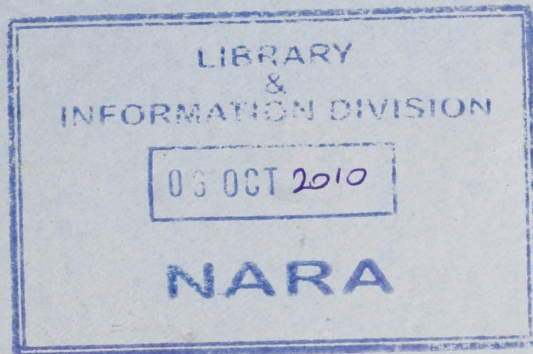


# ANNUAL REPORT & ACCOUNTS

## 2006



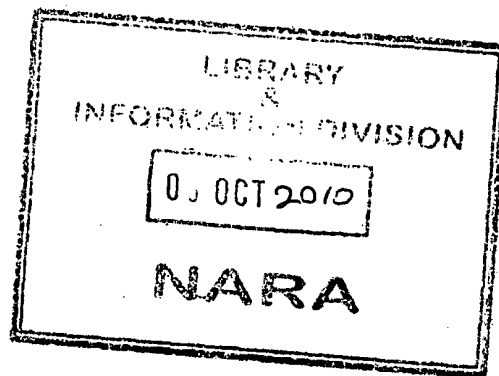
NATIONAL AQUATIC RESOURCES, RESEARCH AND  
DEVELOPMENT AGENCY  
CROW ISLAND, MATTAKKULIYA, COLOMBO 15

RA-044



# ANNUAL REPORT & ACCOUNTS

## 2006



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

# ANNUAL REPORT FOR THE YEAR 2006

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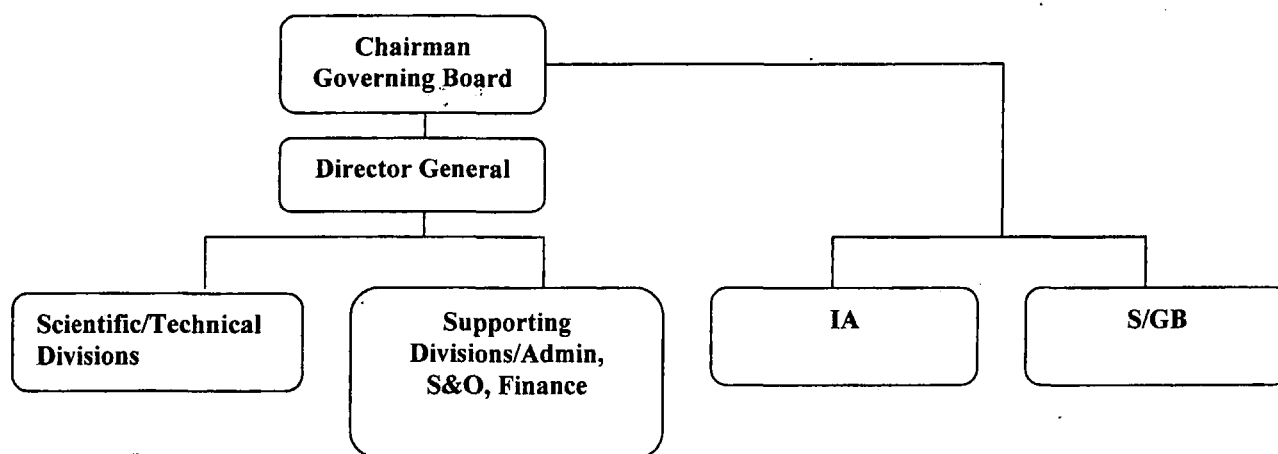
# GENERAL ADMINISTRATION

The National Aquatic Resources Research and Development Agency (NARA) is the principal national institution charged with the responsibility of carrying out and co-ordinating research development and management activities on the subject of aquatic resources. 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 in 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.

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 information.
- To provide training.

## 1. Organizational Structure



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

## 2. General Performance

Both 2005 and 2006 can be considered as difficult years for NARA, years 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 this period. Hence the performance of the year 2006 should be viewed accordingly.

With all such difficulties at hand there had been a marked improvement in both financial and physical performance during the year 2006. The overall financial performance during the year was 70% favourable than the previous year.

Stringent management measures taken were able to deliver salutary results. As per the final accounts (see page 1 of Annex 1) a significant improvement in the financial result has been observed during the year under review. The financial deficit for the year was only Rs.95,402,909.00 as against the staggering financial deficit of Rs.170,855,232.00 for the previous year amounting to an improvement of 45%. The Auditor General in his report at Annex has commented *inter alia* on this remarkable improvement.

The improvement is attributable to the drastic measures taken to control finances and maintenance of financial discipline during the period under review. 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 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 (07) 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 from

#### 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

#### Ex Officio Members

- |    |                                 |   |                                            |
|----|---------------------------------|---|--------------------------------------------|
| 1. | Mr A Hettiarachchi              | - | Director General (Development) MFARD       |
| 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 T S G Samarasinghe | - | 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                   | - | Director General – Department of Fisheries |
| 8. | Ms K T R Prathapasinghe         | - | Director General/NARA                      |

#### 4. Organization

Mr K Haputhantri continued as the Chairman. Mr Yoshan Saddhasena functioned as the Director General until 11<sup>th</sup> June 2006. Mrs K T R Prathapasinghe continued to work as Director General from 20<sup>th</sup> July 2006.

In order to perform the mandated functions of the Agency the organization had been designed to constitute eight Research and Technical Divisions ie. Environmental Studies, Fishing Technology, Hydrographic Office, Information and Technology, Inland Aquatic Resources & Aquaculture, Library & Information, Marine Biological Resources, Oceanography, Socio-Economic and Market Research, Post Harvest Technology supported by Administration, Services & Operations and Finance Divisions.

#### 5. Heads of Divisions

Following officials officiated as Heads of Divisions during the year

##### Research Divisions

Mr N Sureshkumar	-	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 Arulanathan	-	Oceanography
Dr E M B R K Edirisinghe	-	Post Harvest Technology
Dr (Mrs) R Maldeniya )		
Dr (Mrs) S C Jayamanne )	-	Socio Economics & Marketing Research

##### Support Services Division

Mr Sumedha Jayasinghe	-	Administration
Mr M D Senaratne	-	Finance
Mr G O L P Bandara )		
Mr N B P Punyadeva )	-	Services & Operations

#### 6. Recruitments within the year 2006

Name	Designation	Date of appointment
Ms. K.K.T.E. Kahatapitiya	Audit Clerk	01.02.2006
Mr. S.I.L Gunawardhana	Unskilled Labourer	01.02.2006
Mr. B.K.K.K. Jinadasa	Research Officer	09.02.2006
Ms. A. Nisansala Perera	Word processing Operator/Clerk	03.07.2006
Mrs. K.T.R. Prathapasinghe	Director General	20.07.2006
Mr. P.R.P. Perera	Clerk	01.12.2006
Mr. M.B.S.J. Perera	Unskilled Labourer	01.12.2006
Mr. E.I. Wasantha Silva	Unskilled Labourer	01.12.2006
Mr. W.F.S.N. Fonseka	Clerk – Contract Basis	01.12.2006
Ms. M.W. Gayani Chathurika	Word processing Operator (Sinhala)	11.12.2006
Mr. G. Aruna Priyashantha	Word processing Operator (Sinhala)	11.12.2006

## 7. Departures of the service within the year 2006

Name	Designation	Effective Date	Reason for the Departure
Dr. P.P.G.S.N. Siriwardena	Research Officer	26.01.2006	Resignation
Mr. W.F.S.N. Fonseka	Clerk (Con. Basis)	02.02.2006	Resignation
Mr. J.B.A. Magamma	Mechanical Engineer	01.03.2006	Compulsory Retirement
Mr. G. Lamahewa	Supervisor (Civil)	01.03.2006	- Do -
Mr. G.O.L.P. Bandara	Maintenance Engineer	01.03.2006	Resignation
Mr. P.N. Kodikara	Chief Land Surveyor	01.06.2006	Retirement
Mr. Yoshan Saddhasena	Director General	11.06.2006	End of the contract period
Ms. P.W.S.N. Jayarathna	Project Asst./ Data Base	31.08.2006	Resignation
Mrs. S. Thalakada	Chief Librarian	01.09.2006	Vacation of post
Mr. S. Sasitharan	Project Asst.(GIS / RS)	26.09.2006	Resignation

## 8. NARA Vacancies as up to 31/12/2006

Designation	Vacancies
Secretary to the Governing Board	01
Accountant	01
Store Keeper	01
Chief Librarian	01
Translator	01
Project Asst. (Database)	01
Project Asst. (GIS/RS)	01
Chief Administrative Officer	01
Research Officer	12
Research Asst.	05
Sampler	01
W.P. Operator (English)	01
Lab Attendant	01
Skipper NW35	01
Unskilled Labourer	06
Supervisor (Civil)	01
Work Clerk	01
Instrument Technician	01
Mason	01
Welder	01
Electrician	01
Sanitary Labourer	02
Care Taker	01
Driver	05
Economist	01
Research Officer (Sociologist)	01
Deck Hand	01
Seaman	02
Boatswain	01
ERA	02

Cook/ " Samudramaru"	01
Captain/Skipper	01
Chief Officer	01
Dy. Director/Hydrographer	01
Chief Hydrographic Surveyor	01
Hydrographic Surveyor	04
Chief Land Surveyor	01
Land Surveyor	02
Chief Cartographer	01
Dy. Chief Cartographer	01
system Analyst	01
Draughtsman	02
System Analyst/Programmer	02
EDP Asst.	01
Mechanical Engineer	01
Electronic Engineer	01
Technical Asst. (Mechanical)	01
Skipper (Sayuri)	01
Coxwain	01
Watcher	03
Asst. to Bungalow Keeper	01
Research Officer (Graduate Scheme)	05

**9. Promotions within the year 2006**

NO.	NAME	DATE	GRADE (FROM)	GRADE (TO)
01	Mr D A Athukorale (Research Officer)	07.06.2004 (Evaluation done within 2006)	IV	III
02	Mr H M Priyantha (Internal Auditor)	26.08.2004 (Evaluation done within 2006)	III	II
03	Mr M H S Ariyaratne (Research Officer)	30.11.2004 (Evaluation done within 2006)	II	I
04	Ms M G I U Kariyawasam (Research Officer)	08.04.2005 (Evaluation done within 2006)	IV	III
05	Mr N B P Punyadeva (Research Officer)	30.06.2005 (Evaluation done within 2006)	IV	III
06	Dr E M R K B Edirisingne (Research Officer)	27.08.2005 (Evaluation done within 2006)	II	I
07	Mr C K Amarasinghe (Land Surveyor)	04.10.2005 (Evaluation done within 2006)	IV	III
08	Mr S W S Weerasinghe (Chief System Analyst)	07.10.2005 (Evaluation done within 2006)	II	I
09	Mr M K Cyril (Driver)	30.11.2005 (Evaluation done within 2006)	VIII	VII



10	Mr P S Jayasinghe (Research Officer)	03.11.2005 (Evaluation done within 2006)	III	II
11	Mr H B Jayasiri (Research Officer)	30.12.2005 (Evaluation done within 2006)	III	II
12	Mr W A Rathnasiri (Driver)	18.01.2006	VII	VI
13	Ms M K Premawathi (Data Entry Operator)	01.02.2006	VIII	VII
14	Mr K Munasinghe (Driver)	01.03.2006	VII	VI
15	Mr K W W R Amaraweera (Research Assistant)	01.03.2006	VII	VI
16	Ms G Premalatha (Word Processing Operator)	02.03.2006	VII	VI
17	Mr D S Yapa (Labourer)	02.03.2006	X	IX
18	Mrs V K G Jayasena (Promotion as Admin Asst)	08.03.2006	VII	V
19	Mr M D Asanga Manjula (Store-Keeper)	20.04.2006	VII	VI
20	Mr J B Allahaperuma (Research Assistant)	15.03.2006	VII	VI
21	Ms Muditha Alawathugoda (Telephone Operator)	30.03.2006	VII	VI
22	Mr A P Somasiri Driver	31.03.2006	VIII	VI
23	Mr W G Anura (Research Assistant)	01.04.2006	VI	V
24	Mr T H Dharmasena (Skilled Labourer)	02.05.2006	VIII	VII
25	Mr J A Gunawardane (Labourer)	02.05.2006	X	IX
26	Ms D C T Dissanayake (Research Officer)	23.05.2006	IV	III
27	Mr B H M N de Silva (Research Assistant)	28.05.2006	VI	V
28	Ms B H B Jayamalee Silva (Promotion as a Cartographix Draughtsman)	24.05.2006	VI	V
29	Ms P P M Heenatigla (Research Officer)	01.06.2006	IV	III
30	Ms B R C Mendis (Research Assistant)	28.06.2006	VI	V
31	Ms S Liyanarachchi (Word Processing Operator)	01.07.2006	VI	V
32	Mr P Jayasuriya (Research Assistant)	01.09.2006	VI	V
33	Ms M K Chandrani (Word Processing Operator)	10.08.2006	VII	VI
34	Mr S P Jayasooriya (Research Assistant)	04.08.2006	VI	V
35	Mr M D Wijewickrema (Sampler)	01.10.2006	VII	VI

36	Mr A Sooriyakumar (Sampler)	01.10.2006	VII	VI
37	Mr S C V U Seneviratne (Research Assistant)	01.12.2006	VI	V

**10. 1. Court Cases**

- i. A court case has been filed in Colombo Court against Mr K T Weerasuriya for not reporting to office after completion of his Ph.D. Summons could not be issued to the witnesses because their addresses could not be traced.
- ii. Labour Tribunal Case of Mr J K Balapatabendi is in progress
- iii. District Court Case No. 6137/L of the Regional Research Centre, Kadolkelle land dispute is in progress
- iv. Supreme Court Case No. (SC/FR/57/04) of Mr D A Karunasena is in progress.
- v. Labour Tribunal Case filed by Mr G Lamahewa and Mr J BA Magamma is in progress
- vi. Mr N H Dassanayake has not returned to office after the Ph.D Studies in this regard we have informed the Attorney

**2. Disciplinary Inquiries**

- i. Mr J B A Magamma and Mr G Lamahewa have been compulsory retired from 1<sup>st</sup> March 2006 on approving 13 charges from 18 charges filed against them.
- ii. Mr O K P Nandana has been released from all the charges filed against him.
- iii. According to the results of the disciplinary inquiries against Dr R R P Maldeniya, Mr H M Wasantha Bandara, Mr W G Anura and Mr N S Gunathilake punishments have been given. An appeal has been made by Dr R Maldeniya, Mr H M Wasantha Bandara and Mr W G Anura against this punishment
- iv. A Disciplinary Case against Mr D A Karunasena is in progress regarding several constructions done by him in NARA

**11. Staff Transport Facilities Continue**

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

## 12. Foreign travels within 2006

PERIOD	COUNTRY	PURPOSE	NAME
18-20/01/2006	India	07 <sup>th</sup> Meeting of partnership for Global Oceans	Dr.Champa Amarasiri RO/Head-MBRD
19-23/06/2006	Thailand	FAO Regional workshop	
06-10/11/2006	Seychelles	09 <sup>th</sup> Scientific Sessions of the IOTC	
09-12/12/2006	India	India-Sri Lanka Seminar on bilateral corporation in marine affairs.	
18-20/01/2006	India	07 <sup>th</sup> Meeting of partnership for Global Oceans	Dr.K.Arulananthan RO/Head-Oceanography
13-17/02/2006	India	Workshop on Molecular Techniques in aquaculture & seafood safety	Dr.E.M.R.K.B.Edirisinghe RO/Head-PHTD
26/06/2006- 07/07/2006	Iceland	Training of managers involved in the rehabilitation of fisheries harbours in Sri Lanka	
12-14/02/2006	India	UNESCO/MOEF workshop	Mr.M.Sureshkumar RO/Head-ESD
17-19/02/2006	Thailand	Pre-Project Planning workshop for IO-GOOS Project	Dr.S.C.Jayamanne/RO Mr.A.B.A.K.Gunarathne RO/Head-IT
06-09/06/2006	France	To present a paper	Dr.E.M.S.Wijerathne RO
09-11/11/2006	China	To present a paper for Open Science Conference	
	Thailand	training on Advanced freshwater Aquaculture	Mr M Gammanpila RO
21-28/06/2006	France	39 <sup>th</sup> Session of the Executive Council of IOC	Mr K Haputhantri Chairman
09-12/12/2006	India	India-Sri Lanka Seminar on bilateral corporation in marine affairs.	
21-28/06/2006	France	39 <sup>th</sup> Session of the Executive Council of IOC	Dr T K D Tennakoon RO
10-12/10/2006	Tanzania	IGOOS workshop & 4 <sup>th</sup> Annual meeting	
21/07/2006- 01/08/2006	Seychelles	Working party meeting on Tropical tunas	Mrs D C T Dissanayake RO
24/08/2006- 22/09/2006	Korea	Training on coastal Aquaculture Technology	Mr P A D A Kumara RO
03-08/07/2006	China	To present a paper	Miss M H S Ariyaratne RO-Head-IARAD
10/07/2006- 11/08/2006	UK	Training on Marine Cartography	Mr.P.B.Rathnapala C. Draughtsman
10/09/2006- 10/03/2007	Iceland	Training on Quality management of Fish handling & Processing	Ms P S Jayasinghe RO

18-22/09/2006	England	Workshop on Chlorophyll pilot study	Mr J K Rajapakshe RO
06-24/11/2006	Thailand	Strengthen capacity on Multi-hazard risk assessment in Tsunami affected countries	
25/11/2006 17/12/2006	Do	NOAA/MODIS System setup for automated deviation of near real time SST and Chlorophyll product for fishery forecasting in Sri Lanka.	
08-28/10/2006	Korea	Training on Marine Product processing & Hazard analysis critical control point.	Mr D S Ariyaratne RA
11-16/09/2006	Reunion Island France	Workshop on Indian Ocean Swordfish stock structure & characteristics	Ms E K V Samaraweera RO
01-16/10/2006	Japan	UNIRAR Workshop on Marine Food Security	Mr D A Athukorala RO
06-12/11/2006	India	To present a paper or 3 <sup>rd</sup> International Seminar & Exhibition on Exploration Geophysics.	Mr S U P Jinadasa RO
03-14/12/2006	Pakistan	Training Program to the International Centre for Chemical Sciences.	Ms A S L E Corea RO

### 13. Participated Local trainings/Seminars/Workshops – within 2006

Name	Participated Local trainings/Seminars/Workshops	Institute	Fees (Rs.)
Mr S.Jayasinghe /Admin. Officer	Human-Resources Development through proper disciplinary management	Centre for Studies in Disciplinary management	4500/=
Mr M Sureshkumar/RO Ms A.S.L.E.Corea/RO	Seminar on Development of Sustainable Inland fish & Shrimp Culture Industry	CEO	5,000/=
Ms E K V Samaraweera/RO Ms.D.N.A.Ranmadugala/RO Mr W G Anura/RA Mr W D M de Mel/RA Mr G R H K Godagedara/RA Mr J P Wickramarahchi/RO	Workshop on Research and Survey Methodology	NIBM	5,750/= per head
Mr K H M L Amaralal/Ro(Market Research)	Postgraduate Diploma in Applied Statistics	Post Graduate Institute of Agriculture /Peradeniya.	30,000/=
Mr S Jayasinghe /Admin Officer Mr G O L P Bandara/ME	Japanese 5 “S” System Training programme	Institute of Government Accounts and Finance.	2,500/= per head
Ms W N C Priyadarshanie/RO	Training seminar on “in search of excellence towards enhancement of quality and productivity in laboratories”	Institute of Chemistry Ceylon.	4000/=
Mr H M Priyantha/Internal Auditor	Training program on Value for money in public Procurement.	National Procurement Agency	-
Ms M H S Ariyaratne/RO Ms A S L E Corea/RO	Workshop on Enhancing Support for Biodiversity Conservation	Ministry of Environment.	-
Mr S Sasitharan/Project Asst.(GIS/RS)	Training programme on certificate course on Geographical Information system(GIS)	Post Graduate Institute of Agriculture/ Peradeniya.	20,000/=

Ms.W.A.N.Wickramarachchi/RO Ms.W.N.C.Priyadaeshanie/RO Mr K D S Chinthaka/RO Ms D N A Ranmadugala/RO Mr D D G L Dahanayake/RO Mr B K K Jinadasa/RO MsP.W.N Jayarathne/ Project Asst(Data Base) Mr S Sasitharan/Project Asst.(GIS/RS) Ms.N.I.Kalasinghe(Project asst./Management) Ms E M M Senewirathne(Project asst./Management) Ms Y M R N Kumari(Hydrographic Surveyor)	Orientation training Course for newly recruited Graduates	FAO/MF& AR	-
Ms.N.I.Kalasinghe(Project asst./Management)	JICA-NET Videoconferencing Course on Remote Sensing & GIS	JICA Sri Lanka Office	-
Ms A M Gunathilake/Accounts Clerk Ms H M c Hemamalie/Accounts Clerk	Skills Development for Accounts Assistants	Institute of Government Accounts and Finance.	3,500/= per head
Mr P Jayasooriya /RA	Short course in Disaster Management	Post Graduate Institute of Agriculture/ Peradeniya.	10,000/=
Mr J K Rajapakshe/RO	Workshop on Damage & loss Estimation for risk management	Asian Disaster Preparedness Centre	-
Dr K Arulanathan/RO Ms M H S Ariyaratne/RO Ms A S L E Corea/RO Mr D A Athukorala/RO Mr A N D Perera/RO Mr A R A Ghafoor/Hydrographic Surveyor Mr S U P Jinadasa/RO Ms D C T Dissanayake/RO Mr A A D Amaratunge/RO Ms D N A Ranmadugala/RO Ms N I Kalasinghe(Project asst./Management)	Training in Geographical Information System	Post Graduate Institute of Agriculture/ Peradeniya.	-
Dr C Amarasiri/RO Dr S C Jayamanne/RO Dr k Arulanathan/RO Dr R R P Maldeniya/RO Dr E M S Wijerathne/RO Dr T K D Tennakoon/RO Dr S S K Haputhantri/RO Mr k H M L Amaralal/RO(Market Research) Ms E K V Samaraweera/RO Ms D C T Dissanayake/RO Ms D n A Ranmadugala/RO Mr U S P K Liyanage/RO Mr A Rajasuriya/RO Mr N B P punyadewa/RO Mr D Chinthaka/RO Ms P S Jayasinghe/RO Ms M G I U Kariyawasam/RO Mr B K K K Jinadasa/RO Ms A S E Corea/RO Mr D A Athukorala/RO Ms P P M Heenatigala/RO Mr D D G L Dahanayake/RO	Administrative Rules & Regulations	SIDA	152,923/=



<p>Mr J K Rajapakshe/RO  Mr H B Jayasiri/RO  Ms W N C Priyadarshanie/RO  Mr S U P Jinadasa/RO  Mr N Sureshkumar/RO  Mr A A D Amaratunge/Ro  Mr W D N Wickramarachchi/RO  Mr P A D Kumara/RO  Mr M A Ariyawansa/Hydrographer  Mr S W S Weerasinghe/Schief System Analyst  Mr O V Premachandra/cartographer  Mr D A Karunasena/CE  Mr A N D Perera/Senior Hydrographic Surveyor  Mr C K Amarasinghe/Land Surveyor  Mr A R A Ghafoor/Hydrographic Surveyor  Mr S R C Ranaweera/ Hydrographic Surveyor  Mr R H P Weligodapitiya/ Hydrographic Surveyor  Ms Y M R N Kumari/ Hydrographic Surveyor  Mr S R T P Sinhabahu/Cartographer  Ms E M M Senewirathne/Project Asst /Management)  Mr A B A K Gunarathne/Information Officer  Ms N I Kalasinghe(Project Asst/Management)  Ms P W S N Jayarathne( Project Asst/Data Base)  Mr S Sasitharan(Project Asst-GIS/RS)  Mr K D N L A Liyanage/Extension Officer</p>			
<p>Ms S Liyanarachchi/Librarian  Mr R A M Jayathilake/RA  Ms S Fernando/DEO</p>	"Five S " Programme	SLSI	4,500/= + VA
<p>Ms A M A S K Wijesinghe/PA</p>	Diploma in English for Professionals	SLIDA	26,000/=
<p>Ms A S L E Corea/RO  Ms P P M Heenatigala/RO  Mr P A D A Kumara/RO  Mr M Gammanpila/RO</p>	Capacity Building on to fish health Management & Disease Diagnosis.	Ministry of Estate Infrastructure and Livestock Development	-
<p>Mr B L S Wimalasinghe/Transport Officer)  Mr MA L Gunawardena (Motor Mechanic/ Forman)</p>	Education Program on Motor Insurance & Claim Settlement and Skills Development.	Union Assurance LTD	-

# ENVIRONMENTAL STUDIES DIVISION

**Head of Division : N Sureshkumar**

## 1. Overview of the year

The main function of the division is to conduct studies related to water pollution and assessment on environmental impacts with respect to aquatic environment. The staff strength during the period includes three Research Officers, three Research Assistants a Word Processing Operator and three Labourers. However during the period one Research officer Mr S A M Azmy was away as he was released on no pay leave to undertake an assignment as the National Project Coordinator, Stockholm Convention Project at the Ministry of Environment. One Research Assistant was transferred out of the division.

The division implemented three projects to cater to objectives of the division.

## 2. Activities undertaken

Programme		Project		Allocation (Rs / M)	Officer Responsible	Period	
						From	To
1	Status of pollution of the inland aquatic environment	1	Monitoring of surface water quality and assessment of pollution loads coming into Maduganga lagoon	0.407	N Sureshkumar A A D Amaratunga	Jan 2006	Dec 2006
2	Status of pollution of the coastal aquatic environment	2.1	Status of Water Quality in selected locations of coastal aquatic environment with special reference to pollution	0.375	N Sureshkumar W D N Wickramarachchi	Jan 2006	Dec 2006
3	Process to obtain accreditation to the laboratory consultancy advisory service and test services emergency studies	3.1	Laboratory improvement programme of ESD laboratory, test services advisory, consultancy service and emergency studies	0.650	N Sureshkumar W D N Wickramarachchi A A D Amaratunga	Jan 2006	Dec 2006
4	Purchase of equipments	4.1	Purchase of equipments	0.32	N Sureshkumar	Jan 2006	Dec 2006

## 2. Performance

Programm1 Status of pollution of the inland aquatic environment

**Project – 1** - Monitoring of surface water quality and assessment of pollution loads coming into Maduganga lagoon

The objective of the study was to assess the present surface water pollution trends of major inlets of Maduganga in view of providing recommendations for management of the Maduganga ecosystem and to assist the Maduganga Special Area Management (SAM) process in management of water system of the estuarine lagoon. This study is undertaken as a collaboration research project with Oceanography division of NARA.

Water sampling at 19 sampling locations involving major inlets and discharging points of Maduganga lagoon were carried out on monthly basis from month of May to September 2006. Participatory community appraisal was conducted in September to supplement information on pollution sources and proliferation of *Najas marina*. Preliminary mapping of distribution of *Najas marina* within the lagoon was conducted.

It is observed incoming waters through all inlets were polluted in terms of BOD and Total Suspended Solids. In some places atrophic condition were observed in terms of chlorophyll concentration. Preliminary mapping indicate proliferation of *Najas marina* to extensive areas within the Maduganga lagoon.

Progress (%)	Physical	Cumulative target	68 %	Cumulative achieved	51 %
	Financial %	Cumulative target	100 %	Cumulative achieved	90.5 %

#### Project – 2 – Status of Water Quality in Selected Locations of Coastal Aquatic Environment with Special Reference to Water Pollution

The objective of the project is to study the present pollution levels within the Hikkaduwa Marine Sanctuary (HMS) and to review the management process implemented for HMS in the past to study the constraints and underlying causes that have impacted the implementation of recommendations evolved through these process. This project is implemented in collaboration with Oceanography Division

Surface water quality monitoring of Hikkaduwa marine Sanctuary (HMS) and major outlets falling into HMS was continued for the Northeast monsoon periods that is November 2006 to March 2007. Questionnaire survey was carried out to understand the effluent disposal and treatment facilities available with the tourist establishments and continuing survey data analysis is in progress. The special area management process was thoroughly studied and identified the activities not implemented which are important in conserving the HMS. Meetings with main stakeholders (DWLC, COD, CMP, DS and PS) conducted and further discussions are in progress to obtain their views.

According to the finding of the research, the important pollution parameters as well as normal physico-chemical parameters tested are below the accepted maximum permissible limits. But some parameters like turbidity and TSS levels are not desired for the optimal growth of the most coral species exist in the HMS although the levels present is below the maximum permissible limits, When comparing the results with 1994 study, slight increase of some parameters can be observed. But it is not a significant increase.

Research Report will be completed after the data collection for the month east monsoon period

Progress (%)	Physical	Cumulative target	100 %	Cumulative achieved	80 %
	Financial %	Cumulative target	100 %	Cumulative achieved	110 %

## Constraints

- The Management reviews was not completed due to the delaying the scheduling meetings with officials of stakeholders
- During the southwest monsoonal period sampling points located in the sea could not be collected due to rocky islets boat could not reach the desired locations

**Programme 3** – Process to obtain accreditation to the laboratory consultancy advisory service and test services Emergency Studies

**Project 3** – Laboratory improvement programme of ESD laboratory, Test Services Advisory Consultancy service and Emergency Studies

The objective of the project is to cater to the improvement of laboratory facilities of the division and to provide facilitation for advisory activities test services and emergency situations of water quality incidents.

As a major activity, it is planned to rebuild the laboratory cupboards since laboratory infrastructure of the division is rendered to a dilapidated condition as a result of the tsunami in 2004. In this regard designs and necessary BOQs were completed and tender documents are drafted. During this period probe of the portable Dissolved Oxygen meter was replaced after malfunction. Air Compressor unit and power pack of the Atomic Absorption spectrophotometer (AAS) were replaced as it was affected by tsunami. Further replacement of power pack of the AAS is also in the process as it was found to be short circuited due to tsunami waters. The cost of replacement Rs.175,500/= to be found as no funds is available under the project. Old AAS was assessed by the agents for repair and a TEC is appointed to assess the viability of the repair. Further one deep freezer, one incubator and parts of the Kjedal instrument were required to be repaired in order to bring back to working order.

During this period, Research Officers participated at several scoping meetings related to IEE project on offshore mining off Kalutara proposed by Asia Dredging Company, Hambantota Harbour Development project proposed by SLPA and EIA scoping meeting Mining of mineral sands along Magama to Kirinda. officers also participated at several advisory and management committee meetings organized by Central Environmental Authority, Department of Fisheries, Coast Conservation Department and Marine pollution Prevention Authority such as National Wetlands Steering Committee CEPROM etc.

Progress (%)	Physical	Cumulative target	55 %	Cumulative achieved	35%
	Financial (Rs)	Cumulative (Rs)	369,000.00	Cumulative achieved	110,619.11
	Financial (Rs)	Cumulative target	85 %	Cumulative achieved	17 %

## 4. Extension and awareness programme

Lecture and qualitative and qualitative impacts of oil spill or biodiversity in Koggala oil Spill

## 5. Trainings

### a) Local Training

1. Training programme on laboratory management at NIBM was offered to Two Research Assistants to strengthen the laboratory management capabilities
2. Ocean observation and Data Analysis (POGO) Training for one research Officer
3. Training on Administrative regulations, Management concepts, financial regulations, 5S system and productivity at Sri Lanka Institute of Development Administration – common training for all ROs
4. Short course on GIS and its applications conducted by Post Graduate Institute of Science in University of Peradeniya for Two Research Officers

### b) Foreign Training NIL



# FISHING TECHNOLOGY DIVISION

**Head of the Division : N B P Punyadeva**

## 1. Overview of the year

Initially proposed project of the Fishing Technology Division was to conduct pilot scale experimental fishing trials to introduce an ice fold for 18 – Foot Fiberglass Plastic (FRP) boats with small-scale fishermen for deep sea Bottom Set Long Line (BSLLL) Fishery. However Science and Technical Committee of the NARA was recommended to start a new project instead of the above topic. Therefore the finalized project the development of an experimental fishing gear to export large exotic cyprinids in inland reservoirs of Sri Lanka Exotic large cyprinids fish species (Catia Catia) were stocked by MOFARD in major permanent reservoirs some times ago. However these fish species could be caught only in certain period of the year. It is observed that the mesh sizes and hanging rates of the existing fishing gears using in the reservoirs by the fishermen are not suitable for sustainable harvest, Further catching efficiency of the existing nets are not sufficient and the caught fish 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 fishermen. It is proposed that NARA to conduct a comprehensive study and to make recommendations to manage this fishery for sustainable exploitation.

## 2. Activities Undertaken

Information were collected about the present status of the fishery through field visits and from fishermen. Visit the major harvesting area – Udawalawe reservoir and Lunugamwera reservoir . Construct the experimental fishing gear to exploit the catila-catila with fishing community participation. Data collection through experiments fishing and sampling of other commercial catches. Data analysis and report writing

Programme	Project	Allocation	Officer/s Responsible	Period From
Development of New Fishing Techniques	Development of effective fishing gear to exploit large exotic cyprinids in i	0.71 Million Rs.	NBP Punydeva KSD Chinthaka	2006 March to December

## 3. Performance

The project activities were started in December 2006. under the 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 fish were existed in the reservoir. From the experimental fishing operations it was observed that catching of the large Catla catla fish from the gear was not sufficient. The availability of the Catla catla ish inn the experimental area were charged due to environmental condition of the reservoir. However it is needed further alterations to the experimental gear to enhance its efficiency.

Progress (%)	Physical	Cumulative Target	100%	Cumulative Achieved	80%
	Financial (Rs)	Cumulative Target		Cumulative Achieved	
	Financial (Rs)	Cumulative Target	100%	Cumulative Achieved	80%

#### **4. Extension and Awareness Programme**

Meetings were arranged with Fisheries Inspectors and fishermen of respective areas. Experimental fishing trials were conducted with fishing community population to solve fishing disputes of Chilaw

#### **5. Trainings**

- a) Local Trainings
- b) Foreign Trainings

# HYDROGRAPHIC DIVISION

Head of the Division 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 2006 the following surveys were conducted.

1. Re-survey (bathymetry) of Colombo and Galle harbour approaches including land survey of the relevant coastal stretch.
2. Detailed bathymetric survey of Kalpitiya Lagoon including land survey of the relevant coastal stretch.

Due to the security reasons only 70% of the Kalpitiya Lagoon Survey was completed.

## 2. Activities undertaken :

<b>Programme</b>	<b>Project</b>	<b>Officer Responsible</b>	<b>Period From To</b>
<b>National Charting Programme</b>			
1. Bathymetric Survey of Galle Harbour	1.1 Data Acquisition of Kalpitiya Lagoon, Colombo & Galle Harbour resurvey	A.N.D. Perera S.N.S. Amarasinghe (Snr. Hyd. Surveyor)	Jan. Dec.
2. Land Survey	2.1 Relevant Land Surveys of Kalpitiya Lagoon, Colombo & Galle Harbour areas	P.N. Kodikara, (Chief Land Surveyor)	Jan. Dec.
3. Data Processing	3.1 Production of digital fair sheet of the above surveys	S.W.S. Weerasinghe (Chief Sys. Analyst)	Jan. Dec.
4. Cartography	4.1 Cartography work of the above surveys	O.V. Premachandra (Snr. Cartographer)	Jan. Dec.
<b>Additional Programme</b>			
5. North Indian Ocean Hydrographic Commission Regional Meeting	Co-ordinating & conducting the meeting	All the Staff of NHO	Jan. Mar.

### 3. Performance

#### Progress - National Charting Programme

Physical : 95      Financial : 108.4

##### Project 1.1

Data Acquisition

Progress : (%)      Physical : 95

##### Project 2.1

Land Surveys

Progress : (%)      Physical : 95

##### Project 3.1

Production of digital fair sheet

Progress : (%)      Physical : 95

##### Project 4.1

Cartography Work

Progress : (%)      Physical : 95

#### 4. Training / Awareness Programmes conducted :

##### Foreign Training

Hydrographic Survey Category "B", India - 01 officer

Marine Cartography training, UK Hydrographic Office – 01 officer

##### Local Training

IDM Computer Diploma - 01 officer

#### 5. Publications

**Updated Galle Harbour Nautical Chart with collaboration of UK Hydrographic Office.**

#### 6. Non scheduled activities undertaken as consultancy work

- (a) Hydrographic Survey of Colombo Tunnel Outlet for Land Reclamation Authority
- (b) Peraliya Fishery Anchorage Development Project for CFHC
- (c) Negombo to Lansigama Bathymetric Survey for CCD
- (d) Kalawawa Reservoir Bathymetric Survey for Mahaweli Authority

## INLAND AQUATIC RESOURCES AND AQUACULTURE DIVISION

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

2. Over view of the year :

Ten projects were undertaken during the year 2006. Six Research Officers were available at the beginning of the year in the head office while two officers were available in the regional stations to carry out the programmes (Kalpitiya and Kadolkele). Among the head office staff, one officer was taken maternity leave since September and 01 Officer who was read Ph. D in ....University, Australia has return to the division in November.

Special emphasis was made to renovate the buildings, collected new broodstock of endemic/exotic ornamental fish, repairing damage instruments and purchasing new instruments to the Division.

The division carried out the projects undertaken successfully during the year but there were a few draw back to in the fish disease identification programmes as the equipment and chemicals were not received in time. As such 2 research components under Project 1.4 couldn't be carried out as the effect of tsunami.

The division provided many service related to water quality testing, site inspections, fish disease identification and treatment training programmes and services to other government departments on aquaculture or other request. The RAs, LA and Labourers, attached to RRC/Rekawa, Kalpitiya and Kadolkele were used in the Research projects that conducted in Puttalam, Hambanthota and Gampaha Districts.

Three ornamental trainings (10 days length) were successfully completed and more than 100 participants were knowledged in the field and 2 exhibitions (Min-Visithuru and "Janadhipathi Pranama" were participated within the year.

One research paper was presented in 2<sup>nd</sup> International symposium in cage culture in Asia (CAA2) that was in Zhinghu, China.

### 3. Activities undertaken

Programme	Projects	Allocation (Rs.)	Officers responsible
	1. Stock assessment and determination of optimum exploitation levels for the reservoir fishery. i. Impact of mono-filament gill net fishing to the fisheries of inland reservoirs in Sri Lanka.	500,000.00	D.A. Athukorala D.A. Athukorala
	2. Investigation of the distribution of aquatic plants and study the suitable Technologies to enhance propagation	300,000.00	A.S.L.E. Corea



	3. Monitoring the Health of Shrimp Industry in Northwestern province	965,000.00	A.S.L.E. Corea
	i. Monitoring Shrimp Health Management	300,000.00	A.S.L.E. Corea
	ii. Monitoring Shrimp disease	650,000.00	P.P.M. Heenetigala
	4. Development of Induce Breeding Techniques for finfish culture.	1150,000.00	M.H.S. Ariyaratne
	i. Development of induce breeding techniques for commercially important fish Sea bass and Milkfish.	575,000.00	P.A.D. Ajith Kumara
	ii. Development of Induce breeding techniques for native/indigenous fish <i>Clarias brachysoma</i> , with the view of introducing them to Inland Aquaculture.	575,000.00	M.H.S. Ariyaratne
	5. Development of Techniques for increasing quality and demand of Ornamental fish for export market.	965,000.00	Dr. S.C.Jayamanne P.P.M. Heenetigala M. Gammanpila
	6. Study on current status and Vulnerability of the Coastal Ecosystems from Puttalam to Kirinda		Dr. S.C. Jayamanne
	i. Study on current status of tsunami impacted near shore marine ecosystem and establishment rehabilitation strategy.	300,000.00	Dr. S.C. Jayamanne D.G.L. Dahanayaka

#### 4.Performance

##### Programme :

**Project : Impact of mono-filament gill net fishing to the fisheries of inland reservoirs in Sri Lanka**

##### The main objectives of this project are,

1. Investigate the present status of use of mono-filament gill nets in perennial reservoirs
2. Investigate the effect of mono-filament gill nets to the fish yield
3. Determine optimal fishing strategies for the reservoir fishery
4. Disseminate the finding to the Ministry of fisheries for policy making.

The monthly sampling has been carried out in two reservoirs namely, Udawalawe (Ratnapura district) and Lunugamvehera (Hambantota district) reservoirs.

Length frequency data of commercially important major fish species namely *Oreochromis mossambicus*, *O. niloticus*, *Tilapia rendalli* in above reservoirs were collected from the commercial catches of randomly selected fishing crafts. Mesh wise length frequency data of these fish species were also collected whenever possible. Total lengths of fish were measured to nearest 0.5 cm below the actual length. Total weight fish landed in individual boats, species composition, numbers of net pieces used in each boat and filament characteristics of gill nets were also recorded.

It was planned to do experimental fishing in selected reservoirs to investigate the impact of monofilament gill nets to the fishery. However, it is not possible to do that as use of those illegal fishing nets was completely banned by MOFARD. Nevertheless stock assessment methodologies could be employed to determine optimum exploitation levels for the fishery by using collected monthly fishery data.

Collected monthly field data has been fed in to computers and data manipulation has been carrying out. The project is a continuation project and will be carried out until December 2007. Until then, the data couldn't be analyzed for forecasting the optimum exploitation levels for the fishery.

Enough consequent monthly length frequency data are required for analysis. At the end of data collection Beverton and Holt's relative yield per recruit model will be employed to determine

Progress(%)

Physical: 80

Financial :

Constraints :

- Lack of vehicle.
- illegal fishing nets was completely banned by MOFARD.
- Lack of lap-top computer for data entering in the field

### **Project : Investigation of the distribution of the aquatic plants and study the suitable Technologies to enhance propagation**

Ornamental aquatic plant industry is an expanding export industry in the country wild collection of plants are prohibited at present but at present but continues due to lack of technology and interest, to propagate them. Development of propagation techniques and maintaining good quality plants need the knowledge on the ecology at the plant, which is also not available at present.

During 2006, a plant survey was carried out in the Ampara district and it was noted that most reservoirs contained only aquatic weeds (*Eichornia*, *pistia*, *Salvania* etc.) *Nelubium* had spread rapidly covering many reservoirs becoming a weed in the Ampara district water bodies.

Canals contained *Hydrilla* and *Potamogeton* both are considered as weeds.

Collection of plants could not be maintained for long in the collection tanks due to lack of river sand and problems of fast spreading *Hydrilla*, *lemna*, *Salvinea*, *Azolla*, and algae. Snail attacks also affected collection as well as propagation trials. Two small scale plant out growers have commenced with our advice and advisory services was provided to the Wayamba provincial council for Aquatic plant culture. Export farmers and data depends on the exporters and can be obtained only from Customs Department. However number of sites visits for export permits with Forest department (requesting agency) was reduced to four visits in 2006.

Results

1. Culture trials in tanks showed that *Cryptocorune* species took 2 – 4 months to reproduce new plants through vegetative propagation.
2. Distribution map for Polonnaruwa district was prepared.

Progress(%)

Physical: 80 %

Financial : 75%

100% of chemicals were paid for after tender

**Constraints :**

- Unavailability of river sand (even after several request we did not receive sand in 2006).
- Unavailability of vehicles
- Delays in getting chemicals and culture material.

**Project :** Shrimp Health and Environment Management

**Activities carried out :**

- Control of shrimp disease through chemicals and other additives ( bacterial cultures and pharmaceuticals continuous and is promoted. The studies on the environmental consequences of bacterial culture showed that some species were not effective even at salinity levels of 30 ppt. \* Studies on chemicals used to kill other animals in ponds showed that they were effective controllers within ponds but if released to the environment. It would cause fish kill. Investigations on the chemicals used to kill diseased shrimp did not yield good results as we could not get necessary samples when it is used due to lack of vehicles to attend to sudden disease work and further investigations are needed. \* According to results of the received this year, the floods during the latter part of the year caused many bacterial and fungal diseases to surface and low salinity ; high toxic gasses and poor water quality caused mass mortalities and slow growth Surveillance of wild. Shrimp in Dutch canal – Mundel lake area showed no signs of white spot disease in wild shrimp. Samples collected form farms a few sample s were positive to white spot disease during the 1<sup>st</sup> quarter of the year. Total number of farms visited was 282 with continuous sampling in 20 throughout a cycle. 24 points in the water source was monitored throughout the year and six landing sites were monitored for shrimp catches through out the year in the Dutch canal. 45 farm sites were visited under the NAQDA regularizing programme and about 38 were approved by NAQDA with the observations made. The others could not be recommended as they were situated within the reservations and were under floods during site visits.

Progress(%)

Physical: 70%

Financial : 100%

**Constraints :**

Un availability of vehicles for sampling

Delay in receiving chemicals and equipment.

**Project : 1.4 Monitoring shrimp disease management**

**Activities carried out**

The project was commenced only in June as this project was not included in the work plan earlier and there was an uncertainty of whether it would be carried out. Sampling of shrimp ponds and water source for bacterial quality of water was carried out during 2006. Sampling of hatcheries to study the bacterial quality in water used for hatchery tanks were also carried out. In the farm study only a part of a culture cycle could be studied but in hatcheries it was noted that even after water treatment using UV the water used in hatchery tanks contained bacteria in many hatcheries.

12 hatcheries were tested during the year for bacterial quality of water.

5 sites in the water source was checked monthly for bacterial quality.

3 farms were checked for bacterial quality throughout a culture cycle.

**Results :** 8 hatcheries showed suitable water quality with respect to bacterial quality.

<b>Progress(%)</b>	<b>Physical: 40%</b>	<b>Financial :</b> Finance were used from shrimp health management project.
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**Constraints :** The project was started late due to uncertainty of the project been carried out.

**Project : 5 Development of Induce breeding techniques for native/indigenous fish *Clarias brachysoma*, Family:Clariidae and *Tor khudree*, Family:Cyprinidae) with the view of introducing them to Inland Aquaculture -**

**Activities carried out** Literature survey was over. Chemicals and Fibre glass tanks were requested.

<b>Progress(%)</b>	<b>Physical: %</b>	<b>Financial : %</b>
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**Constraints:** Fiber glass tanks for hatchery and chemicals couldn't be purchased. Accordingly, all the process was collapsed.

**Project:** Development of induce breeding techniques for commercially important fish Sea bass and Milkfish.

**Progress (%)**

**Physical: %**

**Financial : %**

**Constrains**

Current security situation in the area

**Project:** Development of Techniques for Increasing quality and demand of Ornamental fish for export market.

**Activities carried out:**

Experiments were carried out to improve feeds both live and artificial, prevent and control diseases, improve breeding technology and collection of endemic fish species for ex-situ conservation.

Culture diversity of live feeds was improved by adding *Chlorella* and Chironomid larvae as live feeds. Technology for mass breeding of chironomid larvae is in progress. A feed which is equal to commercial feed and suitable for koi carps was developed using locally available fish waste and by-catch (Tuna waste, Karalla pesalai). The texture and size of the feed has to be improved further. Disease survey carried out in 5 farms in Kalutara District showed that Skin Fluke, *Trichodina* (Most common) Gill fluke, *Ichthiophthius*, *Argulus*, Bacterial diseases (rare) are the most common diseases in the area and that the low temperature and rainy conditions influence the disease occurrence. Selective breeding and line breeding methods were tried for exotic species and in progress. Endemic species; Hal mal Dandiya, Le titteya (*P. titteya*), Thal kossa, *Puntius srilankensis*, Bulath hapaya (*P. nigrofasciatus*). Bandula petiya (*P. bandula*) and *P. martinistyne* were collected and maintained (Ex-situ conservation).

**Constraints:**

Unavailability of vehicles constrained the progress of the project

**Progress %**

**Physical %: 90%**

**Financial %: 65 %**

**Project 102.8 :** Study on current status of tsunami impacted near shore marine ecosystem and establishment rehabilitation strategy.

**Activities carried out:**

The status of near shore marine ecosystems in the southern coast affected by the Indian Ocean tsunami was studied and the factors; nature and extent of damage, current status and mechanisms for fast recovery were investigated. The recovery of sea grass beds and sea weed habitats were fast and occurred naturally while recovery of sand dune vegetation and creeping beach vegetation could be rated at 75%. Recovery of mangroves is quite slow and sedimentation is the major impact on mangrove vegetation. Rehabilitation of beach vegetation and mangroves is required and the sites need to be rehabilitated has been identified from Kirinda, Kalametiya and Rekawa.

**Constraints:**

Unavailability of vehicles affected the progress of the project

Progress %

Physical %: 100

Financial %: %

5.

### 5. Extension work

1. Ornamental fish culture, breeding and management training course at NARA- 10 days programme (02)- (income 150,000.00)
2. Conduct two day training programme on ornamental fish culture and management at Galle.
3. Testing water quality for ornamental fish farming.
4. Instruct fish farmers on ornamental fish farming as their request
5. Advice school children on their school projects on Aquaculture and Aquatic resources.
6. Conducted lectures on aquaculture management for Diploma course in Aquaculture & Fisheries Management at National Institute of Fisheries and Nautical Engineering (NIFNE)
7. Site selection for fish farms (Soil and water quality testing)
8. Site appraisal export shrimp farms -4
9. Provide services for the Plant nursery inspections in Forest Department -3
10. Aquatic plant information for projects of Katubedda, University students – 6
11. Conduct
12. Provide services for prevention and control of fish disease (20 clients) all are fish farm owners in small scale
13. Participation for " Minvisithuru exhibition (Income 82,000/=).
14. Held in "Fish exhibit stall" for Weerawila, Debarawewa Central College.
- 15.

### Other activities

1. Representing NARA in shrimp culture technical committee of NAQDA
2. Representing NARA in Aquaculture, technical committee of Department of Fisheries
3. Lectures on aquatic plants for workshop on ornamental fish and plants for small scale entrepreneurs organized by YSF = NASTEC.
4. Shrimp culture regularization committee, participation
5. Representing NASTEC, NSF, CARP

### Publications

#### Abstract for the other events

- I. De Silva, Y.Y.K. & D.D.G.L. Dahanayaka (2006) Performance and competitiveness Fisheries export trade in Sri Lanka, Twelfth Annual Scientific Sessions, Sri Lanka Association for Fisheries and Aquatic Resources (Abstract): p 38.
- II. Jayakody, D.S., U. Liyanage & D.D.G.L. Dahanayaka (2006) Growth observations through restocking of *Penaeus monodon* (Crustacea: Penaeidae) in Rekawa Lagoon, Twelfth Annual Scientific Sessions, Sri Lanka Association for Fisheries and Aquatic Resources (Abstract): p 26.
- III. Dahanayaka, D.D.G.L. & S.C. Jayamanne (2006) Macrozoobenthic community structure in the channel segment, Negombo estuary, Western coast of Sri Lanka, International Conference on

Humid Tropical Ecosystems: Changes, Challenges Opportunities, 4-9<sup>th</sup> December 2006 Kandy, Sri Lanka (Abstract): p 22.

- IV. Dahanayaka, D.D.G.L., S.C. Jayamanne & M.J.S. Wijeyaratne (2006) Assemblages of macro-invertebrates in the Negombo estuarine ecosystem in relation to the locations of drainage outlets, Annual symposium of Faculty of Graduate Studies, University of Kelaniya (Abstract).

### Research papers

1. Dahanayaka, D.D.G.L. & M.J.S. Wijeyaratne (2006) Diversity of macro benthic community in the Negombo estuary, Sri Lanka with special reference to environmental conditions, Sri Lanka Journal of Aquatic Sciences 11: 43-61.
2. M.H.S. Ariyaratne(2006) Cage culture as a source of seed production for enhancement of culture based Fisheries in small reservoirs of Sri Lanka (2<sup>nd</sup> International symposium on cage culture-full paper submitted).

### Reports

1. S.C.Jayamanne, Import of Japanese Medaka fish (*Oryzias latipes*) for educational purpose. A report submitted to the Ministry of Fisheries and Aquatic Resources
3. S.C.Jayamanne, List of categories required HS codes A report submitted to the Ministry of Fisheries and Aquatic Resources
4. S.C.Jayamanne and D.D.G.L.Dahanayake, Rapid assessment of impact of oil spill on coastal ecosystems (Koggala-, Ahangama area) 12<sup>th</sup> & 13<sup>th</sup> of September 2006. A report submitted to the Ministry of Fisheries and Aquatic Resources and Marine Pollution Prevention Authority.
5. S.C.Jayamanne and R. Maldeniya, A Rapid Assessment of the Status of the Fisheries in Tsunami Affected Areas of Sri Lanka (OSRO/RAS/504/LAO) A report submitted to FAO.
  - a. Inception Report
  - b. Review Report and
  - c. Final Report

### Reports for current issues

1. Water quality test reports for ornamental fish farming.
2. Fish kill report for Ibbankatuwa Reservoir
3. Report for the fish mortality in Attidiya lake.
4. Report on the fish kill incidence Negambo Lagoon
5. Report on Initial Assessment of environmental damage due to Oil spill incident off Koggala
6. Report on impact of slatterns on shrimp culture
7. Joint report prepared on "Fish kill in Beire lake" with ESD, MBRD and Oceanography divisions.
8. Report on slatterns to the Department of fisheries and Secretary/ MOF.
9. Report on Fish kill at Mundel lagoon.

### Participation at workshops/Trainings / (Overseas)

1. Training to Young Scientist at Chemical Research Institute, Pakistan, 7<sup>th</sup> – 17<sup>th</sup> December, 2006.
2. Advance Fresh water Aquaculture, Thailand, 5<sup>th</sup> June – 21<sup>st</sup> July, 2006. – 01 Research Officer
3. Coastal Aquaculture Technology, South Korea , one month. – 01 Research Officer
4. UNITAR series on sea and Human security- Training workshop on Food security Hiroshima, Japan, 1<sup>st</sup> - 6<sup>th</sup> October, 2006. – 01 Research Office
  
5. Attended Pre-project planning workshop on Coastal ecosystems, 17<sup>th</sup> -19<sup>th</sup> February 2006, Phuket, Thailand

#### National

1. POGO Visiting Professorship Training Programme 2006 on “Ocean Observation and Data Analysis 26.01.2006- 15.02.2006 and 05.06.2006 to 23.06.2006, Organized by NARA and University of Western Australia. – Conducted in Colombo.-02 research Officers
2. Residential short course in GIS and Its Applications conducted by Post Graduate Institute of Science (PGIS), University of Peradeniya, Sri Lanka from 05.07.2006- 10.07.2006. –03 Research Officers
3. Training Program for NARA Research Staff at Sri Lanka Institute of Development Administration (SLIDA) 03<sup>rd</sup> , 04<sup>th</sup> and 19<sup>th</sup> of July 2006. – 06 Research Officers.-05 Research Officers
4. Workshop on “ Biostatistics for young scientists”, Faculty of Science, University of Kelaniya, 2 days (30<sup>th</sup> – 31<sup>st</sup> October, 2006). – 02 Research Officers.
5. Workshop on Enhancing Support for Bio diversity Conservation at Regional, Local level, Galgamuwa (one day) – 02 Research Officers.
6. Workshop/seminar on Captive Breeding of Freshwater and Marine fin fish (ornamental and Food) and Bio security- It's effect on the industry, 11<sup>th</sup> – 13<sup>th</sup> January 2006. -02 Research Officers.
7. Aquatic animal health 21<sup>st</sup> – 23<sup>rd</sup> July 2006, Peradeniya, Sri Lanka-?
8. Research proposal preparation (Organized by CARP) 13<sup>th</sup> March 2006, Peradeniya.
9. General principles of Fish health management,(organized by Ministry of estate infrastructure and livestock development, Faculty of Veterinary medicine and animal science).21<sup>st</sup> -23<sup>rd</sup>, August 2006. – 04 Research Officers and 01 Research Assistant
10. Shrimp culture Best Management Practices – Chilaw-01 Research Officer
11. Scientific Session – University of Wayamaba-01 Research Officer
12. Organized and chaired the workshop on “Research Priorities in Fisheries and aquaculture” held at CARP , 10<sup>th</sup> April 2006.
13. Attended the workshop on “ Monitoring and post evaluation of research projects” held at CARP?
14. Participated in the workshop on Participatory Rural Appraisal methods and approaches” held at NARA Auditorium, 09<sup>th</sup> -10<sup>th</sup> May 2006.-03 Research Officers
15. Organized and participated in the workshop on” Assessment of the status of fisheries in Tsunami affected area of Sri Lanka” held at NARA Auditorium, 11.08.06
16. Participated in the international conference on” S & T Policy Research and Statistical indicators” organized by NSF at Galle Face Hotel, 8-10<sup>th</sup> November, 2006.?



17. Participated in the international conference on Humid Tropical Ecosystems: Changes, Challenges Opportunities, 4-9<sup>th</sup> December 2006, Kandy, Sri Lanka
18. Organized and participated in the workshop on " Assessment of the status of fisheries in Tsunami affected area of Sri Lanka" held at NARA Auditorium, 11.08.06
19. Participated in the international conference on " S & T Policy Research and Statistical indicators" organized by NSF at Galle Face Hotel, 8-10<sup>th</sup> November, 2006.
20. Participated in the international conference on Humid Tropical Ecosystems: Changes, Challenges Opportunities, 4-9<sup>th</sup> December 2006, Kandy, Sri Lanka

#### International symposium

1. International Conference on Humid Tropical Ecosystems: Changes, Challenges Opportunities, 4-9<sup>th</sup> December 2006 Kandy, Sri Lanka.
2. 2<sup>nd</sup> International Symposium on cage culture in Asia (CAA2) Hangzhon, China, 3<sup>rd</sup> – 11<sup>th</sup> July 2006

#### National symposium

- 1 4<sup>th</sup> Food and Nutrition Symposium 2006, Wayamba University of Sri Lanka. 27<sup>th</sup> Sep. 2006

# **INFORMATION TECHNOLOGY DIVISION**

**Head of the Division : Ajith Gunaratne**

## **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

During the year the division worked in two NARA funded projects and four external projects while carrying out day to day operational activities in network and computer maintenance with five staff members. NARA funded projects achieved the target as expected. Under the external projects, a website was designed for National Institute of Fisheries and Nautical Engineering and launched and two GIS project is being carried out to prepare zonal plan to develop shrimp culture in Batticaloa and Trincomalee districts with financial assistance of National Aquaculture Development Authority (NAQDA) . Newly recruited 03 staff members attended to trainings on database management, GIS remote sensing and numerical modeling related to oceanography

Mid of the year two staff members resigned and project work and maintenance work were carried out by three staff members.

## **2. Activities undertaken ;**

Programme	Project	Allocation(M)	Officer Responsible	Period	
				From	To
1. IT Application Development and Support	1.1 Development and upgrading of NARA website and other Internet Services	LKR 1,800,000.00	A B A K Gunaratne Janka Lokugamage	comtinous	
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	LKR 355,000,00	A B A K Gunaratne	2003	2007

### **3. Performance**

#### **3.1 NARA Project**

The Project is continuous project to provide proper IT infrastructure, internet services to the NARA as well as to disseminate information through NARA website. NARA website was modified with the use open source. Apache web server to provide more reliable platform for the website. New email system using Lotus notes software was introduced. NARA staff was trained to use the software. Central network virus scan server was setup both outgoing and incoming mail

Inform Database that used to evaluate research cost of the institutions engaged in CARP network, was submitted to Centre for Agriculture Research Policy (CARP). Database to store personnel information for Administration division could not finished as the Project Assistant (Database) resigned in the mid of the year

Internet facility to reach NARA servers from Regional Research Centres was established by providing dial up connectivity. The division involved with printing work for different workshop held at NARA during the year

Progress (%)	Physical 100	Financial 118
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**Project 3.2 Development of GIS and Remote Sensing strategies for the Management of Sensitive coastal habitat with reference to Negombo Lagoon and Rekawa lagoon**

Studies were initiated with using available satellite imageries and 1,50,000 map sheets multi spectral data was purchased for further refinements to the analysis. Mangrove area around Rekawa lagoon was mapped and techniques to differentiate mangrove species have examined. Mapping of catchments characteristics such as land-use partially completed due to experts from University of Uppsala, Sweden was not attended to field work as a result of incidence occurred in Galle Harbour. Accuracy assessments for the analyzed data was assessed and 60 % of accuracy for the unsupervised classification and 78% for the supervised classification

Progress (%)	Physical 95	Financial (%) 66
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#### **3.2 Externally Funded Projects**

1. Preparation of Zonal pal for development of shrimp culture in Batticaloa District

Data collection for the project work was assisted by the University of Eastern, Sri Lanka Analysis and field assessments were carried out by the division. Data collection and field assessments could not be done at Vahari due to the security situation preparation of the final map excluding the Vahari was done.

2. Design and setting up of website for National Institute of Fisheries and Nautical Engineering. The development website was launched by the iHis Excellency President Mahina Rajapaksha on 19<sup>th</sup> June 2006.

3. Preparation of zonal pal for Development of shrimp culture in Batticaloa District.

Initial meeting with NAQDA was held with NAQDA and an estimate for the project was submitted at the year end

#### 4. Sethusamudaran Ship Canal Project

Total coral reef area was mapped using Landsat ETM – data and data collected from November 2005. Total reef area estimated to be 54 km

#### 4. Extension and Awareness Programme

1. Use of Lotus note for emails, scheduling meetings, preparation of to do list and document collaboration, NARA on March 2, 2006
2. Data and Information requirements for decision making in preparation of zonal for development of shrimp culture, Eastern University, Batticaloa – August 12, 2006
3. Visiting lectures on Information Technology, GIS and remote sensing for undergraduates, national Institute of Fisheries & Nautical Engineering

#### 5. Training, Seminar and Workshop Attended

##### a) Local

1. International Training Programme on basic oceanography (Module) conducted by The Partnership for Observation of the Global Oceans (POGO) – January 26 to February 15, 2006. S Sasitharan and S N Jayaratne
2. International Workshop on preparation of regional project for conservation and management of coastal habitat using remote sensing and GIS, Phuket, Thailand – 26 – 28 February, 2006 – A B A K Gunaratne
3. GIS and remote sensing video conferencing seminar organized by JICA NET, 17 – 2, 31 May 2006 and 07, 14, 21, 28 June 2006 – N I Kalasinghe
4. Introduction training for graduate trainees organized by Ministry of Fisheries and Aquatic Resources – S N Jayaratne (2006-04-18 to 2006-04-22) N I Kalasinghe (2006-04-25 to 2006-04-29) and S Sasitharan (2006-05-30 to 2006-06-03)
5. Training Programme on administration and financial regulation for NARA staff, SLIDA, 03-07 July, 2006 – A B A K Gunaratne, S Sasitharan S N Jayaratne and N I Kalasinghe
6. Short-Term training on GIS and its application sponsored by DAO, University of Peradeniya 05-10 July, 2006 N I Kalasinghe
7. Training Programme on Fundamentals of GIS conducted by Post Graduate Institute of Science, University of Peradeniy, 15 – 19 May 2006 – Sasitharan
8. International Training Programme on basic oceanography (Module 2) conducted by The Partnership for Observation of the Global Oceans (POGO) June 05 to June 23, 2006 – S Sasitharan and S N Jayaratne

9. Training on INFORM database management organized by Center to Agriculture Research Policy, University of Peradeniya 12 – 13 October 2006 – N I Kalasinghe

**b) Foreign**

**6. Publications**

a) Research Papers

1. Gunarante, A B A K, 2006, Data and Information generation for Aquatic Resources Management GIS and Remote Sensing approach (Abstract) Workshop proceedings of International Workshop on Fisheries and Aquatic Research in Sri Lanka, NARA
2. Wijenayake, W M H R, Jayasinghe, U A D, Amarasinghe, U S, Gunaratne, A B A K, and De Silva S, 2005, (Abstract) Workshop proceedings of International Workshop on Fisheries and Aquatic Research in Sri Lanka, NARA

2. In Preparation

- i. Guneratne, A B A K, 2006, GIS Modeling for shrimp culture zonal planning of Batticaloa District, Sri Lanka, NARA
- ii, Gunaratne, A B A K, RajasooriyaA , 2006, Present status of coral reefs in northern coastal waters of Sri Lanka, NARA

**7. Other Activities**

1. INFORM database was submitted to Centre for Agriculture Research Policy (CARP)
2. Participated for all pollution study at Koggala 12 – 13 September 2006
3. Assistance on GIS and remote sensing for NARA staff

## LIBRARY AND INFORMATION DIVISION

**Head of the Division : Ms. 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 the centre of the Division and 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:**

<b>Programme</b>	<b>Project</b>	<b>Allocation (Rs.M)</b>	<b>Officer Responsible</b>	<b>Period</b>	
1. Library and Information Division	1.1 Establishment of integrated Network Library & Information System to serve Aquatic Resources Sector in Sri Lanka	.285	V. Rupasinghe O.K.P. Nandana S. Liyanarachchi	Jan. 2006	Dec. 2006
	1.2 Acquisition of Library Resources	1.215	V. Rupasinghe O.K.P. Nandana S. Liyanarachchi	Jan. 2006	Dec. 2006
2. Publishing Scientific Journal	2.1 Publishing Scientific Journal information related to Fisheries & Aquatic Resources NARA Journal	0.4	S.C. Jayamana N. Sureshkumar O.K.P. Nandana	Continuous	

### **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 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**

Subscriptions were made for Journals and books were purchased.  
The List of Journals and books purchased are given below:

### **Books:**

- 1 Walker, P.J. Diseases in Asian Aquaculture – Acc. No.4533
- 2 Cronan, David S., Hand Book of Marine Mineral Deposits Acc. No.4536
- 3 Ultimate Visual Dictionary 21<sup>st</sup> Century Supplement –Acc.No.4560 – Acc. No.4561
- 4 Britannica Ready Reference Encyclopedia (vol.01-10) – (Two sets) Acc. No.4562-Acc. N.4581

### **Journals :**

- 1 Aquaculture vol.250-vol.262
- 2 Fisheries Research vol.77-82
- 3 National Geographic vol.209-210
- 4 Marine Pollution Bulletin vol.52-53
- 5 Estuarine Coastal and Shelf Science vol.68-71
- 6 Ocean and Coastal Management vol.49(1-8)
- 7 Time vol.167-168
- 8 Fortune vol.153-154

Progress                      Physical – 50%                      Financial – 50%

## **4. Publishing and Scientific Journals**

NARA Editorial Board was appointed with NARA Chairman presiding the committees and Dr. S.C. Jayamanne working in the capacity of Editor-in-Chief.. Five editorial committees were held and Guildlines for authors was revised. Collection, refereeing, editing and printing of the journal volume 37 was completed. Papers for a special issue on Sethu Samudram has also been collected.

Progress                      Physical – 80%                      Financial – Not used as the publication of Journal was not done

## **Library and Information Division**

### **Future Plans for 5 Years**

- 1 To develop Library Online Public Access Catalogue
- 2 Develop Current Awareness Services
- 3 To Develop Library Circulation System
- 4 Preparing a CD ROM on NARA Journal

**Work Progress of Library and Information Division**

**January – April - 2006**

7.1 Strengthening of NARA Library – 1.5

7.1.1 Sharing of National / International Library Resources - expenditure – Rs.6795.84

7.1.2 Strengthening and Procurement of Library Resources - expenditure – Rs.5426.00

Journals- \$12041.50

Training – Rs.30,000.00



# MARINE BIOLOGICAL RESOURCES DIVISION

Head of the Division : Dr C Amarasiri

## 01. Overview of the year

Marine Biological Resources Division is responsible for conducting research on marine resources for management and development

Research focused for two major areas

1. Sustainable utilization of fishery resources
2. Conservation and management of ecologically important marine habitats and resources

To support the above goals MBD conducted 10 research projects

The staff of the division is comprised of 09 Research Officers, 11 Research Assistants, 12 Samplers, 02 Diver Assistants, 1 Lab Attendant, 2 Data Entry Operators, 01 Typist and 2 Labourers. Research Officers are responsible for all research activities including project planning, implementation and reporting. The responsibilities of the Research Assistants are to assist research by collecting field data, data compilation and analysis of fish samples. Samplers are assigned to collect fisheries statistics from offshore fisheries and selected coastal fisheries to upgrade the data base which Data Entry Operators are responsible for maintaining data base of the division

The division implemented following 10 research projects to cater to objectives.

## 01. Activities undertaken

Project	Allocation Min Rs.	Officer Responsible	Period	
			From	To
1. Assessment and Management of Offshore Fisheries	2.5	C Amarasiri	2000	2006
2. Assessment and Management of Coastal Fishery Resources – Study the status of exploitation and estimate the potentials	0.9	S Haputhanthri	2004	2006
2.1 Assess the exploitation levels of Coastal pelagic Fishery Resources				
2.2 Assess the exploitation levels of demersal Finfish Resources and enhancement of habitat				

3. Stock Assessment and Management of Sea Cucumber, Chank and Lobster Resources	0.8	R Maldeniya	2006	2006
3.1 Monitoring of Lobster Fisheries in Southern and Eastern Coastal Waters				
3.2 Stock Assessment and Management of Sea Cucumber and Chank Resources				
4. Conservation and management of Coral Reefs	0.8	A Rajasoorya	2000	2006
5. Conservation of Sea Turtle Fauna of Sri Lanka	0.9	R Maldeniya	2000	2006
5.1 Establishment of scientific based conservation plan		D Herath and D N A Ranmadugala		
5.2 Study of the Genomes of the Marine Turtle species of Sri Lanka				

### 3. Performance

#### Project 1 : *Monitoring of Offshore Fisheries*

The objective of the project is collection of landing data on large pelagic fishery for database management for the purpose of production estimation and assessment of exploitation levels and stock assessment. The data collection was carried out at major landing sites in western, southern and eastern coasts from Kalpitiya to Trincomalee by 12 permanent samplers based in 6 major landing sites. Catch and effort data for different craft types, length frequency data, species composition and other fishery related biological information were gathered and entered into the large pelagic database. Pelagos in the process offshore multiday and coastal longline fishery were considered separately and the data were analysed and production estimates were made for different species concerned in harbour wise, vessel type and area wise. It is reported an increase in the total large pelagic production from 72 – 86 thousand tones in 2006. The results shows increase in production in both offshore and coastal landings. The production estimates shows the same pattern of distribution of production throughout the year where a significant increase is observed in yellow fin and skipjack tuna catches tuna being the dominant species in almost at the area concerned. Main change observed was that the marine which were earlier grouped as a broad group of marine was categorized and identified separately in 2006. Data base was updated with vessel registry and annual data summaries were presented to MFARD and IOTC. This is a continuous project for data base management and production estimation to cater MFARD and other relevant authorities.

Progress (%)                      Physical 100%

**Project 2:** Assessment and Management of Chemical Fishery Resources – Study the Status of Exploitation and estimate the potentials

**Component 2:1** Assess the exploitation levels of Coastal Pelagic Fishery Resources

Small pelagic fishery data collection programme was conducted in the selected fish landing sales from Kalpitiya to Trincomalee. Data were collected by Research Assistants and Samplers under close supervision of the Research Officers of MBRD. The necessary information such as specifications of crafts, details of fishing operation, the total catch and its species composition were recorded. In addition, the location and depth of fishing, fishing gear used, number of fishing devices used and their sizes (number of net pieces used with the mesh sizes etc.) and the fishing time for each vessel were recorded. Apart from that fishing effort in the study area in terms of number of operated vessels and the type of fishing gear used by vessels was monitored. The lengths of commercially important species were also measured. The data base has been updated and made available to stakeholders such as MFAR, FAO. In addition any other users can have access to the data base. This is a continuous project.

Progress (%)

Physical 95 %

Financial 56.88 %

### **Component 2.2 : Assess the exploitation levels of Demersal Fish Resources and enhancement of habitat**

The objectives of the project is to collect data on fisheries performance such as catch, effort, species and size composition of the catch and socio-economic data on demersa fisheries for the purpose of assessment and management of the fisheries. The data collection was carried out at major leading sites namely, Kandakuliya, Chilaw, Negombo, Beruwala, Hambantota and Kirinda covering north-western, western and southern coasts of the country. The production estimate for the year (2006) showed increase than in 2005 as many of the boats and ears are replaced after tsunami. Under this project an artificial net has been designed to deploy off Kirinda. South Coast of Sri with the objective of enhancing fishing opportunities by providing more accessible fishing grounds for small scale fishermen. Artificial reef would also enhance recreational fishing and sport fishing opportunities. The piling units of the reef was built using orid trees filled with concrete and the deploying will be mad when the sea get calm.

Progress (%)

Physical 99 %

Financial 54.15 %

### **Project 3 : Stock Assessment and Management of Sea Cucumber, Chank and Lobster Resources**

#### **Component 3.1 Monitoring of Lobster Fisheries in Southern and Eastern Coast Waters**

Spiny Lobster *P. honorus* contributes to the 62% of the lobster catch in Southern Coastal Region of Sri Lanka. Declining trend in catches was observed during monitoring and may be attributed to increased fishing pressure on undersized lobsters (carapace length less than 6 cm and total length less than 16 cm) and berried female lobsters.

As a preliminary trial six undersized lobsters were stocked in cement tanks at Rekawa RRC and four undersized lobsters were stocked in cages in the sea off Tangalle to monitor the growth. they were fed with bivalve fish twice a day (10% of the body weight) Water usually in cement tanks were monitored and DO and salinity were kept in the range of 7.8 – 9 ppt and 22 – 33 – 35 ppt respectively. individual body lengths and weight were monitored once in a fortnight

Bermed females with immature eggs were kept in captivity to monitor the time taken for release of eggs. Maturation stages are observed through the colour changes with the time and duration taken for release of eggs were monitored.

There was no significant growth of undersized lobsters in cement tanks during the eighty month study. In the experiment with berried . It was observed that eggs matured and post larvae were

released in 24 to 30 days line period. During the period egg colour changes were observed from pale orange to dark orange then to brown colour.

Progress (%)

Physical 80 %

Financial 51.8 %

### **Component 3.2 : Stock Assessment and Management of Sea Cucumber and Chank Resources**

Chanks and Sea Cucumber are one of the major fisheries export commodities of the country. These species exclusively exploited from the wild. Since they are sessile animals and are from localized distribution they are highly vulnerable to exploitation. Regulations are enacted only for chanks. This project was designed with the objective of collection of data on chanks and sea cucumbers for the purpose of stock assessment and estimating the exploitation levels. This has been planned to undertake both by collecting of catch and effort statistics and carrying out underwater surveys.

The species are mainly found in the coastal waters of northern and eastern areas especially Gulf of Marine, Palk Strait, Palk Bay off Trincomalee, Batticaloa, Kalmunari and Kirinda. The collection of catch and effort statistics was hampered as in most instances the landing sites were in unclear areas. Underwater surveys also have not been carried out due to high risk. Diving for chanks and sea cucumbers has not been carried out in Kirinda during the season due to loss of diving equipments by tsunami information collection is therefore limited to processing centers.

### **Project 4 : Conservation and management of Coral Reefs**

Coral reefs are an important and valuable resource in Sri Lanka. They are particularly important for the fisheries industry including aquarium fisheries, coast protection and tourism. Healthy coral reefs support various livelihoods of many coastal communities and provide employment and bring in revenue to the country. Coral reefs are also indications of climate change, especially global warming and its consequences. Severe coral bleaching in 1998 caused extensive damage to coral reefs. Studies conducted by NARA indicate that their recovery is variable. There was also extensive damage to coral reefs due to the tsunami in 2004. Extreme damage to coral habitats were recorded in Trincomalee and Batticaloa Districts. The impact on reef dwelling fish was high particularly species that are dependant on live corals such as butterfly fish that are important for the marine aquarium industry. Unmanaged resource exploitation, destructive fishing pollution and increased siltation are major causes of reef degradation in Sri Lanka. The socio-economic impacts of such scale damage to reefs will be seen several years later due to lowered productivity and reduced fish stocks. Therefore its important to management coral reef resources and conserve areas for spawning and recovery of species. The proposed project will provide the necessary information for management of these valuable resources.

Objectives of the project is to provide information for the management of coral reef areas and resources biodiversity inventorisation status of coral reefs and marine protected areas, and conservation of areas for spawning and recovery of species

#### Outcomes

- Provided advice to the Department of Wildlife Conservation on the management of coral reefs
- Provided information and advice to the Department of Fisheries and Aquatic Resources on management needs of coral reefs and on the management of sea cucumber fisheries
- Increased understanding on the need to minimize the impact on the reef ecosystem whilst collecting ornamental fish among the fish collections and exporters of marine ornamental fish exporters agreed to voluntary stop the collection of *Gobiodon* species to prevent the damage to live corals
- Increased the understanding of diving safety and the use of safe methods of diving among the ornamental fish collections

Progress (%)

Physical

Financial

#### **Project 5 : Conservation of Sea Turtle Fauna of Sri Lanka**

##### **Component 5.1 : Establishment of scientific based conservation plan**

The objective of this project is to identify contemporary threats to the continued survival of sea turtles, prepare guide lines to sea turtle hatcheries on effective and responsible turtle farming and make recommendation for conservation and management of sea turtles. Turtle nesting data collection was carried out from Kandakuliya to Hambantota. Nesting in the study area has shown rapid declined over the first three to four months due to distraction of most nesting beaches by tsunami. However there after many occurrences of turtle landings have been reported from batches such as Wellawatte, Moratuwa, Luawa etc. where turtle nesting have not been reported over the past years while declines have been observed in major nesting beaches such as Indurwa, Kahandmedura, Godaway, Walawemodera and Ussangoda

Hatchery guidelines has been prepared and submitted to Department of Wild Life for legalization and implementation

Progress (%)

Physical 95 %

Financial 54 %

##### **Component 5.2 : Study of the Genomes of the Marine Turtle Species of Sri Lanka**

Mitochondria DNA (M DNA) has proved particularly effective for detecting population structure in marine turtles as it is rapidly evolving. Even without complete coverage it may be possible to provide qualitative advice on appropriate demographic units for research and development i.e. genetically discrete populations and also assess the origin of nesting as well as harvested populations. This application is a significant management tool.

## Research Findings

1. As the graphical phylogenetic tree drawn for Green turtles from Sri Lanka (Indian Ocean basin) and Atlantic Green turtles falls into separate clusters. It is evident that the movement between Atlantic and Indian Ocean basins may be limited by Geographic barriers and cotemporary climate. Therefore as a management recommendation, in order to conserve the genetic diversity appreciation of the genetic separation between the oceans basins may augment the scientific basis for marine turtle management.
2. The mt DNA sequences of Albino Green turtle from Kosgala, Sri Lanka and the mt DNA sequence of a green turtle from Oman are 100% identical. Therefore they may share a common ancestor at some unknown time in the past.
3. As we report here 2.1% of the total number of hatchings that emerged from the rest were albinos. The results are consistent with the suggestion that green turtles show multiple paternity.
4. NCB! sequence analysis enabled the identification of confiscated marine turtle species from the Western coast DNA analysis revealed one of the meat samples previously said to be from a green turtle (Designated as GT D) as a Hawksbil turtle. Mega blast for highly similar sequences confirmed confiscated species material of GT C is to be a green turtle
4. The intra specific mt DNA genealogies in loggerhead marine turtles are consistent with expectations that the temperate adapted loggerhead turtle may more readily transplant between Atlantic & Indian Ocean basin. Therefore in wildlife management strategies if loggerhead species are to persist and to exist with human populations, protection of nesting beaches and feeding grounds must proceed regardless of the level of genetic differentiation between ocean basins.

## Publications

Sequences were submitted to Genbank (national center for Biotechnological information/NCB)

Following are the accession numbers

EF545379 HB2	EF587753 LH2	DO 354572 HB3
EF546380 GT7	EF567754 GT2	DO 354573 OR3
EF546381 LH3	EF567755 GTC	DO 354574 Hybrid
EF546382 OR6	DO354570/GT3	
EF567752 HB5	DO354571LH1	

Progress (%)

Physical 100%

Financial 96.14 %

### 3.2 Externally funded projects

Project IOTC/OFCF/NARA project for Enhancing Data Collection on Billfish and tuna Landings from Offshore fishery in Sri Lanka

The project for Enhancing Data Collection on Billfish and Tuna Landings from Offshore fishery in Sri Lanka is funded by OFCF (Overseas Fishery Co-operation Foundation) through IOTC (Indian Ocean Tuna Commission) and was commenced in December 2005 with the objective of enhancing the data collection of Billfish and tuna landings in the large pelagic fishery. This project and the above mentioned MBRD 101.1 project work was carried out as a single operation. The data gathered through the six temporary samplers based in Negombo, Beruwala and Kalpitiya for data collection of the IOTC project and the data collected by the NARA samplers (12) were entered into the Pelagos data base and analyzed as mentioned above for the results and reports. The Pelagos data base was further updated accordingly for input data and the methodology of analysis and production estimation to adopt the current and changing situations. Data from January to December 2006 were entered to the data base and analyzed boat registry was updated according to the NARA numbers and also with the new registration numbers of the MFAR. Sticker operation was continued and nearly 1800 stickers were issued upto December 2006. The project activity was ended in December 2006.

Progress (%)                      Physical 100%

                                            Financial 90%

#### **4. Extension and Awareness Programmes**

##### Training and Workshops

##### a) Local

1. Billfish Workshop party meeting. Nara Auditorium, Colombo 15, Sri Lanka – 4 Officers
2. A stakeholders workshop on collection, analysis and use of marine fisheries statistics in Sri Lanka on 04<sup>th</sup> March 2006 in Cinnamon Grand Hotel, Colombo, Sri Lanka – 4 Officers
3. Workshop on Research and Survey Methodology NIBM, 15<sup>th</sup>, 26<sup>th</sup>, 22<sup>nd</sup> and 23<sup>rd</sup> March 2006 – 2 Officers
4. GIS and its application 5<sup>th</sup> to 10<sup>th</sup> July 2006 Post Graduate Institute of Science (PGIS), University of Peradeniya Sri Lanka – 2 Officers
5. Training Workshop on Biostatistics for young Scientists which was held in Department of Zoology, University of Kelaniya, Sri Lanka – 3 Officers
6. Workshop on Carrying Capacity Assessment and Sustainable Tourism Development in Coastal Area Kukuleganga Holiday Resort from 7<sup>th</sup> to 10<sup>th</sup> November 2006 in Kukuleganga, Sri Lanka – 1 Officer

##### b) Foreign

1. Advanced training and research in the Marine and Inland water resources monitoring and assessment. Six months training from September 2005 to February 2006 in Marine Research Institute (MRI), Rakjavik, Iceland – 1 Officer
2. 8<sup>th</sup> Working Party Meeting on Tropical Tuna and by-catch. This was held in IOTC office, Victoria, Seychelles, from 21<sup>st</sup> July to 2<sup>nd</sup> August 2006 – 1 Officer
3. Billfish working party Meeting, Mauritius – 1 Officer

## Publications

1. Dissanayake, D C T, C Amarasiri, E K V Samaraweera, U Adikari, and F Poisson (2006) Preliminary catch estimates of tuna and tuna like species from NARA/IOTC/OFOF sampling programme in Sri Lanka  
8<sup>th</sup> Working Party Meeting on Tropical Tunas, Victoria, Seyschelles WPTT 31  
<http://iotc/orgfiles/proceedings/2006/wph/IOTC-2006-WPB-13.pdf>
2. Dissanayake, C C T, E K V Samaraweera and C Amarasiri (2006) Trends of offshore fishery in Sri Lanka – An update Twelfth Annual Scientific Session Sri Lanka Association for Fisheries and Aquatic Resources NARA Auditorium,, Colombo,. Sri Lanka (Abstract) P.6
3. Dissanayake D C T (2006) Monitoring and Assessment of offshore fishery in Sri Lanka. Report submitted for the United Nation University Fisheries Training Programme in Iceland
4. Haputhanthri, S S K and P A A T Jayawardena, 2006. Predictive models for paranooid shrimp abundance in the sea off Negombo and Hendala. Sri Lanka Fisheries Research 77.34.44
5. Haputhanthri, S S K 2006. A simple method for determining optional fishing strategies using Beverton and half yield per recruit model in fish stocks with parameter uncertainties. Journal of the National Science Council of Sri Lanka 34(3) 125-129

## Papers Under consideration

1. Haputhanthri S S K, M C S Villanueva and J Morea. Tropic interactions in the coastal ecosystem of Sri Lanka an ECOPATH preliminary approach. Estuarine coastal and shelf service
2. Hauthanthri S S K J Morea and S Lek. Standardized abundance indices for *Amblygaster sirm* in coastal fishery of Sri Lanka fisheries Management and Ecology
3. Haputhanthri 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, Sri Lanka

## Reports

1. Sisira Haputhanthri, 2006. An overview of small scale coastal gillnet fishery of Sri Lanka. Marine Biological Resources Division, National Aquatic Resources & Development Agency, Sri Lanka
2. Sisira Haputhanthri, 2006. Coastal fishing crafts survey – 2006. Marine Biological Resources Division. National Aquatic Resources & Development Agency, Sri Lanka (Draft report is available)



# OCEANOGRAPHY DIVISION

HEAD OF THE DIVISION: Dr K Arulananthan

## 1. Overview of the year

Oceanography Division strives to improve our understanding of the ocean for sustainable development of ocean resources improving livelihood and timely warnings of ocean based hazards

Oceanography divisional activities were conducted under three major areas

- Oceanographic monitoring and modeling

Intended to understand the hydrodynamics of coastal water bodies and ocean and its impact on the coastal community, resources and geomorphology and assess predict an plan for potential ocean hazards

- Oceanographic application in environmental studies and fisheries  
Intended to use oceanography as a tool ecologically sustainable ocean based economic development activities
- Oceanographic data management  
Intended to make available data and information in the end users, researches, postgraduate students government and private organizations

In addition to the above planned research and development activities the division conducted 4 research projects and 4 components. The staff of the division comprised 07 Research Officers, 03 Research Assistants, 01 Peon

## 2. Activities undertaken :

Programme	Project	Allocation (Rs M)	Officer Responsible	Period	
				From	To
1. Application of Remote Sensing and GIS at Forecasting Pelagic fishing zone		0.308	J K Rajapakse	2006	2006
2. Monitoring of Sethsamudran Ship Canal project		2,8	K Arulananthan	continous	
7. Assessment of Present Pollution Levels, Biodiversity and Management Aspect related to Hikkaduwa Marine Sanctuary	Component 7.2 hydronamics and hydrographic studies at Hikkaduwa marine sanctuary	0.280	K Arulananthan	2006	2006
8. Monitoring of Surface Water Pollution and Water Management System in Maduganga Estuarine system	Component 8.2 Use of Planton roductivity to determine the ecosystem Health at Maduganga Estuary	0.216	H B Jayasiri	2006	2006
	Component 8,3 Nutrient fluxes dynamics and budget of Maduganga lagoon	0.140	W A C Priyadarshani	2006	2007

17 Monitoring and modeling of short and long term sea level changes around Sri Lanka waters		2.6	E M Wijeratne	continuous	
26, Oceanographic Data Management		0.2	K Tennakoon	2006	2006
29, Study on current status and vulnerability of the coastal ecosystems from Puttalam to Kirinda	Component 29,2 Coastal Erosion vulnerability mapping along the North Eastern Coast of Sri Lanka	0.4	S U P Jinadasa	2006	2006

### 3. Performance

#### Project 1: Application of Remote Sensing and GIS in Forecasting pelagic fishing zones

Responsible Officer : J K Rajapakse

The project aims to establish a mechanism to provide fisheries and information based on satellite remote sensing technology. Since the ocean is dynamic and the fishes are most likely environmental specific their occurrence and migration is very important for commercial fishing. From this technology fishery forecasting can help fishermen to reduce their search time and fuel ensuring their catch.

NOAA/MODIS System set up for automated. Deviation of Near Real Time SST and Chlophyl products established for fishery forecasting in Sri Lanka 29<sup>th</sup> Nov – 17<sup>th</sup> December 2006 (expenditure 1158 USD). A working group formulated for remote sensing and GIS data analysis

**Progress (%)                      Physical 50                      Financial 2**

#### Project 2 : Monitoring of Sethsamudran Ship Canal Project

Responsible officer : K Arulanathan

The project is intended to monitor official indicative parameters such as physo-chemical biological environmental and socio economics to propose strategies for the execution of environmental protection and/or mitigation

The project is formulated on the request of Ministry of Foreign Affairs. Monitoring could not be conducted due to the prevailing situation at the study sites. Gulf of Marine and Palk Strait. The base line data gathered during the assessments surveys on 09<sup>th</sup> – 19<sup>th</sup> February 2006 in Gulf of Mannar and 27<sup>th</sup> October – 8<sup>th</sup> November 2006 are used for formulation of monitoring plan. The plan is submitted to the Ministry of Foreign Affairs

**Progress (%)                      Physical 40                      Financial 21**

#### Component 7.2Hydronamics and hydrographic studies in Hikkaduwa marine Sanctuary

Responsible Officer : K Arulanathan

The management initiative of Hikkaduwa Marine Sanctuary though conducted through special area management process the ecosystem is in continuous degradation . The study is intended to establish failure, constraints, underlying cases that showed down the implementation of recommendations involved through SAM process

Two environmental monitoring stations were established. The cause for the coral degradation is identified as the station. The river flow is established as the main source of station material. A comprehensive study programme is submitted to USAID for funding.

Progress (%)

Physical 50 %

Financial 25 %

### **Component 8.2 : Use of Plankton productivity to determine the Ecosystem Health of Maduganga Estuary**

Responsible Officer: H B Jayasiri

Project intended to carry out the study for evaluation of ecosystem health of Maduganga Estuary. Plankton organisms with other water quality parameters were used to study the trophic status of the estuary. Standing stock of plankton and chlorophyll levels can be used as bio-indications to evaluate its health.

Estuary salinity is related to monsoon rains and water exchange with the sea in generally meant salinity in the estuary is low with a variation of 1-13 PSU. The lowest mean salinity was observed in December in 2005 and 2006 while highest surface salinity was observed in July 2005. High salinity levels were observed at location 1 and 2. But no salt water intrusion into upstream areas. Zooplankton density varied spatially and seasonally in the Maduganga estuary. Lowest zooplankton abundance is during the month of December for both year and it is associated with low salinity. Highest abundance was observed during the month of September 2005. Statistical analysis also showed good correlation between zooplankton abundance and salinity. Zooplankton of the Maduganga was classified under 17 laconic groups. Most dominant zooplankton group of the area is copepods and crustacean larvae (nauphils). Lowest temperature also was observed in December. There is no market variation of DO and BOD with respect to month. Highest chlorophyll concentration of 12 ugll was observed during the month of October 2005. Mean turbidity levels varied from 5 to 10 NTU from May to December 2008 (Fig 6). High turbidity levels in December is due to high freshwater discharged from Polathapalatha Ganga and Mudali -ela.

Progress (%)

Physical 30 %

Financial 150 %

### **Component 8,3 : Nutrient and budget of Madu Ganga Lagoon**

Responsible Officer : W N C Priyadarshini

Madu Ganga estuaries lagoon is an important coastal site, which categorized under special area management (SAM) by the Coastal Resource management project since the high biodiversity and identified as a tourist development area. Inland turn of to the Ocean through Maduganga is a major environmental issue, which is concerned by the SAM. The nutrient loads brought by the various inland sources affect whole system of the estuarine system. Thus this project was aimed to evaluate nutrient fluctuations within the system and fluxes (in terms of phosphorous and nitrogen) to the ocean via Maduganga Estuary and identify the major sources of the nutrient loads.

The study revealed that the lagoon system and the ocean were separated by sand, bridge during three months and no salt water exchange occurred during the period. Thus budgeting of the nutrient was unsuccessful as no flow towards the sea.

Highest water volume was brought by the Polathupalatha-ela which includes agrochemical turn off industrial and domestic wastes. Major sources of the nutrient loading were Cinnamon Rubber plantations and paddy cultivations.

Laboratory analysis showed that highest (0.49 mg/l) and lowest (0.001 mg/l) ammonia – nitrogen concentrations near to Ocean mouth in month of July and September respectively. Both highest (0.1373 mg/l) and lowest (0.00 mg/l) concentrations of nitrate are observed at location number 5 (Close to Kodduwa temple) in month of May and close to sea mouth in month of August respectively. During rest of the periods nitrate concentrations were vary from 0.00 to 0.80 mg/l with locations. Both highest Nitrate (0.0063 mg/l) and phosphate (0.671 mg/l) concentrations were recorded in month of July at location number 2 (200m towards the inland from the sea mouth) and in location number 5 (close to Kodduwa temple) respectively. Both lowest nitrate (0.00mg/l) and phosphate (0.0008mg/l) concentrations were recorded in month of October at location 1,2,3,4,9, 10 and location 9 close to Sathagaha duwa respectively. During the rest of months, nitrate and phosphate concentrations vary from 0.00-0.005mg/l and 0.00-0.20 mg/l respectively. Qualification of nutrient is difficult as no way to measure the home garden run off directly to the system.

**Progress (%)**

**Physical 75 &**

**Financial 50 %**

#### **Project 07.: Early Morning Monitoring and Modeling of Short and Long Term Sea Level Changes Around Sri Lanka Waters**

Responsible Officer : E M Wijeratne

The main purpose of this project is to monitor short-term and long-term sea level variability in Sri Lanka Waters, which will be extremely important for sustainable management of coastal environmental and essential mitigation measures. Further tide gauge networks are an important component of the ocean based disaster (tsunami and storm surges) early warning system. Other than the local interest of this project tide stations will represent an important component of the Global Sea Level Observing system (GLOSS) in which Sri Lanka is a Member State. Further coastal hydrodynamic and ecological model investigations were conducted under the project results will be extremely useful for sustainable management and mitigation measures for all coastal ecosystems.

High frequency sea level data from west (Colombo) south (Kirinda) and east (Trincomalee) coast tide gauges were analyzed. Time series analysis of sub tide sea level data clearly shows (spectral and time filtering) periodic oscillations with 20 to 120 mm 80 to 120 hrs and significant seasonal availability with range upto 0.4 m. Oscillations of 80 and 120 hour periods are possibly due variation of atmosphere pressure. High frequency (<2 hr) periodic oscillations are could be shelf oscillations and the magnitudes and periods of these oscillations vary along the coast and occasionally they can attain heights that match or exceed the local tidal range.

The seasonal range around Sri Lanka waters is about 0.2.0.3 m. The maximum sea level occurs in December-January and the minimum in August-September. Approximately 50% of seasonal sea level range around Sri Lanka Waters could be explained by satiric height variations assuming a well-mixed surface layer of 100 m and salinity variations of 2 psu. The numerical model studies were carried out to with understand circulation ad water exchange through Palk Strait. Basically there are large seasonal sea level variations around Sri Lanka and also there are differences between the north-east coast (Bay of Bengal) and the west coast. These differences in sea level drive the circulation around Sri Lanka but also the net flux through the Palk Strait/Adams Bridge. Therefore, observations of the net flux and its seasonal variations can be used to determine the actual sea level slope between the Palk Strait, Adams Bridge and the Arabian Sea, and thus making leveling of the tide gauges located at east and west coast of Sri Lanka is possible. Once the absolute difference is known modeling of the through-flow and circulation can be done with much improved results. The following activities are completed.

- Establishment of Kirinda Sea Level Monitoring Station
- Upgrading of Colombo sea level station with radar and pressure sensors
- Real time data transmitting via satellite
- Establishment of Ocean Observation Centre

**Progress (%)                      Physical 100                      Financial 43**

**Project 26 : Oceanographic Data Management**

Responsible Officer : K Tennakoon

The project is aimed at establishing National Oceanographic Data Center of Sri Lanka (NODC-SL) to maintain and enhance the capabilities of acquiring achieving and dissemination oceanographic data in Sri Lankan waters and facilitate the exchange of oceanographic data and information among national community and between IOC states

Three Samudra-mary cruises reports has been computerized. Colour map prepared manually from 29 Samudra-mary cruise data 9late 1980) completely digitalized. Down loaded date set from 'Indian National Center Ocean Information Services (INCOIS), Sea Surface temperature, surface waves, currents around Sri Lanka throughout the year. These data set achieved in the project server.

**Progress (%)                      Physical : 100                      Financial : 101**

**Component 29.2 : Coastal Erosion Vulnerability Mapping along the North –Western Coast of Sri Lanka**

Responsible Officer : S U P Jinadasa

Maha Oya – Lansigama survey (sediment sampling and analysis was conducted during April and May 2006 to investigate the transport mechanism of sediment and textural characteristics of sediments as well as beach profiles. The coastal stretch is from 4<sup>th</sup> breakwater Negombo scheme (Southern boundary) and spans 16 km northwards to Modarawella (North boundary). The coastal stretch was divided into 16 at 1 km distance hence, 17 profile sections were established for beach monitoring as well as sediment sampling. Total number of 25 base points was established to get continuous monitoring of seasonal coastline changes. The co-ordinates of the base points are available at the Oceanography division of NARA.

**Progress (%)**

**Physical 80**

**Financial :**

#### **4.1 Publications**

De Silva, B H M N and Jayasiri, H B

Diversity of mesozooplankton in the uppermost water column in Palk Strait, Sri Lanka(SLAFAR 12<sup>th</sup> Annual Session

Jayasiri, H B

Salt water intrusion and its impacts on Koggala lagoon and associated areas SLAFAR 12<sup>th</sup> Annual Session

Jayasiri, H B and Priyadarshani, W N C

Distribution, abundance and diversity of phytoplankton off Jaffna, Sri Lanka, SLAFAR 12<sup>th</sup> Annual Session

Jayasiri, H B and E M S Wijeratne

Oil dispersion and status of plank tonic organism in Koggala Lagoon, IOMAC 2006

Jayasiri, H B and Priyadarshani, W N C

Distribution, abundance and diversity of phytoplankton off Jaffna, SLAFAR 2006

Jinadasa, S U P

Third international seminar on exploration geophysics

Wijeratne, E M S, Leveling of Sri Lanka Tide Gauges and improved hydrodynamic modeling of Palk Strait. Open Ocean Science Conference 2006, Beijing

Wijeratne, E M S, and Charitha B Pattiaratchi

Sea level variability in Sri Lankan Waters, Sea Level Rise and Variability Conference, IOC, Paris 2006

Wijeratne, E M S

Monitoring and modeling of Coastal Ocean Processes in Sri Lanka Waters, Challenges in Marine Science Research in Sri Lanka 26 January 2006, National Science Foundation

Wijeratne, E M S and Rydberg, L

Modeling of tidal circulation, dispersion and flushing of large hyper saline lagoon. A Puttalam Lagoon, Sri Lanka (submitted on 2006 and accepted to publish on ECSS, 2007)

#### **4.2 Presentations**

Arulanathan, K

Challenges in Marine Sciences research in Sri Lanka, NSF, Sri Lanka, January 26, 2006

Arulanathan, K

Partnership for Observation of the Global Ocean – 7, Hyderabad, India, January 18-20 2006

Arulanathan, K

Existing Early Warning Systems in Sri Lanka for Marine Hazards

Disaster Risk Communication Sri Lanka/ADPC September 21 – 22 2006

#### **4.3 Reports**

Arulanathan, K

Climate change impact on coastal resources in Sri Lanka

Arulanathan, K

Monitoring Plan, Establishment of base line conditions based on rapid assessment and monitoring survey for Sethusamudram Ship Canal Project, February 2006

Tenekoon, K

Three computerized R/V Samudra-mary curies reports

#### **5. Training/Awareness programmes conducted**

Arulanathan, K

Organized regional training programme on Ocean Observation and data analysis, Part 1, 26 January – 15 February 2006 and Part II, June 5 - 23, 2006, Holiday Inn Hotel, Colombo, Sri Lanka

Rajapaksha, J K

Organized and conducted training on 'Basic course on remote sensing – Part 1' to the working group

Wijeratne, E M S

Supervision of M.Sc student's project thesis

**6. Training, Seminar and Workshop attended :**

**Local**

Arulananthan, K

Awareness raisin in Disaster Management, UNESCO/NSF, Sri Lanka, February 21 – 24, 2006

Arulananthan, K

Disaster Risk Communication, Sri Lanka/ADPC, September 21 – 22, 2006

Arulananthan, K

Introductory Workshop on Sri Lanka Disaster Resources network, DMC/UNDP, 30<sup>th</sup> November 2006

Arulananthan,K, Jayasiri, H B, Priyadarshani, W N C, Rajapaksha, J K and Tennekoon, K

Basic management concepts, administrative regulations and financial regulations and 5S systems. Training seminar at SLIDA from 3 – 5 July and 19 July 2006

Jayasiri, H B, Priyadarshani, W N C, Rajapaksha, J R

Ocean Observation and data analysis, Part 1, 26 January – 15 February 2006 and Part II, June 5 – 23, 2006 Holiday Inn Hotel, Colombo, Sri Lanka

Jayasiri, H B, Priyadarshani, W N C

Bio statistics for young scientists – 30 – 31 October 2006, Dept of Zoology, University of Kelaniya

Jayasiri, H B and Priyadarshani, W N C

Basic training on Remote Sensing technology 2006 at NARA

Priyadarshani, W N C

Induction Training Programme for Graduates conducted by FAO (April 18 – 22)



## **Foreign**

Rajapaksha, J K

The Chlorophyll Ploty Study Workshop (Extended Antares Network) Plymouth Marine Laboratory, UK, 18- 22 2006

Rajapaksha, J K

Strengthening Capacit on multi-hazard Risk Assessment in Tsunami affected countries (SCRATCH) 06 – 26 Nov, 2006 AIT, Thailand

Tennekoon, K

39<sup>th</sup> Executive council meeting of the Intergovernmental Oceanographic Commission (OC) 18 – 28<sup>th</sup>, 2005

Tennekoon, K

IOGOOS – III, Zanbar, Tanzania, October 2006

Wijeratne, E M S

Sea Level Rise and Variability Conference, IOC, Paris 2006

Wijeratne, E M S

Open Ocean Science Conference, 2006, Beijing

## **7. Other Activities**

Arulananthan, K

Serve as a member of 3<sup>rd</sup> bilateral technical negotiation team of Sethusamudran Stip Canal Project

Arulananthan, K

Serve as Vice President, IOC Regional Committee for the Central Indian Ocean (OCNDIO)

Arulananthan, K

Serve as National Coordinator of the Indian Ocean Data Exchange (ODE) for Marine Information Management

Arulanathan, K

Serve as a Member of National Committee on Land Ocean Interaction in the Coastal Zone (LOICZ)

Arulanathan, K

Serve as technical advisory committee member of Disaster Management Centre, chaired by Hon. Minister of Disaster Management and Human Rights

Arulanathan, K

Serve as Board Member of Earth Sciences, post Graduate Institute of Peradeniya

Arulanathan, K and Wijeratne, E M S

Serve as the technical advisory environment and hydrodynamic modeling committee members respectively of Sethusamudran Ship Canal project

Priyadarshani, W N C

Served as a member of EI scoping meeting of Central Environmental Authority

Wijeratne, E M S

Served as the member of Marine Science Committee, National Science Foundation

# **POST HARVEST TECHNOLOGY DIVISION**

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

## **1. Overview of the Year**

Post harvest activities 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. Two research projects and one test service program are being conducted during the year 2006. In addition, one joint project with fishing technology division, and two special projects are also being carried out to reestablish the facilities of the fish processing factory and to educate managers on quality matters.

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 06 Research Officers, 06 Research Assistants, 01 Data Entry Operator and other supporting staff, comprising 02 Laboratory Attendant and 07 skilled Labourers. One research officer is studying for a PhD program in abroad, and one officer has gone abroad on no-pay leave. At present, there are number of vacant positions in the division. One research officer has undergone training in India on Molecular Techniques in Seafood Safety. As per requirement of ISO quality control program, staff members of the division attended to number of training programs at SLSI.

The division has been damaged severally by the Tsunami on 26<sup>th</sup> December 2004. The chemistry, microbiology and nutrition laboratories and processing factory and those equipments were badly damaged by the incident. Number of equipments will be replaced and already being repaired under ICEIDA assistance. In addition fish processing factory will also repaired by the ICEIDA.

## **2. Activities undertaken**

<b>NARA No.</b>	<b>Project</b>	<b>Component</b>	<b>Allocation (LKR)</b>	<b>Officer Responsible</b>	<b>Period From - To</b>
3	Improvement of Post Harvest Quality of Fish	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 (ICIDA Counterpart Funds)		Dr.R. Edirisinghe I. Kariyawasam K.Jinadasa	Jan - Dec 2006

	Fish Landings	2. Evaluation of Post Harvest Quality Losses in offshore Fish Industry	G.J.Ganegama Arachchi	Jan - Dec 2006
		3. Investigation of Quality and Handling of a commercial fish species of Scombridae family along a main commercial distribution channel of Negombo fishery harbour	I. Kariyawasam	Jan - Dec 2006
4	Quality Assurance of Inland Fishery	3 Quality Assurance of Inland Fishery and Fishery Products	I. Kariyawasam	Jan - Dec 2006
16	Value Addition to Seafood Products and Utilization of By Catch.	Utilization of the Trawl By - Catch and the Waste Generation from Shrimp / Fish Processing Industry for Development of a Fish Feed for Aquaculture Industry	P. S. Jayasinghe Dr.R. Edirisinghe	Jan - Dec 2006
		Development and Cost Benefit Analysis of a Small Scale Production Industry for Production of Value Added Seafood Products at NARA	P. S. Jayasinghe Dr. R Edirisinghe	Jan - Dec 2006
27	ISO 17025 certification of PHTD laboratories and Test Services to the Industry		Dr.R. Edirisinghe I. Kariyawasam	Jan - Dec 2006

### 3. Performance

#### **Project 3: 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 Counterpart Project)**

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). Two consultants from Environment and Food Agency of Iceland worked with NARA scientists at PHTD, NARA were designed the project. During the designing of the project, number of sampling sites including Beruwala, Hikkaduwa, Puranawella, Kudawella, Hambantota, Kirinda and Patanangalla were visited.

A stake-holder meeting was held with the participation of Central Environmental Authority; Department of Coast Conservation, Department of Fisheries & Aquatic Resources, Ceylon Fishery Harbour Corporation, Ceylon Fisheries Corporation, Seafood Exporters Association of Sri Lanka, Water Resources Board, National Water Supply & Drainage Board, Industrial Technology Institute

and Sri Lanka Standard Institution. Comments and suggestions of the participants were also taken in to account when designing of the project.

The sampling of the first phase of the projects was started in June and samples obtained from different ice plants and water sources were tested for number of microbiological and chemical parameters. The results showed that most of the water sources and ice are contaminated with number of bacteria. Further confirmation will be carried out in the second phase.

Progress	Physical %	Financial %
	85	> 100

## **Component 2. Evaluation of Post Harvest Quality Losses in offshore Fish Industry**

### **Investigation of quality of fish and fishery products**

*Pathogenic bacteria:* This investigation has been continued from year 2005. A study on the occurrence of *Listeria* sps in tuna fish handled at initial stages of fish distribution channel centering the Negombo fish landing site, found *Listeria monocytogenes* (Positive for *hlyA* - PCR techniques) in a one sample of out of three Skipjack samples sold at fish sales place near shore (Valla, Negombo). Further studies are to be carried out and awaiting the receiving of microbiological media ordered to purchase.

More sampling and analysis should be conducted and investigated the sources of *Listeria monocytogene* contamination. Further studies are to be carried out and awaiting the microbiological media ordered to purchase.

### **Identification of colour grading systems adopted tuna fish (*Thunnus albacares* and *Thunnus obeses*) export industry - Physical properties of fish**

Sri Lanka, no reported information is available on colour of tuna flesh used in fish grading systems. This study planned to record the different colour of tuna flesh adopted in fish grading systems in export industry of Sri Lanka. These information will be useful in test services to industry, developing the official quality assurance programs, and training of the personnel in fish quality assurance programs. Colour of fish flesh adopted in export fish grading systems, are recorded with reference to the standard colour charts (The Munsell Book of Colour)

Further information on fish color grading systems and data on flesh color of different fish species from different commercial grading systems in fish export industry as per seasonal availability in order to further validation of Standard colors of tuna flesh assigned in this study. Flesh color of other different fish species also can be fixed using these Color Standards.

### **Investigation of quality and economy of salted *Katsuwonus pelamis* (skipjack tuna) produced offshore fishing boats in Sri Lanka**

There has been an increasing tendency of producing salted skipjack in offshore boats (OFB's) of Sri Lanka since late 1990's. The salted skipjack landed from boats has a good potential to become wholesome raw material for dried salted fish industry compared to stale chilled skipjack. This study aimed to assess current quality status of these salted fish from OFB's operated in Beruwala and Puranawella by analyzing the salted fish samples and economic feasibility of the production that are useful in development plans of the sector. This study found that the moisture content, salt content and water activity of all salted fish samples were in the range of 49-56.6%, 27-34.6% (dry wt. basis)

and 0.71-0.85 respectively. These limits prevent the proliferation of pathogenic bacteria in salted fish. However, histamine contents are above the acceptable limits implying the poor primary handling of skipjack onboard. This study found that Total Bacterial Count enumerated on Marine Agar were in the range of  $1.2 \times 10^5$  -  $1.9 \times 10^7$  cfu/g.

The production cost of salted fish is more economic than the production of commercial Grade-III iced skipjack that are unacceptable for human consumption. It is recommended to disseminate knowledge on good processing handling techniques on salted skipjack in OFBs among fishers to make this industry further economic and viable.

Further studies, mainly, are to be continued in order to bring down the histamine level of salted fish below the toluene levels.

**Investigation of halophilic spoilage of dried fish moved in local market**

This short study was conducted to gather baseline data on counts of Extreme-halophiles on salted dried fish available in current in supporting the revision of Standards on dried fish in Sri Lanka. Analysis of samples (Tuna, Katta and Shark) collected from three sites: Colombo (Pettah market), Kandy and Kegalle found that increase of counts of red halophiles in dried fish which were handled without a proper package were strongly associated with time and climatic conditions (Relative humidity and temperature) along the distribution channels.

These data are useful in setting the shelf quality of dried salted fish.

Progress	Physical %	Financial %
	85	81

**Component 3. Investigation of Quality and Handling of a commercial fish species of Scombridae family along a main commercial distribution channel of Negombo fishery harbour**

The research activity up to now reveals that post harvest practices taking place at the Negombo harbour is not acceptable. The body temperature of the fish unloaded from multiday boats has an average body temperature of 11.2 °C and increase up to an average of 16.2 °C. With reference to the microbiology data collected up to now it indicates that bacterial counts increase at each step of the distribution channel and highest at retail market. E.coli was not present in the boat samples but it shows that E.coli was introduced significantly at the market.

Although with acceptable microbiological and chemical criteria levels visual appearance of majority of fish unloaded from the boat was not in an acceptable manner. The harbour water used for cleaning the fish is not fit for use on food items.

Analyzed fish samples along a market channel starting from Negombo harbour to assess the post harvest quality losses and to determine the each market point deviating from set quality regulation until it reaches the consumer.

Tuna fish aimed for local consumption was selected for study. 175 samples were tested microbiologically and chemically. Other parameters were physical (Temperature) and visual observations were made. Handling and hygienic practices were recorded. No Salmonella contamination found. Occurrence of E.coli was observed mostly from transportation onwards. Sufficient icing was used at boat & selected transportation chain but physical appearance was not good due to prolonged storage in boats.

Progress	Physical %	Financial %
	80	3

#### Project 4 : Quality Assurance of Inland fishery

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.

Fresh Fish directly from the boat also contain Salmonella occasionally.

There are no proper post harvest practices practiced at the inland fishery to a satisfactory level. Only very few sites use ice for handling. Because there are no accessible ice factories available.

Study revealed that post handling of carp at the harvesting season is a problem and methods should be develop the storage life of carp to reduce post harvest losses.

Continued sampling Hambanthota, Puttalam, Anuradhapura, Polonnaruwa, Matale districts for the study. Information relating to quality issues were collected from the fishers at each site. Fresh fish from the boat, market , Deppfreezed fish and fish fillet was taken as samples.

Sampling was carried out from February to December 2006. Samples of Tilapia sp. and Carp sp. As they are the major fresh water fish species with a commercial value. Research was carried out in Kala wewa, Nachchaduwa tank, Maha Wilachchi tank (Anuradhapura district, north central province Sri Lanka) Thabbowa wewa (Puttalam District, north western province Sri Lanka), Lunugamwehera tank, Weerawila wewa (Hambanthota district, Southern province Sri Lanka), Parakrama Samuddraya, Minneriya tank, Kaudulla tank (Polonnaruwa, north central province Sri Lanka) Kandalama tank, Dewahuwa tank (Matale, central province Sri Lanka), Nuwara Eliya districts. Water from the sampling tanks which is used for handling of fish was also collected for analysis.

Samples were tested for microiological parameters of APC, Coliforms Faecal coliforms & *E.coli*, *Salmonella*. While water was tested for potable water quality.

Fifty fish samples and 15 water samples water tested for quality. Reults are being analysed.

Report with all the data and information collected are being prepared at present. Continuation of the project planed to carry out in 2006 to cover other districts.

Based on the results a project proposal was forwarded for funding to NSF to develop the commercial inland fishery . Funding was approved

Faced difficulties in finding accommodation at the field visits, some of the field visits had to be cancelled due to unavailability of accommodation and vehicles.

Progress	Physical %	Financial %
	85	85

**Project 16: Value Addition to Seafood Products and Utilization of By Catch.**

**Component 16.1 Utilization of the Trawl By – Catch and the Waste Generation from Shrimp / Fish Processing Industry for Development of a Fish Feed for Aquaculture Industry**

The potential of application offal's and waste generated from Tuna processing industry more than 50% of main fishery products. Excepts the meat part most of them discarded as inedible by products such as bone, skin, fins, internal organs and head. Thus many studies have been performed to utilize the large amount of protein, oil mineral carbohydrate and nucleic acid originated from fishery by products and 70 improve their functional properties converted to powdered fish meal. This project was focused on manufacturing of fish meal powder two type of fish waste and stored in the refrigerator. It converted in pellet form fish feed by mixing with several other nutritional feed ingredients and converted in to high quality standard fish feeds.

The product development laboratory of Post harvest Technology Division carried out processing part of this program. The manufacturing of fish powder and then it was converted in to fish feed was performed. The quality of the fish feed is 80% protein, fat moisture and ash.

This fish feed has used examine the growth of carp and finger. The feeding trial for carp fingerlings were and growth indicators were measured.

Progress	Physical %	Financial %
	65	> 100

**Component 16.2. Development and Cost Benefit Analysis of a Small Scale Production Industry for Production of Value Added Seafood Products at NARA**

The number of extension program were conducted for families who engaging fishery activities and also hit from tsunami southern coastal belt of Sri Lanka. The dissemination of knowledge related to the research carried out in the product development laboratory and fish processing plant of PHTD. The programmed is focus on train persons who wish to be small scale enterprises in rural area. Most of them in the target group of program are fisheries women's. The processing of traditional Sri Lanken fishery products in hygienically manner and using low cost resources were introduced to trainers. In addition to that we also address about scientific situation of traditional ethics existing among people in the fish post harvest sector. About 50 fisher women have been trained to produce bottle jaadi, ambulthiyal and some other

The processing of following products in hygienically and low cost way was introduced during the training.

- Maldiv* fish processing
- Jaadi* processing
- Ambulthiyal* processing.

Renovation of fish processing laboratory and repairing of its equipments are being continued under ICEIDA assistance.



Progress	Physical %	Financial %
	65	38

**Project 27: ISO 17025 certification of PHTD laboratories and Test Services to the Industry**

The ISO accreditation is compulsory requirement for quality control laboratory to test exportable products. The accreditation program of PHTD was in 1999 and after number of years of extensive work, the ISO 17025 accreditation has been obtained for 12 microbiological parameters in 2004. Since then, the laboratory has been inspected annually and approved by the quality auditors. In August 2006, the laboratory is able to obtained accreditation for another 24 new parameter, increasing the total number of accredited parameters in to 36. This SLAB (Sri Lanka Accreditation Board) accreditation is valid till 2009.

In addition to that, an audit tem from European Union has inspected the laboratory and certified the laboratory for testing.

With the expansion of the ISO quality system, the service is becoming more and more popular. The testing service earned Rs 1,435,900/= during the year 2006, nearly 7% increase when compared to the year 2005. The laboratory analysed 1088 microbiological and chemical parameters and issued 205 test reports, mainly for the exporting industry.

Actions are being taken to expands the testing services to histamine and heavy metals in fish.

Progress	Physical %	Financial %
	85	34

**Purchase of Equipment**

Actions are being taken to purchase number of equipments worth of Rs. 1.3 Million under ICEIDA assistance during the year. Most of the equipments are replacements for the tsunami damages. Among these equipments, Spectrophotometer, Bomb Calorimeter, Kjeldhal Nitrogen analyzer, Cooling Incubator, Fish dryer and Ice making machine were already purchased and necessary actions are already being taken to purchase Atomic Absorption Spectrophotometer (AAS) for the analysis of heavy metals in fish. In addition, the fish processing factory of the division also repaired under ICEIDA assistance. Further, all the equipments of the factory were also repaired.

Progress	Physical %	Financial %
	N/A	N/A

**4. Research Reports:**

1. Report on the Amount of Waste Generated During Processing of Fish at Ceylon Fisheries Corporation, Colombo, April 2006. – Study carried out for CFC.
2. Application of Chilled Sea Water (CSW) Storage System to Prolong the Self life of Fresh Fish – A Commercial Level Study for CFC, April 2006 - Study carried out for CFC.

## **Leaflets**

1. Translations and dubbing of Preparation of 08 video programs in to Sinhala medium on handling of fish at main stages of the fish distribution channels by dubbing and editing of video programs in English medium donated by Secretarial of Pacific Community, Noumea, New Caledonia.
2. Leaflets: “ on primary fish handling” - Tamil translation is ready for printing.

## **5. Training/ Awareness programs conducted:**

1. Two training programs were conducted on Quality and Safety Management in Fishery Harbours in Sri Lanka. About 71 officials from fisheries sector were trained during the program at Beruwala.
2. Training workshops for industrial smoking of fresh water fish for fisher woman's in Matara, Kalutara and Gall area. Sponsored by world vision Lanka.
3. Training conducted for the Fisheries Co-operative Societies, Organize by JICA implementation Recovery Rehabilitation and Development Project for Tsunami affected area Southern Region of Sri Lanka.

## **6. Trainings / Workshops attended:**

1. International Workshop on “Molecular Techniques in Aquaculture & Seafood Safety” UNESCO Microbiological Resources Center (MIRCEN), College of Fisheries, Mangalore, India, 13<sup>th</sup> -17<sup>th</sup> Feb 2006.
2. Training of Managers Involved in the Rehabilitation of Fisheries Harbours in Sri Lanka: United Nations - Fisheries Training Program in Iceland : 26<sup>th</sup> June - 07<sup>th</sup> July 2006.
3. Training Program on Marine Products Process & HACCP, 08<sup>th</sup> – 28<sup>th</sup> October 2006, South Korea.

# SERVICE & OPERATION DIVISION

Head of Division – Chief Engineer – D A Karunasena

## 1.0 Clear view of the Year

Main function of the Service & Operation Division is for maintenance operation and development of infrastructure facilities of the institution to carry out research and technical activities.

### Staff :

In 2006 Head of the Service & Operation. Five (05) Supervising Officers and Forty Six (46) skill and semi-skill grade staff inclusive of 26 drivers was utilized for the said task.

In the 1<sup>st</sup> quarter of the year Head of the S & O Division who was on contractual appointment left and a temporary measurers, Head of Fishing & Technology Division was appointed to administer the division and at the end of the third quarter permanent Head was appointed for the division. On disciplinary grounds one supervisory capacity officer was terminated in he 1<sup>st</sup> quarter of the year.

Due to changes of Head of Division three instances during the year as well as financial constrain affected from the third quarter comparatively relatively low progress achieved within the year

## 2.0 Activities Undertaken From Capital Budget

Progress	Project	Allocation	Officer Responsible	Period From To
1.	Rehabilitation Building & of vehicles	6.0	Head S & O / TO	Jan-Dec/2006
2.	Procurement new vehicles	6.5	Head S & O / TO	Jan-Mar/2006

## 3.0 Performance – From Capital Budget

Progress – Project : Rehabilitation & Vehicles

### 1.1 Rehabilitation of Main Buildings

- 1.1.1. Main Building part of material area was panned to do colour washing
- 1.1.2. Fishing Technology division floor renovation
- 1.1.3. For DEOCOM project construction of bathroom were carried out

Progress (%)                      Physical      100%      Financial 75%      (Rs.0.34 million)

### 1.2 Internal Roads Rehabilitation

Internal road structure was not repair more than 15 years and task was planned with Road Development Authority (RDA) to complete before the 25<sup>th</sup> anniversary of NARA that was scheduled on 3<sup>rd</sup> week February 2007. Planning approval of estimates and advanced payment was made for the task as agreed to finish by 2<sup>nd</sup> week February 2007

Progress (%)                      Physical 0%                      Financial 70%                      (Rs.1.75 million)

**1.3 Dragging of NARA Head office area, Crow Island Canal and RRC/Kadolkelle Canal for accesses to lagoon area**

NARA Head Office area is surrounded by Crow Island Canal. It was badly polluted due to non-circulation of water. The Colombo Municipality has advised NARA to maintain the canal belonging to NARA area clearly as it contributes for unhealthy environment for the area. In addition Regional Center Kadolkelle requires an access canal for the lagoon and task was planned and dredging was implemented through Land Reclamation Board.

Progress (%)                      Physical 100%                      Financial 85% (Rs.0.375 million)

**1.4 House for a Tide Gauge installation at coast of Kirinda**

Tide data acquisition purpose installation Tide gauges and equipment, compartment was constructed at coast of Kirinda

Progress (%)                      Physical 70%                      Financial 85% (Rs. 0.895 million)

**1.5 Rehabilitation of Vehicles**

1.5.1 Reg. No. 32/7196, 20/3284 and 61/0012 vehicle engines were beyond repair state and rehabilitation with the procurement and installation of three reconditioned engines.

Progress (%)                      Physical 100%                      Financial 80% (Rs.0.4 million)

15.2 Reg. No. 61/46251, 19/7768, 32/728 suspension system were renovated during the year

Progress (%)                      Physical 100%                      Financial 100% (Rs.0.4 million)

**Program – project 2: Procurement of new vehicles**

**2.1 Procured 4 wheel Cab D/Cab (Out right purchase)**

Progress (%)                      Physical 100%                      Financial 100% (Rs.5.45 million)

**2.2 Procured 4 Wheel – Cab D/Cab (lease purchase – installment basis)**

Progress (%)                      Physical 100%                      Financial 100% (Rs.1.236 million)

**4.0 Maintenance of other Facilities under recurrent Budget**

Under the recurrent budget preventive maintenance of buildings, electricity, water, telephones, air conditioning systems, computer systems and vehicle float were maintained. But because of serious financial constrains occurred after second quarter of the year some essential maintenance had to postpone for the 2007. It was considerably affected for the air conditioners/system and vehicle maintenance

## **5.0 Vehicle Fleet utilization for the Research Work**

Nineteen (19) vehicles were in the fleet and with addition of two new vehicles it became 21. Due to major repairs of 3 vehicle years fleet of 18 were utilized and effectively run 260,060 km for research and technical activates during the year at cost of Rs.11,202,940.35. The average cost per km was Rs.31.11

## **SOCIO-ECONOMIC AND MARKET RESEARCH DIVISION**

**Head of the Division Dr (Mrs) R Maldeniya, Dr (Mrs) S C Jayamanne**

### 1. Overview of the year

Socio-Economic and Market Research Division is responsible for conducting research and social and marketing issues of fisheries sector and the fishing community. The division is comprised of 02 Research Officers, 2 Research Assistants, 01 Data Entry Operator and a Labourer. Dr R Maldeniya Head of the Division has gone on sabbatical leave from November and Dr S C Jayamanne was appointed as Acting Head of the Division until she returns. These projects were conducted during the year 2006

<b>Programme</b>	<b>Project</b>	<b>Officer Responsible</b>	<b>Estimated Cost (LKR)</b>
Engagement of fishing communities	Micro-finance and its impact on empowerment of fisherwomen and their families	R Maldeniya Y de Silva	702,000.00
Improvement of the fish marketing system	Perceived farmers to consumption of marine fish among Sri Lankans	K H M L Amaralal	410,00.00
Data Management of the fisheries sector	Compilation and updating of fisheries statistics and publishing of the Fisheries Year Book	R Maldeniya & Editorial Board	450,000.00

#### **Project 1. Micro-finance and its impact on empowerment of fisherwomen and their families**

Information has been collected on the involvement of fisherwomen in economic activities at the family level and community level in Puttalam, Gampaha, Anuradhapura, Polonnaruwa, Ampara, Ratnaapura and Hambantota Districts. Training Workshops were held for the fisherwomen in Anuradhapura, Hambantota and Ampara in collaboration with Industrial Development Board for empowerment of marginalized fisherwomen and introduce alternative and fisheries livelihoods for the ready women in the study area.

Review of the formal and informal credit programmes that have been impacted on empowerment of fisherwomen could not be assessed accurately since most NGO's and NGO's were reluctant to give accurate data and hence quantitative assessment on the impact of micro-credits on empowerment of fisherwomen was found to be not possible.

Programme

Physical

Financials

## **Project 2. Enhancement of fish marketing of consumer perceival barriers**

Activities carried out :

The study has been conducted in Moneragala, Nuwara Eliya, Colombo and Hambantota districts. Consumption barriers and consumer preferences were collected through household surveys using a designed questionnaire. The following consumer barriers have been identified in sequence.

1. Household income in disposable income
2. Supply shortages
3. Unavailability of very good quality fish
4. High price of fish
5. Family size
6. Health factors
7. Religious issues

Progress %

Physical %

Financial %

Project 3 Fisheries Year Book

Activities carried out

The Sri Lanka Fisheries Year Book is a single document of collection of fisheries statistics collected from individual agencies. Data and fisheries statistics collected from different institutes during the period from 2003-2005 were completed in the year book in a coherent manner using tables and graphical presentations. The fisheries year book containing data and statistics of 3 years 2003-2005 will be published in the year issue.

Progress %

Physical %

Financial %

5. Extension Work

Awareness Programme

Awareness Programme on 'Making ornaments' at Polonnaruwa for community

Publications

Maldeniya R and A Gamage (2005) impact of fish marketing on the income of small-scale fishermen with species reference to demersal fishery of Negombo west coast of Sri Lanka Journal of NARA vol.137

Reports Maldeniya R and S C Jayamanne (2006) Report on 'A rapid assessment of the fisheries in tsunami affected areas of Sri Lanka (OSRO/RAS/504/LAO submitted to FAO

NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY

BALANCE SHEET AS AT 31ST DECEMBER 2006

ASSETS

NON- CURRENT ASSETS	2006	2005
PROPERTY, PLANT AND EQUIPMENT	1,229,704,416.00	1,239,419,618
	<u>1,229,704,416.00</u>	<u>1,239,419,618</u>
CURRENT ASSETS		
STOCK AS AT 31.12.2005	1,856,007.80	2,311,485
DEBTORS & PREPAYMENTS	60,064,372.83	2,208,938
DEPOSITS	857,250.00	807,250
ADVANCES	2,655,393.64	934,668
STAFF LOANS	10,579,570.67	9,179,213
CASH IN HAND & AT BANK	3,540,908.50	18,268,490
	<u>79,553,503.44</u>	<u>33,710,044</u>
TOTAL ASSETS	<u>1,309,257,919.44</u>	<u>1,273,129,662</u>

EQUITY AND LIABILITIES

CAPITAL AND RESERVE

CAPITAL CONTRIBUTION(GOVERNMENT)	624,433,380.00	577,833,380
REVALUATION RESERVE	1,138,373,966.93	1,267,097,872
FOREIGN GRANT	216,823,955.12	206,381,615
LOCAL GRANT	25,717,505.64	25,433,231
RESEARCH GRANT FUND	9,871,412.60	14,650,862
CONSULTANCY FUND	1,383,769.74	222,853
DEFERED INCOME - GRANT RELATED TO INCOME	862,630.77	1,250,815
ACCUMULATED EXCESS OF EXPENDITURE EXPENDITURE OVER INCOME	<u>(758,272,601.97)</u>	<u>(858,041,249)</u>
	<u>1,259,194,018.83</u>	<u>1,234,829,379</u>

NON- CURRENT LIABILITIES

PROVISION FOR GRATUITY	36,153,145.00	28,489,647
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CURRENT LIABILITIES

CREDITORS & ACCRUED EXPENDITURE	13,910,755.61	9,810,636
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TOTAL EQUITY AND LIABILITIES

<u>1,309,257,919.44</u>	<u>1,273,129,662</u>
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K.Haputhanthri  
CHAIRMAN

  
K.T.R. Prathapasinghe  
DIRECTOR GENERAL

  
M.D. Senarathne  
ACTING-HEAD FINANCE



NATIONAL AQUATIC RESOURCES RESEARCH & DEVELOPMENT AGENCY

CASH FLOW STATEMENT FOR THE YEAR ENDED 31ST DECEMBER 2006

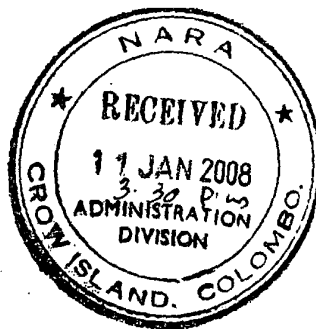
Cash flow from operating activities		
Excess of expenditure over income		(95,402,909)
Adjustments for:		
Deprecation for the year	56,103,546	
Provision Gratuity	8,409,758	
Deferred income on capital grant	(388,184)	
Adjustment for Insurance claim receivable for Vessel	59,111,229	123,236,349
Operating deficit before working capital changes		27,833,440
Increase/Decrease in Working Capital		
(Increase) / Decrease In Stock	455,477	
(Increase) / Decrease in Debtors & Deposits	(57,905,435)	
(Increase) / Decrease in Advances & Staff Loans	(3,121,083)	
Increase / (Decrease) in Creditors & Accruals	4,100,120	
Total Working Capital Changes		(56,470,921)
Net Cash generated in Operation activities		(28,637,481)
Cash flows from investing activities		
- Purchasing of fixed assets	(28,325,308)	
- Payment of gratuity	(746,260)	
- proceeds from sale of Equipment		
Net Cash used in investing activities		(29,071,568)
Cash flow from financing activities		
- Govt. Grant for Capital Expenditure		46,600,000
-Research & Project Fund		(3,618,533)
Net Increase / (Decrease) in Cash & Cash equivalents		(14,727,582)
Cash & Cash equivalents at the beginning of the year (01.01.2006)		18,268,490
Cash & Cash equivalents at the end of the year (31.12.2006)		3,540,909

NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER 2006

RECEIPTS	2006	2005
GOVERNMENT CONTRIBUTION	87,600,000.00	84,843,000
SUNDRY INCOME	10,668,988.82	11,625,350
INTEREST INCOME	333,388.76	338,904
PROFIT ON SALE OF FIXED ASSETS		20,000
OTHER CONTRIBUTIONS	1,041,837.36	870,180
	99,644,214.94	97,697,434
EXPENDITURE		
ADMINISTRATIVE EXPENSES		
PERSONNEL EMOLUMENTS	75,099,214.14	67,135,554
PROVISION FOR GRATUITY	8,409,758.00	3,445,875
TRAVELING & SUBSISTENCE	327,346.45	265,298
FEES-BOARD MEETINGS	98,000.00	54,000
OTHER FEES & ALLOWANCES	331,515.50	787,225
SECURITY CHARGES	2,928,660.11	3,685,022
FUEL FOR VEHICLES	520,387.99	764,657
STAFF TRANSPORT & HIRING CHARGES	3,143,212.00	2,699,506
ADVERTISING CHARGES	254,466.25	307,407
STATIONERY	643,741.27	631,626
POSTAGE	123,331.76	98,245
ENTERTAINMENT	159,037.06	189,974
STAFF WELFARE	96,406.25	152,784
STAFF TRAINING	284,192.46	194,589
TELEPHONE	1,021,185.37	1,030,678
FOREIGN TRAVELING	1,039,399.97	881,325
INSURANCE	144,672.64	150,636
REPAIRS & MAINTENANCE	9,259,765.14	10,582,622
AUDIT FEES	71,093.00	71,093
BANK CHARGES	253,484.35	211,187
CHEMICAL & CONSUMABLES	20,015.50	208,574
SUNDRIES	501,833.15	649,746
PRINTING	33,161.48	48,749
ELECTRICITY CHARGES	8,466,182.64	7,817,763
WATER CHARGES	2,640,807.56	2,563,961
RATES & TAXES	594,000.00	594,000
SPECIAL PROJECTS EXPENSES	1,041,837.36	870,180
RESEARCH & DEVELOPMENT COST	21,380,395.15	21,148,429
PROVISION FOR BAD DEBTORS	56,475.50	96,890,859
PROVISION FOR DEPRECIATION	56,103,546.00	44,421,102
	195,047,124.05	268,552,666
EXCESS OF EXPENDITURE OVER RECEIPTS	(95,402,909.11)	(170,855,232)

My No: AF/A/NARA/FA/06



11 Jan 2008

Chairman,  
National Aquatic Resources Research and Development Agency.

**Report of the Auditor General on the Accounts of the National Aquatic Resources Research and Development Agency for the year ended 31 December 2006 in terms of Section (14)(2)(c) of the Finance Act No.38 of 1971.**

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Above mentioned report is submitted here with.

P.A Preamathilaka  
Auditor General

Copy : Secretary - Ministry of Fisheries and Aquatic Resources  
Secretary - Ministry of Finance & Planning

Chairman  
National Aquatic Resources Research and Development Agency.

**Report of the Auditor General on the Accounts of the National Aquatic Resources Research and Development Agency for the year ended 31 December 2006 in terms of Section (16)(2)(c) of the Finance Act No.38 of 1971.**

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The audit of accounts of the National Aquatic Resources Research and Development Agency for the year ended 31 December 2006 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 37(3) of the National Aquatic Resources Research and Development Agency Act No.54 of 1981. My observations which I consider should be published with the annual report of the Agency in terms of Section 16(2)(c) of the Finance Act appear in this report. A detailed report in terms of Section 16(2)(a) of the Finance Act will be issued in due course.

## 1.2 Scope of Audit

Audit opinion, comments and findings in this report are based on a review of the financial statements presented to audit and substantive tests of samples of transactions. The scope and extent 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 generally accepted auditing standards, methods and practices to obtain reasonable assurance as to whether the financial statements are free of material misstatements. The audit included examination of evidence supporting the amounts and disclosures in financial statements and assessment of accounting principle and significant estimates, and judgments made in the preparation of financial statements, evaluation of their overall presentation and determining whether accounting policies adopted were appropriate, consistently applied and adequately disclosed. Sub-sections (3) and (c) of Section 13 of the Financial Act No. 38 of 1971 give discretionary powers to the Auditor General to determine the scope and extent of the audit.

## **2. Accounts**

### **2.1 Audit Opinion**

Except for the effects in paragraph 2.2 of this report, I am of opinion, so far as appears from my examination and to the best of my information and according to the explanations given to me that the financial statements have been prepared and presented in accordance with the generally accepted accounting principles and the stated accounting policies as set out in Notes (Notes No. 1 to 27) to the financial statements and give a true and fair view of the financial position of the Agency as at 31 December 2006 and the financial results and cash flow for the year then ended.

### **2.2 Comments on Account**

#### **2.2.1 Sri Lanka Accounting Standards (SLAS)**

According to the SLAS 10, the nature and to extent of each extraordinary item should be shown as notes in the financial statements and disclose the total amount in the Income and Expenditure statement. That requirement has not been complied with.

#### **2.2.2 Omissions in the Accounts**

- (a) The amount of Rs 37,500,000.00 had been transferred to the disposal account at the previous year from the equipments costing Rs 38,890,859 damage due to tsunami disaster. But the residual value of that equipment had not been taken to accounts during the year under review.
- (b) The number of 59 books had not been valued and taken in to assets account which was donated without indicating value.
- (c) The accrued expenses amounting Rs 162,992.00 had not been taken to account during the year 2006 under review.

#### **2.2.3 Understatements and overstatements in the Accounts**

- (a) Although the equipment in the Inland aquatic Resources and Aquaculture Division the gross replacement value of which amounts to Rs 5,133,000 had been destroyed by the Tsunami disaster and action had not been taken to delete the cost of those items from the accounts
- (b) A sum of Rs 44,595 had been under provision for depreciation for computer

#### **2.2.4 Inappropriate disclosures in the accounts**

The following Inappropriate disclosures in the accounts were observed

- (a) The loss of Sayuri vassal which was damaged due to Tsunami disaster had not been disclosed under extra ordinary items and it was adjusted to broad forwarded accumulated deficit
- (b) The insurance receivable for Sauri vassal had not been presented under current assets and it has been presented under the debtors and prepayments.
- (c) The funds of Rs 11,255,182 received from external organization for research and consultancy had been presented under Capital and Reserve.
- (d) A sum of Rs 50,587 charged from officers for personal telephone calls had not been credited to telephone accounts and it has been shown as a sundry income.

#### **2.2.5 Receivable and payable**

The following observations were made

- (a) Although a sum of 12 items of Rs 501,069 of debtors and prepayments had been b/f from more than 2 years and action had not been taken to recover those items during the year under review.
- (b) Although the advance of Rs 40,728 had been paid to the 3 institutions for purchase of goods and services in 2 to 4 years ago, those items had not been received as at 31<sup>st</sup> December 2006.
- (c) Action had not been taken to recover defaulted distress loan balances aggregating Rs 180,081 from the employees who have left the service of the Institute.
- (d) Although the advance of Rs 666,905 had been paid to the 3 institution for obtaining services, the action had not been taken to settle those advances after the period of 2 to 6 years.

#### **2.2.6 Non-compliance with laws, rules, regulations and management decisions.**

The following non compliances were observed

##### **(a) Financial regulations**

- i FR 105 and 104 : Non compliance of provision of FR of the lost articles of transport division

ii. FR 110 : Non maintenance of a Register of Losses and Damages

(b) Public administration circular no 41/90 of 10<sup>th</sup> October 1990

Fuel consumption of vehicles were not examined at 6 months intervals.

### 3. Financial and Operating Review

#### 3.1 Financial Results

According to the accounts rendered, the working capital of the Agency for the year ended 31st December 2006 resulted in a deficit of Rs 95,402,909. The corresponding deficit of the preceding year was Rs 170,855,232 after consideration of Tsunami disaster loss of Rs 96,890,859. This shows an increase in Rs 75,452,323 in financial result in 2006, However the deficit of 2006 has increased by Rs 21,438,536 if the extra ordinary item of Tsunami disaster loss of the preceding year is not conceded .

#### 3.2 Performance

(a) The book value of the fixed asses of the Agency damage due to Tsunami disaster had been assessed as Rs 122,511,769 approximately and provision had not been received to replace the essential laboratory equipment damaged during the year under review.

(b) Although Agency had targeted to complete project estimated at Rs 37,700,000 during the year under review only a sum of Rs 21,380,395 had been spent out of the targeted amount .Percentage completion of projects are as follows .

<u>No of project</u>	<u>Percentage completion</u>
18	75%
05	50%-75%
07	25%-50%
08	not started

(c) The following research grant received had not been spent for any of the research activities in a long period and showing in the financial statement

<u>Description</u>	<u>Period which had not been spent research</u>		
	<u>year 1-2</u>	<u>year 3-4</u>	<u>more than 5 years</u>
Various research activities	4,081,648	495,343	272,606

### **3.3 Management Inefficient**

National Charting Programme and consultancies had not been achieved the targeted level as a result of not constructed Sayuri vassal damaged due to Tsunami disaster

### **3.4 Corporate Plan**

The Corporate Plan had not been prepared in accordance with Public Enterprises circular No PED/12 of 02<sup>nd</sup> June 2003.

### **3.5 Un-economic transactions**

- (a) Agency had spent excess amount of Rs 1,909,408 for purchase of vehicle under lease term without obtaining approval from Treasury.
- (b) Incentive has been paid for the scientific officers who work directly on the consultancy project of CKE. Decision has been taken to pay that incentive for those who opt for such assignment after recovering overtime / holiday payments if some one obtained. Action had not been taken to recover overtime / holiday payment of Rs 16,870 from the employees who had obtained incentive, during the year under review.
- (c) A sum of Rs 57,453 had been paid as surcharge during the year under review for not paying the electricity bills on the due dates.
- (d) A sum of Rs 38,977 had been lost as discount during the year under review for not paying the water bills on the due date.
- (e) A sum of Rs 5,600 had been paid as surcharge during the year under review for not paying the EPF on the due dates.

### **3.6 Idle and underutilized assets**

- (a) 33 stores item valued at Rs 267,877 and 616 fixed assets item valued at Rs 126,235 approximately were lying idle in the stores for more than 5 years and 2 years respectively.
- (b) Two motorcycles, exceeding a period of 7 years and one motorcycle exceeding a period of 1 year were remained in the stores of the Head Office without taking action to repair and use or to dispose them.



- (c) A sum of Rs 852,718 balance b/f from 1999 as a work-in – progress under the fixed assets.

### **3.7 Identified losses**

- (a) Out of the debtors, a sum of Rs 301,278 had been identified as irrecoverable.
- (b) The value of deposit in the external parties was Rs 1,015,722. Out of the deposit, a sum of Rs 158,472 had been identified as irrecoverable and accounted as a provision for bad debts.
- (c) A receivable balance of Rs 334,089 had been written off which was due from the employees who have left the service of institute during the period of 1991 to 2004.
- (d) Action had not been taken to recover the lost articles value of Rs 102,479 in the transport division during the year 2004 and 2005.
- (e) Although a sum of Rs 503,205 had been spent to construct a Crab Breeding center at Kadolkele that construction work had been abandoned

### **4. Systems and Controls**

Deficiencies observed in audit were informed to the chairman of the National Aquatic Resources Research and Development Agency from time to time. Special attention is needed in the following areas of control.

- (a) Advances.
- (b) Construction payments
- (c) Fixed assets
- (d) Stores

P.A Preamathilaka  
Auditor General

**Actions taken on the Report of the Auditor General on the Accounts of the National Aquatic Resources Research and Development Agency for the year ended 31 December 2006 in terms of Section (14)(2)(c) of the Finance Act No.38 of 1971.**

**2.2 Comments on Financial Statements**

**2.2.1 Sri Lanka Accounting Standards (SLAS)**

A note regarding this has been given under No (4) to the accounts. Steps will be taken to take actions as per your guidance in future.

**2.2.2 Omissions in financial Statements**

- (a) The equipment valued at Rs 37,500,000 from the total equipment value of Rs 38,890,859 on board "sayuri" which was damaged by Tsunami has been transferred to Disposal A/C. Insurance claim amounting to Rs. 59,111,230.32 has been received on 2007.03.15 for the loss / damage. Disposal account will be adjusted in year 2007.
- (b) Value of the books donated by Asia Foundation cannot be taken into accounts, as the values of books were not given by them, but they have been entered in the Accession Register of the library.
- (c) Agreed. Actions will be taken to follow the correct accounting procedure in next year.

**2.2.3 Understatements and overstatements in the financial statements.**

- (a) Most of the equipments out of total equipments valued at Rs 5,133,000.00 of gross replacement value , has been repaired and being used at present.
- (b) Agreed, This is a computer computation error. This will be corrected in annual accounts of year 2007.

**2.2.4 Inappropriate Disclosures in the financial statements**

- (a) The cost and the accumulated depreciation of the vessel "Sayuri" which was damaged by Tsunami have been transferred to another account from Fixed Asset A/C in year 2005. Adjustments relating to insurance claim receipts have not been shown under extraordinary items in year 2006 and it has been adjusted to the opening balance carried forward in the balance sheet of the previous year. Please see 2.2.2 (a) it has been noted to make necessary adjustments on the total loss after the disposal of scrapped vessel.

- (b) It is agreed that Insurance receivable for vessel Sayuri has not been shown under the current Assets. However this has been disclosed under Note 04 in the notes to the Accounts separately.
- (c) Agreed. This will be corrected in year 2007.
- (d) Agreed. Steps will be taken to account as per your guidance.

#### **2.2.5 Bills receivable and payable**

##### **(a) Debtors & prepayments – Rs 501,069.00**

1-2 years

Action has already been taken to reimburse Rs 7819.70 incurred for Koggala lagoon project from the Coast Conservation project.

3-4 years

Rs. 4687.50 represents a payment for an external project. Action will be taken to get this amount reimbursed.

More than 5 years Rs 488,610.55

Provisions has been made to write off Rs.301,277.71. Arrangements to recover the balance and make necessary adjustments in accounts will be made when preparing 2007 annual accounts

##### **(b) Rs 34,250.00**

This money has been paid to a printer (P.A.T De silva) for printing the leaflet "NARA PUWATH" and the officer responsible for this task was released to Ministry for same time. Due to this reason, this task could not be completed. However, the particular officer has now been sent back to NARA from the ministry and arrangements have been made to finalise this matter in October 2007.

Approval of the board of management has been given to write off an amount of Rs.4790 and arrangements will be made to recover the balance of Rs 1687.50

- (C) Employees who had taken these distress loans have vacated their posts. Sureties who signed for them have also resigned. Only one surety was taken as a guarantee those days. The employees who vacated their posts have not claimed their gratuity so far. Hence these balances cannot be settled and those were shown in books of Accounts continuously.
- (D) Rs.399,510.00 and Rs.200,000 have been paid under a contract on construction. As the work has not been carried out in an acceptable manner a dispute had arisen. Arrangements will be made to keep proper entries after comparing the work done and the payments made so far.

**Rs.67,395.00**

This is a payment made to IOMAC to bury a whale within NARA premises with the help of IOMAC. It is expected to use the whale skeleton as an asset. Steps will be taken to charge this to the relevant account.

## **2.2.6 Non compliance with laws rules & regulation and management decisions**

### **(a) Govt. Financial Regulations**

i. Steps have already been taken to follow the Financial Regulations

ii. Steps have been taken to maintain a register of losses.

(b) Fuel consumption has not been checked, once in 06 months due to heavy work load and inadequate staff, but when fuel tank is fully filled, consumption is checked. However action will be taken to act as your guidance in future

## **03. Financial and operating Review**

### **3.1 Financial Results**

Information relating to changes in financial results are described in detail in annual financial statements. This favourable situation arose as a result of cutting down unnecessary expenditure, financial discipline, streamlining procurement procedure and consolidation of projects.

### **3.2 Performance**

(a) Although funds have not been allocated to procure the assets during the year 2006, Treasury has allocated Rs. 110 Million for this purpose in 2007 budget.

(b) The percentages of project completion and the progress of the projects carried out by each & every division and the reasons for shortfall are given below.

### **Progress more than 75% - No of projects 18**

Library

#### **01. 28.1 Maintenance of software and linkages through internet**

As the only representative in Sri Lanka for maintenance of the computer software was out of the country, the software has been completed with the instructions received through telephone from the Asian representative in India. As this was done by NARA staff, it was completed without any expenditure.

SED

02. 107.3 Perceived barriers of consumption of marine fish among Sri Lankans

Under this project 95% of the physical progress was achieved. However, the final report is not yet submitted. Currently the preparation of the final report is in progress.

ESD

03. ES/33RP/2006/01 Environmental profile & Status of water quality in selected inland Aquatic Environment with special reference to water Pollution.

With the aim of the improvement of the quality of projects in the institution Maduganga project was included as a part of the above named project, with effect from the middle of the year. Since the Maduganga project was commenced in March, a progress was reported, from March to December. This project has been completed.

04. ES/33RP/2006/02 Assessment of present pollution Levels and Management Aspect related Hikkaduwa Marine Sanctuary.

This project was scheduled to be completed within 02 years period. For the year 2006, all scheduled activities were completed and budgeted money was spent. However, due to some errors in recording, this project was placed, under the category of more than 75% completed. While activities scheduled for 2006 were 100% completed, further activities under this project are to be done during the year 2007.

05. ES/33RP/2006/03 Emergency Studies, Consultancy Services & Laboratory Improvement.

Due to the delays in tender processes, progress of the project couldn't be achieved up to 100% and part of the lab improvement work is rescheduled for 2007.

IARD

06. 102.10 Development of export oriented ornamental fish industry in Sri Lanka

Due to lack of transport facilities, field visits in connection with collection of brood stocks could not be carried out. Therefore 100% progress could not be achieved, but 90% was achieved.

07. 102.1 Impact of monofilament gill nets to fish

Permission was not received to carry out this study even at the experimental level due to the ban on using monofilament nets. At the same time field visits could not be carried out due to lack of vehicles facilities for data collection and expected progress could not be achieved.

Extention unit

08. The progress of the projects conducted by the extention unit was more than 75%. The reasons mentioned below are attributable to the reduced progress .

1. Participation at exhibitions were very limited in the particular year. Therefore, allocated funds were not utilized fully.
2. Tenders were called for purchasing in 2006 but the payments were done in Year 2007 .
3. Funds allocations for video productions were not fully utilized because several media organizations telecasted our news programs free of charge.

NHO

09. National Nautical charting programme Bathymetric survey of Colombo harbour, Kalpitiya Lagoon

Due to the early on-set of the South-West monsoon, the bathymetric surveys scheduled for the period of September to December could not be completed as expected in the Work programme.

The security situation at the Kalpitiya Lagoon area also reduced the expected work progress.

FTD

10. 3.1 Develpoment of an effective fishing gear to exploit large exotic cyprinids(Catla Catla) in inland reservoirs.

The permission from the NAQDA and DFAR were given in late 2006 to carry out this project.and it was started in octomber 2006. Hence ,the experiments of a new fishing gear couldn't be completed within one year period.Therefore,this project was extended up to 2008 to complete the main objectives of the project.

The initial objectives of the project was , to conduct pilot scale experilmental fishing trials to introduce an ice hold for 18 – Foot Fibreglass Reinforced Plastic (FRP) boats and harvest the deep sea demersal fish resources using Bottom Set Long Line (BSLL) method. However, Science and Technical Committee of the

NARA recommended to start a new project instead of this project . Therefore, the project was amended as the development of an experimental fishing gear to exploit large exotic cyprinids in inland reservoirs of Sri Lanka.

## IT

### 11. Development of GIS and remote sensing strategies for the management of sensing coastal habitat with reference to Negambo Lagoon and Rekawa Lagoon

As the officer responsible for the field work, resigned , 100% progress could not be achieved, but about 95% progress was achieved. Although the report was not finished at the end of year 2006 expected targets will be achieved in 2007.

## IPHT

More than 75% - Five projects

12. The project , no 3.1 recorded 85% progress . This is a collaborative programme within ICEIDA and NARA . This project was commenced 2-3 months later in the year as the agreement of understanding at the initial stage of the project had to be finalized.

The work plan of the ICEIDA project was submitted for approval in 2005, but approval was given only in 2006. The above agreement was signed in March 2006. However, at the moment 1<sup>st</sup> phase of this project has been completed.

All other projects, where more than 80% of progress was achieved mainly due to limited vehicle facilities for field work, lack of accommodation for field visits and also equipment facilities for the project.

## MBRD

### 17. Monitoring of offshore fisheries.

Although Rs. 900,000.00 was allocated for the purchase of motorcycles under this project, only Rs. 467,700.00 was spent and therefore there was a balance of Rs 432,300.00 . Similarly, though Rs 650,000.00 had been allocated for the IOTC conference, only Rs. 356,000.00 was spent as the mid year meeting was not held.

### 18. Study of the genomes of the marine turtle species of Sri Lanka

Due to delays in the tender procedure, the repairing of the main equipment used in this project was delayed. It has now been rectified.

**50%- 75% - five projects**

IARD

01. **102.3 Shrimp health Management**

Since necessary chemicals were not received in time and lack of vehicles to carryout field work during disease periods, the work could not be successfully completed.

IPHTD

02. **50%-75% - around progress – project 2**

The two projects which have achieved only 65 % of progress were planned & used the fish processing plant. The processing plant was destroyed by Tsunami. The renovation works of the processing plant was planned to be completed by the middle of the year. But, it was not completed due to delay in obtaining funds. Hence the project work planned could not be completed during 2006. However renovation works of the pilot plant was finished in February 2007 under ICEIDA funds and projects have now been completed .

MBRD

04. **Stock assessment and management of sea cucumber and chank resources**

This project was supposed to be carried out in Kalpitiya and the eastern coastal areas. The progress of the project was low due to the unfavourable security situation and the unexpected weather conditions that prevailed .

05. **Establishment of scientific based conservation plan for sea turtle fauna of Sri Lanka**

Although the progress of this project was more than 98% , the progress report erroneously showed a progress of only 62% . The project has now been completed.

**25% - 50% around progress - Projects 07**

IARD

In the progress report, it was erroneously mentioned that there were 03 projects with a progress of 25% – 50% but it should be corrected as 02 projects.



01. 102.5 Monitoring of shrimp diseases

Repairs to the PCR lab needed for this project was delayed and work could not be completed.

02. 102.6 Development of induced breeding strategies for native indigenous fish *Clarias brachysoma* and *Tor khudree* with the view of introducing them to inland Aquaculture

Due to unavoidable delays in Tender procedure the work could not be completed.

Oceanography – 04 projects

04. Project 01

Rs 1.55 million was allocated for tide house construction project . However due to the following reasons the expenditure was less than the estimated amount.

01. Electricity Board supplied electricity free of charge.

02. Due to non availability of appropriate telephone connection, the proposed telephone connection to the tide house was not established.

03. Rs. 0.4 million was allocated to the purchase and maintenance of Equipments/Instruments but the Germany BSH donated the required instruments.

05. Project 02

Some projects were later conducted as joint projects leading to savings. As a result of amended action plan of 2006, Hydrographic studies of Hikkaduwa marine sanctuary was joined with the project of ESD Ascertaining current environment status of Hikkaduwa marine sanctuary. Thus, it was able to reduce the field expenses considerably. Further, some donations were also received from USAIDS for this project considerably.

06. Project 03

When amending the action plan a sum of Rs 0.4 million was allocated for this project. The total cost is Rs 299,000.00 (52%). Later it was amalgamated with IARD Project of "Current STATUS AND Vulnerability". Thus field trips and travelling were conducted jointly, resulting savings. At the same time , donations were received from CRMP to complete a part of this project. Due to increased efficiency unexpected savings were achieved .

07. Project 04 & 06 (Coastal vulnerability / Phytoplankton Studies Nutrient Fluxes)

The projects 4 and 6 were amalgamated. The original allocation of these two projects were Rs.255,000.00+ 200,000.00 respectively, resulting in a total

allocation of Rs 455,000.00 . The total expenditure was Rs 322,000+56,000=378,00.00 and progress of the projects was 83%. The amalgamation of the two projects caused unexpected savings.

### **projects Not started**

#### **FTD – 02 Projects**

01. To conduct pilot scale experimental fishing trials to introduce an ice hold for 18 – Foot Fiberglass Reinforced Plastic (FRP) boats and harvest the deep sea dimersal fish resources using Bottom Set Long Line (BSLL) method.

Science and Technical Committee of NARA recommended to start a new project instead of the above . Therefore, the funds allocated for the above mentioned project was transferred for a new project titled Development of effective fishing gear to exploit large exotic cyprinids (Catla Catla) in inland reservoirs. Hence, above mentioned project has been removed from the work plan and it has been reported as not started by mistake.

02. Study the Impact of Monofilament Gill Nets to the Reservoir Fisheries.

Recently the government banned the use of monofilament gill nets in the inland reservoirs. Therefore DFAR and NAQDA did not grant permission to start the experiments in the reservoirs. Therefore, this project was cancelled.

#### **Oceanography – projects 02**

03. Project 05

As the Project “Monitoring of thermocline is connected to other studies , it was not implemented in year 2006. It was fully implemented under a project titled “Ocean status” in year 2007.

04. Project 08

When amending the action plan in early 2006, it was realized that using wind energy is not economical and the project was abandoned. However basic study in wave energy was carried out with the help of Ministry of Science & Technology and no costs involved

#### **MBRD – 04 Projects**

05. Estimation of trawl by - catch / waste generation from shrimp/fish processing industry and utilization of the above for development

This project (given as no.4) was not started due to the leaving of officer responsible in NARA and on the advice of the Science and Technical Committee.

06. Project no. 3 (Development & management of demersal finfish resources ) and Project No 06 (Biological & economic feasibility) have been merged .

Therefore, project 03 is not an abandoned project but was conducted together with project 06. The progress of this project for 2006 was 91%.

07. Project no.05 (Post "Tsunami" investigations on lobster resources in Sri Lanka) and project 07 (Stock assessment & management of sea cucumber & chank resources) also have been merged .

Though projects 05 and 07 were merged, but the progress of the 2 projects have been given separately. The progress of project 05 was 72% and as the work that has to be carried out in the eastern coastal areas it could not be completed due to security reasons. Project 07 showed a 62% progress and there was a balance from the amount allocated for this project as it was combined with project No 5.

08. Equipment

There are 11 projects under the MBRD and the project no.11 was for the purchase of equipment for the division . After the discussions held in May 2006 to restructure NARA, it was suggested that the purchase of equipment should be under one common project for all NARA projects. Hence , this was merged with all other equipment requirement.

### **OVER EXPENDITURE FROM ALLOCATED MONEY - 07 Projects**

#### **IPHT**

- 01 Improvement of quality of ice and water ICEIDA and NARA to collaborative project.

Rs 500,000.00 has been allocated to Project no.3.1, but some expenditure (fuel, travelling and other administrative expenditure) has been met by ICEIDA, according to the agreement. This expenditure was met by NARA on reimbursement basis. Accordingly Rs 165,119.58 has been reimbursed and action is being taken to reimburse Rs31,350.00. As such there is no over expenditure in connection with this project.

02. Projects to improve fish food production methods using fish waste. The allocated money for this project was Rs 300,000.00 while the actual expenditure was Rs 355,000.00. It is agreed that allocation has been exceeded by 55,000.00. However Rs 172,350 has been earned from extension and training programmes conducting under this project offsetting the over expenditure.

## Oceanography

### 03. Project 04 & 06 (Coastal vulnerability / Phytoplankton Studies Nutrient Fluxes)

The project 4 and 6 were amalgamated as a single project. The original allocation of these two projects were Rs.255,000.00+ 200,000.00 respectively, resulting in the total allocation of Rs 455,000.00 . The total expenditure was Rs 322,000+56,000=378,00.00. Although the budgetary allocations for the first project has exceeded the total allocation has not been exceeded as a result of merging the 2 projects. Hence the progress of the amalgamated project was 83%.

## MBRD

04. Though Rs. 800,000.00 was allocated for project no. 03 of MBRD, the total expenditure for this project was Rs. 840,000.00. This was due to the merging of projects 03 and 06. Though the final stages of project 06 could not be completed in 2006 due to the unfavourable weather conditions, it was successfully completed in 2007. The allocations for projects 03 and 06 at the beginning of the year were Rs. 800,000.00 and Rs. 500,000.00 respectively. Therefore, the expenditure has not exceeded the amount allocated and the progress should be shown as 91%.

## IARD

### 05. 102.2 Investigation on Aquatic plants and their Propagation technology in the Ornamental aquatic plants Industry

The estimated cost at first was 350,000.00 but it was reduced to 300,000.00 during allocation of funds. However since the aquatic garden had to be re-arranged for the 25th anniversary celebrations 2007, the expenses were higher than the allocated funds.

### 06. 102.3 Shrimp health & Environment Management

Since the project involves water quality testing heavy travelling is valued and due to floods in the areas and spread of white spot disease , more field work had to be carried out.

### 07. 102.7 Introduce improved technologies of breeding, hatching and rearing of tilapia

Leaflets and booklets that had to be printed during the previous year were completed only during this year and all such expenses were not under this project.

ESD

08. Project No ES/33RP/2006/02 Status of water quality in selected to locations of coastal aquatic environment with special reference to water pollution

Project No ES/33RP/2006/02 is within the budgetary allocationS. However due to errorneous record of a transaction incurred under project no ES/33RP/2006/01 this shows an overexpenditure and arrangements will be made to do the necessary adjustments.

Note :-Although budgetory allocations have been exceeded for some of the projects due to unavoidable circumstances the total budget for Research & Development has not exceeded.

(c) Rs 4,849,598.31

This amount includes various projects & consultancy services. Out of this two projects continued for more than 5 years amounting to Rs 272,606.00 have been completed. Steps have been taken to credit, balance amount into income. The amount categorized under 3-4 years amounted to Rs.495,343.57 has been kept for purchase of equipment and payment will be made in year 2007. Amount categorised between 2 years are related to projects which are being continued.

### 3.3 Management Inefficiencies

Survey work of fisheries harbours assigned to our institution after Tsunami disaster were carried out using equipment and small boats rented out. Navy vessels and small boats available with us were used for National Charting Programme. It was able to carry out essential reasearch work without hindrance with equipments as donations .

However there is a decline in some areas of the National charting programme and consultancy services .

It was able to controll the interruption of research work to a certain extent, as we were able to carry out the essential work which should have been carried out by survey vessel, with the help of vessels belonging to NAVY.

3.4 Although co-operate plan has not been prepared, action plan has been prepared. Annual budget has been prepared followed by the action plan. Therefore productivity of the institution can be measured by comparing financial & physical performance . However the corporate plan is being prepared for 5 years commencing from 2007 to 2011

### 3.5 Uncommercial Transaction

- (a) As NARA is a financial institution a number of projects are carried out during a year. A large number of vehicles are needed to go on field trips connected to these projects. There is a scarcity of vehicles since NARA did not purchase any new vehicles for the last 10 years. To overcome this situation the approval of the Treasury was obtained at least, to purchase two vehicles.

To avoid this situation the vehicles were hired earlier as per guidelines given in Public Expenditure Guidelines for Good Governance. Since NARA had to incur a large cost for this and 28 permanent drivers are available in the organisation, it was stopped by the management.

In this circumstances the projects of NARA has to desist. Although NARA requested to purchase 66 vehicles, approval was given only for two vehicles but the Treasury informed that they are unable to provide funds. It was noticed that funds could be available to lease vehicles paying a monthly lease rental. Therefore, it was decided to purchase one vehicle on outright basis and the other on lease rental basis due to following reasons.

- There was an urgent need for an extra vehicle, as it was very difficult to carry out research projects.
- Leasing a vehicle is more profitable than hiring a vehicle, Approval of the board also was obtained for this purpose.

Accordingly, one vehicle has been purchased under a financial lease from the Merchant bank Ltd which was a company comes under the Bank of Ceylon. It was used for project work and it has run about 45000 km, within 13 months. Nearly Rs. 75000 has to be paid to hire a vehicle of such condition and to run 3000 km without fuel & the driver. Last year Rs 975,000 has been paid by the institution only to hire vehicles.

If the institution hire a vehicle for the period of lease, that is for 04 years NARA has to pay Rs 3.6 million and the institution do not get the ownership of the vehicle.

Although the institution has to incur Rs. 1,989,408.00 even on per lease basis, the institution get the ownership of the vehicle at the end of the lease period. This expenditure can be considered as a cost of capital. As such, it is proved that, this transaction is an economical transaction and a solution for the scarcity of vehicles.

- (b) This was a long term consultancy project carried out from Feb 2002 to 31 st March 2005. Although the project has been programmed for 3 years at first, it was over by one year as a result of ceasing the construction of Katumayake highway road.

This was a longterm project and overtime has been paid since the consultancy payments are made at the end of the project.

When consultancy payments were computed on 2nd May 2006, it has been observed that 07 employees were paid more than the consultancy payment entitled, as the over time. The total amount is Rs 16,870.28. Five employees out of those seven have left NARA by that time and the remaining two had to pay Rs. 130.07 and Rs.2557.50 respectively.

Dr Sepalika Jayamanne, Wasantha Pahalaarachchi & Dr Champa Amarasiri are the other officers worked for this project. They have taken only 3 months salary of them and not claimed any consultancy payment. As such institution received some excess money and the co-ordinator (Dr Champa Amarasiri) has discussed this issue with Director General requesting to settle this outstanding amount of Rs 16,870.28 out of their unclaimed consultancy and Director General has given approval for that.

- (c) This was due to the delay in releasing funds from Treasury
- (d) This was due to the delay in releasing funds from Treasury
- (e) This has happened due to unavoidable circumstances. The E.T.F payment for the month of March 2006 had to be paid before 30.04.2006. Arrangements were made to deliver the cheque on 28.04.2006, but the vehicle which was sent to deliver the cheques met with a technical error and the holder of cheque was not able to hand over it on the same day. 29th & 30th April was a week- end and the following day was 1st of May. Hence this delay could not be avoided.

### 3.6 Idle and Under-utilized Assets

- (a) Stores items were purchased in bulk and it is practical to remain some of the items. The stores items mentioned here are the remainings of purchases more than 5 years. Action has been taken to use these items for daily work of the institution.
- (b) Action will be taken to repair or dispose the bicycle lying in the stores.
- (c) These balances were re-curring due to the dispute arisen in contracts of constructions. Neccessary adjutments will be made when preparing the accounts for the year ended 31.12.2007

### 3.7 Identified losses

- (a) The outstanding money amounted to Rs.301,277.71 has been recognized as non-recovered and provision has been made to write off those from books of Accounts.

(b) Deposits

These deposits have been kept in government institution as a requirement to obtain certain services. Those should be kept in each & every institution till the necessity of these services are lapsed . Hence it is impossible to recover these. Rs 158,472.00 out of this belongs to the transactions taken place from 1982 to 1991. Confirmation of balances and relevant documentary information for these transactions cannot be found in the institution. Therefore it is treated as the doubtful debts.

DIRECTOR TELECOMMUNICATION	5,000.00
C.W.E.	10,000.00
COLOMBO GAS & WATER CO.LTD	6,000.00
BUILDING MATERIALS CORPORATION	25,000.00
RUHUNU UNIVERSITY	2,000.00
BUILDING MATERIALS CORPORATION	13,165.00
DIRECTOR, TELECOMMUNICATION	5,000.00
CEYLON OXYGEN COMPANY LTD	8,000.00
CEYLON OXYGEN COMPANY LTD	4,000.00
CEYLON ELECTRICITY BOARD (CHINA BAY)	1,000.00
COLOMBO GAS & WATER COMPANY LTD	500.00
SRI LANKA NAVY	2,500.00
C.F.C. DE MEL	10,000.00
DIRECTOR, COAST CONSERVATION DEPT.	500.00
SRI LANKA PORTS AUTHORITY	40,000.00
COMMISSIONER, MUNICIPAL COUNCIL (NEGOMBO)	500.00
SECRETARY, MINISTRY OF PUBLIC ADMINISTRATION	8,500.00
DIRECTOR, COAST CONSERVATION DEPT.	500.00
SRI LANKA TELECOM LTD.	1,000.00
CEYLON ELECTRICITY BOARD	3,250.00
SRI LANKA TELECOM LTD	5,000.00
CEYLON OXYGEN LTD	6,000.00
COMMISSIONER, MUNICIPAL COUNCIL (COLOMBO)	557.00
CEYLON ELECTRICITY BOARD	6,000.00
COMMISSIONER, MUNICIPAL COUNCIL (COLOMBO)	3,000.00
NATIONAL INSTITUTE OF BUSINESS MANAGEMENT	2,000.00
CEYLON OXYGEN LTD	17,000.00
CEYLON OXYGEN LTD	17,000.00
CEYLON OXYGEN LTD	8,500.00
ANURADHA AGENCIES	7,500.00
CEYLON ELECTRICITY BOARD	250,000.00
SRI LANKA NATIONAL ARBITRATION	1,250.00
FROSTY MARKETING LTD	8,000.00
FROSTY MARKETING LTD	8,000.00
CEYLON OXYGEN LTD	34,000.00
DIRECTOR, COAST CONSERVATION DEPT.	500.00
CEYLON ELECTRICITY BOARD	437,500.00
CEYLON OXYGEN LTD	7,500.00
	<u>965,722.00</u>

(c) It has been done according to the approval of the board and the Financial Regulations. Following steps have been taken to avoid such losses in future.



01. The cash advance given at a time was limited to Rs. 30,000.00 (Board decision No 317.05(c))

02. No officer is given a new advance till he settles the previous advance obtained.

03. Advances have to be settled immediately after the expenditure is incurred. The maximum period given for settlement is 30 days.

04. The salaries of the persons who are unable to settle the advance within 30 days are stopped. (AMC decision- 45.03)

05. Payment of advances are limited to the officers of grade iv and above.

(d) Committees have been appointed to conduct preliminary investigations regarding loss of vehicle spare parts (4WD hub) and cassette recorder. At the same time a committee has been appointed to conduct a preliminary investigation regarding loss of T.V. Necessary steps will be taken when these committee reports are received.

(c) It is true that Rs. 503,215.00 was spent to construct a prawn hatchery at Kadolkele. This construction has not carried out in an accepted manner and the contractor has over-advanced the money. Although it has been informed to the contractor to pay this money back, there is no response from him and steps have been taken to initiate legal action against him for noncompletion of work and to recover the money over-advanced, as per the contract of construction.

#### 4. Systems & Controls

Steps have been taken to pay special attention for the systems & controls which need special attention

K. Haputhanthri  
Chairman/NARA

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