levels of marine food chain and indicators for productivity and pollution. Zooplankton and phytoplankton samples collected in Palk Strait were analyzed in detail for abundance, diversity and distribution. Identified species were listed and photographed. Results were presented at the International Conference on Biodiversity: Issues & concerns at Kolkata, India from 20-24 November 2007. Full paper will be published in 39 Volume of NARA journal.

Some field activities could not carried out due to security reasons in the area

Physical Achievement 50%
(Referring to performance indicators
and expected out put) :

Financial achievement: allocated Rs 200,000.00, Spent Rs 60,878.45 (30 %)

5.2 Project: Coastal Sea Level Monitoring and Modelling

Physical achievement: 95%

The project consist of two major components that will collectively provide the data and predictions needed for various aspects of coastal zone management, ocean based hazard early warning and mitigation. The project components includes (1) Short and long term monitoring of sea levels and related parameters around Sri Lanka Waters (2) Hydrodynamic modelling of physical processes and interaction with bio-chemical processes in coastal environment.

Under the component one, three real time permanent sea level monitoring stations including temperature sensors are operating at west, south and east coast of Sri Lanka. In year 2007, we have analysed sea level records to examine the seasonal sea level cycle and regularly observed seiches in Sri Lanka Waters and northern part of Indian Ocean. The data from Sri Lanka sea level monitoring stations and other regional stations data are used in the study.

Physical achievement : 100%
(Referring to performance indicators
and expected out put) :

Financial achievement: allocated Rs 600,000.00, Spent Rs 745,080.30, (124 %)

5.3 Study of wave energy spectrum

Physical achievement: 100 %

Ocean wave energy study of project was start in 1993 and complete after 02 years period. After a decade with new tendency and recognition for the alternative energy source in Sri-Lanka, NARA has granted a project in 2007 for wave energy studies. It was a new experience to NARA and because of that project had to go through with the limited resources. Before embark the work, this time it was decided to utilize previous experience and background information.

Carried out field visits several times to obtain the knowledge of changes of shoreline, beach profile etc in all the Bundala, Palatupana and Patanangala sites,. Considering the factors mentioned and observations made during the field visits it was decided to select Bundala as the site for a design.

It was observes that, for on shore - Oscillation water column with concrete caisson, for offshore Oscillation Water Column (OWC) plant combine with wind plant or floating device (Salter duck) are the most suitable wave power plant types/devices for the Southern coastal belt. To Bundala OWC with concrete caisson is the best device type.

For the manufacturing and assembling the plant, Infrastructure and facilities (machineries, workshops, human resources) available in the Lanks Salt's, to whom the site is belong could be utilized. Considering the wave climate and the distance to the location from workshops it is proposed to do basement works at the site and other parts fabricate in the workshops and assemble at the site. The safety measures should be the up to standards because of the wave climate in the location is so hazardous and work is risky.

All the possible dimension of the plant has been calculated, with the input (wave motion etc). Lack of wind data was one of the major constrains for calculation. Hydro is the main source of generating electricity in Sri-Lanka where the production cost is Rs.4.22/kwh at present rates. The CEB has declared Rs.9.24/kwh as a viable rate for the Diesel turbine plant with the present energy crises in Sri-Lanka.

The production cost of Rs 9.48/kwh is seen as a moderately high figure at the first glance for the OWC plant. But the other benefits which accrue such as marine culture, control of sea erosion, breakwater facility, facility of ice plants in the fisheries harbours, energy for the remote fishing villages and environmental benignness would increase it's competitiveness among other alternative sources.

It is premature to go for construction on the basis of such report because they must be other investigation, feasibility report and environmental Impact Assessment (EIA). But this satisfies the need of the investor or the Government establishment such as newly formed Alternative Energy Authority who is willing to carry out for further studies for commercial purposes.

Physical achievement : 100%
(Referring to performance indicators
and expected out put) :

Financial achievement: allocated Rs 200,000.00, Spent Rs 233,715.37 (117 %)

5.4 Ocean Observation and Early Response

Physical achievement: 100%

Under the project, Ocean Observation Centre (OOC) has been established. OOC is operational on 24 hrs, 7 days basis and monitoring and gathering real time and near real time ocean physical environmental data around Sri Lanka Waters from reliable sources. Data have been analyzed and synthesized to generate new information, and information products are being designed to meet the needs of scientific community. The data, which are intended for use in oceanographic and other interdisciplinary scientific research, is freely available in OOC database. Products include coastal sea level, sea surface topography, ocean wind, sea surface temperature, salinity and temperature profiles, chlorophyll, wave climate, and deep ocean pressure data.

With respect to ocean based disasters, the centre collaborates with the Ministry of Fisheries and Aquatic Resources, Disaster Management Centre (DMC) and the Department of Meteorology to provide the necessary technical information and guidance for the early [illegible]ing and mitigation of impacts from natural ocean disasters.

Physical achievement : 100%
(Referring to performance indicators
and expected out put) :

Financial achievement: allocated Rs 800,000.00, Spent Rs 892,351.83 (111 %)

5.5 Geological and geophysical investigations for estimation of offshore mineral deposit along the southern coast of Sri Lanka.

Physical achievement : 70%

Sri Lanka is a coastal state with 1740 km long coastal belt. Also it consists of 65000 km^2 land area and more than 522,000 km^2 sea area. With increasing population of the country, the land based resources are limited and currently being over exploitation. Therefore, it is important to give attention on ocean based resources for satisfies the future demand. The offshore placer deposits are the most economically viable ocean based resources which can be utilised in future economical developments.

The current effort was to identify and volumetric estimate the placer deposits on southern nearshore area which was identified by bottom sampling. When the project was initiated, NARA did not have Seismic sub-bottom profiler to estimate volume. However, later sub-bottom profiler has been donated by German Government and used to estimate the potential volume of offshore mineral deposits. Several test investigation surveys were carried out at Hambantota area in April 2007. The investigation results were not successful due to the lack of expertise in this field. So, further training on this instrument was received from German at the end of June 2007. Currently, the responsible officer is studying for his master certificate on ocean mapping, University of New Hampshire in USA. During his study he is involving to prepare digital elevation model (DEM) of southern continental shelf of Sri Lanka.

Physical achievement : 70 %
(Referring to performance indicators
and expected out put) :

Financial achievement: allocated Rs 400,000.00, Spent Rs 247,589.43 (62 %)

Publications

Jayasiri, H.B., Composition, abundance and spatial variation of phytoplankton and zooplankton off Jaffna (Palk Strait). International Conference on Biodiversity: Issues & concerns from 20-24 November 2007, Kolkata, India, 2007

Jayasiri, H.B., Saltwater intrusion and water quality changes in Koggala Lagoon and associated areas, Sri Lanka., International Conference on DELTA 2007, Managing the Coastal Land-Water Interface in Tropical Delta Systems 7-9 November 2007 Bang Saen, Thailand 2007.

Jayasiri, H.B., Wijeratne E.,M.S. Oil dispersion and status of planktonic organism in Koggala Lagoon. International conference on Tropical Aquatic Research towards Sustainable management, 15-16, February 2007, NARA auditorium 2007,

Jayasiri, H.B., Zooplankton abundance and seasonality in relation to some water quality parameters in Maduganga Estuary, Southwestern coast of Sri Lanka. SLAFAR 13th Annual Session, 2007.

Jayasiri, H.B., and Wickramarachchi N. "Ocean Observation Center (OOC) activities for mitigation of ocean based environmental and biological hazards". Workshop on ocean observation Center at NARA and its contribution towards ocean research and environmental security, NARA, 13th September 2007

Arulananthan K., Jayasiri H.B. and Priyayadarshani W.N.C., Understanding Oceanography around Sri Lankan waters with particular emphasis on monsoon variability. Workshop on ocean observation Center at NARA and its contribution towards ocean research and environmental security. 13th September 2007, NARA, 2007

Jinadasa, S.U.P., Rajapaksha J.K, Qualitative and Quantitative analysis of offshore sand deposits, Mudun ela Sri Lanka, The International conference on Natural hazards management, University of Peradeniya, Sri Lanka 2007

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Jayasiri H.B. Priyadarshani W.N.C., Diversity and abundance of marine plankton and benthos of selected locations of Gulf of Mannar and Palk Bay, Sri Lanka, NARA Journal, 2007.

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Perez, B.; Wijeratne, E.M.S.; Alvarez Fanjul, E.; Woodworth P., for real time automatic detection of sudden oscillations of sea level, General Assembly, European Geophysical Union, 2008.

Pattiaratchi C.B. Wijeratne E.M.S., Tide gauge observations of the 2004-2007 Indian Ocean Tsunamis from Sri Lanka and Western Australia, Pure and Applied Geophysics topical issue on tsunamis (2008), in review.

Wijeratne E.M.S., Woodworth P.L, David Pugh, Atmospheric and internal waves driven seiches along the Sri Lanka Coast (submitted to journal of Continental Shelf Research, 2008)

Wijeratne E.M.S., Woodworth P.L., Pattiaratchi C.B., Observation and modelling of recent tsunami induced seiches along the Sri Lanka Coast (In Prep.).

Wijeratne E.M.S, Levelling of Sri Lanka Tide Gauges for improved hydrodynamic modelling of Palk Strait (accepted, NARA Journal)

Ranmadugala B.H.S, Wijeratne, E.M.S., Pitawala.A., 2007, Modelling of Saltwater Intrusion in Kelani River Estuary , International Conference on Tropical Aquatic Research Towards Sustainable Development , Colombo, 15-16 Feb 2007

Thushara. H.K.R, Wijeratne.E.M.S, 2007, Modelling of Sanity and Flushing Time in Strongly Restricted Tidal Inlet Lagoon: A Rekawa Lagoon, South Coast of Sri Lanka, International Conference on Tropical Aquatic Research Towards Sustainable Development , Colombo, 15-16 Feb 2007

Rajapaksha J.K, Wijeratne E.M.S, Gunaratne A, Lokugamage J., 2007, Concept of "Digital Sri Lanka"; Development of spatial database and data sharing network, International Conference on Tropical Aquatic Research Towards Sustainable Development , Colombo, 15-16 Feb 2007

Wijeratne E.M.S., Present Status of Tsunami Early Warning for Sri Lanka , proceedings of the International Conference on Mitigation of the Risk of Natural Hazards, Uni. of Peradeniya, 2007

Wijeratne E.M.S., Climate change and sea level variability, SACAP, BMICH, Colombo, 2007

Wijeratne E.M.S., Athukorala D.A., Nishantha de Silva, Ratnayake G.A.A., An Overview, the Role of Ocean Observation Center (OOC) activities on ocean based disaster early warnings and mitigation, Workshop on the Ocean Observation Center at NARA and its Contribution towards Ocean Research and Environmental Security, NARA, Colombo-15, 13 Sep 2007.

Rajapaksha J.K., Wijeratne E.M.S., Wickramarachchi D.N., Karunatilake K.M.B.C., Jinadasa S.U.P., Tsunami simulation and inundation mapping for evacuation planning, Workshop on the Ocean Observation Center at NARA and its Contribution towards Ocean Research and Environmental Security, NARA, Colombo-15, 13 Sep 2007.

Arulananthan K., Azmy S.A.M., Jayasiri H.B., Wijeratne E.M.S., Understanding oceanography around Sri Lanka Waters with particularly emphasis on monsoon variability, Workshop on the Ocean Observation Center at NARA and its Contribution towards Ocean Research and Environmental Security, NARA, Colombo-15, 13 Sep 2007.

Training/Fellowship and Meeting Attended

Jayasiri, H.B., International Conference on Biodiversity: Issues & concerns from 20-24 November 2007, Kolkata, India.

Jayasiri, H.B., International Conference on Biodiversity: Issues & concerns from 20-24 November 2007, Kolkata, India.

Karunathilake, K.M.B.C., Young Scientist Data Management Course; Organized by IODE for IOC, From 04th to 9th June 2007. Belgium.

Jinadasa S.U.P, GEBCO/ NIPPON Foundation scholarship programme, Master certificate on Ocean mapping, Center for Coastal and Ocean mapping, University of New Hampshire, From August 2007, U.S.A

Tennakoon T.K.D., Global Ocean Observation System for Indian Ocean (IOGOOS - V), annual conference – V, November 30 – December 03, 2007, Thailand,

Tennakoon T.K.D., Intergovernmental Oceanographic Commission, 24th General Assembly and 40th Executive Council meeting 18 -28th June 2007, Paris, France

Rajapaksha J.K., Software training, ESL Environmental Simulation Laboratory, Japan from 10-13 Dec. 2007

Wijeratne E.M.S., Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS IV),. Served as a member of Sri Lanka delegation team of the Indian Ocean Tsunami Warning and Mitigation System. 28 February –2 March, 2007, Mombassa, Kenya

Wijeratne E.M.S., IOC Indian Ocean Tsunami Warning System Fellowship Programme in Sea Level Science and Applications, 2007-2008. The main themes considered for the job training under the above fellowship during the period are sea level data analysis techniques and interpretation of results, tide gauge technology, modelling of storm surges and tsunamis. Sep -18 Dec 2007, UK

Activities of Ocean Observation Centre

A workshop titled "Ocean Observation Centre and its contribution towards ocean research and environmental security" has been held on 13th September 2007 at NARA Auditorium to demonstrate the OOC activities, capacities and their significance to relevant authorities and stakeholders. The Hon Minister of Fisheries and Aquatic Resources was the chief guest of the workshop and many officials from relevant authorities were participated in this occasion. A number of presentations relevant to the OOC activities were presented. The titles of the presentations as follow.

1. An Overview, the Role of Ocean Observation Center (OOC) activities on ocean based disaster early warnings and mitigation, **Wijeratne E.M.S**, Athukorala D.A., Nishantha de Silva, Ratnayake G.A.A.

2. Tsunami simulation and inundation mapping for evacuation planning, **Rajapaksha J.K, Wijeratne E.M.S.** , Wickramarachchi D.N., Karunatilake K.M.B.C., Jinadasa S.U.P.

3. The effect of tides and ocean weather for developments of storm surges on the west coast of Sri Lanka, **Athukorala D.A., Jayasooriya P.,** , Liyanapathirana J., Fernando R., Jayasinghe R.P.P.K.

4. Ocean based disaster early warnings and social responsibility, **Amaralal K.H.M.L., Puyadewa N.P.B.,** Mendis D.T., Indika K.W.

5. Ocean Observation Centre Data Base and its Structure, **Tennakoon K., Lokugamage J.** , Adikari U., Ratnayake G.A.A.

6. Understanding oceanography around Sri Lanka Waters with particularly emphasis on monsoon variability, **K Arulananthan, Priyadarshani W.N.C.,,** Wijeratne E.M.S.

7. Internet sources for reliable geo-spatial data and the responsibility of Ocean Observation Center for the fishery forecasting, **Rajapaksha J.K.**, Jinadasa S.U.P., Priyadarsani W.N.C., Seneviratne U.

8. OOC activities for mitigation of ocean based environmental and biological hazards, **Jayasiri H.B.**, Wickramarachchi D.N., Azmy S.A.M, Mendis D.T.

9. Challenges of global warming and sea level rise, **Dahanayaka D.D.G.L.**, Punyadewa N.P.B., Mendis D.T., Nishantha de Silva

Documentary
A video documentary was prepared on OOC activities and its responsibilities

Presentation at President House

Tennakoon T.K.D., Rajapakha J.K., Lolkgamage J., Rathnayake G.A.A. staff has been presented its activities and responsibilities to the His Excellency President of Sri Lanka and honourable cabinet ministers at the Cabinet meeting in October 2007 at Temple Trees.

resentation at Ministry of Fisheries and Aquatic Resources

Tennakoon T.K.D., Rajapakha J.K., Lolkgamage J., Rathnayake G.A.A. have been presented its activities and responsibilities to the management and staff of Ministry of Fisheries and Aquatic Resources in the Head of Institutions meeting October 2007.

Electronic Media Publicity
A number of TV programmes have been conducted on OOC activities and responsibilities during 2007.

Ocean Observation Centre Web Site
A web page was prepared inside the NARA web on OOC

Printed Media Publicity
A number of leaflets and documents have been prepared on OOC activities. Several articles were published through the news papers on ocean based disasters.

Activities of Potential of Fishing zone cell

Awareness programs were conducted to convince the fishermen and to get their support for trail fishing to validate fish forecast that generate with satellite derived ocean parameters in Kudawella, Matara, Trincomalee and Chilaw.

Computers, Furniture, Photocopy machine, Color printer, and Software were purchased through ICEIDA funds. To improve the NARA network, Network switches and router purchased with ICEIDA funds.

"Fishing diary" a logbook for fisheries information recording was designed, printed and distributed among fishers and the diary printed with ICEIDA funds.

Harbor entrance waypoint GPS data was collected and a map was prepared with waypoint list. This map was included in the fishing diary.

Special software, Marine Explorer GIS was purchased and participated in software training held in ESL Environmental Simulation Laboratory, Japan.

Awareness programmes/meetings were conducted on fishery forecasting projects in Kudawella 23 Dec. 2007.

Post Harvest Technology Division (PHTD)

Head of the Division – Dr E M R K B Edirisinghe

1. Overview

Post harvest technology of fisheries and aquatic resources are the main research and development areas of the division. The division also provides laboratory testing and certification services for local and export industry. Research & development activities of the division are belongs to three main groups, i.e. test services, quality assurance of seafood products and development of aquatic food products. Three research projects (2.1, 2.2 and 2.3) under Post Harvest & Marketing section and one test service program (7.3.1: Capacity building and Resources Development) are being conducted during the year 2007. In addition, two foreign funded projects (ICEIDA & AIDA) are also being carried out.

Microbiology and chemistry sections of the Quality Control Laboratory have conducted testing service to the industry. The laboratories have been engaging with expanding the services as per ISO 17025 quality certification. The staff of the PHTD has conducted several public and industry awareness programs on various issues in fish post harvest technology field. These programs were mainly targeted on post harvest handling and fish product development. In addition, the division provided services to the industry by training technical personnel, required and trouble shooting the hygienic problems of fish processing plants.

At present, division is staffed with 07 Research Officers, 07 Research Assistants, 01 Data Entry Operator and other supporting staff, comprising 02 Laboratory Attendants and 07 skilled Labourers.

Staff Training

Mrs. S. Ariyawansa (R.O) has returned after completion of her PhD program in Malaysia. Mrs P.S. Jayasinghe (R.O) has undergone training on fish quality and safety issues in Iceland for 6 months, and 2 RAs undergone 2 weeks training in Iceland on microbiological and PCR analysis. Both trainings were funded by the ICEIDA funded Water & Ice quality project of the Division. In addition, 4 ROs and 2 RAs undergone 2 –weeks training in Spain under AIDA project. Mrs. P.S. Jayasinghe has participated ASIAN Fisheries Society Meeting in India.

The division has been damaged severally by the Tsunami on 26th December 2004. The chemistry, microbiology and nutrition laboratories and processing factory and those equipments were badly damaged by the incident. Number of equipments such as Atomic Absorption spectrometer (AAS), Can Seamer, UV spectrophotometer, Kjhedhal Protein Analyzer, Bomb Calorimeter, Flake Ice Maker were obtained under ICEIDA assistance. Further, Coliform water bath and some other equipments were also obtained under FAO assistance.

The fish processing factory, wish was severely damaged by the Tsunami, was repaired under ICEIDA assistance at a cost of Rs 13 Million, and declared open on 15th February 2007. In addition, fish drying unit also establish in the division with the assistance of ICEIDA.

Further the officers of the division were actively participated in the 25th Anniversary conference of NARA. Research program were suspended during the month of February to support the conference work.

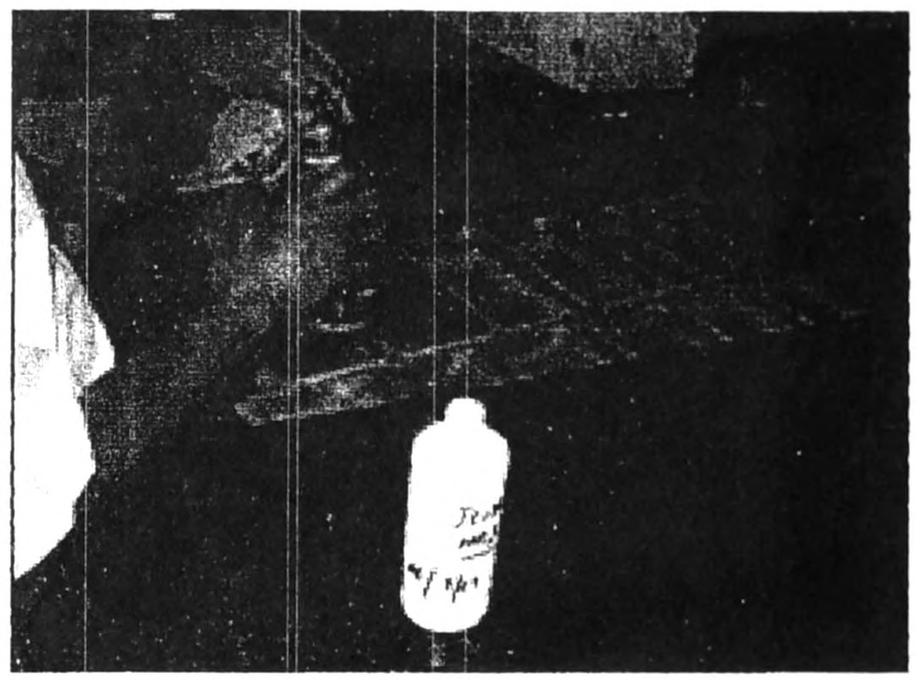
Extension Programs

The division has signed agreements with Industrial Development Board (IDB), NIFNE and CFC to train their staff on various subjects of post harvest technology including hygienic fish handling, development of fish products, and identification of good quality fish. During these program more that 50 officials were trained during the period. Further large number of field training programs on fish processing were conducted with the help of various NGOs during the period.

NARA and Industrial Development board jointly conducted Nugasevana TV program delivering at Rupavahini Cooperation on 16 May for transfer to processing technology.

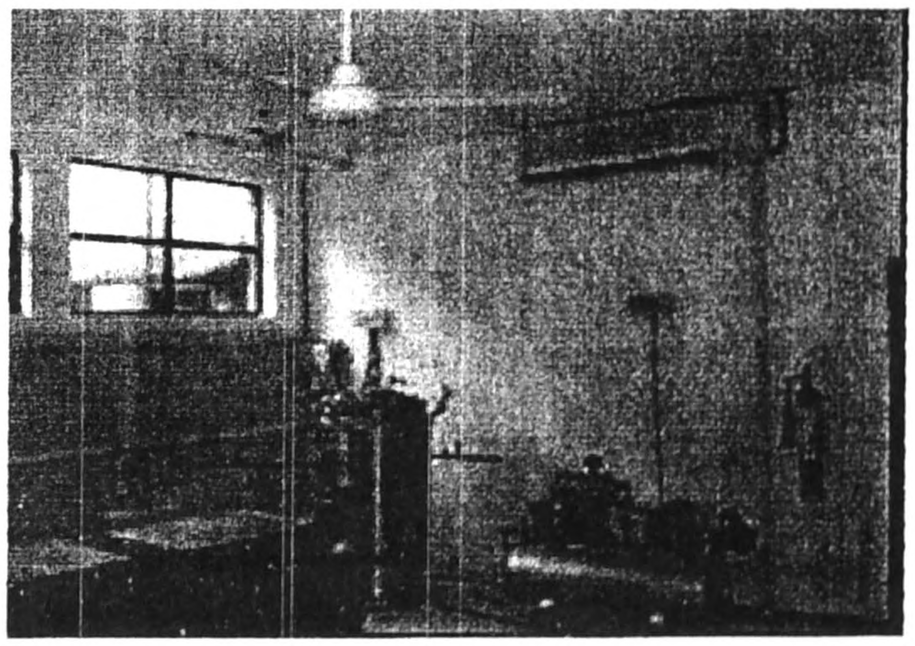
Teachers Training Program

Initiating NARA-IDB Joint Program for Training of IDB staff on fish processing



Measurement of Quality of Ice

Fish Drying Facility



Renovated Fish Processing unit

2. Performance

Project 2.1. Improvement of Post Harvest Quality of Fish Landings

Component 1. Improvement of the Quality of Water and Ice Used in the Fishery Industry in Sri Lanka to Minimize Post Harvest Quality Losses of Fish (ICEIDA Funded Project : Counterpart Funds)

The project has been designed to study the quality of water and ice used in the fishery industry in Sri lanka. The project is funded by the Icelandic International Development Agency (ICEIDA). During the period, number of sampling sites including Beruwala, Hikkaduwa, Puranawella, Kudawella, Hambantota, Kirinda and Patanangalla were visited and fish and ice samples were obtained and analyzes for quality. The phase of the project is completed and the database from the project is being prepared.

The results shows that the awareness on the quality of water in ice processing is very little. There are many small corrective actions that are possible to implement to better the quality of the ice used in fish processing. The tap water is clearly better water source then water from tube wells or the dug wells, but it is possible to improve tube wells and the dug wells for example by making the tube wells deeper and closing the dug wells so birds and other animals do not have access to them. Sumps and overhead tanks are often open and there for open for contamination, this is of cause very easy to fix. There is clearly need to educate ice processing plant owners and the people that work in them. One source of contamination is the ice pool water, the results indicáte that his water is not chlorinated and suitable for bacteria growth, it is necessary to use chlorine in the pool and drain it with few days

Further, an additional research also started to study the level of contamination during harvesting and handling in boats.

Number of meeting and discussions including management committee meeting were held with ICEID and Dept of Fisheries. Actions have been taken to purchase necessary equipments, media and chemicals. One research officer has undergone a 6 months training in Iceland.

Progress	Physical %	Financial %
	98	79

Component 2. Investigation of remedial measures to quality deterioration of fish in export industry of Sri Lanka

Gathering the information current researchable issues related to export industry:
It has been reported that rapid physical quality deteriorations of yellowfin tuna during the latter stages of exporting channels have been caused to more rejection of consignments at the destination of the importing countries.
This is to be addressed in relation to the primary handling of in offshore boats and analysis of samples for physical and chemical quality parameters. Investigations are in progress.

Analysis of samples to be performed.

In addition to the above project activities, following are continued from the last year project

Investigation of present post harvest quality depreciation percentages of *Katsuwonus pelamis* (skipjack) produced offshore fishing boats (OFB' s) in Sri Lanka:

Since recent past, it has been observed that, skipjack landed from OFB's is sold mainly to consume as fresh fish while salted fish is become the main raw material for dried fish industry. Therefore, this study plans to investigate current levels of quality depreciation percentages of skipjack landed from OFB's in terms of commercial fish grading system. These data could be compared with past reported data in order to study progress of primary fish handling and preservation in OFB's. At present five OFB's have been assessed and study is in progress. Further investigation of quality of salted dried fish produced in OFB's is being also continued as further investigations are required to reveal the right production paths.
In addition, a voice tape on "good fish practices for Beruwala Fishery harbour" were prepared and used to educate fisherman. .

Short term assignment
Production of high quality dried fish using solar driers: Basic infrastructure and tools required for monitoring have been developed and processing trails are in progress

Physical %	Financial %
95	84

Project 2.2 : Value addition to seafood products

Component 1. Development and cost benefit analysis of a small scale production industry

Repairs of fish processing factory were completed during the period. Activities of the project was mainly concentrated on technology transfer activates. Number of training programs was also carried out:

1. The six day industrial training program was carried out at NARA fish processing plant for the officers of Industrial Development Board by introducing ten products and their processing techniques for suitable to the cottage and commercial industry. The available products are
Oyster sauce, Oyster snaks, Agar sheet and jelly processing, Dried soup mix, steamed dried shrimp, Fish meat balls, Fish powder, Fish paste and Fish curry

2. The three awareness programs were conducted at Matara, Thangalle districts for the request of Sarvodaya women's movement and Australian & Sri Lanka Friendship Foundation transferring the technology of processing of Jaadi, Maldive fish, Ambulthiyal and Dried fish.

The Booklet has been prepared with including fifteen processing techniques and recipes of sea food. Further, preliminary work on preparation of video program on "Fish products for self employment opportunities" is started. The program will be used in the during training programs.

In addition, an application was produced to get patient rights for "The Novel processing Technology for preparation of Tilapia Maldives Fish". In addition, some leaflets were prepared on

Prawn processing and culture practices in Sri Lanka for AIDA project. Further, a full paper was prepared for agar processing from sea weed.

Progress	Physical %	Financial %
	90	73

Project 2.3 Development of quality and marketing of Island fishery Industry

Component 2.3.1 Study the Quality Status of Freshwater fish Industry

The project is continued from 2006. Fish and water sample analysis continued the results indicate that the water of some perennial tanks are not up to the internationally accepted recreational water quality standard. And these waters could act as carrier of pathogenic bacteria at the direct use of human consumption. Further, there is no proper post harvest practices practiced at the inland fishery to a satisfactory level. Study revealed that post handling of carp at the harvesting season is a problem and methods should be developing the storage life of carp to reduce post harvest losses. Based on the results obtained from the 1st part, a grant is being obtained from NSF to continue the project, "Develop the commercial inland fishery"

The project jointly implemented by NARA (PHTD and IARAD) and NAQDA. A freshwater tank - Aru Ula in Dhambuall area was selected to implement the project. As there was no fisheries society, actions have been taken to form a society. The first part of the project is mainly on aquaculture and followed by post harvest processing and value addition. The funding agency, NSF, has provided nearly Rs 250,000/= for the initial work of the project in September.

As an additional part of the project, it has been decided to analysis heavy metals in freshwater fish. The necessary equipment Atomic Absorption Spectrophotometer (AAS) was obtained under ICEIDA assistance. Commissioning of the instrument is continued.

As the project leader, Ms. I. Kariyawasam is on leave, Mrs. P.S. Jayasinghe has been appointed for the position to carry out the work jointly with Ms. S. Ariyarathna.

Progress	Physical %	Financial %
	90	69

Section 7. Capacity Building and Human Resources Development

Project 7.3. Institutionalization of specialized laboratories

Component 7.3.1 ISO 17025 certification of PHTD laboratories and Test Services to the Industry

The program has been designed to provide certification services for fish and seafoods to improve the quality of the products. The program has tested more than 700 samples from exportable fish, fishery products and water from the industry and provided quality certificates. Quality Control Laboratory has renew ISO 17025 accreditation up to 2009. The quality control program will be

upgrade for ISO 17025 : 2005 Version near future. Further, the laboratory is now preparing for annual audit of the Department of Fisheries. Number of equipments including Cooling Incubator and Coliform water bath were obtained under ICEIDA and FAO assistance.

A plan has been forwarded develop the infrastructure of the laboratory and now being processed. In addition, necessary chemicals and media already been ordered. Almost all of the financial allocation will be used for these renovations and purchasing.
The service has been extended further and the income generated is 22% higher than the previous year. The total income of the pervious, 2006, was Rs 2,695,900/-.
Followings are highlighted during this period.

- Number of parameters analyzed : 2,658
- Total earning : Rs. 3,297,400/-
- No of reports : 317

Progress	Physical %	Financial %
	92	97

urchase of Equipment

Actions have been taken to purchase number of equipments during the year 2007. Atomic Absorption Spectrophotometer (AAS) for the analysis of heavy metals in fish was purchased under ICEIDA assistance at a cost of ~ Rs 6 M. In addition, the fish processing factory and its equipments were repaired under ICEIDA assistance. The renewed factory was declared open by distinguish guests including Country Director-ICEIDA, Director – INFOFISH, Chairman and DG/NARA on 15th Feb 2007.

3. Research Reports:

Research publications / Papers / Presentations

i. G. J. Ganegama Arachchi, R. Mathan and N. Weeratahna. (2007) **Investigation of quality of salted Katsuwonus pelamis (skipjack tuna) produced in offshore fishing boats landed at Beruwala Fishing Harbour.** Proceedings of 25th Anniversary Scientific Conference of NARA on Tropical Aquatic Research towards Sustainable Development. 15 p. NARA Colombo 15, Sri Lanka.

ii. P. .S. Jayasinghe, W. Pahalewatharachchi, S. Santhanam, A.G.C. Kiriella. (2007). **"Evaluation of the quality of agarophytes available in Sri Lanka for utilization in the food processing industry"**. Proceedings of 8th Asian fisheries forum in Cochin, India, 21st – 24th -November- 2007.

iii. **Edirisinghe, E.M.R.K.B., Graffham, A.J. and Taylor. S (2007).** Characterisation of the Volatiles of Yellowfin Tuna (Thunnus albacares) during Storage by Solid Phase Microextraction (SPME) and GC-MS and their Relationship to Fish Quality Parameters. **International Journal of Food Science and Technology, 42 (10), 1139–1147.**

iv. **Edirisinghe, E.M.R.K.B., Kariyawasam, M.I.G.U. and. Sureshkumar. N. (2007).** Investigation of Surface Water Quality of Karaganlewaya, Hambantota aftermaths of Tsunami. **Proceedings of the 25th Anniversary Scientific International Conference of NARA on Tropical Aquatic Research Towards Sustainable Development, 15 – 16th Feb.**

v. **Edirisinghe, E.M.R.K.B., Kariyawasam, M.G.I.U. and Rajasuriya, A. (2007).** A Preliminary Study on the Antibacterial Activity of Marine Sponges from East Coast of Sri Lanka. **Proceedings of the 25th Anniversary International Scientific Conference of NARA on Tropical Aquatic Research Towards Sustainable Development, 15 – 16th Feb.**

vi. **Nanthaprakash, S.1., Wanninayake, W.M.T.B. and Edirisinghe, E.M.R.K.B. (2007).** Elimination of *Escherichia coli (E-coli)* and Salmonella species from the flesh of Meretrix casta, by the depuration. **Proceedings of the 13th *Annual Scientific Sessions of the Sri Lanka Association for the Fisheries and Aquatic Resources (SLAFAR),* Colombo, Sri Lanka.28th June 2007.**

Booklets, reports and leaflets prepared:

i. Post harvest quality loss of *Katsuwonus pelamis* (skipjack) landed from offshore fishing boats in Sri Lanka
ii. Pre-processing of skipjack tuna in OFB in both Sinhala and Tamil languages: Target group: fishers and stakeholders
iii. Drying of fish using a solar drier (in preparation)
iv. Fish products for self employment opportunities
v. Processing of Ambulthiyal as slef- employment opportunities.
vi. Prawn culturing and processing industry in Sri Lanka.
vii. Processing of fish products

4. Training/ Awareness programs conducted

i. 30 officials of IDB were trained on processing fishery products such as Smoked fish, Small fish in retort pouches, Fish paste, Agar sheet/Agar dessert and agar powder, Fish meat balls, Fish powder, Dried & steamed shrimps, Oyster sauce, Oyster snack (Improved recipe for better texture), Dry soup mix, Thilapia ambulthiyal
2007/03/

ii. About 35 fisher women were participated in this 4 day training program at Matara from 20-23 Nov 2007- Joint program with IDB
The program covers fish products including Maldive fish, Salted fish, Smoked fish, Jaddi and Abulthial, Fish meal, Fish silage and Agar dessert.

iii. Training of School Teachers on Post Harvest Handing and Product Development:
80 teachers were participated and gained theory and practical knowledge on nutrition, handling, quality & safety, processing including Maldive fish, Salted fish , Smoked fish, Jaddi and Abulthial, Fish meal, Fish silage and Agar dessert : 12th – 16th Nov 2007 at NARA

iv. Training of NIFNE officials on Fish processing
Around 25officers of NIFNE training collages were participated for this 4 day program in October 2007 at NARA. Trained on theory and practicals on processing of 12 nos fish products including Maldive fish , Salted fish , Smoked fish, Jaddi and Abulthial, Fish meal, Fish silage and sauce and Agar dessert

v. Jathika Saviya – Gamanaguma Development Program
Joint program with MOFAR, 15 Fisher women were trained on preparation of Maldive fish and salted dried fish in Negombo.

vi. Training on fish handling and processing
Joint program with Industrial Services Bureau of Southern Province. 20 fisher woman from Tangalla area were participated in a training program to gain knowledge on fish handling and fish processing on 20th Sept 2007 at Marine University, Tangalle.

vii. Program on Production of Ambulthial
Joint program with Swedish Cooperative Centre (Hambanthota)
25 fisher women in the area were participated in the training on production of Ambulthiyal on 24th July 2007 at Kudawella , Matara.

viii. Training Program on Production Fish products and Poultry Feeds
Program conducted for 3 officials of Meat Max Farm (Pvt) Ltd of Badalgama from 29th – 30th Nov 2007 at NARA.
Trained on production of Fish meal, Fish silage and Fish meat balls

ix. Awareness program on handling of fish in Multiday Vessels
Awareness at Kudawella on 23rd Dec. 2007. Organized by NANASALA and ICTA (Information and Communication Technology Agency). 40 - 50 fishermen were participated

5. Trainings / Workshops attended:

1. Participated at the International Post graduate training programme specialized on Quality Management of Fish Handling and Processing conducted by UNU-FTP in Iceland from 09, 2006 to March 09, 2007. - Mrs. P.S. Jayasinghe (R.O) participated in the program.

2. Participated at International Seminar on India 8th Asian fisheries Forum at Cochin- India "Participated at the 8th Asian Fisheries Forum, held in India: Kochin -November -19- 23rd – 2007 – Mrs. P.S. Jayasinghe (R.O) participated in the seminar.

3. Training workshop on "Improvement of Technical and Training Capacities of NARA & NAQDA, and initiating 4 years action Plan: Application of PCR and Chemical analysis techniques, National Association of fish & Shellfish Canned Manufactures of Spain (ANFACO), Vigo, Spain, 23rd April – 07th May 2007.
: Dr. R. Edirisinghe (H/PHTD), Ms. G.J. Ganegamaarachchi (R.O), Ms. I. Kariyawsam (R.O), Mr. B.K. Jinadasa (R.O), Ms K. Hettiarchchi (R.A) and Ms. F. Nisreena (R.A) participated in the program

4. Training on laboratory procedures on microbiology and PCR procedures, MATIS Laboratory, Iceland. Under ICEIDA funded project "Quality of Water and Ice used in the Sri Lanka Fisheries Sector". 05th – 16th Nov 2007.
Ms K. Hettiarchchi (R.A) and Ms. T. Dahanayake (R.A) participated in the program.

Socio-Economic and Marketing Research Division

Head of the Division – Dr S C Jayamanne,(Actg.)

The main functions of the division include social, economic and marketing studies in the fishing industry, including the welfare of fishermen and their dependants, analysis of different fish distribution patterns and its impacts on consumers.

1. Conducted research projects in year 2007

i. Fisheries year book 2006
ii. Investigation on the existing market barriers and develop strategies to improve the system (Project 2.3.2)

2. Activities:

Under the above two projects the following activities were carried out by the research team of the division.

- data collection
- data analysis
- report writing/annual publications

Programmer	Project	Allocation (Rs.)	Responsible Officer	Duration
Socio-economic and Marketing	**1.** Sri Lanka Fisheries Year Book- 2006 (Project 6.1)	500,000.00	S. C. Jayamanne	One Year 01.01 07 To 31.12. 07
	2. Investigation on the existing market barriers and develop strategies to improve the system (Project 2.3.2)	400,000.00	KHML Amaralal	One Year 01.01.07 To 31.12.07

3. Results:

Project 1 (6.1):

Preparation and publishing of 400 copies of fisheries year book- 2006 were completed.

Project 2 (2.3.2):

If some body needs distribution mechanism of fresh water fisheries to reorganize in order to enhance the efficacy of the system it is necessity to study about presently prevailing marketing systems' strengths and weaknesses, involving intermediaries' activities, characteristics, cost, margins and barriers in marketing of the industry. Therefore, this study has been planed to examine the above and make suggestions if need to mitigate any constraints related to the industry. The

study took the form of questionnaire survey and data were collected from all intermediaries involving in the existing distribution systems of fresh water fisheries in Anuradhapura and Hambantota districts on the basis of intermediaries' characteristics, activities, cost, margins and business barriers.

The survey results revealed that motor bicycle vendors were dominate followed by bicycle vendors and they collectively responsible for more than 81 and 97 per cent of the fresh water fish marketing in Hambantota and Anuradhapura districts respectively. Assemblers and other types of intermediaries were very few in numbers because of absence of their activities in many reservoirs due to inadequate production quantity of those particular reservoirs. According to the survey results all intermediaries have more than 5 years of business experience in fisl. marketing of them motor bicycle vendors were relatively new comers in to the system in Hambantota while Aseemblers in Anuradhapura districts.

Further, survey results revealed that the total mean selling price ranges per one kg of thilapia, korali and other varieties are 111 – 120, 101 – 110 and 91 – 100 rupees respectively but shows dramatic variation among the type of middlemen due to their mood of business and gross marketing cost. The highest selling price range, 131- 140 rupees per 1kg of thilapia is charged by other retailer such as slab and market retailer because of a higher profit margin due to lack of competition at the markets they operate in. Similarly, for Korali the overall mean price rang is 101 – 110 rupees per 1kg and varies among middlemen where the lowest is charged by assembler because of his mode of business. Selling prices of invasive species are always higher than indigenous species at the retail markets due to a higher consumer preference level and the higher purchasing prices at primary level market.

According to the survey results the average operational expenditure of the middlemen in fresh water fish marketing system is 81 – 140 rupees in range per day but varies according to the types of middlemen due to business duration, traveling distance, activity time and mode of travel. The expenditure, 101 – 180 rupees in range, belongs to assembler which mainly spends on fuel and ice until fish reach to retailers specially who in long distance to the producing centres. Other types of retailers such as slab and market retailers and bicycle vendors spend 61 – 100 rupees in range per day due to limitation of time in operation and lack of fuel cost. Of mobile vendors motor bicycle vendors are expending the highest amount, 141 – 160 rupees in range, mainly due to fuel cost.

According to the survey results total marketing cost for one kg of fresh water fish in Hambantota district is

19 – 24 Rs in range which incurred by the assembler 7 – 10 and the retailer 12 – 14 Rs in range. But in

Anuradhapura district the total marketing cost of one kg of fresh water fish is 16 - 18 Rs in range which
incurred by the assembler 6 - 7 Rs and the retailer 10 – 11 Rs in ranges. Among the marketing costs retailer
cost is higher than the assembler because of higher refreshments expense due to long business duration per day.

4. Publications:

i) Sri Lanka Fisheries Year Book- 2006.

ii) **Reports**

Project report on fresh water fish marketing system and its value chain analysis in Anuradhapura and hambantota districts in Sri lanka.

iii) **Abstract presentations**

(a) Feasibility of improving fish marketing system at fishery harbours of Sri Lank (Research findings were presented at 12th annual session of SLAFAR in 2007).

(b) Economic aspect of technologically improved ring-net used in medium sized tuna fisheries in southern coast of Sri Lanka. (SLAFAR 13th Annual scientific sessions 2007).

(c) Fish retailing trade and price spread in Colombo municipal council markets in Sri Lanka. (SLAFAR 13th Annual scientific sessions 2007).

iv) **Paper article**
True story of increasing price of fish(Sinhala), Dinamina paper article-2007.

5. Training programmes:

No

6. Constraints:

Difficulties to collect data from some respondents and institutions.

7. Other developments:

One research assistant promoted to the research officer category in the year.

Service and Operations Division

Head of Division /Chief Engineer: D. A. Karunasena

Main function of Service & operation is maintenance, operation and development of infrastructure facilities of the institution to enable and support the research and technical activities.

Staff:

In 2007 Four (4) supervising officers, Eleven (11) skill craftsmen, Eleven (11) semi skill craftsmen and Twenty Two (22) drivers were in the division and contributed for the divisional goal of Engineering Service Division.

There were two methods applied for operation, maintenance and infrastructure development work, consist of day to day maintenance and supportive work and with available competency of the divisional work forces and some limited capital nature work was undertaken by the staff of the division. Major capital nature work is out sourced to competent organizations via calling competitive tenders or implemented via State Institutions which are designated for such assignments.

Continues decrease of competent staff due to retirement, transfers to other divisions and not filling of vacancies of the division, some in house organised work programs were disturbed and was not able to be complete on time.

Work out Sourced (From Capital Budget)

Program	Project:	Allocation Rs. Million	Officer Responsible	Period From – To
Rehabilitation Building & of Vehicles		8.4	Head S &O	Jan – Dece2007

Scheduled of work on priority basis: (cost in Rs. million)

1.1	Rehabilitation of Main Building of Head Office–	1.650
1.2	Rehabilitation of internal roads of NARA Head Office	1.850
1.3	Rehabilitation of boundary parapet walls that damaged during tsunami-	2.390 *
1.4	Purchase of Fencing material for Sea Side of Land Boundary at NARA	0.800 *
1.5	Rehabilitation of IARD Office Building-	0.680
1.6	Rehabilitation of the Engine the Vehicle 62-2177	0.340
1.7	Rehabilitation of the Body the Vehicle 62-2177, Suspension & Auxiliary system	0.250
1.8	Rehabilitation of the Body Vehicle 32-2951	0.225
1.9	Rehabilitation of Vehicle 20-3224 ,replacement of R/C engine with gear box	0.065
1.10	Rehabilitation of Vehicle 61-0012 ,replacement of R/C engine with gear box	0.020
1.11	Rehabilitation of Vehicle 32-7196 ,replacement of R/C engine with gear box	0.030
1.12	Rehabilitation of Vehicle 32-3417,,replacement of Power steering system	0.085
	Total projected cost	**8.385**

* Identified and planned 3rd quarter of 2007

2.0 Re habilitation of Equipment		**1.5 million** Head S&O / T.O/WA/P.O Jan – Dec 2007
2.1	Rehabilitation of 17 ½ ton Air Conditioner Main Air Duct	0.45
2.2	Rehabilitation of 18 Split type Air Conditioners	0.35
2.3	Installation of Lightning Arrestors for PABX	0.08
2.4	Rehabilitation of Electrical system IARD & PHT division	0.90
	Projected Total Cost	**1.78**
2.5.	Lease payment for Rented Vehicle	**1.90million** Head S &O/ TO. /P.O Jan –Dec 2007

3. Performance - From Capital Budget

(Project; 1 Rehabilitation Building & Vehicles)

3.1.1 Rehabilitation of Main Building:

Part of Main Building Roof and external walls colour washing was done and work completed.

Progress (%): Physical: 100% Financial: 100% (Total cost Rs. 2.25 million).

Note:
Project was started in December 2006 and progressed to 2007 and completed. In 2006, 30% work has been completed and Rs.1.65 million investment in 2007.

3.1.2 Rehabilitation of Internal Roads of NARA Head Office:

Internal road structure was not repaired during last 15 years and task was planned with Road Development Authority (RDA) to complete before the 25th anniversary planned to be held on 3rdweek February 2007. Task completed mid February 2007 and Rs. 1.85 million investments in 2007.

Progress (%): Physical: 100% Financial: 100% (Rs.1.85 million)

3.1.3 NARA Head Office land boundary rehabilitation:

Part of the parapet wall, length of 105 meters badly damaged during tsunami in December 2004 and that was organized to rehabilitate with State Engineering Corporation (SEC). The work physically progressed since December 2007.

Progress (%): Physical: 40% Financial: 0%
(Total Project cost Rs. 2.5 million)

Note: SEC did not submit the invoices during the year and financial progress was 0% and shifted to 2008.

3.1. 4. Purchase of fencing material for NARA Head Office Sea side boundary construction.

Progress (%): Physical: 55% Financial: 45% (Total Estimated cost Rs.2.2 million)

Note: Procurement of material was done during 2007 and 45% (as funds were limited for the year) of cost incurred during the year and physically erecting of fence implementation was scheduled for 2008.

3.1.5. Two laboratories and office of Inland Aquatic Resources Division (IARD) was renovated and work is in progress

Progress (%): Physical: 100% Financial: 90% (Rs. 0.60 million)

Rehabilitation of Vehicles

3.1.6. Rehabilitation of the Engine Vehicle 62-2177:

The performance of the engine of the vehicle was very poor and on estimate of Agent, Mitsubishi Motors Lanka Limited rehabilitation was done. The cost of rehabilitation was Rs. 0.340 million.

Progress (%): Physical: 100% Financial: 100%

3.1.7 Rehabilitation of Body of the vehicle 62-2177:

The body of this vehicle was badly deteriorated because of the age and usage it was planned for tinkering & painting work. Job was entrusted to the Government Factory with formal tender.

Progress (%): Physical: 40% Financial: 0%

Note:
Work was arranged with the Government Factory to complete work within 2 months as agreed with them. Due to factors beyond control of NARA, work was not completed within the year.

3.1.8 Rehabilitation of Vehicle Body 32-2951:

This repair was completed 4th quarter of 2006 and settlement of invoices posted to 2007 as funds not received in 4th quarter of the 2006. The settlement of the invoices made in 2007.

Progress (%): Physical: 0% Financial: 100%

3.1.9 Rehabilitation of Vehicle 20-3224 (Petrol Vehicle) by installation of recondition Diesel Engine

The 20-3224 due to poor performance of the petrol engine and higher operational cost, recondition diesel engine was planned to fit for the vehicle in 2006. Procurement of recondition done in 2006 and installation was completed and registered with new reg. No.253-2553 in 2007. Cost of fixing and registration was Rs.0.065 million.

Progress (%): Physical: 100% Financial: 100%

3.1.10 Rehabilitation of Vehicle 61-0012 by replacement of recondition engine with gear box

Due to poor performance and uneconomical repair of the engine of the vehicle replacement by recondition engine and Gear box was planned and procured in 2006. However due to non availability of funds within the year for supplementary items for fixing and commissioning the engine posted to 2007 and work was completed.

Progress (%): Physical: 100% Financial: 100%

3.1.11 Rehabilitation of Vehicle 32-7196 by replacement of recondition engine with gear box.

Replacement of recondition engine and Gear box for the vehicle 32-7196 was planned and procurement was done in 2006. Supplementary items required for the replacement were procured and task completed in 2007

Progress (%): Physical: 100% Financial: 100%

3.1.12 Rehabilitation of Vehicle 32-3417,replacement of Power steering system

Progress (%): Physical: 100% Financial: 100%

3.1.13 Release of lease rental for the vehicle PA5935

Progress (%): Physical: 100% Financial: 100% (Rs.1.860 million)

3.2 Rehabilitation of Equipment:

3.2.1 17 ½ Ton Main Auditorium Air Conditioner ducting system had to be renovated and work was completed.

Progress (%) Physical: 100% financial: 100% (Rs.0.450 million)

3.2.2 Rehabilitation of 18 units of Air Conditioners of Laboratories & office

Progress (%): Physical: 100% Financial: 100%

3.2.3 Installation of Lightning Arrestors for PABX

Progress (%): Physical: 100% Financial: 100%

3. 2.4 Rehabilitation of Electrical system IARD & PHT division (project cost. Rs. 0.90 million)

Progress (%): Physical: 48% Financial: 45%

Note:
Part of the material and equipment procured and implementation will take place after receiving all material. Material received and had shift for 2008 as supply is beyond control of the division.

Operation of Vehicle Fleet for Research and Development Work at NARA.-2007

During the year vehicle fleet of NARA was utilized for 451,644 km. The maintenance cost for the fleet was Rs. 3,101,700.00 during the year 2007 and for 2006 it was Rs.3, 868,518.77

Total operational cost for the year in comparison of previous year is given as follows:

Performance Vehicle Fleet	2007	Rs/ km	2006	Rs/ Km	Change
1. No of vehicles in the fleet (Nos)	18		19		-1
2. Total operated distance for NARA Research (Km)	451,644		487,678		- 36034

3. Cost of maintenance & up keep of the fleet	(Rs.)	3,101,700.00	6. 87	3,868,518.77	7.93	- 1.06
4 Fuel use during the year	(Lts)	53959.50		57806.76		
5. Fuel for the year	(Rs.)	3,267,879.00	7. 23	2,744,724.65	5.63	+1.60
6 Operational & Maintenance Admin Cost	(Rs.)	1,939,556.00	4.29	1,699,802.53	3.49	+0.80
7. Drivers (26) remuneration : Subsistence		692,867.40		526,400.85		
Overtime		2,984,859.82		2,636,205.14		
Salary		7,536,937.35		6,384,225.64		
Sub Total		**11,214,664.22**	24.83	**9,546,831.23**	19.58	+5.25
Grand Total		**19,523,799.22**	**43.23**	**17,859,877.18**	**36.63**	**+6.60**

The above table show 29 % reduction in maintenance cost in respective of 2006 and overall operational cost has increased by 18% due to other factors such as increase of fuel cost and employees remuneration during the year.

PURCHASING & SUPPLIES DIVISION

Head of the Division: Mr. Ananda Amarasinghe

Overview of the Division

Purchasing and Supplies Division was established with effect from 23/05/2008. The functions and responsibilities of the division are as follows.

01. Supply goods and services relevant to the all divisions.
02. Handle all tender works.
03. Procurement works relevant to all divisions.
04. Air freight and clearance of goods.
05. Administration of main stores.

Activities performed by the division

The premier function of the division is to provide all necessary services and supplies in a formal and systematic manner in accordance with Procurement Guide Lines in order to carry out research and development activities of divisions of National Aquatic Resources Research & Development Agency and Regional Research Centres. In addition to above activities, providing other related services for smooth functioning of research and development activities.

Performance

I. Mainly purchase of equipments & chemicals for on-going projects, acquisition of spare parts for vehicles and hiring of vehicles are performed by the division according proper tender procedures.

- ❖ Registration and selection of suppliers according to requirements of NARA.
- ❖ Calling of tenders/quotations from local and foreign suppliers for goods / equipments / chemicals following tender procedures as per the given specifications.
- ❖ Purchase of goods for day to use by utilizing a petty cash imprest and maintain records.

II. Clearance of goods received as donations, purchase of goods from foreign sources or air freight of goods for repairs. Take actions where necessary to obtain tax relief when clearance of goods received from foreign sources are done & sending equipments for repair etc. abroad subject to normal mail and airfreight charges.

III. Insure all vehicles / motor – bicycles / equipment of NARA through proper tender procedures. Obtain insurance coverage for the personnel who perform duty at sea and land. (unsecured areas)

IV. Distribution of goods ordered by this division to respective divisions after updating ledgers in the Main Stores.

- ❖ Maintain buffer stocks of consumables in the main stores for day to day requirements of divisions, issue of goods receipt notes, produce documents for

payments, submit report to respective divisions when requested are also performed by this division.

- ❖ It is planned to computerize all documentation work of the division for the efficiency of works handled by the division.

NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY

STATEMENT OF FINANCIAL POSITION

AS AT	Notes	31.12.2007 Rs. Cts.	31.12.2006 Rs.
ASSETS			
NON-CURRENT ASSETS			
PROPERTY, PLANT AND EQUIPMENT		1,254,221,161.25	1,228,851,698
CAPITAL WORK IN PROGRESS			
ABANDONED PROJECT		852,718.18	852,718
		1,255,073,879.43	1,229,704,416
CURRENT ASSETS			
INVENTORIES/STOCKS		3,401,648.77	1,856,008
TRADE AND OTHER RECEIVABLES		16,037,666.37	73,828,604
PREPAYMENTS		336,020.50	327,983
INVESTMENTS IN GOVERNMENT SECURITIES		66,243,100.00	-
CASH AND CASH EQUIVALENTS		19,999,917.29	3,540,908
		106,018,352.93	79,553,503
TOTAL ASSETS		**1,361,092,232.36**	**1,309,257,919**
LIABILITIES			
CURRENT LIABILITIES			
PAYABLES		34,356,899.67	14,663,261
ACCRUED EXPENSES		16,866,120.93	6,000,591
		51,223,020.60	20,663,852
NON-CURRENT LIABILITIES			
PAYABLE		2,264,562.80	4,502,086
DEFERRED INCOME		862,630.77	862,630
PROVISION FOR GRATUITY		46,240,656.51	36,153,145
		49,367,850.08	41,517,861
TOTAL LIABILITIES		100,590,870.68	62,181,713
NET ASSETS/EQUITY			
ACCUMULATED FUND		987,148,386.75	866,974,841
RESERVES		273,352,974.93	380,101,365
TOTAL NET ASSETS/EQUITY		1,260,501,361.68	1,247,076,206.00
		1,361,092,232.36	**1,309,257,919**

THE SIGNIFICANT ACCOUNTING POLICIES AND THE NOTES THEIRIN FORM AN INTEGRAL PART OF THESE FINANCIAL STATEMENTS. THE FIGURES IN BRACKETS INDICATE DEDUCTIONS AND NEGATIVE VARIANCES.

APPROVED AND SIGNED ON BEHALF OF THE BOARD.

.....	.....	.....
Mr. K . Haputhanthri	**Mrs. K.T.R. Prathapasinghe**	**Mrs. R.H.S.P. Ranasinghe**
CHAIRMAN	*DIRECTOR GENERAL*	*HEAD/FINANCE*

COLOMBO

28th May 2008.

NATIONAL AQUATIC RESOURCES RESEARCH & DEVELOPMENT AGENCY

FINANCIAL PERFORMANCE

FOR THE YEAR ENDED	31.12.2007	31.12.2006	VARIENCE
	Rs. Cts.	Rs.	Rs.
OPERATING REVENUE			
RECURRENT GRANT	119,592,000.00	87,600,000	31,992,000
OTHER INCOME	20,417,694.63	12,044,215	8,373,480
	140,009,694.63	99,644,215	40,365,480
OPERATING EXPENSES			
PERSONNEL EMOLUMENTS	125,413,828.56	83,508,972	41,904,857
TRAVELLING & SUBSISTANCE	1,215,408.03	1,366,746	(151,338)
SUPPLIES & CONSUMABLES USED	1,337,786.81	1,217,306	120,481
MAINTENANCE EXPENDITURE	5,942,102.66	9,259,765	(3,317,662)
CONTRACTUAL SERVICES	18,728,302.38	19,193,187	(464,885)
RESEARCH & DEVELOPMENT EXPENDITURE	36,697,598.48	21,380,395	15,317,203
DEPRECIATION & AMORTISATION EXPENSES	62,255,048.00	56,160,022	6,095,026
OTHER OPERATING EXPENSES	1,964,736.26	2,707,247	(742,511)
TOTAL OPERATING EXPENSES	253,554,811.18	194,793,640	58,761,171
SURPLUS (DEFICIT) FROM OPERATING ACTIVITIES	(113,545,116.55)	(95,149,425)	(18,395,691)
NON OPERATING REVENUE / EXPENSES			
FINANCE COST	1,343,535.21	253,484	1,090,051
NON-OPERATING REVENUE	8,140,261.73		8,140,262
TOTAL NON-OPERATING REVENUE/EXPENSES	6,796,726.52	(253,484)	7,050,211
NET SURPLUS(DEFICIT) FOR THE PERIOD	(106,748,390.03)	(95,402,909)	(11,345,481)

NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY

CONSOLIDATED CASH FLOW STATEMENT

FOR THE YEAR ENDED	31.12.2007		31.12.2006
CASH FLOWS FROM OPERATING ACTIVITIES			
	RS	**RS**	**RS**
SURPLUS (DEFICIT) FROM ORDINARY ACTIVITIES	(114,169,742)	(114,169,742)	(95,402,909)
NON-CASH MOVEMENTS			
DEPRECIATION	62,255,048		56,103,546
AMORTIZATION OF DEFERRED EXPENDITURE	(9,273,591)		(388,184)
PROVISION FOR GRATUITY	11,792,704		8,409,758
GRATUITY PAYMENTS	(2,025,766)		(746,260)
INTEREST	574,098		
ADJUSTMENT FOR INSURANCE CLAIM RECEIVABLE			59,111,229
INCREASE IN STOCKS	(1,545,641)		455,477
DECREASE IN TRADE & OTHER RECEIVABLES	57,685,938		(61,026,518)
INCREASE IN PREPAYMENTS	(8,038)		
INCREASE IN PAYABLES	19,697,638		4,100,120
INCREASE IN ACCRUED EXPENSES	10,568,194	149,720,584	
NET CASH FLOWS FROM OPERATING ACTIVITIES		35,550,842	(29,383,741)
CASH FLOW FROM INVESTING ACTIVITIES			
PURCHASE OF PLANT AND EQUIPMENT	(23,150,335)		(28,325,308)
INTEREST ON TREASURY BILLS	7,243,275		
NET CASH FLOWS FROM INVESTING ACTIVITIES		(15,907,060)	(28,325,308)
CASH FLOWS FROM FINANCING ACTIVITIES			
CAPITAL GRANT	65,051,500		46,600,000
REPAYMENT OF BORROWINGS	(1,993,173)		
RESEARCH & PROJECT FUND			(3,618,533)
NET CASH FLOWS FROM FINANCING ACTIVITIES		63,058,327	42,981,467
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS		82,702,109	(14,727,582)

	31.12.2007	31.12.2006	
CASH & CASH EQUIVALENTS			
INVESTMENT IN GOVERNMENT TREASURY BILLS	66,243,100		
CASH AT BANK	19,999,917	3,540,908	
	86,243,017	3,540,908	82,702,109

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கணக்காய்வாளர் தலைமை அதிபதி திணைக்களம்
AUDITOR GENERAL'S DEPARTMENT

මගේ අංකය
எனது இல
No. AF/A/NARA/FA/07

මගේ අංකය
உமது இல
Your No.

දිනය
திகதி
Date 30 August 2008

The Chairman
National Aquatic Resources Research and Development Agency

Report of the Auditor General on the Financial Statements of the National Aquatic Resources and Research Development Agency for the year ended 31 December 2007 in terms of Section 14 (2) (c) of the Finance Act, No. 38 0f 1971

The audit of financial statements of the National Aquatic Resources Research and Development Agency for the year ended 31 December 2007 was carried out under my direction in pursuance of provisions in Article 154 (1) of the Constitution of the Democratic Socialist Republic of Sri Lanka read in conjunction with Section 13 (1) of the Finance Act, No .38 of 1971 and section 32 (3) of the National Aquatic Resources Research and Development Act, No 54 of 1981. My comments and observations which I consider should be published with the annual report of the Agency in terms of Section 14 (2) (c) of the Finance Act appear in this report.

1 : 2 **Responsibility of Management for the Financial Statements**

Management is the responsible for the preparation and fair presentation of these Financial Statements in the accordance with Sri Lanka Accounting Standards. This responsibility includes: designing, implementing and maintaining internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatements, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are responsible in the circumstances.

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කොළඹ 07, ශ්‍රී ලංකාව
INDEPENDENCE SQUARE,
COLOMBO 07, SRI LANKA

දුරකථනය
தொலைபேசி 2691151

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பகா: இல 2697451

1 : 3 **Scope of Audit and Basis of Opinion**

My responsibility is to express an opinion on these financial statements based on my audit. Audit opinion, comments and findings in this report are based on a review of the financial statements presented to audit and substantive testes of samples of transactions. The scope and extend of such review and tests were such as to enable as wide an audit coverage as possible within the limitations of staff, other resources and time available to me. The audit was carried out in accordance with Sri Lanka Auditing Standards to obtain reasonable assurance as to whether the financial statements are free from material misstatements. The audit include the examination on a test basis of evidence supporting the amounts and disclosures in financial statements and assessment of accounting principles used and significant estimates made by the management in the preparation of financial statements as well as evaluating their overall presentation. I have obtained sufficient information and explanations which to the best of my knowledge and belief were necessary for the purpose of my audit. I therefore believe that my audit provides a reasonable basis for my opinion. Sub-sections (3) and (4) of Section 13 of the Finance Act, No. 38 of 1971 give discretionary powers to the Auditor General to determine the scope and extend of the Audit.

2. **Financial Statement**

2.1 **Opinion**

So far as appears from my examination and to the best of information and according to the explanations given to me, I am of opinion that the National Aquatic Resources Research and Development Agency had maintained proper accounting records for the year ended 31 December 2007 and except for the effects on the financial statements of the matters referred to in paragraph 2.2 of this report, the financial statements have been prepared in accordance with Sri Lanka Accounting Standards and give a true and fair view of the state of affairs of the National Aquatic Resources Research and Development Agency as at 31 December 2007 and the financial results of its operation and cash flows for the year then ended.

2.2 Comments on Financial Statement

2.2.1 Accounting Deficiencies

(a) Accounts Receivable

The sum of Rs.16 Million shown as trade and other receivable under the current assets in the statement of financial position indicated debtors amounting to about Rs.2.2 million older than one year. An age analysis of these debtors in given below.

	Rs.
Over 5 years	1,179,431
4 to 5 years	449,688
3 to 4 years	36,350
2 to 3 years	9,320
1 to 2 years	525,306
Total	**2,200,095**

Accounts receivable older than 05 years in respect of which confirmation of balances could not be obtained amounted to Rs.1.179 million, but an adequate provision for bad debts had not been made in that connection.

(b) Accounts Payable

The sum of Rs.3 million indicated in the sum of Rs.34 million shown under current liabilities in the statement of financial position had been liabilities older than 05 years and the amount continued to be shown under the liabilities annually without taking action to settle the liabilities. An age analysis of the liabilities in given below.

	Rs.
Over 5 years	3,043,103
4 to 5 years	686,391
3 to 4 years	7,212
2 to 3 years	3,776,619
1 to 2 years	4,291,574
Total	**11,804,899**

I. A sum of Rs.26.7 million had been shown in the accounts as project creditors due to the failure to carry out the activities that should have been carried out from the grants made available for 33 foreign aid project. This amount also included an income which should have been obtained for operational activities of the Agency.

II. Non adjustment of accounts of officers who had vacated posts

Even though unclaimed salaries, overtime and other allowances of 4 officers who had vacated posts several years ago should have been set off against the sum of Rs.193,431 recoverable from them it had not been so set off and adjusted.

2.2.2 Lack of Evidence for Audit

Adequate evidence in support of the balances shown under the following items of account was not available.

Particulars	Value Rs.	Evidence required
a) Lands of the Regional Center, Rekawa	Unidentifiable	Title Deeds in support of ownership and survey plans.
b) Buildings	Unidentifiable	Building plans and files on construction and handing over.
c) Machinery Equipment Computers and Accessories	Unidentifiable	Inventory books or goods received/issue notes and annual verification reports.
d) Boats and Vessels	5,056,800	Registration certificate of boats and vessels running records (Log) inventories of articles and equipments of boats and vessels, annual verification reports.

2.2.3 Non-compliance with Laws, Rules, Regulations and Management Decisions

Reference to Laws, Rules, Regulations	Non-compliance
a) Financial Regulations	
No 372(2) (c)	An Officers had been paid an advance of Rs.20,000 despite non-settlement of an amount of Rs.3,576 out of a previous advance. The officer had been dismissed subsequently
b) Establishments Code of the Democratic Socialist Republic of Sri Lanka	
Chapter II Sections13:2 and 13:3	An acting appointment should not be made and acting salary should not be paid for a temporary vacancy of a post. Nevertheless, acting salaries amounting to Rs.903,691 had been paid since the year 2003 for 05 vacant posts without recruiting officers for the vacancies.
c) Public Finance Circulars	
No 340 (1) of 18 December 1995 and No 353	Motor vehicles which cannot be repaired and parked in the garages and yards should be disposed of. Nevertheless 10 motor cycles, 02 vans, 01motor car, one truck and a'double cab had been retained without being disposed of.

3. Financial and Operating Review

3.1 Financial Review

3.1.1 Financial Results

According to the financial statements presented the operations of the Agency during the year ended 31 December 2007 had resulted in a deficit of Rs.106,748,390 as compared with the corresponding deficit of Rs.95,402,909 for the preceding year thus indicating a further deterioration of Rs.11,345,481 in the financial results. The increase in the employees salaries had resulted the increase in the deficit.

3.1. Budgetary Control

Substantial variances as shown below were observed between the budget and the actual income and expenditure.

Particulars of Budget Items	Estimated Amounts Rs.	Actual Amount Rs.	Variance Rs.	Variance Percentage %
a) Other Income	3,500,000	3,186,650	313,350	(8.9)
b) Consultancy Income	4,500,000	7,953,454	3,453,454	76
c) Salaries	78,000,000	94,547,128	16,547,128	(21.2)
d) Gratuity Expenses	6,000,000	11,792,704	5,792,704	(96)
e) Security Expenses	2,800,000	4,228,312	1,428,312	(51)
f) Publicity	200,000	336,134	136,134	(68)
g) Research and Development Expenditure	47,750,000	36,379,950	11,370,050	(23.8)

The agency had failed to achieve the expected targets of research and development activity which in the main objectives of the agency.

3.2 Operating Review

3.2.1 Operating Inefficiencies

Even though recurrent receipts of Rs.175 million was expected for the year under review only a sum of Rs.140 million had been received while the excepted recurrent expenditure amounted to Rs.223 million. The actual expenditure amounted to Rs.252 million.

3.2.2 Uneconomic Transaction

The Agency had incurred a loss of Rs.12,776 due to the failure to settle the electricity bills before the specific date.

4. Systems and Controls

Special attention is needed in respect of the following areas of control.

a) Debtors and Creditors Control

b) Advances

c) Assets Controls

S.Swarnajothi
Auditor General

Steps taken on report of the Auditor General on the Financial Statements of National Aquatic Resources Research & Development Agency for the year ended 31st December 2007 in terms of Section 14 (2) (c) of the Finance Act No.38 of 1971.

2.2 Comments on Financial Statements

2.2.1 Accounting Deficiencies

(a) Money receivable Rs.2,200,095.00 (This should be corrected as Rs. 2,200,145.00)

More than 5 years Rs.1,179,431.00

Bad debts 816,811.00

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to write off it as a bad debt. Accordingly, bad debt adjustments will be done when final accounts are prepared in 2008.

Money deposits 348,500.00

These deposits are for continuous services obtained and actions had been taken to keep them further.

Over payments 14,120.00

These amounts had been already settled.

4 to 5 years Rs. 449,688.00 (approximately)

Bad debts 4,687.50

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to write off it as a bad debt. Accordingly, bad debt adjustments will be done when final accounts are prepared in 2008.

Money deposits 445,000.00

These deposits are for the continuous services obtained and the actions had been taken to keep them further.

3 to 4 years 36,350.00

Advances for purchases 34,250.00

At present it is near completion.

Money receivable from the employees who had left the service Rs. 2,100.00

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to pay the balance gratuity calculated by adjusting the amount receivable & payable to them. Accordingly, the bad debt adjustments will be done when final accounts are prepared in 2008.

2 to 3 years Rs.9,320.00

Project debtors Rs.7,820.00

This amount had been settled.

Salary advances Rs.1,500.00

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to do adjustments for gratuity. Accordingly, the bad debt adjustments will be done when final accounts are prepared in 2008.

1 to 2 years Rs.525,306.00 (This should be corrected as Rs.525,356.00 (approximately rupees)

Project debtors Rs.415,320.00

The several reminders had been sent. The actions will be done to settle it in 2008.

Money deposits Rs.50,000.00

These deposits are for the continuous services obtained and the actions had been taken to keep them further.

Purchasing advances Rs. 35,459.52

This had been already settled.

Bicycle loans Rs.1000.00

This had been already settled.

Petty cash advances Rs.23,576.00

This amount is receivable from an employee who had been sent under compulsory retirement. The actions are taken to show it as a payable amount after calculating gratuity and deducting the balance.

(b)Money payable Rs.11,804,899.00(This should be corrected as 11,804,890.00)

More than 5 years Rs.3,043,103.00 (This should be corrected as 3,043,094.00) (approximately rupees)

Project creditors Rs. 272,607.03

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to adjust to income. Accordingly ,the adjustments to income will be done when final accounts are prepared in 2008.

2 to3 years Rs.3,776,619.00 (approximately rupees)

Project creditors Rs.Rs.3,736,388.00

These creditors are for the current active projects and actions are taken to pay properly at required occasions.

Other creditors Rs.1,826.50

This is an employee bank loan. Actions are taken to pay when it is claimed. Otherwise the actions are taken to adjust it to income under relevant approval after 3 years are lapsed.

Tender deposits not claimed Rs.10,000.00

Actions are taken to pay it when it is claimed. Otherwise the actions are taken to adjust it to income under relevant approval after 3 years are lapsed.

Others not claimed Rs.28,404.00

Actions are taken to pay it when it is claimed. Otherwise the actions are taken to adjust to income under relevant approval after 3 years are lapsed.

1 to 2 years Rs. 4,291,574.00

Project creditors Rs.4,166,328.00

Actions are taken to pay it when it is claimed. Otherwise the actions are taken to adjust to it to income under relevant approval after 3 years are lapsed.

Tender deposits not claimed Rs.20,000.00

Actions are taken to pay it when it is claimed. Otherwise the actions are taken to adjust it to income under relevant approval after 3 years are lapsed.

Travelling expenses & Overtime not claimed Rs.12,269.00

This is a payment to an employees who had been compulsory retired on results of formal disciplinary inquiry. The case filed against it by them is still questioned at Labour Tribunal. This will be settled in accordance with the final decision of it.

Others, not claimed Rs.16,471.00

These are relevant to employees. The payments will be done when those are claimed. Otherwise the actions are taken to adjust it to income.

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to adjust to income. Accordingly ,adjustments to income will be done when final accounts are prepared in 2008.

Retention money Rs. 846,189.34

This had been forwarded to a committee under FR104 to submit recommendations related to obtain approval of Board of Directors to adjust to income. Accordingly, adjustments to income will be done when final accounts are prepared in 2008.

Miscellaneous creditors Rs.1,522,230.00

This amount should be paid to Colombo Municipal Council. It was agreed to pay it in parts and now it is being paid in installments.

Miscellaneous creditors Rs.684.02

This is an amount payable for spectacle loans. This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to adjust to income. Accordingly, adjustments to income will be done when final accounts are prepared in 2008.

Salaries & travelling expenses not claimed Rs.7,949.50

This is a payable amount to the employee who has been sacked from his services. This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to do adjustments to income after cor paring with money receivable from them. Accordingly, adjustments to income will L e done when final accounts are prepared in 2008.

Accrued expenses Rs.393,434.00

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to adjust to income. Accordingly, adjustments to income will be done when final accounts are prepared in 2008.

4 to 5 years Rs.686,391.00 (approximately rupees)

Project creditors Rs.495,344.00

This transaction had been settled after paying.

Retention money Rs. 191,047.00

The actions will be taken to pay when it is claimed.

3 to 4 years Rs.7,212.00

Miscellaneous creditors Rs.7,212.00

Accrued expenses Rs.76,506.00

This is an audit fee in 2006.The payments will be done when bills are forwarded.

(i) A part of liabilities to project account holders had been already released. The balance will be paid when it is claimed. The actions will be taken to adjust the balances more than 3 years. Incomes receivable from operational activities had been adjusted to income in 2008, properly.

(ii) Non adjustments of accounts of officers who had left the services.

This had been forwarded to a committee under FR 104 to submit recommendations related to obtain approval of Board of Directors to write off it as a bad debt. Accordingly the bad debt adjustments will be done when final accounts are prepared in 2008.

2.2.2 Lack of evidence for audit

a,b,c,d

Most of them had been forwarded for audit. The actions will be taken to forward the documents which had not forwarded, as soon as possible.

2.. 3 Non compliance with laws, rules, regulations & mgt decisions

a) Financial Regulation No.372 (2) (b)

These money advances had been taken for two projects. Practically, in such occasions those payments should be done to achieve the progress of both projects. In future such payments will be minimized.

(b) Establishments Code of Democratic Socialist Republic of Sri Lanka

(i) Chapter (ii) -13.2 & 13.3

At present recruitments had been done for 1 post and the actions will be taken to do recruitments for remaining posts in future.

(c) Public Finance Circulars

No.340(1) and 353 dated 18th December 1995

The actions had been already taken to dispose these vehicles.

03. Financial & Operational review

3.1 Financial review

3.1.1 Financial Result

Agreed. This is due to increase of employee salaries.

3.1.2 Budget control

Agreed. The answers for these had been already sent to Auditor General. This is due to limitations of estimates of General Treasury.

3.2 Operational review

Operational Inefficiencies

3.2.1 Rs. 175 million is expected in current year inclusive of research & development provisions of Rs.47.75 million. Only recurrent receipts includes in Rs.140 million in operational Statement. The actual expenses exceeded expected recurrent expenditure due to increase of expenses such as salaries, gratuity due to increase of salaries in accordance with Management Services Circular No. 30. In addition when actual expense is shown as Rs. 253 million it includes Rs.62 million of depreciation which is a non-monetary transaction. But budgeted depreciation is Rs.43 million. This is also a reason for the variance between actual & budgeted recurrent expenditure.

3.2.2 Non-economic transactions

Agreed. This loss has happened due to a delay in releasing of funds from Treasury.

04. Systems & controls

The more progress had achieved than previous years related to (a) (b) (c) and attention will be paid on these in due course. However, as the difficulties of recruitments of required staff & strict procedures and methods. badly affected to these facts. Attention is paid to create a certain flexibility.

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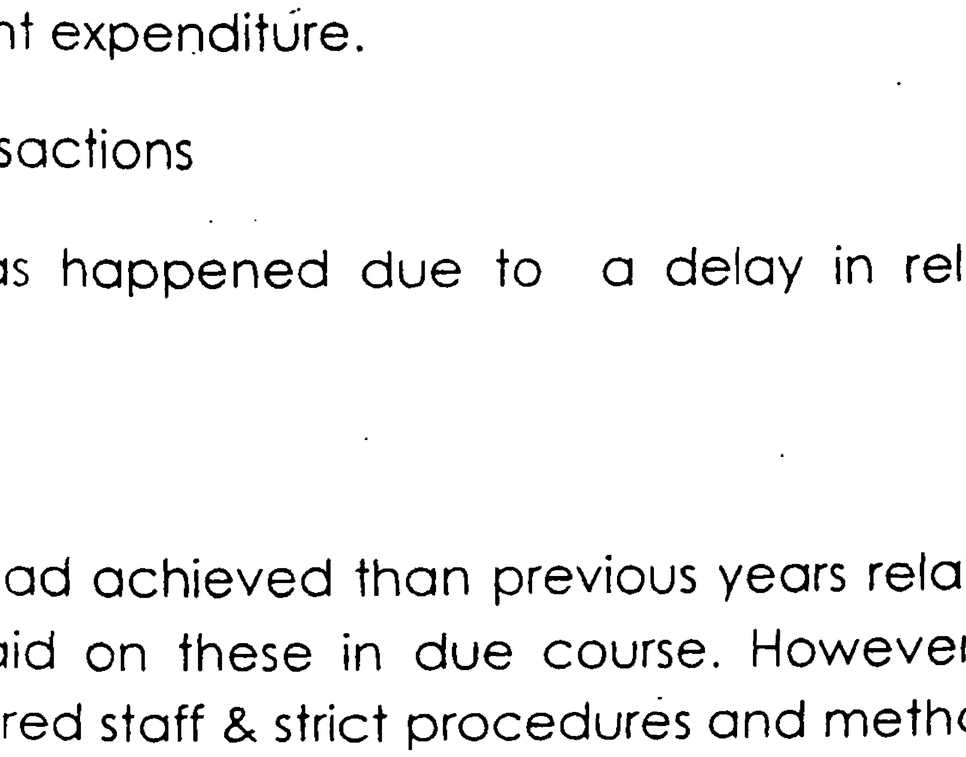
K.Haputhanthri

Chairman-NARA



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