



ANNUAL REPORT & ACCOUNTS 2012



National Aquatic Resources Research and Development Agency

Crow Island, Colombo 15

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NATIONAL AQUATIC RESOURCES, RESEARCH & DEVELOPMENT AGENCY

1. CORPORATE INFORMATION

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 in Sri Lanka. NARA was established in the year 1981 by restructuring the Research Division of the Department of Fisheries. In the restructuring process research division was amalgamated with the Institute of Fish Technology which existed in the present premises of NARA at Crow Island, Mattakkuliya, Colombo 15 to establish a fully 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. The following Vision, Mission, Goals/Objectives as the highlights of the NARA functions as a statutory body under the Ministry of Fisheries and Aquatic Resources Development are as follows.

Our Vision

To be the premier institution for scientific research in conservation, management and development of aquatic resources in the region.

Our Mission

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

The main objectives and functions of the Agency:

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

Governing Board

The Governing Board consists of Eight (08) Appointed Members and Eight (08) ex officio members in accordance with the Section 6 of the National Aquatic Resources Research and Development Agency Act No 54 of 1981 as amended by Act No 32 of 1996.

The following members served as the members of the Governing Board during the year 2012 and eleven Board Meetings were held during the year. The existing cadre at the end of the year was 308.

Appointed Members

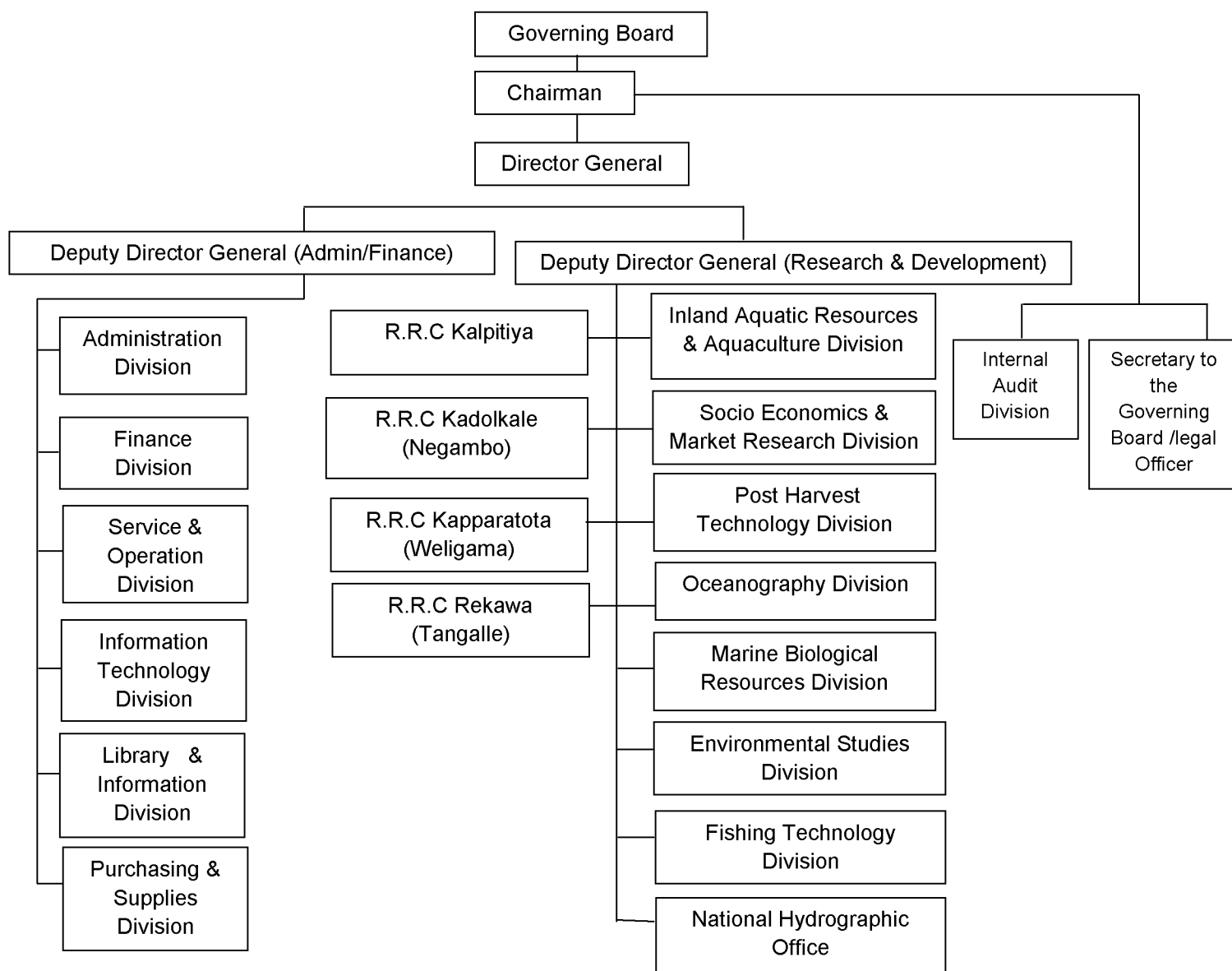
Dr. Hiran W. Jayewardene (up to January 2012)	Chairman
Dr S G Samarasundera (Since February 2012)	Chairman
Dr. K. Sivasubramaniam (up to May 2012)	Member
Prof. W. M. T. B. Wanninayaka	Member
Mr. Dunstan Fernando	Member
Dr. Oscar Amarasinghe (up to May 2012)	Member
Mr. K. N. Rienzie Perera	Member
Mr. M. J. Irshad Rummy Jauffer	Member
Professor T S G Fonseka (since October 2012)	Member
Mr P N N Fernando (since October 2012)	Member
Mr.Roshan Fernando (since October 2012)	Member

Ex –officio Members

Dr. (Mrs) Damitha de Zoysa	Member (Secretary, Ministry of Fisheries & Aquatic Resources Development)
Mrs. Nilmini Diyabedanage (up to January 2012)	Member (Director General, NARA)
Mr.S Suriyaarachchi (since July 2012)	Member (Director General, NARA)
Rear Admiral S. A. M. J. Perera	Member (Director General /Operations – Sri Lanka Navy)
Mr. A. R. Wickramaratne	Member (Deputy Director, Department of National Budget)
Mr. S. M .W. Fernando	Member (Surveyor General)

Dr. Sarath Abayawardana (up to May 2012)	Member (Director, National Science Foundation)
Mr. Nimal Hettiarachchi	Member (Director General, Department of Fisheries & Aquatic Resources)
Mr. Anura Jayawickrama	Member (Additional Secretary, Ministry of Ports & Highways)
Ms. Anusha Amarasinghe (Since June 2012)	Member (Director, Ministry of Science & Technology)

Organizational Structure



Organization

Dr. Hiran W. Jayawardene and Dr S G Samarasundera functioned as the Chairman and Mrs. Nilmini Diyabedamage, Mrs. M D I B Gamage, Mr Neil Munasinghe and Mr S Suriyaarachchi functioned as the Director General respectively during the year under review.

In order to perform the mandated functions of the Agency the organization had been designed to constitute ten Research and Technical/Services Divisions, Environmental Studies, Fishing Technology, Hydrographic Office, Information and Technology, Inland Aquatic Resources & Aquaculture, Library & Information, Marine Biological Resources, National Institute of Oceanography & Marine Sciences, Socio-Economic and Market Research, Institute of Post Harvest Technology and Fishing Technology divisions. Supported divisions were, Administration, Services & Operations Finance Division and Purchasing & Supplies Divisions.

Following officials officiated as Heads of Divisions during the year 2012.

Research Divisions

Mr. S. A. M. Azmy	Environmental Studies
Mr. N. B. P. Punyadeva	Fishing Technology
Mr. M. A. Ariyawansa	Hydrographic Office
Mr. A. B. A .K. Gunaratne	Information Technology
Dr. V. Pahalawattaarachchi	Inland Aquatic Resources & Aquaculture
Mrs. K. G. B .S. Kariyawasam	Library & Information
Dr. R. R. P. Maldeniya 01.01.2012 - 25.11.2012 Dr S S K Haputhantri 26.11.2012-31.12.2012	Marine Biological Resources
Dr. K. Arulanathan	National Institute of Oceanography & Marine Sciences
Dr.(Mrs.) K. W. S. Ariyawansa	Institute of Post Harvest Technology
Mr. K. H. M. L. Amaralal	Socio Economics & Marketing Research

Support Services Divisions

Mr. Sumedha Jayasinghe 01.01.2012-23.03.2012) Mrs. P A M R Chandrasekara (20.12.2012 – 31.12.2012)	Administration
Mrs. R. H. P. Ranasinghe	Finance
Mr. N. B. P. Punyadewa 01.01.2012 -09.10.2012 Mr C H T Gamage 10.09.2012 - 31.12.2012	Services & Operations
Mr. M. D. Senarathne	Internal Auditor
Ms. A.T.P.K.De Silva	Purchasing & Supplies Division

2. RESEARCH HIGHLIGHTS

Dr.H.M.P.Kithsiri/ Head, Directorate of Research and Development

Marine fish resource: Actively engaged in updating the large pelagic and small pelagic databases, analysing the statistics and preparing research papers on trends and prospects of large and small pelagic fisheries in Sri Lanka, with special reference to further development of Indian Ocean tuna fisheries: Impact of the industrial fishing for developing the fishing industry in the coastal CPCs of the Indian Ocean Tuna Commission (IOTC) with special reference to Sri Lanka has also been studied. In addition, information and statistics with regard to the exploitation of large pelagic fish in 2012 by Sri Lankan fishing crafts has been provided to the MFARD for submitting official statistics to IOTC for the management of tuna and tuna like fish in the Indian Ocean.

Environmental research: Environmental aspects of aquatic resources with special reference to water quality and aquatic ecology. The information resulting from the comprehensive research undertaken by the division is used to provide technical advice to government and other organizations, in order to inform decision making processes and implement sustainable environmental management strategies. During this period the division carried out five research projects related to the Environmental Management and the aquatic heaths a study project to cater to emergency situations such as fish kills and pollution and a project to improve the quality of the laboratory.

Aquaculture and inland fisheries: Induced spawning and larval rearing technology were developed for high value marine species *Pseudocolochirus violaceus* (Sea apple cucumber) and *Colochirus quadrangularis* (Thorny sea cucumber) and *H. scabra*. This species was successfully cultured with *P. monodon*. High value freshwater fish (*Pangasis suchie* and *Garra ceylonensis*) breeding and larval rearing technologies were developed. Low cost high nutritional value fish feeds were developed using untapped minor cyprinid resources. Problems addressed related to water use in shrimp aqua culture through the growing salt industry lead to issue recommendations to the relevant authorities. Around 53 *Vibrio* species were isolated from pond culture system of tiger shrimp. Preliminary management plan was prepared for development of aquaculture in Puttalam and Mannar districts with Korean collaboration. Research on oysters reveled optimum conditions, peak spat falling seasons and best environment friendly spat collectors and it has been given a green light for development of oyster culture in future. Awareness programmes were conducted for the farmers to disseminate research findings.

Oceanography: Studies on ocean environment such as currents, upwelling, thermocline and mixed layer properties have been conducted including non-living resources explorations. The results of the studies have been used to develop methodologies to assess and predict Potential Ocean based hazards, fishing ground forecasting, monsoon and extreme weather events. Operation of Ocean Observation Center (on 24 hr basis) being alert on ocean based disasters for early warnings is one of the major tasks of the

division. Real-time information on ocean based hazards/disaster has been provided to the Disaster Management Center (DMC). Dissemination of fishing ground information on twice a week basis has been continued and the forecast methodology was improved with technical assistance of Japanese Aerospace Exploration Agency (JAXA).

The staff of the division was engaged in consultancy services, training and capacity building providing their expert knowledge to support for the establishment of Central Database System of the Ministry of Fisheries. Country representation for meetings in international organizations such as Indian Ocean Tuna Commission (IOTC) and participating working parties of Indian Ocean tuna research are some of other activities involved.

The outputs of the activities have been published by means of research papers, abstracts and reports that are listed in this report under the National Institute of Oceanography

Minimize post harvest losses and value addition: A preliminary study was carried out to search pharmacologically active compounds that can potentially be used as medicines in sponges. The crude extracts of five sponge samples collected from Dehiwala and two from Jaffna were showed high antioxidant activity and in case of antimicrobial screening, considerable antibacterial activity against *Staphylococcus aureus* was observed in one of the samples collected from Dehiwala and one from Jaffna. It was found that heavy salting increased the final yield of fish based product by 25% and sensory quality of the final product was better. The chemical and microbiological quality and safety of fresh fish obtained from the retail market and supermarket of Sri Lanka was examined. When considering both microbiological and chemical results it can be seen that majority of the samples are unfit for human consumption and that counted as; 35% of yellowfin tuna, 47% of sailfish, 35% of sardine, 100% of squids and 53% shrimp.

Fishing Gear technology: The project activities, data collection from the main fishery harbours were visited catch data from the Ring net from Multiday fishing boats were collected and while Tuna long line boat catches and Gill net catches were recorded. 10-15 field visits were done for a month. Required fishing nets were purchased and net design was made.

Hydrography and navigational charts: Nautical chart of Trincomalee Harbour was prepared and updated nautical chart of approaches to Hambantota. Data collection is in progress for proposed Kalpitiya Chart. Established Marine Spatial Data Infrastructure system. Special Surveys undertaken for NARA Research & Development work. Organized 12th North Indian Ocean Hydrographic Commission. Occupied new research vessel Samudrika to carry out marine research around Sri Lanka.

Socio-economic and marketing research: Economic efficiency of marine fishing operations data revealed that out irrespective of craft categories both motorized and

non-motorized craft not shown remarkable disparity in efficiency. However, the main factor of efficiency depends on gear combinations used in coastal fishery. Hence it is recommended to use more dynamic gears than static gears in the coastal fishery. Fish consumption patterns study in the estate sector revealed that the major barrier for fish consumption in the estate sector was lack of proper fish distribution channel. In addition, religious believes, higher preference on dried fish, price of fresh fish and availability of limited varieties also influenced the low consumption of fresh fish. Moreover, immovable natures of labour, lack of transportation facilities and weak road net work have a negative impact on fish consumption.

3. FINANCIAL HIGHLIGHTS

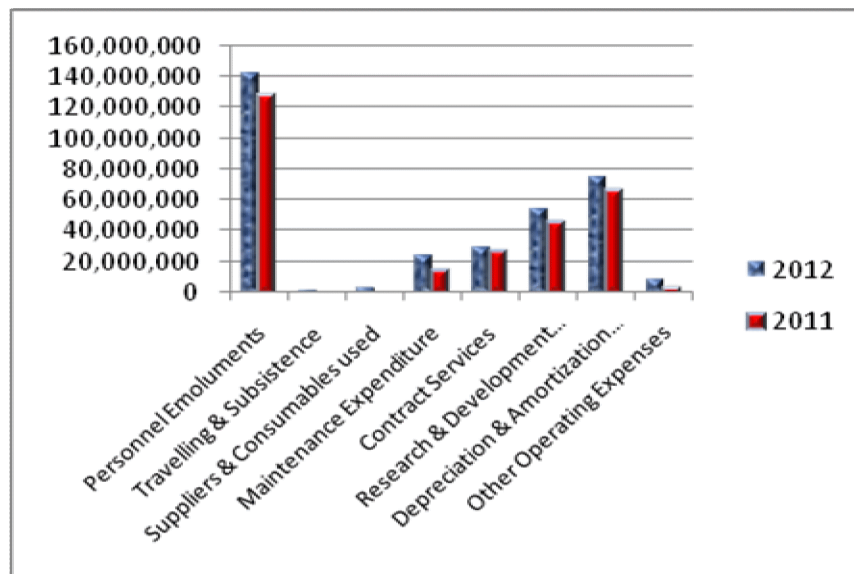
Financial Review

Following highlights are reported for the information of the Board

Operating Expenses

GOSL Grants

	2012	2011
Personnel Emoluments	142,392,013	127,402,151
Travelling & Subsistence	1,364,526	823,047
Suppliers & Consumables used	2,629,602	1,833,537
Maintenance Expenditure	2,3380,740	14,272,686
Contract Services	2,8464,677	26,909,468
Research & Development Expenditure	54,053,593	45,666,861
Depreciation & Amortization Expenses	7,5011,504	66,665,521
Other Operating Expenses	8,017,030	3,229,134
Total	335,313,689	286,802,405



Since 17 vehicles from the fleet are, over 10 years old, the maintenance expenditure had increased, while the old debts which were not recoverable had been written off in the year 2012 had increased the operating expenses.

Self Generated Income

Considerable reduction in self generated income was due to completion of the major projects in 2011.

Operating Expenses

Vehicle Pool at a Glance

Vehicle - In Running Condition

Type	Nos. of Vehicles	Age
Cars	1	14,19,17,17,16,16,14
Double Cab	8	06,06
Jeeps	5	26,26,23,20,19
Vans	6	21,21,17,04,03,01
Trucks	1	25
Three Wheeler	1	12
Total	22	

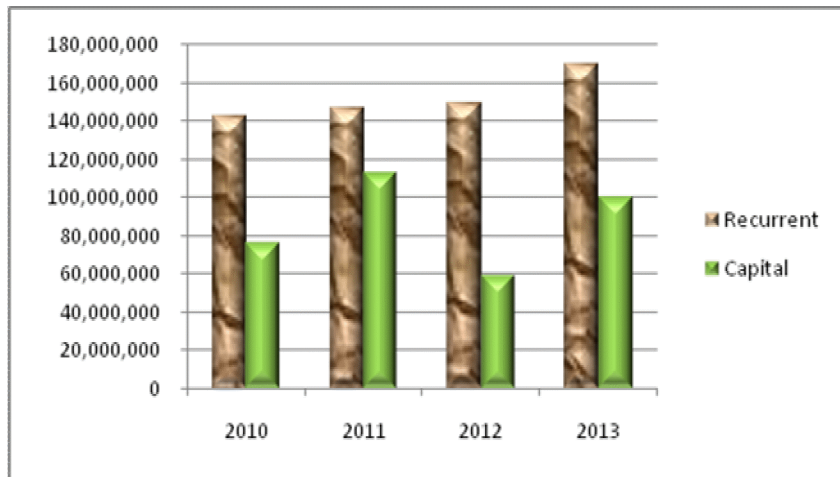
Age Analysis – All Vehicles

Less than 10 Years	05
Between 11-19 years	10
More than 20 years	07
Total	22

Allocations at a Glance – GOSL

	2010	2011	2012	2013*
Recurrent	142,243,000	146,667,000	149,331,453	170,000,000
Capital	75,950,000	112,440,000	59,301,583	100,000,000

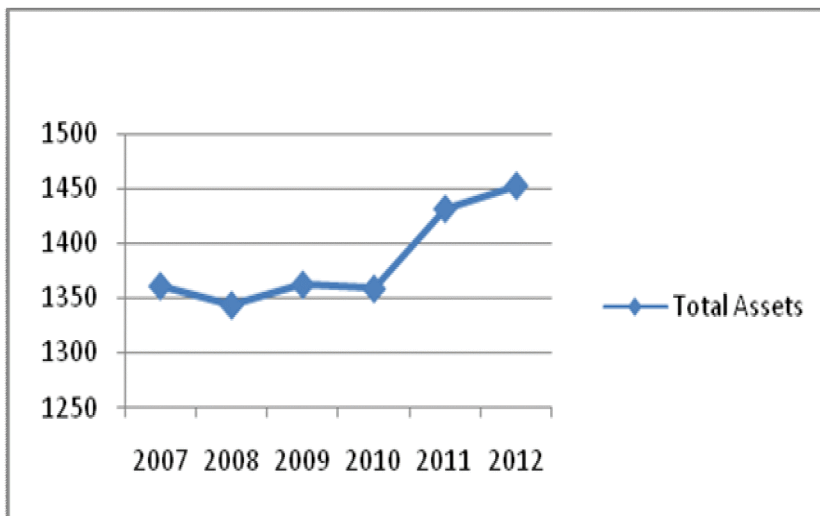
*Estimated



The government grants received towards Research & Development decreased by 47% whereas recurrent grant increased only by 2%, compared to 2011.

Growth in total assets

Description	2007	2008	2009	2010	2011	2012
Total Assets	1361.09	1343.698	1362.354	1358.65	1431.65	1452.6



4. HUMAN RESOURCES INFORMATION

Recruitments

Name	Date	Designation
Ms.A.T.P.K.De Silva	1-Feb-12	P & S Officer
Dr.S.G.Samarasundara	9-Feb-12	Chairman
Ms.M.D.I.B.Gamage	15-Feb-12	Director General
Mr.R.H.Prashantha	10-Feb-12	Driver
Ms.M.G.N.Udawaththa	8-Mar-12	Store Keeper
Mr.M.S.M.Risab	12-Mar-12	Survey Labourer
Mr.B.S.Fernando	13-Mar-12	Unskilled Labourer
Mr.T.M.S.N.Tennakoon	30-May-12	Driver
Mr.M.S.M.Fahim	2-Jul-12	Research Assistant
Ms.I.J.J.Fernando	6-Jul-12	Clerk
Mr.S.Sooriyaarachchi	25-Jul-12	Director General
Mr.W.G.Fernando	16-Aug-12	Skipper
M.B.N.L.Fernando	23-Aug-12	Unskilled Labourer
Mr.C.H.T.Gamage	10-Sep-12	Director/ Service & Operation
Mr.Damith Amaraweera	24-Sep-12	Draughtsman
Mr.G.Roshan	24-Sep-12	Research Assistant
Mr.W.H.Chathuranga Fernando	12-Oct-12	Unskilled Labourer
Mr.P.D.Lahiru Wickramaratne	7-Nov-12	Driver
Mr.R.M. Abeywickrama	19-Nov-12	Diver
Ms.R.V.Narasinghe	3-Dec-12	Research Assistant
Ms.P.A.M.R.Chandrasekara	20-Dec-12	Asst. Director/Admin

Departures of the Service

Name	Designation	Effective Date	Reason for the Departures
Ms.Shalani Sinnathamby	Research Officer	04.01.2012	Completed Contract Period
Ms.C.Wickramaratne	Research Officer	31.01.2012	Completed Contract Period
Mr.R.H.P.Weligodapitiya	Hydrographic surveyor	05.02.2012	Resigned

Ms.Nilmini Diyabedanage	Director General	09.02.2012	Resigned
Ms.I.Gamage	Director General(Actg)	17.02.2012	Resigned
Mr.Sumedha Jayasinghe	Administrative Officer	20.03.2012	Resigned
Mr.N.R.Munasinghe	Director General	03.05.2012	Resigned
Ms.S.A.C.Udeni	Clerk	28.06.2012	Resigned
Mr.E.B.P.Saman Kumara	Coxwain	16.07.2012	Resigned
MS.K.S.K.Dahanayake	Word Processing Operator	26.07.2012	Resigned
Mr.E.M.Ranjith Edirisinghe	Research Officer	03.08.2012	Resigned
Mr.A.Rajasooriya	Research Officer	03.10.2012	Retired
Ms.D.G.N.Hasarangi	Research Officer	05.10.2012	Resigned
Ms.Dulani Priyangika	Clerk	08.12.2012	Resigned
Ms.D.Chamari Dissanayake	Research Officer	31.12.2012	Resigned

Unfilled Vacancies

Srl No.	Designation	Vacant
01	Dy. Director General (Admin & Finance)	1
02	Dy. Director General (R&D)	1
03	Director (Finance)	1
04	Director (Admin/HR)	1
05	Director (Monitoring & Evaluation)	1
06	Scientist	41
07	Hydrographic Surveyor	1
08	Senior Land Surveyor	1
09	Senior Cartographer	1
10	Senior System Analyst/Programmer	1
11	Data Analyst	1
12	Asst. Director (Service & Operation)	1
13	Asst. Director (HR)	1

14	Asst. Director (Information Technology)	1
15	Asst. Director(Finance)	
16	Senior Librarian	1
17	Senior Extension Officer	1
18	Assistant Information Technology Officer	1
19	Technical Officer-(Electronic)	1
20	Internal Audit Officer	1
21	Asst. Project Monitoring Officer	1
22	Librarian	1
23	Stores Officer	1
24	Administration Officer (HR)	1
25	Technical Officer (Mechanical)	1
26	Personal Assistant to Director General	1
27	Cartographer Data Analyst (Nautical)	1
28	Cartographer Data Analyst (ENC)	1
29	Cartographer Data Analyst (GIS)	1
30	System Analyst /Programmer	1
31	Technical Officer (Civil)	1
32	Land Surveyor	1
33	Administration Officer (Admin)	1
34	Translator	3
35	Sampler	4
36	Research Assistant	5
37	Head Driver/Marine	1
38	Multi Media Designer	1
39	Management Assistant (Transport)	1
40	Diver	1

41	Technical Assist (Mechanical)	1
42	Technical Assistant (Electrical)	1
43	Mgt. Asst. (Library)	1
44	Hydrographic Assistant	1
45	Boatswain	1
46	Shroff	1
47	Book-Binder	1
48	Plumber	2
49	Carpenter	2
50	Mason	3
51	Bungalow Keeper	1
52	Lab Attendant	4
53	Caretaker/Cook	2
54	Helper	13

Promotions

Name	Designation	Effective date	Promote	
			From	To
Mr K A Wimal Kumara	Driver	23.08.2010	VII	VI
Mr U S P K Liyanage	Research Officer	21.12.2010	IV	III
Ms R R A R Shirantha	Research Officer	23.05.2011	IV	III
Mr P A D A Kumara	Research Officer	20.05.2011	IV	III
Mr S U P Jinadasa	Research Officer	08.12.2010	II	I
Dr S S K Haputhantri	Research Officer	01.01.2012	II	I
Dr M G I S Parakrama	Research Officer	06.09.2011	III	II
Ms P P M Heenatigala	Research Officer	01.01.2011	III	II
Mr N B P Punyadewa	Research Officer	28.01.2011	III	II
Mr Ruchitha Perera	Research Assistant	18.06.2012	VII	VI
Mr L S K Jayawardena	Office Aid	21.09.2012	VII	VI
Ms A A S H Athukorala	Research Officer	02.08.2012	IV	III
Mr S R C Ranaweera Promoted to Senior Hydrographic Surveyor	Hydrographic Surveyor	28.05.2012	III	II
Mr S A R Rasanga	Clerk	09.01.2012	VIII	VII
Mr M D J Amarajeewa	Cook	18.01.2012	VIII	VII
Mr T H Sunil Shantha	Labourer	04.07.2012	IX	VIII

Mr Indratissa Chandrasekara	Labourer	15.06.2012	X	IX
Mr P A D A Kumara	Research Officer	09.07.2012	III	II
Mr D A Athukorala	Research Officer	14.06.2012	II	I
Mr M M A S Maheepala	Economist	26.09.2012	III	II
Mr K W R R Amaraweera	Research Officer	05.11.2012	IV	III
Mr Rochana Weerasinghe	Research Officer	05.10.2012	IV	III
Mr J S Jayanatha	Research Officer	20.07.2012	IV	III

Local Training

Name/Post	Participated Local Training/ Seminar/Workshop	Institution	Amount
Ms D Siribaddana1 Word Processing Operator Ms M K Premawathie Steno/Typist/Word Processing Operator	Basic concept of computer IT Technology	National Institute of Fisheries and Nautical Engineering	Rs.5,000/= per head
Ms S H U Chathurani Research Assistant	Higher Certificate for Post Harvest Technology of Fisheries	NIFNE	Rs.10,000/=
Ms D A Wijayadewa Research Officer Mr R M R M Jayathilake Scientist	Disaster Risk Reduction	Sri Lanka Institute of Development Administration	Rs.17,000/= per head
Mr H A M P Tissera Electrician	Maintenance of Diesel Generators	Institute for Construction Training and Development	Rs.9,500/=
Dr H M P Kithsiri Directorate of Research & Development Dr V Pahalawattarrachchi Research Officer/Head- IARAD	Workshop on Writing Effective Policy Papers	Sri Lanka Institute of Development Administration	-
Mr D M N Dissanayake Skilled Labourer	Maintenance of Steering Clutch and Brake Systems	Institute for Construction Training and Development	Rs.9,500/=
Ms A T P Kumari de Silva Purchasing Officer/ Supplies Officer	Workshop on Essence of Public Procurement	Sri Lanka Institute of Development Administration	-

Ms A T P Kumari d Silva Purchasing Officer/ Supplies Officer	Workshop on Bid Evaluation	Sri Lanka Institute of Development Administration	-
Ms A M A S K Adikaranayake Personal Assistant to Chairman	One Day Training on Super 5S as a Productivity Tool	National Institute of Labour Studies	Rs.3,000/=
Ms A M A S K Adikaranayake Personal Assistant to Chairman	Two Day Training Programme on Time Management on Time Management for Higher Work Place Productivity	National Institute of Labour Studies	Rs.5,750/=
Mr D Abeywickreme Store-Keeper	Certificate Course on Stores Management	Institute for Construction Training and Development	Rs.19,000/= + Vat
Mr W A S Perera Unskilled Labourer	Diploma in Business Management	Ministry of Youth Affairs and Skills Development	Rs.15,000/=
Mr S Ariyaratne Research Officer Mr B K K K Jinadasa Research Officer	Training on Basic SPPS	Institute of Applied Statistics Sri Lanka	Rs.15,000/= per head
Mr M D Senaratne Internal Auditor	Seminar on Effective Internal Auditing	Skills Development Fund Ltd	Rs.3,500/=
Ms V K G Jayasena Administrative Assistant Ms W A K R Mallika Clerk	Foundation Course in Human Resources Management	Institute of Personnel Management	Rs.14,535/= per head
Mr G A A Ratnayake Network Technician	Diploma in Computer Hardware with Network	Vocational Training Center	Rs.19,000/=
Ms R H S P Ranasinghe Head/Finance Mr P C Romel Perera Accountant Ms K G L Irangani Book-Keeper	Seminar on IFRS	Prag Services (Pvt) Ltd	Rs.8,500/= per head

Dr R R P Maldeniya Research Officer Dr D C T Dissanayake Research Officer Mr K H M L Amaralal Research Officer (Market/Research)	National Strategic Workshop for Governance of Marine Small Scale Fisheries in Sri	Ministry of Fisheries & Aquatic Resources Development	-
Mr M D Senaratne Internal Auditor Ms V K G Jayasena Administrative Assistant	Disciplinary Procedures	National Institute of Labour Studies	Rs.7,500/= per head
Ms R H S P Ranasinghe Head/Finance Mr P C Romel Perera Accountant Ms K G L Irangani Book-Keeper	Seminar on SLFRS – Part II	Prag Services (Pvt) Ltd	Rs.9,500/= per head
Mr B L S Wimalasinghe Transport Officer	High Bridge Vehicle Technology	Institute for Construction Training and Development	Rs.3,000/=
Dr A D W R Rajapakshe Research Officer Mr K H M L Amaralal Research Officer (Market/Research)	Training Programme on Project Proposal Preparations	Sri Lanka Institute of Development Administration	-
Mr P S Ranaweera Technical Officer/ Work Assistant Ms D C Udawatte/ Draughtsman	Energy Conservation in Commercial Building	Institute for Construction Training and Development	Rs.2,000/= per head
Ms R H S P Ranasinghe Head/Finance	Financial Management for Donor Funded Project	Sri Lanka Institute of Development Administration	-
Ms H D A Gunawardena Computer Word Processing Operator	IT Based Office Correspondents	Sri Lanka Institute of Development Administration	-
Ms D A Wijeyadewa Research Office Ms N D Hettige Research Officer	Certificate Course in Disaster Risk Reduction	Sri Lanka Institute of Development Administration	Rs.17,000/= per head

Ms M K Chandrani Word Processing Operator Ms W M K Priyanwada Research Assistant	Certificate in SLIDA Computer Driving License	Sri Lanka Institute of Development Administration	Rs.20,000/= per head
Mr M D M Asanka Hydrographic Assistant	1.Elementary First Aid 2.Fire Prevention and Fire Fighting 3.Personal Survival Techniques 4.Coxswain Course	Mahapola Training Institute	Rs.20,200/=
Mr M D Senaratne Internal Auditor	Workshop on how to minimize audit queries in Government Institutions	Ministry of Fisheries and Aquatic Resources Development.	Rs.4,000/=
Mr B L S Wimalasinghe Transport Officer Ms G N S Priyangika Works Clerk	Transport Management	Institute for Construction Training and Development	Rs.3,000/= per head
Mr R H S P Ranasinghe Head/Finance	Sri Lanka Financial Report Standard	Prag Service (Pvt) Ltd	Rs.9,000/=
Ms R H S P Ranasinghe Head/Finance	Seminar on Taxation	Prag Service (Pvt) Ltd	Rs.8,000/=
Ms V K G Jayasena Administrative Assistant Ms W A R K Mallika General Clerk	Certificate Course in Human Resources Management	Institute of Personnel Management	Rs.26,316/= per head

Foreign travels

Name	Purpose of Visit	Period	Country
Mr N B P Punyadewa Research Officer	BOBLME SEAFDE C-FAO Regional Workshop 'Putting into practice the FAO Technical Guideline on MPA and fisheries	30/01/2012 – 02/02/2012	Thailand
Dr S S K Haputhantari Research Officer	BOBLME Project TDA Confirmation & SAP Development Meeting	13/02/2012 – 17/02/2012	Thailand
Dr S S K Haputhantari Research Officer	BOBLME Project Work Plan Development Meeting	28/02/2012 – 02/03/2012	Thailand
Mr S M Illesinghe Engine Room Artificer	2 nd inspection Visit (2 nd) Purchase of Vessel	12.03.2012 – 19.03.2012	Taiwan
Dr H M P Kithsiri Research Officer	Invitation for participation as a resources person in the consultation on Broad Stock Management and Dissemination of improved fish breed in SAARC countries organized by SAARC	13/03/2012 – 14/03/2012	Pakistan
Dr K Arulanathan Research Officer	DBCP WIO – 3 rd in Region Capacity Building Workshop of the Data Buoy Cooperation Panel for countries of the Western Indian Ocean	14/04/2012 – 22/04/2012	Kenya
Mr A N D Perera Hydrographer	XVIII IHO Conference	22/04/2012 – 28/04/2012	Monaco
Dr S G Samarasundera Chairman Mr M A Ariyawansa Hydrographer	3 rd Inspection Visit (Purchase of Vessel)	23/04/2012 – 30/04/2012	Taiwan
Mr R P P K Jayasinghe Research Officer	Ph.D Studies	30/04/2012 – 08/06/2012	China
Mr U S P K Liyanage Research Officer	Seminar on Marine Fisheries Management of Developed Countries	04/05/2012 – 03/06/2012	China
Mr E Epasinghe Research Officer	International Training on Fresh Water Aquaculture for Asian & African Countries	06/05/2012 – 15/05/2012	Indonesia

Mr J K Rajapakshe Research Officer	4 th SAFE & Climate R3 Joint Workshop	21/05/2012 – 26/05/2012	Australia
Dr S G Samasundera Chairman Dr H M P Kithsiri Research Officer D V Pahalawatarrachchi Research Officer Dr S S K Haputhantari Research Officer Mr P A D A Kumara Research Officer	Training as per the project proposal on designing the Aquaculture Development Plan for the Northern & North Western Province	28/05/2012 – 13/06/2012	Korea
Mr J K Rajapakshe Research Officer Mr K H M L Amaralal Research Officer (Market Research)	Regional Workshop on SAP Fisheries Indicators	30/05/2012 – 31/05/2012	Thailand
Mr M A Ariyawansa Hydrographer Mr S R C Ranaweera Hydrographic Surveyor Mr S M Illesinghe Engine Room Artificer Mr M A B H Kumarasiri Engine Room Artificer	4 th Inspection Visit (Purchase of Vessel)	16/06/2012 – 23/06/2012	Taiwan
Dr S G Samarasundera Chairman	Official visit with Hon Minister	24/06/2012 – 29/06/2012	Vietnam
Dr A D W R Rajapakshe Research Officer	Regional Workshop Laboratory Proficiency Testing	24/07/2012 – 27/07/2012	Thailand
Ms R R A R Shirantha Research Officer	BIMSTEC International Training Programme on Aquatic plants, soilless culture and Post Harvest Technology	30/07/2012 – 28/08/2012	Thailand
Ms Y M R N Kumari Hydrographic Surveyor	Seminar on the importance of Hydrographic Service against the National Disaster	06/08/2012 – 09/08/2012	Japan

Dr H M P Kithsiri Research Officer	BOBLME Workshop on Communicating Science Effectively(Scientific Paper Writing)	21/08/2012 – 24/08/2012	Thailand
Dr K Arulanathan Research Officer	Working on Multi Disciplinary Oceanographic Observations for Coastal Zone Management	03/09/2012 – 14/09/2012	India
Dr S S K Haputhantari Research Officer	IOTC Working Party on Bill Fish	11/09/2012 – 15/09/2012	South Africa
Mr P A D A Kumara Research Officer	Sea Cucumber Fisheries	16/11/2012 – 20/11/2012	Tanzania
Ms D G N Hasarangi Research Officer	IOTC Working Party on Ecosystem By-Catch	17/09/2012 – 19/09/2012	South Africa
Dr S S K Haputhantari Research Officer	IOTC Working Party on Ecosystem & By-Catch	17/09/2012 – 19/09/2012	South Africa
Mr D A Athukorale Research Officer Mr M Epasinghe Research Officer	Training Programme on quality fish seed production through broad fish management in SAARC Countries	30/09/2012 – 11/10/2012	India
Dr H M P Kithsiri Research Officer	Scientific Presentation BOBLME	01/10/2012 – 04/10/2012	Thailand
Dr K Arulanathan Research Officer	2 ⁿ JCOMM Marine Instrument Workshop for the Asia – Pacific Region	02/10/2012 – 06/10/2012	China
Mr A N D Perera Deputy Hydrographer	Foreign Employment	01/10/2012 – 30/09/2014	Saudi Arabia
Ms A A S H Athukorale Research Officer	Coastal Fishing Techniques for Sustainable Resource Use (B)	09/10/2012 – 01/12/2012	Japan
Mr R P P K Jayasinghe Research Officer	Ph.D Studies	15/10/2012 – 14/10/2015	01 yr – Spain 02 yrs – China
Ms D N A Ranmadugala Research Officer	Workshop – Management of Fish and other Marine Resources for IOR ARC Countries	17/10/2012 – 19/10/2012	India
Mr J K Rajapakshe Research Officer	IOTC Working Parties and Scientific Session	23/10/2012 – 03/11/2012	Mauritius

Dr S G Samasundera Chairman	To participate in the grand anase Agriculture & Horticultural show.	24/10/2012 – 31/10/2012	Seychelles
Mr W Fernando Skipper Mr S M Illesinghe Engine Room Artificer	6 th Inspection Visit (Purchase of Vessel)	16/11/2012 – 26/11/2012	Taiwan
Ms K H K Bandaranayake Research Officer Dr S S K Haputhantari Research Officer	IOTC Working Party on Neritic Tunas	19/11/2012 – 21/11/2012	Malaysia
Dr R R P Maldeniya Research Officer	Preparation of Country Report on Regional Study in Coastal & Marine Fisheries Management in SAARC Coastal Countries	20/11/2012 – 21/11/2012	Maldives
Dr H M P Kithsiri Research Officer	KMI International Symposium on Incorporation of Marine Affairs & Fisheries into ODA framework	26/11/2012 – 29/11/2012	South Korea
Dr S G Samasundara Chairman	To enter into a memorandum of understandings	10/12/2012 – 16/12/2012	Seychelles
Dr. Vasantha Pahalawattarachchi Research Officer Mr A B A K Gunaratne Research Officer	To identify the feasible projects/locations	13/12/2012 – 16/12/2012	Seychelles
Dr D C T Dissanayake Research Officer	IOTC Scientific Committee Meeting	10/12/2012 – 15/12/2012	Seychelles
Mr J K Rajapakshe Research Officer	SAFE/AFRSF 19 Workshop	11/12/2012 – 14/12/2012	Malaysia

Court Cases and Disciplinary Inquiries

Labour Tribunal

- a) Case No : 2/Add/2869/2006- G. Lamahewa Vs NARA
The case was concluded. According to the judgment, the applicant i.e.G Lamahewa was re-instated with ½ of the total back wages.
- b) Case No : 02/ Add/3183/06 – J. B. A. Magammana Vs NARA
With regard to the application made by Mr. J .B. A. Magammana at the Additional Labour Tribunal, the Application is now at the inquiry stage.

District Courts

- a) Case No : 3894/10/DMR – District Courts, Colombo
The case filed against Mr. N. H. Dassanayake, Research Officer and his two Sureties on the grounds of breach of Agreement/ Bond entered into with the institution. Steps have been taken to issue Summons through the Ministry of Justice since the 1st Defendant is residing in Canada at the moment.
- b) Case No: 3237/10/DMR- District Courts , Colombo
The case filed against Mr. A. W. Gunasekara, Hydrographic Surveyor who resigned from service without serving the required bonded period. The case was settled at courts. As per the terms of settlement Mr Gunasekara should pay the due amount to NARA in installments within three years.

Files forwarded to the Attorney General's Department

- a) The file has been forwarded to AG's Department to institute legal action against Ms. S. Thalakada, Chief Librarian on the grounds that she has not reported for duty after completion of No-pay leave period abroad.
- b) On the grounds that Dr (Mrs) C V L Jayasinghe has served the Government the obligatory service period as per the terms of the agreement/bond entered in to, this matter was settled amicably.

Welfare Activities

Annual New Year festival celebrated. In addition to that transport facilities provide to the staff to make easy.

5. RESEARCH DIVISIONS

5.1 ENVIRONMENTAL STUDIES DIVISION

Head of the division: Mr. S.A.M. Azmy

Overview of the year

The main function of the division is to conduct studies related to environmental aspects of aquatic resources with special reference to water quality and aquatic ecology. The information resulting from the comprehensive research undertaken by the division is used to provide technical advice to government and other organizations, in order to inform decision making processes and implement sustainable environmental management strategies. Five Research Officers, two Research Assistants, a Word Processing Operator and two Labourers contributed to implement the work programme of the Division. During this period the division carried out five research projects related to the Environmental Management and the aquatic health's a project to cater to emergency situations such as fish kills and pollution and a project to improve the quality of the laboratory.

Programmers		Project		Allocation (Rs)	Officer Responsible	Period	
						From	To
1	Environment	2.5	Emergency Studies (Assessment of Causes for Water pollution, Fish kill incidents and Fish kill incidents) Continuous Project	460,761.00	S.A.M. Azmy K.A.W. Shyamali Weerasekara N.D.Hettige	Jan 2012	Dec 2012
2	Environment	2.7	Investigation on alien aquatic fauna & flora (phytoplankton & zooplankton) in ballast waters and study their impacts on water quality with special reference to economic & human health aspects	370,316.00	K.A.W. Shyamali Weerasekara S.A.M. Azmy N.D.Hettige	Jan 2012	Dec 2012
3	Environment	2.8	Assessment of land based pollution and coastal aquatic	739,398.00	S.A.M. Azmy K.A.W. Shyamali Weerasekara	Jan 2012	Dec 2012

			health - monitoring of coastal water quality from Negombo-Bentota to improve the health of the seas around western province		N.D.Hettige		
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Performance

Project 1:

A high number of aquatic pollution incidents in recent years due to fish kill incidents were recorded specially in the reservoirs and lagoons of Sri Lanka.

The objective of the study was to assess and investigate the causes for emergency situations in terms of water pollution, oil spills, fish kill incidents, and algal blooms etc. and finally give recommendations to overcome the situation. Seven fish kill incidents in Pamunuwila – Kelaniya, Ratmalana, Beruwala –Villuwa, Beira Lake, Arugam lagoon, Kanthale, Minneriya , Dadugam Oya ,Silli Ela- Beruwala & Bolgoda were inspected by the division in coordination with the Inland Aquatic Resources and Aquaculture division. It was determined that majority of the fish kills occurred due to poor health conditions and polluted water. Field visits, sample collection and sample analysis were carried out and the resulting internal reports with suitable recommendations were sent to the relevant authorities.

In addition to that, oil spill monitoring was carried from July to August due to M.V.Thermophylae Sierra sinking off panadura and the resulting oil spill incidents from Beruwala to Marawila.



Some photographs from recorded kill fish incidents



Oil spill incidents at Panadura

Progress (%):-

Progress (%):

Financial: 103%

Physical: 100 %

Water Body	Causes	Remedies
Pamunuwila – Kelaniya	High levels of pH and Phosphate which did not comply with the standard limits for the survival limits of fish and aquatic life	Water pollutant sources, which discharge pollutants into the inland waters directly or indirectly, should be identified through proper monitoring programs & action should be taken to prevent further damage to the water bodies.
Ratmalana	BOD and COD indicated higher values which were not within the Proposed Ambient Water Quality Standards for fish and aquatic life as proposed by CEA, 2001.	Water pollutant sources, which discharged pollutants into the inland waters directly or indirectly, should be identified through proper monitoring programs & action should be taken to prevent further damage to the water bodies.
Beruwala – Villuwa	Preliminary investigations on the possible causes indicate low oxygen in the lagoon (Dissolved Oxygen levels are almost zero) water. It may possibly be due to water pollution conditions with high levels of sediments and eutrophic conditions. Very low water circulation within the lagoon may also have contributed to anoxic conditions. High nutrient levels including ammonia and phosphate which exceed the standard limits for the survival of fish and aquatic life	The sand bar at the sea mouth may be opened for inflow of sea water and improving the water quality of the lagoon as a temporary measure to prevent further fish kills after assessment of water levels, gravitational flow and tidal changes.

Beira Lake	Eutrophic conditions and low dissolved oxygen levels observed	Avoid discharging of untreated water or prevent discharging effluents into water bodies which do not follow the guidelines and general standards limits for discharge of effluents into inland surface waters using recommended dilution factors
Arugam lagoon	High Salinity levels and Ammoniacal - N which exceeded the Standard limits for fish and aquatic life	Increasing the flushing of the lagoon by opening the sand bar more frequently would be a simple option to improving water quality Create awareness program for people in the vicinity of the lagoon Increase the depth of the water level by reducing the sedimentation with sand and silt. Dredging is the best solution to remove the excess accumulated organic matter from the lagoon
Minneriya	Low dissolved oxygen levels observed during the dry period	Common incident recorded during the dry periods.
Dadugam Oya	Nutrients, BOD and COD indicated higher values which were not within the Proposed Ambient Water Quality Standards for fish and aquatic life as proposed by CEA, 2001	Avoid discharging of untreated water or prevent discharging effluents into water bodies which do not follow the guidelines and general standards limits for discharge of effluents into inland surface waters using recommended dilution factors
Silli Ela-Beruwala	Nutrients, BOD indicated higher values which were not within the Proposed Ambient Water Quality Standards for fish and aquatic life as proposed by CEA, 2001 and low DO due to the aquatic plants	Create awareness program for people in the vicinity of the water body The canal should be rehabilitated by uprooting high aquatic plant densities
Kanthale	Could be agricultural outputs from surrounding catchment area	Increase awareness of people about best land use practices in the catchment area and
Bolgoda Lake	High Sulfide concentration and Low dissolved oxygen levels Observed	Water pollutant sources, which discharged pollutants into the inland waters directly or indirectly, should be identified through proper monitoring programs & actions should be taken to prevent further damage to the water bodies.

Project 2:

The ballast water of shipping vessels has been a primary method of alien species introduction throughout the world. Scientists estimate that as many as 3,000 alien species per day are transported in ships around the world; however, not all transported species survive the trip and their new home.

Therefore one of our projects aims was identifying alien aquatic fauna & flora (phytoplankton & zooplankton) in ballast waters and studies their impacts on water quality with special reference to economic & human health aspects and also to identify whether there is any impacts on fisheries and aquaculture to management of fisheries and aquaculture.

Field visits, sample collection from commercial harbours and fishery harbours and sample analysis were carried out. Output of this research is a list of plankton species, list of negative plankton species, Alien invasive species and water quality data from collected ballast water samples, publications including research papers, reports, posters and dissertations and research and industrial oriented training for university students.



Sampling of Ballast Water

Progress (%):- Financial: 98%

Physical: 98%

Project 3:

The project is aimed to identify the Land Based Pollution sources, monitor water quality to identify pollution trends and finally give recommendations to improve the situation. The sampling locations were selected using random sampling techniques with special reference to the areas urbanized areas, tourist areas, industrialized areas and areas which were subjected to fisheries and related activities in the Western Province.

Accordingly, samples were collected both at sea mouth areas and coastal sites that are located 200 m away from the shoreline.

Field visits, sample collection and sample analysis were carried out. Output of this research is publication including research papers, reports, posters and research and industrial oriented training for university students.



Photograph showing waste discharges to the sea



Beach cleaning activity

Progress (%):- Financial: 109 %

Physical: 98 %

Consultancies and Test services done by the Division

Consultancies

1. Environmental monitoring around the drilling locations in SL-2007-01-001 block, Gulf of Mannar – 2011 - 2012

The Environmental Studies Division has conducted environmental impact monitoring during the proposed offshore drilling in SL-2007-01-001 block in coordination with some other divisions of NARA (IARAD, MBRD). Final report was submitted and accepted and the total earning of the project was **Rs.2,435,000.00(Us \$ 25,000.00)**.

2. Environmental Examination of Bridge cum causeway across Kokilai Lagoon

The Road Development Authority (RDA) accepted a proposal submitted by NARA to conduct an Environmental Assessment on the likely issues and impacts of a Road link between Pulmuddai and Kokillai ends of the Kokillai Lagoon. This is basically to identify the possibility of extending the coastal connectivity from Pulmuddai to Jaffna peninsula,

to facilitate smooth and efficient transport which will improve economic, social and cultural links across the Kokillai Lagoon.

The Environmental Studies Division in coordination with some other divisions of NARA (IARAD, IT, MBRD, NIOMS, SED) was conducted the survey and earning of the project was **Rs.783, 900.00**.

Test Services

During the period, 21 clients have been provided with test reports by Environmental studies division and the total earnings is **Rs.118, 600.00**

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

Meetings Attended during the period

1. Technical Evaluation Committee Meeting for IEE-
 - Ministry of Defence (19 Meetings)
 - Central Environmental Authority(7 Meetings),
2. Establishment of Baseline Inventories of flora and fauna in three ecosystems in Eastern Province- Ministry of Defence
3. Formulation of the Interim Guidelines for the Coastal Water Base Development- Ministry of Defence and Urban Development (7 Meetings).
4. Project meeting of National Project Team for implementing the regional project Atomic Energy Authority (5 Meetings).
5. Scoping Committee Meeting Sri Lanka Tourism Development Authority (10 Meetings).
6. Stakeholder workshop to prepare the Technology Action Plan for Adaptation of Technology Needs Assessment Project on Climate Change-Ministry of Environment (10 Meetings).
7. Mangroves for the Future, 5th meeting of working group on Atlas of coastal Ecosystems –IUCN (3 Meetings).
8. Preparation of National coast conservation and coastal resources management plan, Sri Lanka.-Coast conservation and coastal Resource Management Department.
9. M.V Thermopylage Siera Vessel under anchorage off Panadura-Marine Environment Protection Authority (2 Meetings).

10. 25th Annual Sessions “Maximizing National productivity for sustainable growth”
The organization of Professional Associations of Sri Lanka.-
11. Meeting on Cooperation with First Institute of Oceanography, China
12. Meeting with Norwegian delegation on future cooperation
13. Meeting on Cooperation with Third Institute of Oceanography, China
14. Oil Exploration in the Gulf of Mannar-Meeting with Marine Environmental Protection Authority and Petroleum Resources development Secretariat.

Management Plans - National Level

Preparation of National Coastal Zone and Coastal Resource Management Plan

1. Sensitive Habitats
S.A.M.Azmy
2. Water Management
K.A.W.Shyamali Weerasekara

Public Awareness Programs

1. Lectures on Environmental pollution at R/ Seevali Central College, to demarcate science day on 2012.02.29.
K.A.W.Shyamali Weerasekara
2. Three Lectures on Environmental Sensitive Areas Galle, Matara and Hambanthota conducted by Marine Environmental Protection Authority
K.A.W.Shyamali Weerasekara (September – October 2012)
3. Lectures on “Harmful Human Activities on Marine Pollution” for Coast Guard officers .Training programme organized by Department of Coast Guard at Mirissa (May to December 2012)
K.A.W.Shyamali Weerasekara
4. Lectures on “Importance of Biodiversity” for Coast Guard officers. Training programme organized by Department of Coast Guard at Mirissa on 2012.06.07.
K.A.W.Shyamali Weerasekara
5. Lectures on “Importance of Corals” for Coast Guard officers .Training programme organized by Department of Coast Guard at Mirissa on 2012.06.07.
K.A.W.Shyamali Weerasekara
6. Lectures on “Harmful Human Activities on Marine Pollution” for Coast Guard officers. Training programme organized by Department of Coast Guard at Mirissa on 2012.06.07.
K.A.W.Shyamali Weerasekara

Number of Undergraduate Research Projects Has Been Supervised As an External Supervisor – Industrial Training

1. Determination of variations of water quality in selected water bodies in Anuradhapura District - Final year student B.Sc. (Special) in Environmental Sciences and Natural Resource Management
Supervised by S.A.M.Azmy and K.A.W.Shyamali Weerasekara
2. Investigation of marine phytoplankton in the ballast water of ships visiting Colombo Harbour - Final year student B.Sc. (Special) in Environmental Sciences and Natural Resource Management
Supervised by K.A.W.Shyamali Weerasekara and S.A.M.Azmy
3. Investigation of alien marine zoo-plankton in the ballast water of ships visiting Colombo Harbour - Final year student B.Sc. (Special) in Environmental Sciences and Natural Resource Management
Supervised by K.A.W.Shyamali Weerasekara and S.A.M.Azmy

Training of Research Students as an External Supervisor –Industrial Training

1. Post graduate student from University of Peradeniya from Environmental Science Field
2. Post graduate student from University of Sri Jayawardenepura from Aquatic Resource Management Field.
3. 02 third year students from University of Sri Jayawardenepura following Aquatic Resource Management special degree.
4. Final year student from Department of Science & Technology from Uwa Wellassa University of Sri Lanka under the specialization in water science and technology and mineral resource technology degree programme
5. Final year student from University in Bangalalesh

Internal Reports

1. Environmental Report of NARA Premises
S.A.M.Azmy, K.A.W.Shyamali Weerasekara, Chathurangi Wickramarathna ,N.D.Hettige(January 2012)
2. Internal report on fish kill incident at Pamunuwila Canal, Kelaniya
Chathurangi Wickramarathna (January 2012)
3. Internal report on fish kill incident at Beruwala -Villuwa
K.A.W.Shyamali Weerasekara (February 2012)
4. Internal report on fish kill incident at Rathmalana
K.A.W.Shyamali Weerasekara , N.D.Hettige (April 2012)

5. Internal report on fish kill incident at Beire Lake
K.A.W.Shyamali Weerasekara ,P.P.M.Heenatigala, B.R.C. Mendis(May 2012)
6. Internal report on fish kill incident at Arugam Lagoon
S.A.M.Azmy, K.A.W.Shyamali Weerasekara ,N.D.Hettige ,P.P.M.Heenatigala
(July 2012)
7. Internal report on fish kill incident at Silli Ela- Beruwala
K.A.W.Shyamali Weerasekara (October 2012)
8. Internal report on fish kill incident at Kanthale Reservoir
K.A.W.Shyamali Weerasekara (October 2011)

External Reports

1. Initial Environmental Examination of the sand exploration project – July 2012
S.A.M.Azmy, K.A.W.Shyamali Weerasekara, N.D.Hettige (As a contributor)
2. Preliminary Assessment of Kapparatota for Boat Anchorage – August 2012
S.A.M.Azmy/Head/ESD,K.A.W.ShyamaliWeerasekara/RO/ESD,
N.D.Hettige/RO/ESD
(As a contributor)

Training Obtained

Local

1. National Workshop on OPRC Convention, 1990 & OPRC – HNS Protocol,2000 organized by Marine Environment Protection Authority and the International Maritime Organization (June 2012)
N.D.Hettige
2. Certificate in Disaster Risk Reduction at SLIDA (October 2012)
N.D.Hettige
3. Training on RAS/7/024: Supporting Nuclear and Isotopic Techniques to Assess Climate Change Impact for Sustainable Marine Ecosystem Management (RCA), Colombo, Sri Lanka (November 2012)
K.A.W. S Weerasekara
4. Training on Port Biological baseline survey conducted by Marine Environmental Protection Authority (November 2012)
K.A.W. S Weerasekara

Research Publications

International – 04 Abstracts

1. Azmy,S.A.M.,Weerasekara,K.A.W.S.,Hettige,N.D.,Wickramarathne,C.and Amaratunga, A.A.D.,2012,Rapid Assessment Survey to Determine Current Status of Water Quality in Puttalam Lagoon, Giant's Tank and Akurala Water

Bodies , Proceedings of the International Symposium on Water Quality and Human Health: Challenges Ahead, Post Graduate institute of Science, University of Peradeniya, Sri Lanka, pp18

2. Azmy, S.A.M., Weerasekara, K.A.W.S., Hettige, N.D., Wickramarathne, C. and Amarathunga, A.A.D., 2012, Water Quality Status In Some Selected Water Bodies In Anuradapura District, Proceedings of the International Symposium on Water Quality and Human Health: Challenges Ahead, Post Graduate institute of Science, University of Peradeniya, Sri Lanka, pp.26
3. Weerasekara, K.A.W.S., Azmy S.A.M., Hettige, N.D., Wickramarathne, C., Amarathunga A.A.D., Heenatigala P.P.M and Rajapakshe, W., 2012, Assessment of Water Quality Status of Aquatic Environment Subjected to Frequent Occurrences of Fish Kill Incidents, Proceedings of the International Symposium on Water Quality and Human Health: Challenges Ahead, Post Graduate institute of Science, University of Peradeniya, Sri Lanka, pp.50
4. R.T. Nilusha, J.M.C.K. Jayawardana, S.A.M. Azmy and K.A.W.S. Weerasekara (2012). Preliminary study on variations of water quality in selected water bodies in Anuradhapura District. International symposium on "Water Quality and Human Health: Challenges Ahead" conducted by Post Graduate Institute of Science, university of Peradeniya, Sri Lanka .

Local – 02 Abstracts

1. Weerasekara, K.A.W.S., Azmy S.A.M., Wickramaarachchi, W.D.N. and Amarathunga, A.A.D., 2012, Water quality status of some selected water wells located in Padaviya, North Central Province , NARA Scientific Sessions 2012, pp.33
2. Hettige, N.D., Weerasekara, K.A.W.S., Azmy S.A.M., Wickramarathne, C and Amarathunga A.A.D., 2012, Water quality status of some selected water wells located in Padaviya, North Central Province , NARA Scientific Sessions 2012, pp.34

International – 02 Full Papers

1. Azmy, S.A.M., Weerasekara, K.A.W.S., Hettige, N.D., Wickramarathne, C. and Amarathunga, A.A.D., 2012, Determination of the Current Status of Water Quality in Some Economic Important Water Bodies in Sri Lanka, Proceedings of an International Symposium on Urban Lake Monitoring and Management, Cap – Net Lanka, Department of Agricultural Engineering, Faculty of Agricultural Science, University of Peradeniya, Sri Lanka, pp.135-144
2. Weerasekara, K.A.W.S., Azmy S.A.M., Hettige, N.D., Wickramarathne, C., Amarathunga A.A.D., Heenatigala P.P.M and Rajapakshe, W., 2012, Assessment of Causes for Frequent Occurrences of Fish Kill Incidents of Sri Lanka with Special Reference to Water Quality, Proceedings of an International Symposium on Urban Lake Monitoring and Management, Cap – Net Lanka, Department of Agricultural Engineering, Faculty of Agricultural Science, University of Peradeniya, Sri Lanka, pp. 144

5.2 FISHING TECHNOLOGY UNIT

Head of the Unit: N.B.P.Punyadewa

Development of an environmental friendly Ring net (Kandan course) for offshore fishery to sustainable harvest of underutilized Carangidae, Balistidae resources in deep sea.

Activities:

Data collection from the ring net catches and length, species composition, and cost were obtained from the boat owners. In addition to that, Long line catch data and Gill net catch data for the Yellow-fin tuna and Skipjack tuna were gathered. To construct the experimental ring net required net materials were purchased. Experimental ring net design was completed.

Performance

The project activities, data collection from the main fishery harbours were visited catch data from the Ring net from Multiday fishing boats were collected and while Tuna long line boat catches and Gill net catches were recorded. 10-15 field visits were done for a month. Required fishing nets were purchased and net design was made.

Programme	Project	Allocation	Officers responsible	Period from	Physical Progress	Financial Progress
Development of New Fishing Techniques.	Development of an environmental friendly Ring net (Kandan course) for offshore fishery to sustainable harvest of underutilized Carangidae, Balistidae resources in deep sea	0.6 Million Rs	NBP Punyadewa	2012 January to December	T-100% P- 95%	T- 100 % P- 156 %

Physical Achievement: Cumulative target Cumulative Achievement

Project 1 *Cumulative target 100 %
 * Achievement 95 %

Financial Achievement:

Project 1 * Financial target 100 %
 * Achievement 156 %

Publications

Research Report:

Development of an environmental friendly Ring net (Kandan course) for offshore fishery to sustainable harvest of underutilized Carangidae, Balistidae resources in deep sea. Abstract was published on findings from the research and it was presented at NARA sessions in 2012.

Training / Awareness programmers conducted

Meetings were arranged with, Fisheries Inspectors and fishermen of in the fishing area.

Constrain

Most field visits were cancelled due to lack of vehicles.

5.3 NATIONAL HYDROGRAPHIC OFFICE

Head of the Division : M.A. Ariyawansa

Overview of the Year

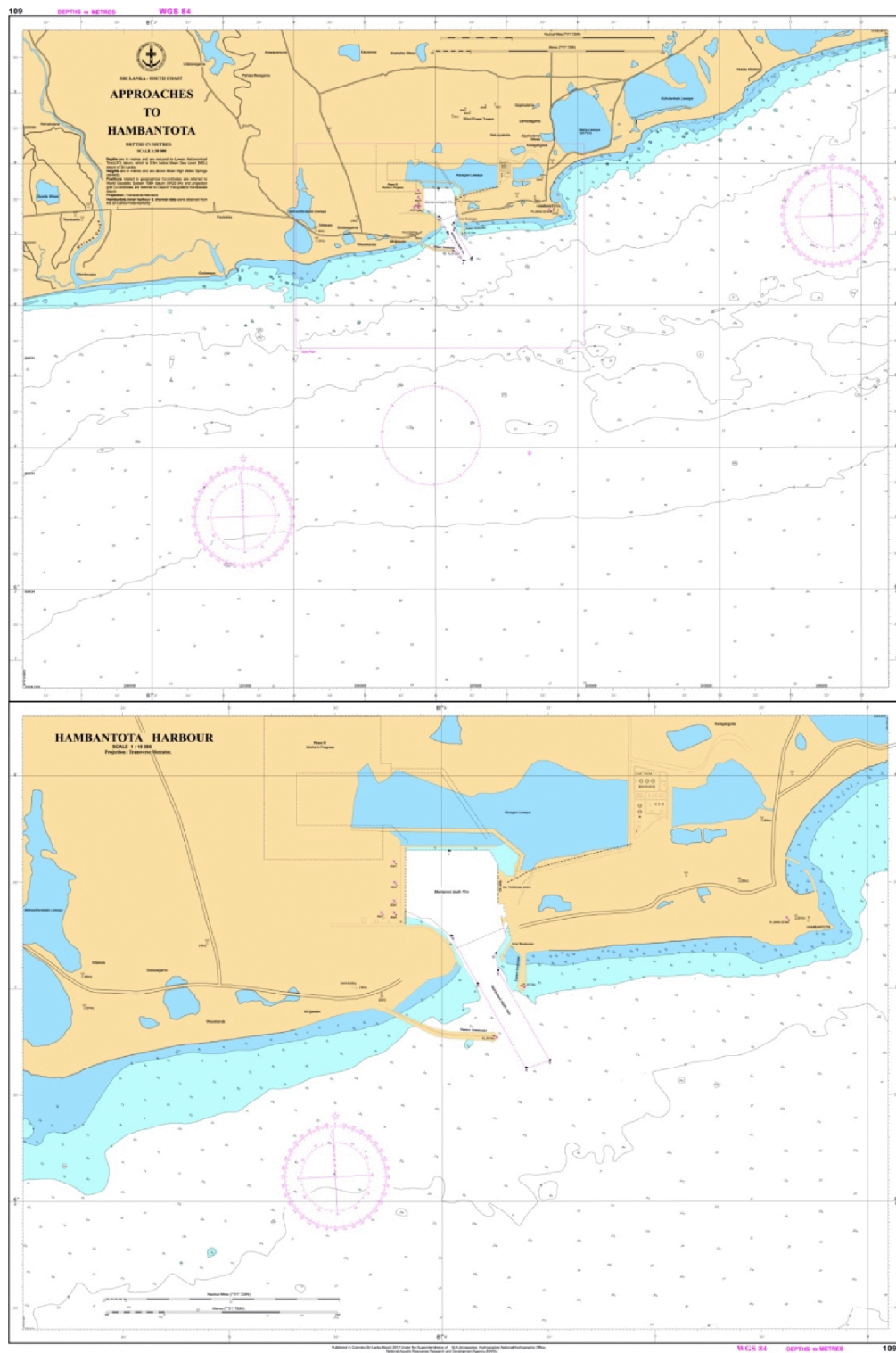
The prime objective of National Hydrographic Office is to provide services to safe and efficient navigation in Sri Lankan water. The other principal services are the provision of up dated and accurate nautical information and bathymetric data for coastal zone management, environmental protection and maritime delimitation. The provision of accurate and up to date charts offers significant economic and commercial benefits through facilitating maritime trade and other marine activities. For the year 2012 the following surveys and activities were conducted

1. Nautical chart of Trincomalee Harbour
2. Updated nautical chart of Approaches to Hambantota
3. Data collection for proposed Kalpitiya Chart
4. Establishment of Marine Spatial Data Infrastructure
5. Surveys conducted for special request
6. Special Surveys undertaken for NARA Research & Development work
7. Organized 12th North Indian Ocean Hydrographic Commission
8. Workshop on Marine Spatial Data Infrastructure (MSDI)

Activities undertaken

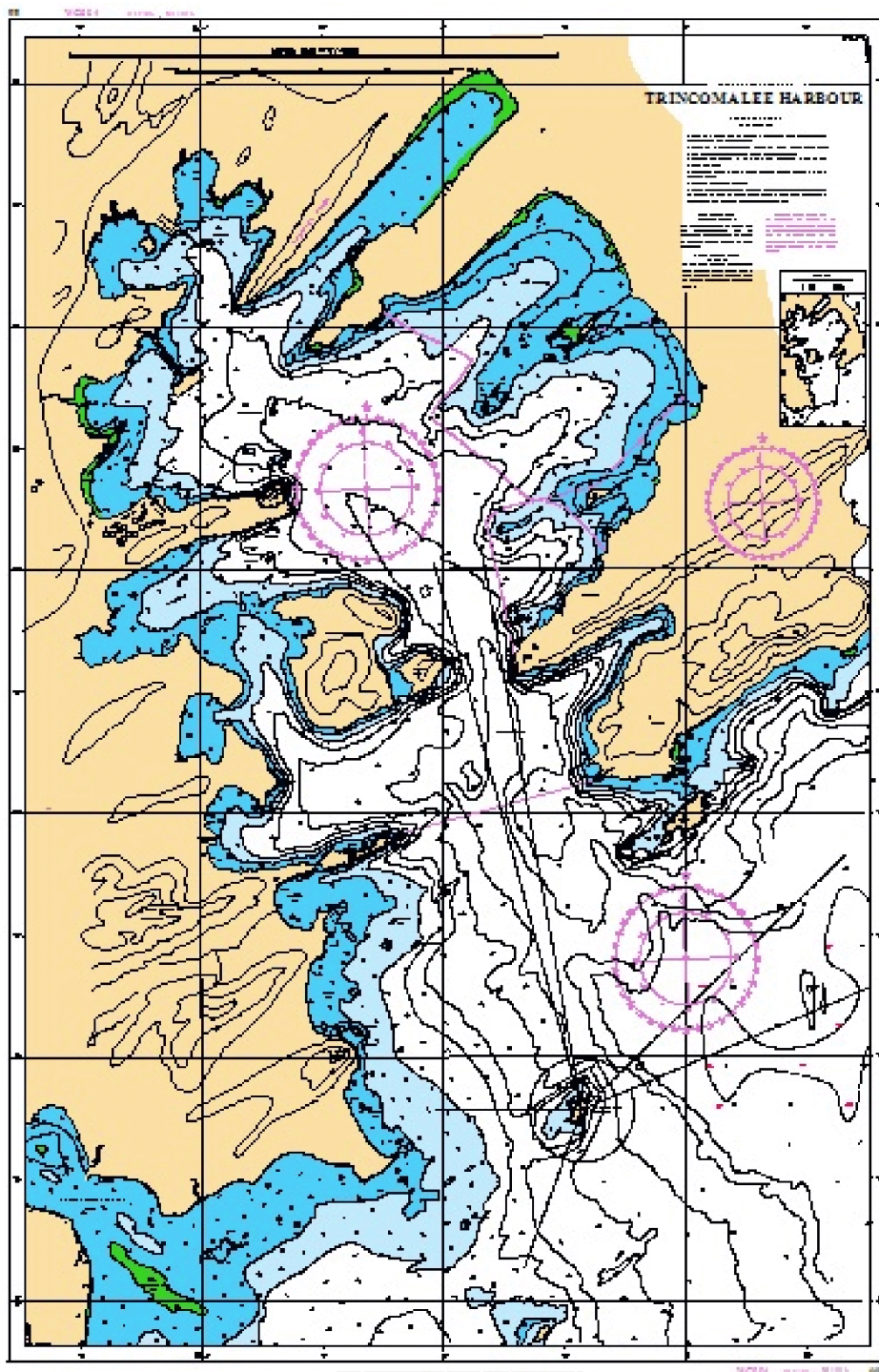
Programme		No.	Project	Officer Responsible	Period
1 National Nautical Charting	1.1	Data Acquisition of Hambantota (Updating Hambantota Chart)	A.N.D. Perera S.R.C.Ranaweera C.K. Amarasinghe	S.W.S.Weerasinghe Y.M.R.Nilupa Kumari	Jan-Dec
	1.2	Data Acquisition of Trincomalee Harbour(Trincomalee Harbour Chart)			
		Data Acquisition of Kalpitiya			
	1.4	Data processing and Cartography			

2. Establishment of Marine Spatial Data Infrastructure(MSDI)	2.1	Develop the proto type system using geonetwork open source software.	R.K.A Ariyaratne W.A.A.P. Wijesundara	Jan-Dec
	2.2	Data feed to the system in the relevant meta data		
3.Surveys conducted for special request	3.1	Bathymetric Survey at Madilla,Tangalle	A.N.D. Perera S.R.C.Ranaweera C.K. Amarasinghe S.W.S.Weerasinghe Y.M.R.Nilupa Kumari	Jan-Dec
	3.2	Bathymetric Survey of Valachchenai		
4. 12 th North Indian Ocean Hydrographic Commission	5.1	Organised 12 th North Indian Ocean Hydrographic Commission collaboration with United Kingdom Hydrographic Office.	A.N.D.Perera S.R.C.Ranawera O.V.Premachandra	March
5.Workshop on Marine Spatial Data Infrastructure(MSDI)		Organized the International workshop on MSDI With the collaboration of IHO and NIOHC under the project of MSDI.	R.K.A.Ariyaratna W.A.A.P.wijesundara	March
6.Launching of Research Vessel "SAMUDDRIKA"		Launching of Research Vessel "SAMUDDRIKA" from Hambantota Port	M.A.Ariyawansa Head,NHO	November



Nautical Chart of Approaches to Hambantota

Nautical Chart of Trincomalee Harbour



Performance

Project 1.1 : Updating approaches to Hambantota

Updating approaches to Hambantota Chart has completed. This is a mandatory requirement to full fill obligation of coastal nation enforce by SOLAS (Safety of Life at Sea) convention to provide safety information to mariners.

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

Project 1.2: Data Acquisition of Trincomalee Harbour

The Nautical Chart has been designed to approach to the Trincomalee Harbour from the International Sea Route. All bathymetric data has been incorporated to the bathymetric data base of NHO. Producing of sea chart is fulfillment of one of the requirement of International Maritime Organization's SOLAS Convention.

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

Project 1.3: Data processing and Cartography

Updating of Hambantota Chart is completed.

Cartographic work related to production of the nautical chart of Trincomalee Harbour is 90% completed. Processing of Kalpitya acquired bathymetric data is completed.

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

Project 2.0: Establishment of Marine Spatial Data Infrastructure MSDI

Develop the proto type system using geonetwork open source software and data feed to the system in the relevant Meta data.

Progress (%) Physical: - 95% Financial: - 100

Project 3.0: Surveys conducted for special request from Government and other institutions

Bathymetric Survey at Madilla, Tangalle

Project 4.0: 12th North Indian Ocean Hydrographic Commission (NIOHC)

12th North Indian Ocean Hydrographic Commission was held in Sri Lanka in March 2012. It was organized by NHO collaborating with United Kingdom Hydrographic Office. Fourteen member countries were participated in this event and also president of International Hydrographic Organization and representatives from many other International bodies were participated in this conference.

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

Project 5.0: Workshop on Marine Spatial Data Infrastructure (MSDI)

Workshop on Marine spatial Data Infrastructure was organized by NHO in March 2012. This was funded by International Hydrographic Organization (IHO) and North Indian Ocean Hydrographic Commission (NIOHC). Duration of the course was 5 days. Seventeen participants from ten countries included in this program. Resource persons were from CARIS Software Company and Oceanwise Company.

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

Project 6.0: Launching of Research Vessel “SAMUDDRIKA”

First ever integrated Hydrographic, Oceanographic and fisheries research and survey vessel of Sri Lanka (“SAMUDDRIKA”) was commissioned on 19th October 2012 at Magampura Mahinda Rajapaksha port. It is built in Thaiwan at the cost of 300 Million fully geared with modern navigational, communication and Survey equipments.

This vessel can facilitate seven Scientists in addition to the ship crew of five members. This vessel also consists with full equipped dry and wet two laboratories providing good platform for conducting onboard research activities. It also capable of multiday offshore sailing.

Publications / Maps

Updated nautical chart of Approaches to Hambantota Harbour

b). Nautical Chart of Trincomalee Harbour

Training / Awareness programs conducted:

- a) Routine awareness programmes in Hydrographic Surveying and Chart Production for Naval Officers and Seamen.
- b) Two undergraduates from Faculty of Geomatics, University of Sabaragamuwa were trained for 3 months period.
- c) Onboard Bathymetric Survey training was given to 100 undergraduates from Faculty of Geomatics, University of Sabaragamuwa at Trincomalee Harbour.

Foreign Training Non

Non Scheduled Activities / Consultancies

Project	Contract Amount
Bathymetric Survey at Madilla, Tangalle for Coast Conservation and Coastal Resource Management Department	Rs.1,237340.00

5.4 INLAND AQUATIC RESOURCES AND AQUACULTURE DIVISION

Head of the division : Dr.V.Pahalawattaarachchi

Overview of the year

The Inland Aquatic Resources and Aquaculture Division (IARAD) contributes to the fisheries sector development mainly focusing on research related to inland , brackish water and marine aquaculture through sustainable utilization of the natural resources.

During year 2012 division has carried out 11 research projects on the following thrust areas.

Induced spawning of *Pseudocolochirus violaceus* (Sea apple cucumber) and *Colochirus quadrangularis* (Thorny sea cucumber) was achieved for the first time in Sri Lanka. After successful breeding of *H. scabra* in 2011, the larval rearing and grow out trials showed that the lagoon pen seems to be the best method for rearing juveniles. It is revealed that *H. scabra* can be poly-cultured with *P. monodon* successfully when it is stocked the period favorable salinity levels. Successful Induced breeding trials of *Pangasius suchie* and captivity breeding of *Garra ceylonensis* highlighted the research findings of ornamental sector. Problems addressed related to water use in shrimp aqua culture through the growing salt industry lead to issue recommendations to the relevant authorities. Around 53 *Vibrio* species were isolated from pond culture system of tiger shrimp. Fish feed enriched with tocopheryl acetate given significant growth increase of common carp and more resistant to pathogenic *Aeromonas* bacteria. As a follow up research of finding of minor cyprinids of inland tanks as a untapped fishery resource attempts were taken to formulate a fish feed using the fish as the protein source. The growth performance data indicate that the fish fed with diet having minor cyprinid fish meal as protein ingredient reflected best growth in terms of weight gain (199.6%). More over the long term endeavor of fish feed development outcome produced six fish feeds for the ornamental fish using local feed ingredients. Fish feed production for the commercial use will be promoted in 2013 Selected ornamental fish breeders in Galle, Matara and Hambantota districts were strengthened with knowledge on breeding and identification of disease conditions and treatments for common diseases. Preliminary management plan was prepared for development of aquaculture in Puttalam and Mannar districts with Korean collaboration. Research on oysters reveled optimum conditions, peak spat falling seasons and best environment friendly spat collectors and it has been given a green light for development of oyster culture in future. According to the plan it is suggested to initiate a pilot scale culture in Puttalam district. The project on grouper culture in Negombo lagoon is introduced for collecting grouper fingerlings and indicator organisms such as rotifers showed that organic pollution in several locations of the estuary. Twenty three (23) abstracts were published and the scientific findings were presented in symposiums while four research papers were published in peer review journals. Eighteen reports on various investigations and surveys produced. On grouper culture in Negombo lagoon is introduced for collecting grouper fingerlings and culture in

net cages as a supplementary livelihood activity for fisher folk around Negombo Lagoon. Relatively higher amount of nutrient especially phosphate concentration and pollution indicator organisms such as rotifers showed that organic pollution in several locations of the estuary. Twenty three (23) abstracts were published and the scientific findings were presented in symposiums while four research papers were published in peer review journals. Eighteen reports on various investigations and surveys produced.

Project no.	Project Name	Allocation (Rs.Mn)	Officer Responsible
4.3	Improvement of breeding and culture techniques for sandfish (<i>Holothuria scabra</i>) and Development of suitable grow-out systems for sandfish (<i>H. scabra</i>) (Component)	1.3	P.A.D. Ajith Kumara
4.4	Development of breeding technology for selected endemic/exotic ornamental fishes and propagation techniques for commercially important aquatic plants.	2.85	Dr. H.M.P. Kithsiri S. Epasinghe, R.R.A.R. Shirantha
4.7.1	Quantitative and Qualitative study of <i>Vibrio</i> communities found in pond culture system of tiger shrimp in Sri Lanka.	0.68	P.P.M. Heenatigala
4.7.2	Aquaculture management and water circulation in the Mundel –Dutch canal estuarine system with respect to current water uses	0.64	S. Corea
4.8	Growth responses and immune assurance to <i>Aeromonas</i> bacteria of juvenile Common carp (food fish) <i>Cyprinus carpio</i> fed a prepared ration augmented with different levels of tocopheryl acetate through enrichment	0.46	Dr. M. G. I. S. Parakrama
	Development of Economical Feasible Feeds for Ornamental and Food fish Species(4.8 and 4.4 projects)		M.H.S. Ariyaratne
4.9	Environmental monitoring and grouper culture of Negombo lagoon	0.35	M. Gammanpila
4.10	Development of Breeding, culture and management of disease outbreaks of ornamental fish industry in southern	0.69	W. Rajapakshe
4.11	Utilization of minor cyprinid-based fish feeds for production of fingerling of Chinese and Indian carps	0.36	D.A. Athukorala
4.17	Designing the Aquaculture Development Plan for Northern and North Western Provinces, Sri Lanka (KOICA project, Sri Lanka)	3.24	Dr.Palitha Kithsiri Dr.V.Pahalawattarachchi Ajith Kumara
	Total allocation	4.64	

Performance

Project 4.3: Technology Development for Selected Economically Important Marine Ornamental Fish Species (Sea horse) and Sea cucumber Species.

Objectives of the project are to Improvement of breeding and culture techniques for sandfish (*Holothuria scabra*), development of suitable grow-out systems for sandfish (*H. scabra*) (Component) and to seek the possibility of culture of other marine edible/ornamental organisms (Sea horse) Induced spawning of *Pseudocolochirus violaceus* (Sea apple cucumber) and *Colochirus quadrangularis* (Thorny sea cucumber) was achieved for the first time in Sri Lanka. Around 0.52 and 0.09 million eggs were produced by *P. violaceus* in each breeding trial and it was around 0.73 million eggs for *C. quadrangularis*. Thermal stimulation was found to be the most successful method for spawning initiation of *H. scabra* and *P. violaceus*. Spawning of *C. quadrangularis* was initiated due to transportation stress. Juveniles of these species took more than two months to attain an average length of 5-8 mm. Hatchery reared juveniles were grown out in different systems including mud pond, lagoon pen and fiberglass tank. Lagoon pen seems to be the best method for rearing juveniles. *H. scabra* juveniles with an average weight of 11 ± 4 were transferred into a pen which was constructed in Puttlam lagoon. The average growth rate for a period of 4 months was 1.7 g day^{-1} and the survival after 4 months was 89%.

The possibility of culturing *Holothuria scabra* (sandfish) with *Penaeus monodon* (tiger prawn) was tested in the northwest coast of Sri Lanka from April to August 2012. It was observed that there is no any negative impact from *H. scabra* on growth and survival of *P. monodon*, and vice versa. Though there were differences in growth rate (g day^{-1}) of *H. scabra* with time, the observed average daily growth rate was 1.3 g day^{-1} with achieving the maximum weight of 232 g during the culture period of 4 months. According to results of the study, salinity has a major effect on growth and survival of *H. scabra*. *H. scabra* grew well up to 38‰. Though *H. scabra* could tolerate salinities up to 45‰, their growth became very slow (0.33 g/day) and beyond this level ($>45‰$) they showed several stress symptoms such as swelled bodies, destroyed epidermis and evisceration of internal organs. This study shows that *H. scabra* can be poly-cultured with *P. monodon* successfully but they need to stocked in correct time of the year.

Broodstock Management and Larval Rearing of Hippocampus kuda (Spotted Sea Horse) carriedout in the Kalpitiya RRC.

The numbers of fry sea horse were released 18 to 106. Larvae initial average length was 8 mm – 11 mm and larvae were stocked $6 - 10 \text{ individuals/m}^2$ and fed with rotifer (1500 – 3500 cells/liter) and enriched *Artemia*. The survival rate was 89.5% after 14 days of rearing.

Progress:

Financial 100%

Physical 100%

Constraints:

Extreme weather conditions badly affect for the seed production as well as larval rearing processes. Prolonged drought period from August to October totally destroyed the culture cycle carried out in shrimp ponds. High rain and flood in the middle of December destroyed 18 sea apple broodstock and damage the lagoon reared sandfish juveniles, sandfish brooders and newly bread sandfish larvae in November. Continuous power cut in Kalpitiya area also badly affected for the larval rearing process. Well conditioned 24 sandfish brooders were stolen from the hatchery premises in April 2012 and this was another major constrain faced during the project period.

Project 4.4: Development of breeding technology for selected endemic/ exotic Ornamental fishes and propagation techniques for commercially important aquatic plants

Objectives of the project are to develop breeding and culture techniques for selected endemic/exotic fishes, to develop new strains of exotic ornamental fishes and to setting up a tissue culture laboratory, a new fish hatchery and renovation of existing aquaria. Captivity breeding experiments on the endemic fish species *Garra ceylonensis* and Asoka barb and the exotic ornamental fish species *Pangasis suchie* were successful. Trials were conducted on some economically important threatened and exotic species. Infrastructure facility development in aquaria and fish hatchery was conducted. Aquatic plant tissue culture laboratory was established and the indoor aquatic plant house was constructed using a house was constructed using a old building which was planned to be demolished.



Major outcomes of the project were introduction of captive breeding techniques for *Garra ceylonensis* and *Pangasis suchie* .

Due to delay in net house renovation and insufficient number of tanks, rearing and more comprehensive captivity breeding research studies on fishes could not be carried out.

Progress:

Financial 100%

Physical 100%

Constraints:

Due to delay in net house renovation and insufficient number of tanks, rearing and more comprehensive captivity breeding research studies on fishes could not be carried out.

Project 4.7.1 : Aquaculture management and water circulation in the Mundel – Dutch canal estuarine system with respect to current water uses.

Water quality monitoring in Mundel – Dutch canal estuarine system in selected sites where shrimp and other industries are situated was carried out in the study. Monthly basis data collection on water use by each industry and Monitoring of growth was carried out while an observation on any disease symptoms with respect to water management was noted. Water salt concentration changes were observed in areas where slatterns are placed, when bittern is released and due to other environmental changes. Salinity was high in the estuarine system during drought periods but salt concentrations were high in areas where bittern was released to the estuarine system during most parts of the year. Growth problems and disease incidence was recorded during the first half year. Shrimp cultured in areas with slatterns had more growth problems than from other areas. During the latter half year culture was suspended due to the hyper saline condition in the lagoons with the drought. In areas where culture continued, no disease conditions were recorded other than observations on growth retardation, luminescence on shrimp body and low feeding. Algal crashes were reported from some areas. Mass mortality was also recorded from some farms after using probiotics in the ponds. Ammonia levels were high in such ponds but no other cause was identified. Project field activities were concluded in October due to financial problems and only lab analysis continued.

Further monitoring of use of chemicals and probiotics is recommended. The release of bittern directly to the estuarine system should be stopped and it could be utilized for some other purpose.

Progress:	Target 100%	Achieved 75%
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Constraints:

Work was affected due to not receiving necessary equipment and during the latter part of the year due to unavailability of funds.

Project 4.7.2 : Quantitative and Qualitative study of *Vibrio* communities found In pond culture system of tiger shrimp in Sri Lanka.

Sampling and data collection was carried out from the shrimp farms in Chilaw and Puttalam area. Bacteriological analysis was carried out for the collected samples. Species confirmation using PCR techniques. Carry out antibiotic sensitivity test for identified pathogenic species. Water quality of the pond water was analyzed when required.

Nearly 90 samples (Water and diseased shrimps) were collected during study period.

Around 53 *Vibrio* species were isolated from collected sample. *Vibrio* counts were increased with increasing salinity. Luminous disease was observed in the shrimp ponds in June with high salinity in Watawana and Pulichchikulam area of Puttalam District.

V.parahaemolyticus was identified as most commonly found *vibrio* species in studied ponds. Antibiotic assay showed that all *vibrio* isolates have gain resistance for the all antibiotics tested. Comparing the outcome of earlier studies shrimp farms showed the richest source for the antibiotic resistant bacteria.

Progress (%): Physical: 98 %

Financial: 100%

Constraints:

Delay of purchasing chemicals.

Project 4.8.: Growth responses and immune assurance to *Aeromonas* bacteria of juvenile Common carp (Food fish) *Cyprinus carpio* fed a prepared ration augment with different levels of *tocopheryl* acetate through enrichment.

Main objective of the project was to introduce a good quality feed for common carp fish farmers with disease resistance. Fish feeds were prepared and enrichment with experimental media. Four feed experiment trials were conducted each with three replicates. *Aeromonas hydrophila* bacteria culture was isolated. At the end of the feed experiment, experimental fishes were exposed to pathogenic bacteria and immunity tests were carried out.

Experimental results indicate that, Enrichment with tocopheryl acetate is more effective for the fish growth than un-enriched feed. Also enriched feed fed fishes are more resistant to pathogenic *Aeromonas* bacteria. Enrichment with 4 mg tocopheryl acetate is more effective than using 2 mg doze.

Progress (%)

Physical - 98%

Financial: 101

Constraints:

Growth/ feed trial experiments had to be delayed until purchasing proper sized fish fingerlings for the experiment.

Project 4.8 and 4.4 : Development of Economical Feasible Feeds for Ornamental and Food fish Species.

Six feeds were prepared for the ornamental fish using local feed ingredients. Imported fish meal and Soybean meal were used as protein providing materials.

1. For all juvenile species (2 feeds) tested in ornamental section at head office, NARA
2. For Molly brood-stock (2 feeds) - tested in Rekawa regional center's ornamental fish breeding and rearing section
3. For Koi carp (2 feeds) - Tested in ornamental fish section at Head Office, NARA
4. Three feeds were prepared a using
 - I. wasted shrimp shell as sole protein provider
 - II. mixing with imported fishmeal and
 - III. mixing with soybean meal. These feed were tested with Gold Fish.



5. Previously formulated (in 2011) fish feed (for Fighter fish) was tested with 04 out grow farmers. The problem of the feed was suitable particle size for juvenile fish. Four particle sizes (No. 0, 1, 2 & 3) were separated through last year tested feed for Fighter fish and provided to out growers.

The used fish species have shown considerable growth performance with these feeds.

Growth of Gold fish is not significantly different in prepared feeds and in commercial feed. 2 prepared feeds have shown bright colours. Accordingly wasted shrimp shell could be incorporated for fish feed.

Progress: Physical - 98%

Financial: 101

Constrains

Lack of Lab facilities for feed analysis and lack of Balances for weighing are main constrains

Project 4.9: Environmental monitoring and grouper culture of Negombo lagoon

Component 1

The composition, abundance and distribution of zooplankton were investigated in relation to some physico-chemical parameters of the six sampling sites (Madabokka, Dandugam Oya, Hamilton canal, Dungalpitiya, Munnakkaraya and Pitipana veediya) where represent various pollution inputs with monthly intervals from January to October 2012. Relatively higher amount of nutrient especially phosphate concentration and pollution indicator organisms such as rotifers showed that organic pollution in several locations of the estuary. This is further evident that distribution patterns of zooplankton are often influenced by environmental factors, and their spatial and temporal distributions are obviously influenced by anthropogenic activities and hydrodynamic processes in the estuary.



Component 2

Grouper culture is widespread in Asia and the Pacific almost totally on wild-caught fry and fingerlings for stocking. The proposed project is introduced for collecting grouper fingerlings and culture in net cages as a supplementary livelihood activity for fisher folk around Negombo Lagoon. Objectives of the project is enhance food security and reduce poverty alleviation in coastal communities will benefit greatly from the supplementary income generated and also promotion of sustainable management and optimal utilization of aquatic resources. According to the last sampling date mean final fish weight and mean final fish length were determined as 905 ± 343 g and 38.77 ± 5.51 cm, 302 ± 215 g and 29.5 ± 5.7 cm and 421.39 ± 153.49 g and 31.11 ± 3.18 cm in Pitipana, Basiyawatta and Katunayake respectively. Results of the present study highest daily weight gain was recorded in Pitipana (2.57g/day) followed by 1.16g/day in Katunayake and 0.8g/day in Basiyawatta. Low salinity in the Katunayake area would be negatively affected for the Grouper culture in the location. However physico-chemical properties of Pitipana are the optimum for coastal aquaculture in Negombo lagoon. Therefore highest daily weight gain was occurred in Pitipana due to better water circulation.

Progress (%):

Physical: 100 %

Financial: 100%

Project 4.10: Development of breeding, culture and management of disease outbreaks of ornamental fish industry in southern province with community participation

The project aim was to enhance the income generating sources for the poor community in southern region while upgrading the knowledge of breeding culture as well as identification of disease conditions and treatments for common diseases of fish for the local community. For fulfilling the aim some breeders were selected in three districts, Galle, Matara and Hambantota and water quality and disease occurrence in their ponds were monitored monthly basis. Instructed given for the treatment of identified diseases of farmers. According to the survey it was found that more than 50 farmers engaged in ornamental industry in the region. Most of them are collecting fish from outside farmers and less than 25 framers are conducting breeding and outgrow systems. They have good demand for their fish in the industry. Diseases are the major problem and diseases spread by the fish purchased from outside farmers. Mostly encountered parasites are, Dactylogyrus, Gyrodactilus and Trichodina. Dropsy condition severs in angle fish.

Progress : Physical: 85 %

Financial: 98%

Constraints:

Difficulties for purchasing chemicals for required period.
Lack of disease diagnostic facility in Rekawa

Project 4.11: Utilization of minor cyprinid-based fish feeds for production of fingerling of Chinese and Indian carps

The project was planned to use un-tapped fishery resources in reservoirs to produce fish feeds for production of fingerlings of Chinese and Indian carps and to introduce low cost minor cyprinid-based fish feeds. Fish feeding trials were conducted using minor cyprinid-based and market fish meal-based fish feeds by stoking the fingerlings in selected ponds.

The water quality parameters in experiment ponds were within the suitable ranges for carp culture. The growth performance data indicate that the fish fed with diet having minor cyprinid fish meal as protein ingredient reflected best growth in terms of weight gain (199.6%) with the specific growth rate being 3.42% of the fish. The lowest weight gain (92.09%) and specific growth rate (2.04%) were recorded for the diet use by the farmer.

Progress: Physical - 90%

Financial - 98%

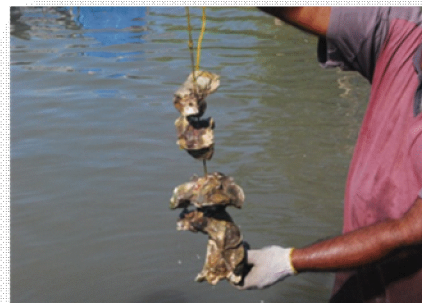
Constraints:

Unable to start experimental fish feeding trials in May 2012 as planned, as NAQDA was not in a position to provide required pond facilities for feeding trials (However able to

start experimental fish feeding trials in August 2012 by selecting ponds in community-based fingerling production farm at Sooriya Wewa).
Absent of proper feed processing facilities and feed testing facilities at NARA

Project 4.11: Designing the Aquaculture Development Plan for Northern and North Western Province, Sri Lanka (KOICA project, Sri Lanka)

Main aim of the project was to design the sustainable aquaculture development and management plan for Mannar district in the Northern Province and Puttalam district in the North Western Province. Major aquaculture commodities studied in the project were oyster culture, mud crab culture and introduction of alternative species for the abandoned shrimp farms. Acquired the new technology on oyster culture and other aquaculture practices at the training of Mari culture technician course in Korea. Estimation of standing stocks, mapping and stock assessment of oyster in Mannar district is being conducted (Marine Biological Resources Division). Study on the efficient spat collectors are carrying out with a view to expand the oyster culture in other suitable areas within and outside the district while investigations are carried out for determination of spat falling seasons, seasonal abundance of oyster larvae and seasonal variation of water quality parameters in the identified locations .Different types of oyster spat collectors were coconut shells, asbestos sheets, discarded clay tiles, discarded tyres and dead oyster shells



Generally higher Spat falling observed in the lower shells in all the collectors except tiles which lay in vertical position. More or less similar density of the spats was observed in asbestos, oyster shells and tiles while spat falling in coconut shells were comparatively low. Hence clay tiles and the oyster shells can be recommended as eco friendly materials. Peak spat falling season was not confirmed in the study although the highest spat falling was observed in May (after the rainy period). The study will be continued for the next year in order to get the finding.

An attempt was taken to carry out artificial breeding of mud crabs at Kalpitiya Regional Research Center of National Aquatic Resources Research and Development Agency (NARA). Four successful breeding trials have been carried out from July to October 2012 by producing approximately 15 million eggs.

The draft management plan was presented in the final workshop held at Colombo in November 2012 and follow-up activities are suggested and the MOU to be signed with the Korean Maritime Institute and NARA.

Progress: Physical - 90% Financial -99%

Project proposals for funding:

1. Upgrading of Rekawa RRC
2. Sea cucumber breeding and culture in Killinochchi for JICA funding
3. Marine Aquatic Resources research and aquaculture development for KOICA funding
4. Fish feed development for NORAD funding

Served as National Committees

1. National Committee on Livestock, fisheries and aquaculture, under Sri Lanka Council for Agricultural Research Policy
2. National Committee on Research Programmes and Projects under Sri Lanka Council for Agricultural Research Policy
3. National Committee on Aquarium fish industry under Export Development Board
4. Task force for ornamental fish culture development under Ministry of Economic Development

Knowledge transferring/ Extension work:

1. On the request made by Assistant Director of Fisheries in Mannar District, NARA officials conducted a workshop in Mannar District Fisheries Office on 08th August 2012 to aware sea cucumber collectors, processors and exporters on the present status of sea cucumber resources in this area and culture related activities. This workshop was mainly addressed the issues and problems related to sandfish (*Holothuria scabra*) fattening programmes conducted in this area and instructions and guidance were provided to overcome these problems.
2. On the request made by Divisional Secretary in Chilaw, NARA Officials conducted a workshop in Chilaw Divisional Secretariat office on 17th August 2012

to aware fishermen and interesting parties on sea cucumber culture and related activities. This programme was mainly linked with "Divinaguma" National programme conducted by the Divisional Secretariat Office in Chilaw and NARA officials provided necessary information and guidance to interesting parties on sandfish (*Holothuria scabra*) breeding and culture.

3. On the request made by Wing Commander Harsha Pinnagoda, Commanding Officer of Sri Lankan Air Force Station in Mallativu, NARA officials visited to Mullativu area from 21st to 23rd August 2012 to find out the possibility of culturing sea cucumbers in Nandikadal lagoon.
4. Seaweed culture nursery management is being conducted in the Northern and Southern coasts of Sri Lanka with community participation.
5. Participation in hatchery grading activities of NAQDA
6. Participation in curriculum development workshop of Wayamba university
7. Acquired knowledge on successful breeding, culturing and rearing of the ornamental fishes was transferred to public through courses/workshops conducted from time to time.
8. Provided information and instructions for ornamental fish farmers on their request.
9. Trained animal quarantine and custom officers for proper identification on export and imported prohibited fishes species.
10. Ornamental fish/aquatic plant breeding/propagation and management" for the training programs on ornamental fish breeding and culture.
11. Provided information and instructions to the ornamental fish farmers on fish diseases on their request.
12. Work on investigations on sudden fish kills. 6 investigations were carried out and reports were submitted.
13. Two days training programme on fish feeding, feed management and feed formulation for the Ornamental fish farmers in Hambantota District
14. Investigate the suitability of abandoned paddy field for fish culture in Beruwala, Boossa and Koggala
15. Analyzed disease fish samples and recommended treatments for the disease fish submitted by fish culturists (14 samples).
16. Three day training on Ornamental fish breeding, culture and Disease mgt. held on 10th March 2011 in AGA office Horana
17. Training programme on Ornamental fish breeding, culture and Disease mgt. Organize by Chamber of commerce, Monaragala on 25th Oct. 2011.

18. Deliver the lecture on “Threats for Mangrove” for the government officers on 23rd Nov. 2011 organized by MPPA.
19. Deliver the lecture on Mangrove ecosystem for school teachers in Tangalle Educational zone on 27th Nov.2011.

Other Communications:

1. Short interview on artificial breeding of sandfish (*Holothuria scabra*) and possible grow out systems for commercial culture was telecasted in Rupavahini Sinhala and English News on 31st March 2012.
2. Short interview for the use of abandon shrimp farm for sandfish culture was given to Lankadeepa newspaper on 31st May 2012 (page 16).
3. Short interview for the sandfish culture as a source of foreign exchange earning was given to Lankadeepa (Sunday) newspaper on 05th August 2012.
4. Short interview on artificial breeding of sea apple cucumber (*Pseudocolochirus violaceus*) and theirs economic importance. “Oruwalla”, monthly news bulletin of Ministry of Fisheries and Aquatic Resources Development, 3rd October 2012.

Publications

Abstracts

1. **Ajith Kumara, P.A.D., J.S. Jayanatha, J. Pushpakumara and D.C.T. Dissanayke** (2012). Artificial breeding and larval rearing of *Pseudocolochirus violaceus* (Sea apple cucumber) in Sri Lanka. Scientific Session: National Aquatic Resources Research and Development Agency (NARA), Colombo 15, Sri Lanka P. 5.
2. **Ajith Kumara, P.A.D., D.C.T. Dissanayke and W. Bandara** (2012). Polyculture of *Holothuria scabra* with *Penaeus monodon* in the northwest coast of Sri Lanka. Scientific Session: National Aquatic Resources Research and Development Agency (NARA), Colombo 15, Sri Lanka P. 6.
3. **Jayanatha J.S. and M.S.M. Fahim** (2012). Broodstock management and larval rearing of *Hippocampus kuda* (Spotted Sea Horse).Scientific Session: National Aquatic Resources Research and Development Agency (NARA), Colombo 15, Sri Lanka P. 20.
4. **Ajith Kumara, P.A.D., J.S. Jayanatha and D.C.T. Dissanayake** (2012). Induced breeding and larval rearing of the sea cucumber *Holothuria scabra*. 18th Annual Scientific Session: Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR), Sri Lanka Foundation Institute, Colombo, Sri Lanka P. 9.
5. **Ariyaratne, M.H.S. and P.A.D. Ajith Kumara** (2012). Sea cucumber (*Holothuria scabra*) spat rearing with sea weed based aqua feed in fiber glass tanks.18th Annual Scientific Session: Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR), Sri Lanka Foundation Institute, Colombo, Sri Lanka P. 23.

6. **Ajith Kumara, P.A.D., J.S. Jayanatha, J. Pushpakumara and D.C.T. Dissanayake** (2012). Research and Development Efforts to Manage Depleted Sea Cucumber Populations in Sri Lanka. YSF Newsletter: 14-16.
7. **M. Gammanpila** (2012). Composition and distribution of zooplankton community in the Negombo estuary in relation to environmental conditions. Proceeding of **annual scientific sessions of** National Aquatic Resources, Research and Development Agency.
8. **M. Gammanpila** (2012). Management of Asian Seabass *Lates calcarifer* (Bloch) Broodstock in Net Cages of Negombo Lagoon. Proceeding of annual sessions of National Aquatic Resources, Research and Development Agency.
9. **Heenatigala P P M** (2012). Occurrence of antimicrobial resistance in pathogenic bacteria of aquatic animals associated with aquaculture practices in Sri Lanka. Proceedings of NARA scientific sessions 2012. p. 27.
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11. **Pahalawattaarachchi, V and Pushpakumara, J.** 2012 Analysis of stomach contents of dugongs (*Dugong dugong*) from the coas of Mannar, Sri Lanka. In proceedings of NARA scientific sessions 2012. p. 32.
12. Jayasinhge, P.S. **Pahalawattaarachchi, V.** and K.K.D.S. Ranaweera 2012 Chemical composition of some edible seaweed species available in Sri Lanka. In proceedings of NARA scientific sessions 2012. p. 46.
13. Weerasekara, K.A.W.S., Azmy S.A.M., Hettige, N.D., Wickramarathne, C., Amarathunga A.A.D., **Heenatigala P.P.M** and Rajapakshe, W. (2012) Assessment of Water Quality Status of Aquatic Environment Subjected to Frequent Occurrences of Fish Kill Incidents, Proceedings of the International Symposium on Water Quality and Human Health: Challenges Ahead, Post Graduate institute of Science, University of Peradeniya, Sri Lanka: p 50.
14. **Shirantha, R. R. A. R. and H. M. P. Kithsiri.** 2012 Socio-ecological dimensions on *Labeo fisheri* in Mahaweli middle catchments in Sri Lanka; an endemic fish species of enigmatic population decline, In: *The proceeding of OMIC group International Symposium on "Biodiversity and energy development"*, 14-16 September, Hyderabad, India, Abstract 54p.
15. **Epasighe S, Kithsiri H. M. P.** and S.T. Waaage 2012 Recent study on spawning success of *Pangasis shucie* (Thailand Cat fish) in Sri Lanka using OvaprimTM. In: *Proceeding of the Annual Sessions of the NARA*, 5th December, NARA Auditorium, Colombo, Sri Lanka, Abstract p 03.

16. Yalineee, M, Jayamanna S.C., **Pahalawattaarachchi** 2012 Optimization of available agar processing methodologies of *Gracilaria verucosa* in Kinniya.Porc/ Research symposium of Uva Wellassa University Nov. 22-23.
17. Thilakarathne, W.M.N. , **Pahalawattaarachchi, V.** and Jayamanne S.C. 2012 Development of liquid fertilizer from Brown Seaweed-Sargassum sp Porc/ Research symposium of Uva Wellassa University Nov. 22-23.
18. Ganesalingam Z., Jayamanne, S.C. and **Pahalawattaarachchi, V.** 2012 A comparative study on Culture of *Kappaphycus alvarezii* using cage culture and monocline culture in Kiranchi Bay, Killinochchi Porc/ Research symposium of Uva Wellassa University Nov. 22-23.
19. Jayasinghe P.S., Ranaweera K.K.D.N. and **Pahalawattaarachchi** 2012 Extraction of characterization of alginate from brown seaweed from South West coast of Sri Lanka. 18th Annual Scientific Session: Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR), Sri Lanka Foundation Institute, Colombo, Sri Lanka P.
20. **Parakrama, M. G. I. S.** 2012 “Two species Poly culture trial of *Macrobrachium rosenbergii* with Common carps (*Cyprinus carpio*), Rohu (*Labeo rohita*) and Tilapia (*Tilapia nilotica*) – Experience from a small scale field trial in Western Province” Abstract published (page 37) in the Proceedings of the eighteenth annual sessions of the **Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR) 17th and 18th May 2012, Auditorium of Sri Lanka Foundation Institute, Colombo 07.**
21. **Parakarma. M.G.I.S.,** K.D. Rawat, G. Venkateshwarlu and A.K. Reddy **2012** “Enhancing the fatty acid profile of comparatively low nutritive live feed *Moina micrura*, using a lipid emulsion rich in highly unsaturated fatty acids” Proceedings in the Conference on “**AQUA 2012 Symposium**” organized by **World Aquaculture Society, Prague, Czech Republic Abstract no. 242**
22. **Parakrama, M. G. I. S. , H. M. P. Kithsiri and G.R.H.Rupika** 2012 “Effect of lipid enriched commercial diets on the growth of *Astronotus ocellatus* fingerlings” In: *Proceeding of the Annual Sessions of the NARA*, 5th December, NARA Auditorium, Colombo , Sri Lanka, Abstract p 21.
23. Weerasekara, K.A.W.S., A.M.Azmy, Hettige, N.D.,Wikramaratne,C., Amarathunga, A.A.D., Heenetigala, P.P.M. and **W.Rajapakshe** (2012).Assessment of Water quality status of Aquatic environment subjected to frequent Occurrence of fish kill incidents. Proceeding of International Symposium on Urban Lake monitoring and Management, Post Graduate Institute of Science, University of Peradeniya, 18th May 2012

Full papers

1. Weerasekara K.A.W.S., Azmy S.A.M., Hettige, N.D., Wickramarathne, C., Amarathunga A.A.D., **Heenatigala P.P.M** and Rajapakshe, W. (2012) Assessment of causes for Frequent Occurrences of Fish Kill Incidents of Sri Lanka with special references to water quality, Proceedings of an International Symposium on Urban Lake Monitoring And Management, Department of Agricultural engineering, Faculty of Agriculture, University of Peradeniya, Sri Lanka, p. 145 – 151
2. **Parakarma, M.G.I.S.**, Rawat, K.D., Venkateshwarlu, G. and Reddy, A.K. Effect of dietary supplementation of tocoferol acetate alone and with varying combinations on growth, survival and fatty acids profile of *Macrobrachium rosenbergii* larvae through *Moina micrura* enrichment. J. Indian Fish Assoc., 36: pp 9 – 20, 2009. (Journal printed in 2012)
3. **Kithsiri, H.M.P.** and Venkateshwaralu 2010 (Journal printed in 2012) Changes in fatty acid profiles during maturation and fatty acid composition of eggs and embryos of feamale guppy *Poecelia reticulata* (Peters) fed on different diets. Journal of National Aquatic Resources Research and Develpomwnt Agency of Sri Lanka, vol 40 pp1-20.
4. **Pahalawattaarachchi, V.**, Purushothaman C. S and Vennila A. 2012 Metal status in water in mangrove ecosystem of Marashtra coast, Indiak *Indian J Geo Mar Sci* 41(4),359-368.
5. **Rajapakshe, A.D.W.R.**, K.Pani Prasad, S.C.Mukharjee, K.Kundan kumar, R.K. Brahmachari, C.T.Meena and N.Kumar (2012). In vitro Sensitivity of Three bacterial pathogens of Koi Carp (*Cyprinus carpio* L.) to certain antibiotics. Journal of Agricultural Science and Technology. B2 93 – 98.

Reports

1. Inspection of fish kill in “Arugambe lagoon” (2012).
2. Inspection of fish kill in “Dehiaththa kandiya” (2012).
3. Inspections of fish kill in “Girandurukotte” (2012).
4. Inspection of fish kill in “Silli ella - Beruwela” (2012).
5. Inspections of fish kill in “Rekawa” (2012).
6. Inspection of fish kill in “Bolgoda lake - Moratuwa” (2012).
7. Report on “ Preparation of Aquaculture management plan for North and North Western Province submitted to KOICA
8. Feasibility report on Aquaculture in Seychelles islands

9. Reports on ecological assessment of Kokilai lagoon on fisheries and other ecological resources to project coordinator of the Kolilai consultancy.
10. Rapid survey report on the site suitability for aquaculture propagation activities in newly created upper Kotmale reservoir
11. Report on “Preliminary study on octopus resource in Sri Lanka” Submitted to KOIKA.
12. Report on development projects conducted by NARA for Northern and Eastern provinces in Sri Lanka submitted to the Ministry of Fisheries
13. Report on “Import statistics of commercial fish feed and the status, utilization and problems of using homemade fish feed in Sri Lanka” January, 2012.
14. Report on the suitability of abandoned paddy field for fish culture in Beruwala, Boossa and Koggala
15. Report on the pollution condition and aquaculture possibilities in Silliya Ela polluted water body in Beruwala
16. Report Octopus resources in Sri Lanka
17. User conflicts of small scale fishery in Mannar lagoon requested by Divisional secretariat Mannar
18. Fish kills in Thalan lagoon in Bentota

Books and Booklets

1. Book on live feed for aquaculture (Presented to the Hon. Minister of Fisheries and Aquatic Resources)

Paper Articles submitted

1. Polyculture of fish in homegarden “Amathara aadayamakata gewaththema sidukalaheki bahuropana mathsa wagawa”

Poster presentations

1. Two posters on Carp culture and Discus culture prepared for the “MINVISITHURU EXHIBITION” held at Convention hall, Colombo, 2012
2. Five posters (on endemic fishes, endemic *Cryptocoryne* plant species, Gold fish varieties, discus varieties, bivalves in Sri Lanka and World Sea Horse) designed and printed. The posters were presented to the Hon. Minister of Fisheries and Aquatic Resources

Workshops, seminars and symposiums Attended

1. KOICA workshop
2. Expert Consultation and Stakeholder Workshop on Alternative Strategies on Fingerling Production was held in Colombo on 8th June 2012
3. Dash Board workshop in Kanneliya on 13th and 14th March 2012
4. Workshop on Presentation skills- SLAFAR was conducted on 10th and 11th Mat 2012
5. National committee for livestock fisheries and aquaculture at Council of Agriculture Research Policy (CARP).
6. National committee for national research and project at Council of Agriculture Research Policy (CARP).
7. Expert review workshop on IUCN red listing 2012, Ministry of Environment and Natural Resources, Battaramulla, Sri Lanka.
8. Inspective workshops on Invasive Alien Species, Ministry of Environment and Natural Resources, Sri Lanka.
9. Annual Sessions of the Sri Lanka Association for Fisheries and Aquatic Resources, July, Sri Lanka Foundation Institute, Colombo, Sri Lanka.
10. Expert review workshop on IUCN red listing 2012, Ministry of Environment and Natural Resources, Battharamulla, Sri Lanka.
11. Annual Sessions of the Sri Lanka Association for Fisheries and Aquatic Resources, July, Sri Lanka Foundation Institute, Colombo, Sri Lanka.
12. Participation in workshop on presentation skills development organized by SLAFAR.
13. Workshop on strengthening Quarantine Activities of ornamental fish exports and imports in NAQDA auditorium in 18th Nov. 2011.
14. International conference on the impact of climate change on Agriculture 20th December 2011. Faculty of Agriculture, University of Ruhuna.
15. Training on "project Proposal writing" Organized by SLIDA, Malalasekara Mawatha, Colombo 7 from 08th October – 12th 2012.
16. Workshop on preparing cooperate plan for NARA, on 17th and 18th January 2012 in NAQDA Training center at Kalawewa.
17. The meeting of ornamental fish farmers association organized by NAQDA in Tangalle on 15th 2012.

Trainings offered:

Undergraduate student External Supervision (B.Sc) d for the final year research Project.

1. Wayamba University -01
2. Peradeniya University -01
3. Uva Wellassa University-04
4. Industrial training offered to Wayamba, Jayawardanapura and Uva wellassa universities.
5. Lectures on Fisheries and Aquaculture for the Navy officers
6. Lectures and practical sessions for the students of Open University

Trainings/ workshops / meetings (Overseas)

1. BIMSTEC international training program on “Aquatic plant soilless culture and post harvest technology”2012, August, AFORI. Thailand.
2. Expert consultation meeting on broodstock management and dissemination of improved fish brooders among SAARC countries in March 2012
3. training in India on catfish breeding
4. training in Indonesia on fish breeding
5. Emerging Asian shrimp disease control workshop in Thailand on EMS disease.
6. Mariculture technician course in Korea
7. Scientific writing in Thailand
8. Scientific presentations in Thailand
9. Marine management in China
10. Aquaculture expert meeting in Korea in December
11. Aquaculture study tour in Seychelles in December
12. Work shop on Regional proficiency Testing Programme for Aquatic Disease Laborarories in Asia – Pacific, 25th – 26 th July 2012 in Bangkok, Thailand.

5.5 MARINE BIOLOGICAL RESOURCES DIVISION

Head of the Division: Dr. Sisira Haputhantri (Since 26.11.2012)

Dr. Rekha Maldeniya (01.01.2012 -25.11.2012)

Overview of the year

The Marine Biological Resources Division (MBRD) is responsible for carrying out research towards management, development and conservation of marine living resources. Five treasury funded research projects were carried out by MBRD in 2012. Major research areas focused in 2012 by MBRD include;

- Monitoring and assessment of finfish fisheries which include large pelagic (tuna, shark, billfish, seer fish etc.), small pelagic (sardines, herrings, anchovies, scads etc) and non finfish such as shrimp, lobster and sea cucumber in the coastal and offshore waters.
- Genetic studies with regard to the identification of species/ stocks of selected marine fish
- Studies on marine mammals / stranded marine mammals
- Surveys and stock assessment of edible oyster stocks in Mannar

Apart from the treasury funded projects, MBRD carried out an external funded research project through the financial support of the International Funds for Agriculture Development (IFAD). The major objective of the project was to provide baseline information on the status of demersal finfish resource in Pedro Bank and also to study the usage of bottom longline in catching the resources.

The Head of the MBRD also acts as the National Coordinator (NC) of the Bay of Bengal Large Marine Ecosystem (BOBLME) regional project. All ongoing national activities conducted by Sri Lanka under the above project are coordinated by the National Coordinator of the Project for Sri Lanka. Two project proposals submitted by MBRD in 2012 with the aim of conducting a study on sharks in collaboration with the Department of Fisheries and Aquatic Resources for formulating a National Plan of Action for sharks and conducting a comprehensive research on Indian Mackerel were accepted by the BOBLME project. Accordingly, the activities related to the shark study have been in progress since November 2012 and the research project of Indian Mackerel will be commenced by MBRD in January 2013.

Two Research Officers of MBRD act as the Editor-in-Chief and the Editor of the Journal of National Aquatic Resources Research and Development Agency (NARA Journal). Two Journal volumes (Volume 39 & Volume 40) were printed in 2012.

MBRD attended to a number of activities in advisory and consultative capacities. More importantly, MBRD responded to a number of requests made by the Ministry of Fisheries

and Aquatic Resources Development (MFARD) and Department of Fisheries and Aquatic Resources (DFAR) for providing recommendations to resolve problems on the exploitation of marine fishery resources. MBRD provided technical assistance to DFAR in the preparation of several management plans for a few marine fisheries; in particular export oriented marine species such as sea cucumber. In addition, MBRD largely contributed to the preparation of the Sri Lanka Fisheries Atlas Volume I published in 2012, which contains species composition, spatial and temporal distribution and abundance and fishery performances of the above resources.

On court orders, several fish samples were analysed by MBRD in 2012 to decide the cause of death in order to determine whether the fish samples provided by the police were caught by using explosives. Further, the officials of MBRD appeared in the court in order to provide expert evidence in connection with the above incidents. In addition, officers in the division were very interactive with the fishing community right around the island and also supported the private sector by attending to requests made by them. The division provided facilities and guidance to university students in undertaking industrial training and to school children to carry out their research projects.

The research staff of the MBRD was actively engaged in updating the large pelagic and small pelagic databases, analysing the statistics and preparing research papers on trends and prospects of large and small pelagic fisheries in Sri Lanka, with special reference to further development of Indian Ocean tuna fisheries: Impact of the industrial fishing for developing the fishing industry in the coastal CPCs of the Indian Ocean Tuna Commission (IOTC) with special reference to Sri Lanka has also been studied. In addition, information and statistics with regard to the exploitation of large pelagic fish in 2012 by Sri Lankan fishing crafts has been provided to the MFARD for submitting official statistics to IOTC for the management of tuna and tuna like fish in the Indian Ocean.

In 2012, two Senior Research Officers and one junior Research Officer of MBRD left the services of NARA. Also, one Research Officer of the Division started his PhD study in Spain. A number of qualified officers leaving the division may adversely impact the overall progress of the Division. Therefore, attention has been drawn to strengthen the research staff of the division by filling the vacant positions of the Research Officers.

Projects undertaken

Project	Allocation (Rs. Millions)	Officer responsible	Period	
			From	To
1.1. Monitoring and assessment of finfish (small pelagic, large pelagic and demersal) and non finfish (shell fish, molluscs and sea cucumber) in the coastal and offshore waters	2.14	Dr. R. Maldeniya Dr. S.S.K. Haputhantri Dr. D.C. T. Dissanayake R.P.P.K. Jayasinghe Ms.K.H.K. Bandaranayake	2011	2012

1.4. A Study on Marine Mammals in selected coastal areas of Sri Lanka	0.36	Dr. R. Maldeniya R.P.P.K. Jayasinghe Ms. K.H.K. Bandaranayake Ms. D.G.N. Hasarangi	2011	2012
1.6.1. Molecular identification of selected marine fish and stranded marine mammals	0.45	Ms. D.N. A. Ranmadugla	2010	2012
1.6.2 Genetic study on Indian mackerel stocks of Sri Lanka		Ms. D.R. Herath	2012	2013
4.17 Designing the Aquaculture Development Plan for Northern and North Western Provinces, Sri Lanka (KOICA project conducted by Inland Aquaculture Resources Division of NARA in collaboration with MBRD) (Surveys and stock assessment of edible oyster stocks in Mannar)		Dr. S.S.K. Haputhantri Mr. Mahendra Jayathilaka	2012	2013

Performance

Project 1.1: Monitoring and assessment of finfish and non-fish resources: Large pelagic, small pelagic, shrimps & crabs, lobsters, sea cucumbers in the coastal and offshore waters

Marine finfish and non-fish landings were monitored at fishery harbours and major fish landing sites in the western, southern and the eastern coasts of Sri Lanka. This includes collecting information such as details on fishing operations, recording the quantity of the landings by species and by different fishing vessel-gear combinations, measuring the lengths of key species and reporting the active fishing boats operated. Biological fish samples taken at landing sites were also analysed to study the reproductive biology of a few marine fish species.

The Sri Lankan fishing vessels engaged in multiday fishing mainly target tuna and tuna like species. Tuna resources mainly comprise of Yellowfin tuna (*Thunnus albacares*), Big eye tuna (*Thunnus obsesus*), Skipjack tuna (*Katsuwonus pelamis*), Kawakawa (*Enthynnus affinis*), Frigate tuna (*Auxis thazard*) and Bullet tuna (*Auxis rochei*). But Kawakawa, Frigate tuna and Bullet tuna are mostly confined to coastal waters. Apart from tuna, other large pelagic fish like billfish, pelagic sharks and seer fish are also caught by multiday fishing vessels. The bulk of offshore and deep sea fish production mainly comprises of tuna and tuna-like fish



Skip jackfish catch



Multiday fishing fleet

Sharks and billfish are mostly caught as by catch species in the tuna fishery. The Silky Sharks account for a higher proportion in the shark landings (more than 60% of the total shark landings by weight). Oceanic white tip shark and blue shark are the next dominant species. A higher proportion of billfish which includes three species of marlins, one species of sailfish and one species of sword fish, are landed by small fresh tuna longline vessels (billfish accounts around 20% of the total catch of a fresh tuna longline vessel). However, small fresh tuna longline vessels operate differently (in terms of technology use, targeting market, vessel characteristics and fishing operation pattern etc.) from other fishing crafts engaged in multiday fishing in Sri Lanka.

The small pelagic fish catch is dominated by herrings followed by sardines. These fish are mostly caught by small mesh gillnets (mesh size range: 9/10"- 1.5"). As per the research conducted at the west coast, immature fish are mostly caught during the period from January to April. Matured fish are mostly caught at the night fishing operations from May to September. Among the night catches, matured females (34%) and matured males (19%) were present whereas morning catches comprised of 18% and 16% of matured females and matured males respectively.



Small-mesh gillnet fishing



Small pelagic fish catch

Progress (%): Physical: 95% Financial: 100%

Project 1.4: A Study on Marine Mammals in selected coastal areas of Sri Lanka

Since there are many gaps in understanding of marine mammals in Sri Lanka, it is important to carry out studies on them and thereby provide scientific recommendations for the conservation and management of these species. The main objective of the project was to understand the distribution and migratory patterns of marine mammals using visual surveys and acoustic surveys. In order to cope with the objectives, several surveys were carried out in Mirrissa, Trincomalee and Kalpitiya areas. Surveys were conducted systematically in the selected areas where marine mammal's co-habitants in the region were observed for their sightings and identified them up to species level using standard identification keys (Marine Mammal FAO guide, 1994). GPS locations of the observed species were recorded and the possible visuals were captured. Marine mammal sounds detected in the area were also recorded for further analysis. As a result, *Balaenoptera musculus* (blue whales), *Stenella longirostris* (Spinner dolphins) and *Sousa chinensis* (Indo Pacific humpback dolphins) were identified and vocalization patterns of Indo Pacific humpback dolphins, bottlenose dolphins and spinner dolphins were intensely analyzed. Furthermore, all the large cetaceans, which have been frequently found stranded in the coastal areas of Sri Lanka, were identified up to the species level and if possible, the cause of death. Strandings were most common among the baleen whales/ blue whales followed by sperm whales. All of these recordings are being maintained in a database for further research.



Acoustics and visual surveys in Mirissa



Blue whale stranded in Colombo Harbour - 19/3/2012

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

Project 1.6.1: Molecular identification of selected marine fish and stranded marine mammals

The future status of sharks is an issue of widespread conservation concern due to the fact that sharks can no longer compensate for the immense pressure which the fishing industry puts on their populations with their slow growth, late maturation and limited number of offspring. Despite the importance of assessing shark catch and trade on a species specific basis to detect potential overexploitation of individual species, achieving this goal has proven elusive due to lack of species specific data on the landings and additionally because the available data are often of suspected quality due to uncertainty about species composition of market names used by traders. Therefore, PCR assay utilizing primers based on mitochondrial COI was used for identification of shark species in the Sri Lankan market. Shark samples were collected from Negombo, Chilaw, and Beruwela areas. Reference barcode sequences of ~645 bp were generated for sharks from four families (Lamnidae, Alopiidae, Sphyrnidae, Carcharhinidae). A barcode reference database on nine shark species (bigeye thresher, blue shark, silky shark, scalloped hammerhead shark, Longfin mako, shortfin mako, tiger shark, silver tip shark, sandbar shark) was established. As the amplification of the standard barcode region of tiger shark failed, a control region sequence was amplified using species specific primers. The reference database can be used for identification of market samples when they are brought ashore with their fins detached or when the specimens are difficult to identify using morphometrics.

Partial sequencing of mitochondrial control region was carried out for specimens marine mammal strandings to distinguish specimens that otherwise, could not have been identified using conventional approaches. Total genomic DNA was extracted from the muscle tissue sample taken for DNA analysis to confirm the identity of the specimen. Approximately 550bp fragment of the mt DNA control region was amplified by PCR following standard protocols. Molecular identification of species was done by phylogenetic reconstruction of the sequences using portals GenBank. Three whales stranded in Galle, Mirissa and Panadura were identified as *Balenoptera musculus* (Blue whale).



Sharks in the Negombo fish landing site



Whale carcass beached at Galle

Progress (%): Physical: 98% Financial: 101%

Project 1.6.2: Genetic study on Indian Mackerel stocks of Sri Lanka

There are three species of mackerel belonging to the species *Rastrelliger* (family Scombridae), namely, *Rastrelliger kanagurta* (Indian mackerel), *R. brachysoma* (short mackerel), *R. faughni* (island mackerel) reported from the countries in the Bay of Bengal region, such as Thailand, Malaysia and Indonesia. The *Rastrelliger* species occurring in the catches of the small pelagic fishery of Sri Lanka has been morphologically identified as *R. kanagurta*. The three species show differences in head related variances and the anterior part of the body. As morphometric changes, particularly head related variances can be influenced by environmental conditions, distinguishing species by genetic methods would be a more accurate method of distinguishing the species. A stock identification of the Indian Mackerel caught from the various regions of Sri Lanka has been undertaken and this study is a preliminary investigation concerned with the identification of the species found in Sri Lanka. The identification of management units is essential in the development of management measures for a fishery.

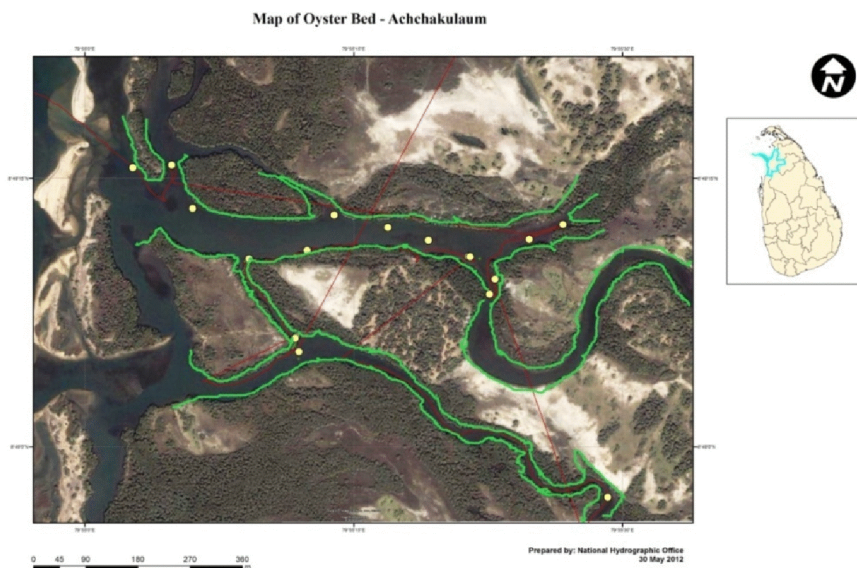
Samples of Indian mackerel were collected from Beruwela, Negombo, Chilaw, Kalpitiya and Trincomalee. Morphometric measurements of the samples were recorded and the DNA was extracted either from the muscle tissue or from fin clips. The mitochondrial COI region was amplified and the approximately 650 bp long PCR products were subsequently sequenced. When compared with the universal database, the sequences matched with *R. kanagurta* with more than 95% similarity. All samples from the different coastal areas of Sri Lanka matching with *R. kanagurta* confirm that the species found in Sri Lanka is *Rastrelliger kanagurta*.



Progress (%): Physical: 98% Financial: 101%

Project 4.17: Designing the Aquaculture Development Plan for North Western Provinces, Sri Lanka (KOICA project)

This project is carried out by Inland Aquatic Resources and Aquaculture Division (IARAD) and MBRD. Activities carried out by MBRD under the project are mainly confined to the surveys and stock assessments of edible oyster stocks in Mannar. The survey of native oyster beds and estimating the standing stocks of native oysters in Mannar district is still in progress. The ongoing resource survey and stock assessment has been focused to two Oyster grounds: Thevanpidi and Achchakulaum in the Mannar District. During the survey, the distribution of the native oyster grounds in Thevanpidi and Achchakulaum were mapped. 1 m × 1 m quadrat was used for assessing the stock at Thevanpidi. Random quadrat samples were taken from each oyster patch and the number of samples to be taken from each patch was determined on the two factors: the extent of the oyster patch and the relative density/ abundance of the live oyster within the patch. Length and weight measurements of the individuals were also taken. The stock assessment in Thevanpidi has now been completed and data analysis and estimating the standing stock is in progress. However, field work in Achchakulaum stock assessment has not yet been started due to bad weather and prevailing high water level on the oysterbed



The map of the oyster grounds in Achchakulaum

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

Externally funded projects

The demersal finfish resource survey was conducted by MBRD to provide baseline information on the status of demersal finfish resource in Pedro Bank and also to study the usage of bottom longline in catching the resources. This was carried out under the project funded by International Funds for Agriculture Development (IFAD). The information will be extremely useful to enhance the marine fish production and also sustainable development of fishery on this less exploited resources base. An exploratory deep-water demersal finfish survey was conducted with community participation. Fishing was done with bottom longline using FRP outboard motor boats. Both gear and vessels were hired with the crew. Exploratory fishing was started at the end of August based on Mullativue and continued the survey for 13 days at a stretch. In the first spell, 27 sampling points were covered. The second spell was started on 21st September 2012, also based on Mullativue but due to operational difficulties, rough sea conditions and long travelling distance, the research team returned to Jaffna after 10 days and operation was abandoned at Point Pedro. During the second spell, 18 sites; 12 from Mullativue and 6 from Point Pedro were sampled.

The most noticeable and interesting observation reported in this preliminary study is the presence of a large stock of *Trachinocephalus myops* belonging to family Synodontidae. There is no such information reported in the previous studies. With the use of bottom longline it was not possible to assess the stock. Therefore, it was decided to conduct limited number of trawl fishing to obtain necessary data to assess the stocks.

Other activities undertaken

1. Printed NARA journal volume 39 and 40.
2. Examined and provided reports on fish samples sent by various high courts for blast fishing.
3. External Supervision (B.Sc): On a request made by the Head Department of Aquaculture and
4. Fisheries, Faculty of livestock, fisheries and nutrition, Wayamba University of Sri Lanka, a letter dated 15th June 2012, Mr. S. Shivanthan, Special degree undergraduate student was supervised for his final year research project.
5. Provided one month of training on “application of molecular biology for identification of marine turtles” for a foreign student from the University of Rostock, Germany for her internship from 13th February to 15th of March 2012.
6. Awareness programme conducted for a group of fishermen from Comoros on the application of biotechnology in fisheries, on a request by NIFNE. January 2012.
7. Carried out an investigation on shell mining in Kakkamunnai lagoon.
8. Carried out an Environmental Impact Assessment (EIA) in Kokilai lagoon.

9. Represented Sri Lanka and presented a country report on coastal and marine fisheries in Sri Lanka at the SAARC conference.
10. Lectures were conducted on the importance of biodiversity and coral reefs for coast guard, Sri Lanka
11. Presentation on fishery resources in Sri Lanka with special reference to identification of fish species for Sri Lanka Standards Institute (SLSI)

Publications

1. Haputhantri S.S.K, (2012) Analysis of billfish landings made by small fresh tuna longline vessels operated from Sri Lanka during 2005 – 2009. IOTC–2012–WPB10–09
2. D.C.T. Dissanayake and G. Stefansson (2012) Habitat preference of sea cucumbers: *Holothuria atra* and *Holothuria edulis* in the coastal waters of Sri Lanka. *Journal of the Marine Biological Association of the United Kingdom*, 92(3): 581 - 590 (ISSN 0025-3154)
3. D.C.T. Dissanayake and G. Stefansson (2012) Present status of the commercial sea cucumber fishery in the coastal waters of Sri Lanka. *Journal of the Marine Biological Association of the United Kingdom*, 92(4): 831-841 (ISSN 0025-3154)
4. D.C.T. Dissanayake and K. Hewapathirana (2012) Sri Lanka National Report. 16th Session of the Scientific Committee meeting of the Indian Ocean Tuna Commission. Mahe, Seychelles.
5. Herath D.R, Ranmadugala D.N.A and Amarakoon, G.U. (2012) Genetic identification of Indian mackerel of Sri Lanka. Proceedings of the National Aquatic Resources Research and Development Agency (NARA) scientific sessions, 4th December 2012, pp. 48.
6. Ranmadugala D.N.A. and Herath D.R. (2012). Mitochondrial DNA as a genetic marker for identification of stranded blue whales. Proceedings of the 18th annual sessions of the Sri Lanka Association for Fisheries and Aquatic Resources, 17th and 18th May, 2012. Auditorium of Sri Lanka Foundation Institute Colombo 07, pp. 30.
7. Ranmadugala D.N.A. and Herath D.R. (2012). Identifying sharks in the Sri Lankan fish landings with DNA barcodes. Proceedings of the 18th sessions of the Sri Lanka Association for Fisheries and Aquatic Resources, 17th and 18th May, 2012. Auditorium of Sri Lanka Foundation Institute Colombo 07, pp. 29.
8. Ranmadugala D.N.A., Herath D.R. and Amarakoon G.U. (2012). The value of mitochondrial gene sequences in species conservation: case studies from the National Aquatic Resources Research and Development Agency (NARA). Proceedings of the National Aquatic Resources Research and Development Agency (NARA) scientific sessions, 4th December, 2012, pp. 49.

9. P.A.D. Ajith Kumara, J.S. Jayanatha and D.C.T. Dissanayake (2012). Induced breeding and larval rearing of the sea cucumber *Holothuria scabra*. 18th Annual Scientific Session: Sri Lanka Association for Fisheries and Aquatic Resources, Sri Lanka Foundation Institute, Colombo, Sri Lanka. (Abstract) P. 9
10. P.A.D. Ajith Kumra, J.S. Jayanatha, J. Pushpkumara and D.C.T. Dissanayke (2012). Artificial breeding and larval rearing of *Pseudocolochirus violaceus* (Sea apple cucumber) in Sri Lanka. Scientific Session: National Aquatic Resources Research and Development Agency (NARA), Colombo, Sri Lanka P.5
11. P.A.D. Ajith Kumra, D.C.T. Dissanayke and W. Bandara (2012). Polyculture of *Holothuria scabra* with *Penaeus monodon* in the northwest coast of Sri Lanka. Scientific Session: National Aquatic Resources Research and Development Agency (NARA), Colombo, Sri Lanka P.6 .
12. Bandaranayake, K.H.K. and Maldeniya, R., (2012) A review on Neritic tuna resources in Sri Lanka, Paper presented at 2nd working party on neritic tunas, Penang, Malaysia, 19-21 November 2012 (IOTC-2012-WPNT02-09).
13. Hasarangi D.G.N., Haputhantri S.S.K, and Maldeniya R., (2012) A Review on Shark Fishery Resources in Sri Lanka, IOTC–2012–WPEB08–15.

Communications

1. Short interview on artificial breeding of sandfish (*Holothuria scabra*) and possible grow out systems for commercial culture was telecasted in Rupavahini English News on 31st March 2012.
2. Short interview for the use of abandon shrimp farm for sandfish culture was given to Lankadeepa newspaper on 21st May 2012 (page 16)
3. Fifteen minutes interview on sea cucumber resource surveys carried out off the northwest and east coasts of Sri Lanka was broadcasted in Sinhala Commercial Service of the Sri Lanka Broadcasting Cooperation on 3rd June 2012 (11.30 – 11.45 am).
4. Fifteen minutes interview on the present status of the sea cucumber fishery in Sri Lanka and it's management was broadcasted in Sinhala Commercial Service of the Sri Lanka Broadcasting Cooperation on 1st July 2012 (11.30 – 11.45 am).
5. Media presentation shown on Rupavahini news on Marine mammal research carried out by NARA- 6th January 2012

Other Reports

1. Ajith Kumara, P.A.D., J.S. Jayanatha, J. Pushpakumara and D.C.T. Dissanayake (2012) Development of artificial breeding and culture techniques for sandfish in Sri Lanka. Sathsamudura: 25-28
2. Ajith Kumara, P.A.D., J.S. Jayanatha, J. Pushpakumara and D.C.T. Dissanayake (2012) Research and Development Efforts to Manage Depleted Sea Cucumber Populations in Sri Lanka. YSF Newsletter: 14-16

Trainings/workshops attended

1. Bay of Bengal Large Marine Ecosystem (BOBLME) project Transboundary Diagnostic Analysis (TDA) confirmation and SAP development meetings held in Phuket, Thailand on 13th - 17th February, 2012
2. Bay of Bengal Large Marine Ecosystem (BOBLME) project partners meeting and annual regional work plan development meeting held in Bangkok, Thailand 28th February-1st March, 2012.
3. SAARC Workshop on Coral Reef Monitoring- Identifying indicators for regional adaptation and resilience, 21st-24th May, 2012; Hikkaduwa, Sri Lanka
4. KOICA Mariculture Training Programme held on 30th May – 10th June, 2012 at Korea.
5. Tenth Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Billfish (WPB) held in Cape Town, South Africa, from 11 to 15 September 2012.
6. Eighth Session of the IOTC Working Party on Ecosystems and Bycatch held in Cape Town, South Africa, from 17–19 September, 2012.
7. Second Session of the Indian Ocean Tuna Commission's (IOTC) Working Party
8. 9th Session of the IOTC compliance committee meeting and 16th session of the IOTC commission meeting from 16th to 27th April 2012 in Fremantle, Australia
9. Fourth APFIC consultative forum meeting and 32nd session of APFIC commission meeting from 16th to 22nd September 2012 in Da Nang, Viet Nam.
10. 16th Session of the IOTC scientific committee meeting from 10th to 15th December 2012 in Mahe, Seychells.
11. Indian mackerel Fisheries Assessment Working group meeting of the BOBLME project from 28th and 29th May 2012, Colombo, Sri Lanka
12. BOBLME stock assessment training course from 31st May to 1st June 2012, Colombo, Sri Lanka

5.6 NATIONAL INSTITUTE OF OCEANOGRAPHY AND MARINE SCIENCES, (NIOMS)

Head of the Division: Dr. K. Arulanathan

Overview of the Year

National Institute of Oceanography and Marine Sciences (NIOMS) strives to intelligently manage our ocean resources to assist the industrial and strategic exploitation of our maritime zones and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs. Thus, NIOMS generates supporting data and knowledge to assist fishing industry and investigate the other available non-living resources within Sri Lanka's EEZ. The division undertakes research and offer advice on environmental impact assessment, planning, selecting suitable sites for coastal constructions such as ports, harbours and coastal protection schemes and other ocean engineering works. Its researches are aimed at predicting climatic changes, including global warming and greenhouse effect, with a view to foresee their impact and assist in desirable planning and devising suitable mitigation measures.

During the 2012, the oceanography division conducted and completed 5 research projects; the projects are aimed at;

- Enhance the understanding of the ocean around Sri Lanka
- Exploration & Quality analysis of non-living ocean resources
- Establishment of current, upwelling, thermocline depth of ocean around Sri Lanka
- Assess, Predict and Plan for potential ocean hazards
- Contribute to the forecast of potential fishing zone, monsoon, extreme weather events
- Generation of satellite imageries to support fishery forecasting
- Geophysical & Geological mapping of continental shelf of Sri Lanka
- Facilitate informed decision making for management of coastal area
- In addition, the division caters for the following national needs
- Ocean Observation and Early Response Centre (24x7), serves as the focal point for the ocean based disasters and maintain permanent sea level station
- Potential Fishing Zone Forecasting Centre, disseminate twice week bulletins of potential fishing zone in ocean waters around Sri Lanka

The staff of the division comprised 20, including Research Officers - 10, Research Assistants – 06, Laboratory attendants 02, Peon 02.

Project 1.4: Identification and localization of marine mammals using passive acoustic monitoring

Objectives:

- To understand the distribution and migratory patterns of marine mammals using visual surveys and acoustic surveys
- To initiate Time Delay of Arrival (TDOA) system for localization of marine mammals
- To prepare a data base on marine mammal stranding recorded around Sri Lankan coasts and preparation dugong skeleton

Outputs:

- Data base for marine mammal sounds (Indo-pacific humpback dolphins, Common, bottle nose dolphins)
Whistle
Click trains
Burst pulse
- Data base on marine mammal stranding
- Preparation of dugong skeleton

Physical Progress: 75% Financial Progress: 100%

Project 1.8: Development of Satellite based fishery forecasting system

Objectives:

- Positioned fishery data collection from tuna (longline/Gillnet) for the improvements of fishery forecasting project
- Satellite data processing and time series analyses of sea surface temperature, chlorophyll, and heights and vertical temperature with catch and effort of tuna fishery
- Awareness creation on fishery forecasting system, new technologies and strategies for fishing operations to offshore fishery sector
- Weekly fish forecast dissemination to increase the economic efficiency of offshore fisheries sector

Outputs:

- Improved capacity for satellite data processing laboratory
- Databases for offshore fishery and oceanographic data
- Enhance the economic efficiency of offshore fishery sector

Physical Progress: 95% Financial Progress: 60%

Project 2.3: Integrated study of Trincomalee Bay and environs including study of Trincomalee River Plume

Objectives:

Trincomalee Bay with adjacent sea in east coast is one of the most important coastal water bodies in Sri Lanka which has greater impact on country's economy, environmental value, and marine navigational purposes. Seasonal changes in water characteristics of the bay is depended on fresh water discharges by Mahaweli river branches (Uppu Aru, Koddigar Aru , Kattu Aru) and Thambalagam bay with agricultural runoff and sediments. Changes in water quality directly affect on aquatic fauna and flora of the bay ecosystem and spread towards adjacent sea as plume. This river plume could influence not only on fish, shrimps, sea urchin, Jelly fish, millions of mollusks, sea weeds, crabs and other microscopic organisms, but also on migratory pattern of marine mammals, (Whales and Dolphins). Annual transportation of sediments with river runoff also governs the current pattern of the bay, primary productivity and habitats of the adjacent coastal structure. Finally, all the economic activities, (Fisheries, Aquaculture and tourism) and environmentally important processes (biodiversity, sand accretion, biogeochemical cycles and physical parameter gradients) based on Trincomalee bay are interfered by river plume.

Trincomalee Bay (156km²) one of the main coastal water body in east coast which has greater impact on country's economy, environmental value, and marine navigational purposes. Especially, Mahaweli River which is 335km long and covers 10450km² of basin area (16% of the total island) opens to the Indian Ocean through Trincomalee bay with all fresh water runoff from agricultural lands and irrigated water ways. Thus, sometimes it creates as plume and affect on aquatic fauna and flora of the bay ecosystem and spread towards adjacent sea. This river plume could influence not only on fish, shrimps, sea urchin, Jelly fish, millions of mollusks, sea weeds, crabs and other microscopic organisms, but also on migratory pattern of marine mammals, (Whales and Dolphins). Annual transportation of sediments with river runoff also governs the current pattern of the bay, primary productivity and habitats of the adjacent coastal structure. Finally, all the economic activities, (Fisheries, Aquaculture and tourism) and environmentally important processes (biodiversity, sand accretion, biogeochemical cycles and physical parameter gradients) based on Trincomalee bay are interfered by river plume.

Physical Progress: 97%

Financial Progress: 130%

Project 5.1: Observation of Oceanographic Conditions for Ocean Based Disaster early warning - OOC

The Ocean Observation Centre (OOC) was established in March 2007. The Centre is working to develop and implement an observing system for monitoring the real time and near real time ocean conditions around Sri Lanka Waters. Main goal is to implement an

end-to-end system with the capability to detect, model, and ultimately forecast changes in the ocean conditions around Sri Lanka Waters.

Objectives

- Early warning and mitigation of ocean based disasters
- Forecasting of physical ocean environmental conditions around Sri Lanka Waters
- Maintains of database for oceanographic and related parameters
- Analysis and providing ocean environmental data and information's to relevant users
- To study impact of climate change on coastal environment through observation and modelling.

Outputs

- Minimizing the ocean based disasters by providing real time information's to DMC etc.
- Maps and images of near real time off shore ocean environmental condition
- Model predictions for various coastal ocean hazards
- Model forecast for physical ocean environmental conditions for fish abundant Zone, weather pattern, etc.

Physical Progress: 95%

Financial Progress: 98%

Project 5.3: Geological and geo- physical exploration

Objectives:

- Investigation of seafloor morphology and sediment characteristics (i.e. occurrence of reliefs, depressions, sedimentary structures etc.).
- Map the distribution of marine sediments
- Side Scan Sonar Surveying specific targets on the seafloor such as shipwrecks, mines sunken objects, etc.

Outputs:

- Detailed sediment distribution map of the sea floor in the study area using bottom sediment samples
- Detail Geomorphologic map of the sea bottom in the study area

Physical Progress: 70%

Financial Progress: 100%

Scientific Papers

Abstracts

1. Arulanathan. K, Circulation system and hydrographic – an introduction to oceanography of Northern Indian Ocean ., Proceeding of the first International conference on oceanography in the Bay of Bengal, 2012
2. Harischandra K.A.D.A.T. and Arulanathan. K., Tropic status of Periya Kalappu Lagoon – a bar built lagoon., National Aquatic Resources Research and Development Agency Scientific Sessions – 2012
3. Jayanthi. M.A.J.C, Arulanathan K.2012. A preliminary study on potentiality of captive breeding of *Holothurians scabra*. Submitted to the Journal of the National Aquatic Resources Research and Development Agency of Sri Lanka.
4. Jayanthi. M.A.J.C., Mallikarachchi, U., and Arulanathan, K.2012. Fattening of sea cucumber as an alternative income generation activity in the Northern Province, Sri Lanka. In: proceedings of the 18th annual sessions: Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR), May 2012, Colombo (abstract).
5. Jayasiri, H. B. Arulanathan K. and Jinadasa S. U. P. (2012), Characterization of bio-physical features in Thalawila fishery ground, Northwestern coast of Sri Lanka, First International Conference of Oceanography in Bay of Bengal
6. Jayathilaka R.M.R.M., K. Arulanthan., Vocalization patterns of Indo-Pacific humpback dolphins (*Sousa chinensis*) in Sri Lanka ,Kalpitiya lagoon, National Aquatic Resources Research and Development Agency Scientific Sessions – 2012.,
7. Jinadasa. S.U.P., Historical evidences of the internal wave generation in the Bay of Bengal, First International Conference of Oceanography in Bay of Bengal
8. Jinadasa. S.U.P., Internal waves and bottom turbulence in the East China sea, NARA scientific session
9. Jinadasa. S.U.P., Integrated geophysical applications for exploration of ship wrecks along the East Coast of Sri Lanka, NARA scientific sessions
10. Jinadasa. S.U.P., Characterization of beach faces using Airborne Lidar Technology, Southern Maine Coastal Area.
11. Lossif Lozovatsky, H.J.S. Fernando, S.U.P. Jinadasa and K. Arulanathan., Internal waves and mixing with emphasis on the East Indian Coastal Current off Sri Lanka., Proceeding of the first International conference on oceanography in the Bay of Bengal, 2012

Full Papers

1. Rajapaksa. J.K., Modeling thermal front using satellite data to locate tuna fishing grounds in the NE Indian Ocean, APRSAF-19, 2012
2. Rajapaksa. J.K., Enhancement of Fishery Forecasting System of Sri Lanka incorporating Satellite Data: Case Study on Yellowfin Tuna (*Thunnus albacores*), PORSEC, 2012
3. Rajapaksa. J.K., Predicting thermal structure of the ocean using satellite data to locate hooking depths of tuna longlines in the northeast Indian Ocean, IOTC, 2012
4. Wijayadewa.A. Preliminary investigation on offshore sand deposits in Negambo, NARA Scientific Session 2012.
5. Jinadasa. S.U.P (2012), Locating of Salt and Fresh Water Interface in Coastal Zones Using 2D Resistivity Imageries *Applied Mechanics and Materials Vols. 212-213 (2012) pp 155-162, Trans Tech Publications, Switzerland doi:10.4028/www.scientific.net*

Full Workshops/ Symosiums/ Meeting

1. Arulanathan. K., DBCP capacity building workshop for the Western Indian Ocean region (Mombassa, 16-20 April 2012)
2. Arulanathan. K., Multidisciplinary Oceanographic Observations for Coastal Zone Management., CSIR-National Institute of Oceanography, Goa, India., September 03 -14, 2012
3. Jayatilake. R.M.R.M., Marine mammal symposium and passive acoustic training programme conducted by CRIOMM-IOMAC, Mount Lavinia Sri Lanka (14-16 th of December 2011)
4. Rajapaksa. J.K., The Space Applications for Environment (SAFE) workshop and the 19th Session of the Asia-Pacific Regional Space Agency Forum (APRSAF-19), Kuala Lumpur, Malaysia, December 11-14, 2012
5. Rajapaksa. J.K., Pan Ocean Remote Sensing Conference (PORSEC), 5-9 November 2012, Kochi, Kerala, India
6. Rajapaksa. J.K., Working Party on Tropical Tunas (WPTT) and India Ocean Tagging Symposium, Indian Ocean Tuna Commission (IOTC), 24th October to 2nd November 2012, Mauritius

Extension Works

Rajapaksa. J.K., Collaborative project “**Modeling ocean frontal zone using satellite and float data to locate tuna fish aggregations in Sri Lankan waters**” technically supported by Japanese Aerospace eXploration Agency (JAXA) through SAFE (Space Agency for Environment) initiative of APRSAF (Asia Pacific Regional Space Agency Forum) was completed and final report was presented at APRSAF-19 meeting held in Malaysia 11-14 December 2012.

Other activities

1. Rajapaksa. J.K., Involved in IOTC CELL meeting participation held in the Ministry of Fisheries and Aquatic Resources for IOTC matters concerned. A proposal is prepared as an alternative management options for the proposed quota allocation proposals submitted by 6 countries.
2. Rajapaksa. J.K., Contributed to the central database management system (CDBMS) established at the Ministry of Fisheries. Meeting participation, technical advices and fisheries data have been provided to the database in the required format to submit to the IOTC.
3. Rajapaksa. J.K., Actively involved in the IOTC-OFCF project for fishery data collection program, Meeting participation as well as a resource person for samplers training program

5.7 INSTITUTE OF POST HARVEST TECHNOLOGY

Head of the division: Dr. Sujeewa Ariyawansa

Overview of the Year

The Institute of Post Harvest Technology (IPHT) has implemented three research projects to fulfill the requirements of the trust area (reduction of post harvest losses and value addition) during the year 2012. In addition to the research programs the division offered several training programmes to the fisher community to disseminate the knowledge in the areas of fish handling and processing.

Several undergraduate/graduate students undertook implant trainings and research programmes under the supervision of the research staff.

The quality control laboratory of IPHT provided test service to the industry. Both microbiological and chemical analysis laboratories have been engaging with expanding the services as per ISO/IEC 17025(2005) quality certification. 955 samples received from the export fishery industry were analyzed and 505 test reports were issued. In 2012 total earnings from the test service were Rs. 5.93 million.

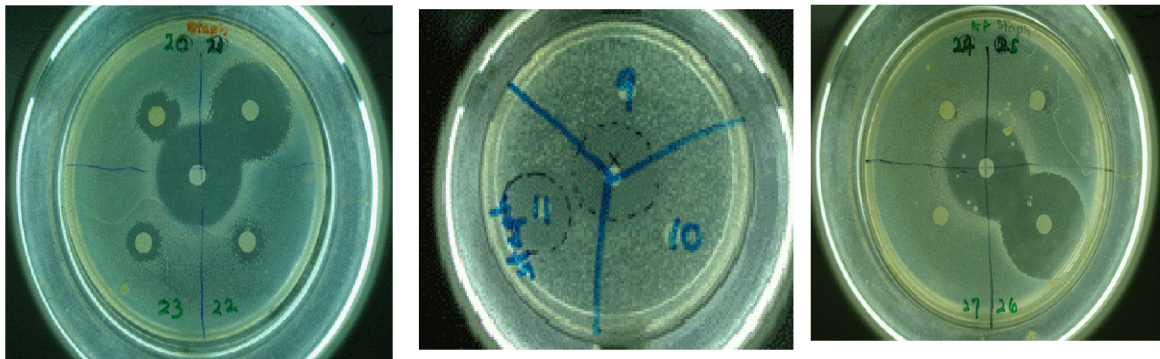
Projects

Trust area	Project	Allocation from Jan-Oct (LKR)	Officer/s Responsible	Period From - To
Reduction of post harvest losses and value addition	3.1 Chemo-taxonomy and bio-diversity of marine sponges and extraction of pharmaceutical extractions from marine organisms	1,274,000	Dr.Ranjith Edirisinghe P. Ginigaddarage S.Ahamed	2010-2012
	3.4 Development of value added fish products and marketable sea weed products from commercially important seaweed species	1,183,000	S. Ariyaratne P.S.Jayasinghe	2010-2013
	3.6 Assessment of the quality of fish catch in fishery harbors and selected fish markets in Sri Lanka	8,820,000	K. Jinadasa Dr.S. Ariyawansa P. Ginigaddarage	2012

Project 3.1: Chemo-taxonomy and bio-diversity of marine sponges and extraction of pharmaceutical extractions from marine organisms

Many marine natural products (secondary metabolites) have interesting biomedical potential, pharmaceutical relevance and diverse applications. The oceans are the unique resources that provide a diverse array of natural products, primarily from invertebrates with unexploited source of potential pharmaceuticals. Marine sponges are rich source of pharmacologically active compounds that can potentially be used as medicines to cure human diseases. The goal of this study was to screen metabolites extracted from marine sponges in Sri Lanka for their antimicrobial, antifungal and antioxidant activities. The samples of sponges (n=19) were collected from sea off Mandathivu, Jaffna and another sixteen samples of sponges were collected from sea off Dehiwala. The antioxidant activity of the 35 sponge samples were investigated by 2, 2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay. The sponge samples were analyzed for antibacterial activity against reference cultures of *Escherichia coli*, *Salmonella* and *Staphylococcus aureus* with chloramphenicol as reference antibiotic by disc diffusion method. The antifungal activity of the samples were analyzed against reference cultures of *Aspergillus niger* ATCC 8739 (American Culture), *Penicillium sp.* and *Fusarium sp.* using disc diffusion method. The crude extracts of five sponge samples collected from Dehiwala and two from Jaffna were showed high antioxidant activity more than 60 %. One of the samples collected from Dehiwala showed the highest antioxidant activity of 91.91% when compared to the standards ascorbic acid and BHT which showed activity of 96.89 and 89.97% respectively. In case of antimicrobial screening, considerable antibacterial activity against *Staphylococcus aureus* was observed in one of the samples collected from Dehiwala and one from Jaffna.





Analysis of Sponges for Antifungal Activity

Physical Progress: 100%

Financial Progress:

Project 3.4: Development of value added fish products and marketable sea weed products from commercially important seaweed species

Component 1

1. Comparative study of salting procedures for salted dried Atlantic herring (*Clupea harengus*) (Conducted during participating to the fisheries training programme in Iceland)

The study was conducted to compare the effect of brining step before dry salting with single dry salting method on; rate of salt penetration in to fish muscle during salting procedures, effects on water and water activity of fish fillets, effect on protein in fish muscle and effect on final yield and quality. Trials were conducted using different salting procedures (brine and brine +dry salting). Samples were analyzed for weight changes, physical, chemical and sensory properties. It was found that brining increases the final yield of product and sensory quality of final product were same in both products.

2. Topic- Assessment of the effect of salting and salted drying on the quality and yield of Talang Queen (*Scomberoides commersonianus*) fish fillets

The study was conducted to find out the effect of salting and salted drying on; rate of salt penetration in to fish muscle during salting procedures, effects on water and water activity of fish fillets, effect on protein in fish muscle and effect on final yield and quality. Trials were conducted using traditional salting procedure and heavy salting procedure. Samples were analyzed for weight changes, physical, chemical and sensory properties. It was found that heavy salting increased the final yield of product by 25% and sensory quality of final product was better in heavy salted fish fillets.

Component 2 Development of value added marketable products from commercially important seaweed species

1. Effect of seaweed liquid fertilizer on plant growth

Seaweed contains trace elements and plant growth hormones required by plants. The present study was conducted to investigate the effect of seaweed liquid fertilizer (SLF) prepared from *Sargassum wighitt*, *Ulva lactuca*, and *Gracilaria edulis*.

The collected seaweed were washed with seawater initially to remove macroscopic epiphytes and sand particles and finally with fresh water to remove adhering salt. They were shade dried for four days followed by oven dry at 60°C for 12h. Then the materials were crushed and made as coarse powder. This was added with chilled water in ratio of 1:20 (w/v) and autoclaved at 121°C, 15 lb/sq inch for 30 minutes. Trials were conducted at NARA for vegetable seeds. The three fertilizer bases were poured into the plastic pots (Hyponex liquid media). Then the germinated vegetable seeds were placed in the wrapped muslin clothes. Then net pots were hanged to dipping in the under mention recommended fertilizer ratios. The pots were allowed to shade growth parameters were measured in two days intervals. The physical and growth parameters such as plant height, fresh weight, dry weight, leaf development, root height, third young leaf were recorded. The N,P,K content of three fertilizer bases were measured using powder pillow method at initially and end of the experiment. The chemical parameters, protein, Carbohydrate and Chlorophylls were estimated according to Anon 1949. The total protein and total lipid content were found maximum at the conditions. The accumulation of total protein, Carbohydrate and lipid content also found maximum due to the application of 30% SLF. Number of branched and leaf area of third young leaf (cm) were also showed higher value when the plants received with 30% SLF. The plants applied with 20% SLF plus recommended rate of chemical fertilizer exhibited maximum values of different parameters except leaf area. Among treatments, plants that received with 30% SLF plus recommended rate of chemical fertilizer exhibited maximum yield of 4.0kg fresh weight plot against 3.6kg/pot recorded in 100% recommended rate of chemical fertilizer. The plants that received only with SLF always showed less yield when compared to the plants received with 100% recommended rate of chemical fertilizers. This indicates that the amount of micronutrients in the SLF could not able to meet the demand of the crop. Whereas, the plants that received with 30% SLF plus recommended rate of chemical fertilizer showed the maximum growth.

2. Compare the chemical composition of differently processed liquid seaweed fertilizers

The liquid fertilizers were extracted according to the three different extraction methods. The following species used for extraction of liquid fertilizer; *Sargassum.wighitt*, *Sargassam filipendula*, *Ulva reticulata*, *Ulva lactuca*, *Gracilaria edulis* and *Glacialaria acerosa*. The extracted liquid fertilizer bases were stored in the glass bottles until taking measurements of the following physical-chemical properties of the saturated solution. The liquid fertilizers bases were saturated by dissolution of mixture of different ratio of K,

P and distilled water before analysis of the physical-chemical parameters such as density, pH, electrical conductivity, mineral composition and proximate composition. In addition to seaweed liquid fertilizers bases were used to make necessary adjustments of commercial standards. The seaweed fertilizers bases manufactured by using *Sargassum.wighitt*, *Sargassum filipendula*, *Ulva reticulata*, *Ulva lactuca*, were obtain highest yield in method one is 75%, method two is 80% and method three 70%. The seaweed fertilizers bases manufactured by using *Ulva reticulata* and *Ulva. lactuca*, were obtain highest yield in method 1 is 70%, method 2 is 85% and method 3 75%. The methods two was found as highest yielded process. Apart from that above three different fertilizer bases were stored to measure all above physic-chemical properties and quality parameters, corrosion activity ($\text{kmg/m}^2\text{h}$), Solubility (g/100g), Density (p20,g/cm^3) Conductivity (Ms/cm) and mineral composition according to the AOAC (1984). The best extraction method will be used to measure of the quality parameters and make necessary nutritional and chemical composition adjustments up to standard level of commercial available seaweed base fertilizers. The present findings encourage the application of such seaweed as natural fertilizer in agriculture sector. Among four different seaweed species thus practice of application of ecofriendly seaweed fertilizer from *Sarguassum* sp. may be useful for attaining better germination, root growth and leaf yield

Physical Progress: 100%

Financial Progress:

Project 3.6: Assessment of the quality of fish catches in fishery harbors and selected fish market in Sri Lanka

Raw fish and seafood is a highly perishable commodity and have short lifetime even at refrigeration temperature. This study aims to find out the quality of fish catch by analyzing fish samples from Ceylon Fisheries cooperation outlets, super markets and other fish outlets for chemical and microbiological parameters. This will help to get a clear idea about the quality status of the fish been sold at local markets. Three type of retail outlets were used to take samples; Ceylon Fisheries Co-operation (CFC), Cargill's Food City and Open Market (OM) and five type of fish/seafood samples were collected, yellowfin tuna (YFT), Sailfish (SF), Salaya, Shrimp and cuttlefish. Totally 155 samples (YFT – 37, SF – 36, Salaya – 26, Shrimp- 36, Squids/Cuttlefish- 20) from Peliyagoda central market, Pannala, Anuradapuraya, Tissamaharamaya, Awissawella, Kantale, Yakkala, Meerigama, Hatton, Kandy, Ambalntota, Ratnapura, Bandarawela, Nuwaraeliya, Elpitiya, Galle, Nugegoda, Horana and Ingiriya areas. The Collected samples were tested for microbiological (Aerobic Plate Count (30°C), *E. coli*, *Salmonella*, *Staphylococcus aureus*), chemical (TVB-N, Histamine, Mercury) parameters and tests were carried out at Institute of Post Harvest Technology (IPHT), NARA. The test methods are as follows. All the values were compared with the international standards, chemical parameters based with the European Union (EU/EC) guideline and microbial parameters based with the International Commission on Microbiological Specification for Food (ICMSF) guidance. The majority of samples were in unacceptable condition including all the shrimp samples. Many of the samples were had at least one parameter with exceeding limits; thus, those samples were considered as unaccepted samples.

The summary of the study is given in below (Fig. 1). Many samples were found with high APC and *E. coli* contents.

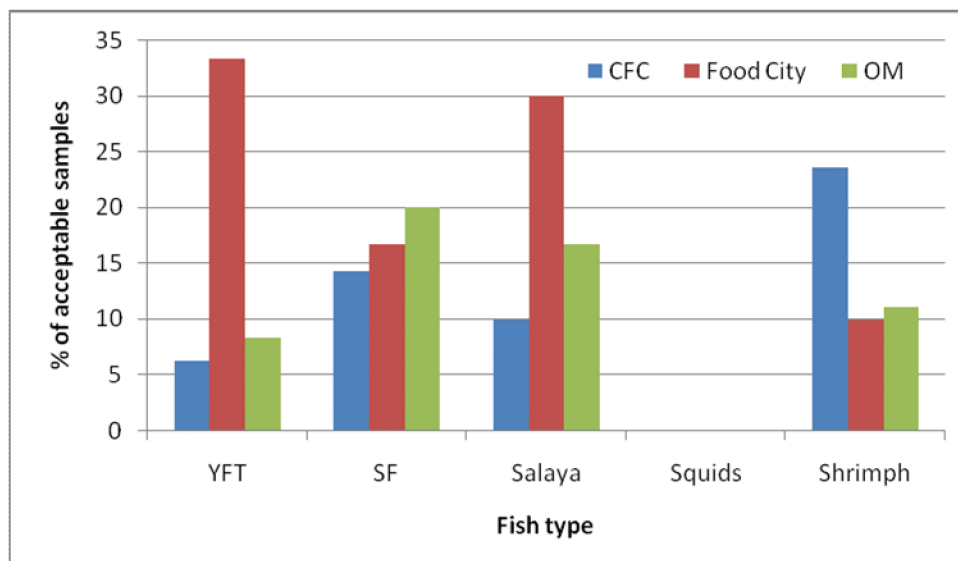


Fig 1: Percentage of acceptable samples in fish outlets

Physical Progress: 100%

Financial Progress:

Budget allocation for project 3.6 for year 2012 was Rs. 1.82 Million. Allocation was increased up to Rs.8.82 Million with the intention of construction of fish stalls in Beruwala. The construction is In process.

Research Publications

1. Norrakiah Abdullah Sani, Sujeewa Ariyawansa, Jamal Khair Hashim and Abdul Salam Babji 2012. The Risk Assessment of *Vibrio parahaemolyticus* in Black Tiger Shrimps (*Penaeus monodon*) in Malaysia. *Food Control* 31 (2013) 546-552.
2. S. Ariyawansa, P. Ginigaddarage and K. Hettiarachchi. An assessment of the effectiveness of cleaning and sanitation practices adopted by five fish processing establishments in Sri Lanka. 4th International symposium Sabaragamuwa University of Sri Lanka 11-12 January, 2013. Pp 3.
3. H.P.E. De Zoysa, P.H. Ginigaddarage, K.W.S. Ariyawansa and I. Wickramasinghe. Sources of faecal contamination of fresh fish harvested by multi-day boats. 4th International symposium Sabaragamuwa University of Sri Lanka 11-12 January, 2013. Pp 8.
4. S.B.N. Ahmad, E.M.R.K.B. Edirisinghe, P.H. Ginigaddarage, A. Rajasuriya and E. Dilip de Silva. Screening for antibacterial, antifungal and antioxidant activities of some local marine sponges. International conference on chemical sciences 20- 22 June 2012.

5. P.H. Ginigaddarage, K.W.S. Ariyawansa and K.S. Hettiarachchi. Sources of bacterial contamination of fresh fish harvested by multi-day boats. NARA scientific sessions 4th December, 2012.
6. S.B.N. Ahmad, E.M.R.K.B. Edirisinghe, P.H. Ginigaddarage, A. Rajasuriya and E. Dilip de Silva. Studies on the biochemical activities of some marine sponges in Sri Lanka. NARA scientific sessions 4th December, 2012.
7. Ariyaratna, D.S., Athauda, A.M.S.C., Ariyawansa, S. and Rajapaksha, N. 2012. Evaluation of shelf life of hot smoked herrings (*Amblygaster sirm*) under different packaging and storage conditions. NARA scientific sessions, 43.
8. Ariyaratna, D.S., Sigurjon, A. and Pórarinsdóttir, K.A., 2012. Effect of brining prior to dry salting on weight yield and quality of salted dried Atlantic herrings (*Clupea harengus*). NARA scientific sessions, 42.
9. B.K.K.K. Jinadasa, E.M.R.K.B. Edirisinghe and I. Wickramasinghe, 2012. Assessment of trace metals levels of main export fish species; Sri Lanka, International conference on chemical sciences-2012 June 20-22, Colombo, Sri Lanka; 67 pp.
10. B.K.K.K. Jinadasa, E.M.R.K.B. Edirisinghe and I. Wickramasinghe, 2012. Mercury in Yellowfintuna, *Thunnus albacares* from waters of Sri Lanka, The first international conference on oceanography in the Bay of Bengal, 2012 Nov. 28 - 29, Colombo, Sri Lanka; 30 pp.
11. B.K.K.K. Jinadasa, I. Wickramasinghe and R.I. Samanthi, 2012. Study on metal concentration of some sea cucumber species in Sri Lanka, International Conference on Fisheries and Marine science 2012 Aug 23-24, Negombo-Sri Lanka; 23 pp.
12. B.K.K.K. Jinadasa and S.B.N. Ahmad, 2012. Evaluation of the concentration of trace metals in the fishing harbors; Sri Lanka, National Aquatic Resources Research & Development Agency, scientific session, 2012 Dec. 04, Colombo, Sri Lanka; 26 pp.
13. S.B.N. Ahmad, B.K.K.K. Jinadasa and E.M.R.K.B. Edirisinghe, 2012. The Nutritional Composition and Fatty acid Profile of Sea Bass (*Lates calcarifer*) in Sri Lanka, National Aquatic Resources Research & Development Agency, scientific session, 2012, Dec. 04, Colombo, Sri Lanka; 41 pp.
14. M.M. Subasinghe, B.K.K.K. Jinadasa and I. Wickramasinghe, 2012. Accumulation of toxic and essential trace metals in four fish species from Anuradapura district, Sri Lanka, First national symposium of "The potential health and environmental impacts of exposure to hazardous natural and man-made chemicals and their proper management", 2012 Nov. 23, Colombo, Sri Lanka; 1-5 pp.
15. B.K.K.K. Jinadasa, E.M.R.K.B. Edirisinghe and S.B.N. Ahmed, 2012. Observations on trace metal concentrations in Yellowfin Tuna (*Thunnus albacores*) and Swordfish (*Xiphias gladius*) of Sri Lanka. 18th Annual Scientific

Sessions of the Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR), 2012 May 17-18, Colombo, Sri Lanka; 41 pp.

16. S.B.N. Ahmad, B.K.K.K. Jinadasa and E.M.R.K.B. Edirisinghe, 2012. Fatty acid compositions of some local sea cucumber species in Sri Lanka, 18th Annual Scientific Sessions of the Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR), 2012 May 17-18, Colombo, Sri Lanka; 40 pp.
17. P.S. Jayasinghe, V. Pahalewattaarachchi, K.K.D. S. Ranaweera. Annual scientific session of Post graduate Faculty in Sri Jayawardanapura 2012 "Evaluation of Post harvest quality of Commercial Important Seaweed species available in Sri Lanka".
18. Jayasinghe P.S., Ranaweera K.K.D.N. and Pahalewatharachi V. Eighteenth annual scientific session of Sri Lanka Association For Fisheries And Resources in 2012 "Extraction and Characterization of alginate from brown seaweed from South West cost of Sri Lanka"
19. P.S. Jayasinghe, V. Pahalewattaarachchi, K.K.D. S. Ranaweera. Chemical Composition of Some Edible Seaweed Species Available in Sri Lanka. Annual scientific session of NARA 2012.

Test Services

The program has been designed to provide certification services in the fields of microbiological and chemical analysis to ensure the quality and safety of the export fishery products intended for human consumption and also for ornamental fish industry. Department of Fisheries & Aquatic Resources is the competent authority for the permitting of export of fishery products from Sri Lanka. Quality control laboratory of NARA has been approved by the competent authority to test samples of fish and fishery products, water, ice etc. (which are to be exported from fish processing establishments).

About 955 samples of exportable fish, fishery products, water (fresh water, sea water, potable water and packing water used for ornamental fish) and ice from the industry were tested and test reports were issued. Quality control laboratory has obtained ISO/IEC 17025 accreditation in 2004 and improved thereafter. Status of accreditation has been maintained. The laboratory was re assessed for the compliance of ISO/IEC 17025 (2005) by the Sri Lanka Accreditation Board and the status of accreditation was extended up to 2015. The scope of accreditation has also been expanded (fresh water, sea water, chilled and frozen fish samples, oyster and canned crabs).

- Number of samples analyzed : 955
- Total earnings : Rs. 5930760.00
- No of test reports issued : 505
- Total number of parameters : 4042

In addition, necessary chemicals and media have been purchased. Laboratory equipment was calibrated by Sri Lanka Standards Institution. Internal audits and management review meetings were carried out.

Training/ Awareness programmers conducted in 2012

Fisher community of different parts of Sri Lanka was trained on good handling practices of fish and fish products processing.

Date / Dates	Institute	Training	Number of participants
19-20/02/2012	World vision -Potuvil	Handling and Fish product processing	35
16-17/05/2012	US AID at NARA	Fish product processing	25
19/06/2012	Sewa Lanka Trincomalie	Handling and Fish product processing	30
24/06/2012	Mahaweli authority Katuwawa	Fish product processing	50
05/09/2012	Department of Fisheries Chilaw	Processing of dried fish	40
13-14/09/2012	Department of Fisheries Negombo	Processing of dried fish	50
08/12/2012	MOFARD and NAQDA Morawewa Trincomalie	Processing of salted dry fish and salted smoke fish	40
09/12/2012	MOFARD and NAQDA Kantale Trincomalie	Processing of salted dry fish and salted smoke fish	40

Staff Trainings

1. Suseema Ariyaratne - Quality of fish handling and processing-Iceland from September 2011-March 2012
2. Suseema Ariyaratne and Kolitha Jinadasa Basic training on SPSS (4 days in July 2012)
3. M.K.Chadrani –Computer training from 9-16 October 2012.

Other Activities of IPHT during 2012

1. Preparation of smoked fish for Dayata Kirula exhibition. Smoked fish was sold to a concessionary price at the exhibition. Other fish based products were displayed at the exhibition.
2. Preparation and fixing of display boards on good handling practices of fish at Mirissa fishery harbor.
3. Attending several meetings on divinaguma programme, advisory committee meeting of export development board, FAO long lining project.
4. Renovation work of IPHT laboratories and fish processing pilot plant has been completed.

5. Kolitha Jinadasa was a resource person for the Mercury workshop- organized by Ministry of Environment - Sep. 5-6.
6. Two project proposals were submitted to NORAD on
 - Improvement of the quality, safety and marketability of fish and fishery products
 - Assessment of heavy metal levels in Sri Lankan marine environment & food products.
7. Two specialists visited NARA from 26 Nov- 4 Dec 2012 to evaluate proposed projects

5.8 SOCIO-ECONOMIC AND MARKETING RESEARCH DIVISION

Head of the Division –Mr K H M L Amaralal

The main functions of the division include social economic and marketing studies in the fishing industry, including the welfare of the fishermen and their dependents, analysis of fish marketing system and its impact on consumers.

Research projects conducted in year 2012

- Fisheries Industry Outlook 2011
- Economic efficiency of marine fishing operations of Sri Lanka
- Fish consumption patterns in the estate sector of Sri Lanka

Activities:

Under the above 03 projects following activities were carried out by the research team of the division.

- Data collection
- Data analysis
- Report writing/annual publications

Programme	Project	Allocation (Rs)	Responsible Officer	Duration
Socio-economic & Marketing	1. Fisheries Industry Outlook 2011 (6.4)	100000.00	M M A S Maheepala & KHML Amaralal	One year
	2. Economic efficiency of marine fishing operations of Sri Lanka (1.12)	452182.00	M M A S Maheepala & KHML Amaralal	One year
	3. Fish consumption patterns in the estate sector of Sri Lanka (1.13)	428319.00	HD Wimalasena & KHML Amaralal	One year

Performance

Project 6.4 : Publication of Fisheries Industry Outlook - 2011

The publication of Fisheries Industry Outlook- 2011 has been completed and published on the NARA website

Project 1.12 : Economically efficiency of marine fishing operations of Sri Lanka

This project was confined to examine efficiency of coastal fishing operations. The data collection covered all fisheries district excluding Northern Province. Data and information enumerated were investment, operational costs, and incomes according craft and gear combinations. It was found out irrespective of craft categories both motorized and non-motorized craft not shown remarkable disparity in efficiency. However, the main factor of efficiency depends on gear combinations used in coastal fishery. Compared to static (stationary) gears, semi-dynamic and dynamic gears showed higher efficiency. Hence it is recommended to use more dynamic gears than static gears in the coastal fishery.

Project 1.13: Fish consumption patterns in the estate sector of Sri Lanka

The aim of this project was to identify fish consumption patterns and barriers in the estate sector of Sri Lanka. The estate sector is the sector which shows the lowest socio-economic indicators compared urban and agricultural sectors. Hence, finding out the fish consumption situation in estate sector provides opportunity to address barriers for fish consumption increase nutritional status of the estate sector. The study was conducted in three districts in Central province namely, Nuwara –Eliya, Kandy and Matale. The major barrier for fish consumption in the estate sector was lack of proper fish distribution channel. In addition, religious believes, higher preference on dried fish, price of fresh fish and availability of limited varieties also influenced the low consumption of fresh fish. Moreover, immovable natures of labour, lack of transportation facilities and weak road net work have a negative impact on fish consumption

Reports

1. Retail marketing of oysters and mussels in Sri Lanka
2. Socio-economic aspects of Kokoilai fishing community
3. The impacts of recent fuel price increase on fishing operations in Sri Lanka
4. Socio-economic impacts assessment of proposed sand extraction for port city development project

Abstract presentations

National

1. H.D.Wimalasena, Amaralal K.H.M.L. and Maheepala M.M.A.S. (2012). Socio-economic Aspects of Kokilai Fishing Community in the Eastern Coast of Sri Lanka. In proceedings of the NARA Scientific Sessions, 04th December, 2012, Colombo, Sri Lanka.
2. M. M.A.S. Maheepala, Amaralal K.H.M.L. and Wimalasena H. D.. (2012). Export destinations of marine fish of Sri Lanka. In proceedings of the NARA Scientific Sessions, 04th December, 2012, Colombo, Sri Lanka.

3. H.D.Wimalasena, Amaralal K.H.M.L. and Maheepala M.M.A.S. (2012). The impacts of recent fuel price increase on fishing operations in Sri Lanka, In proceedings of the International Conference on Fisheries and Marine Sciences 2012, 23-24, August, 2012, Negombo, Sri Lanka.
4. K.H.M.L.Amaralal, Wimalasena, H.D. and Maheepala M.M.A.S. (2012). Unreported fish catch of off shore/ deep sea fishery and its impact on national fish production and per capita fish consumption in Sri Lanka., in proceedings of the International Conference on Fisheries and Marine Sciences 2012, 23-24, August, 2012, Negombo, Sri Lanka.

Trainings

1. Mr. KHML Amaralal, participated in SAP workshop conducted by BOBLEM from 30th 31st May, 2012 in Thailand
2. Mr. HD Wimalasena and Mr. MMAS Maheepala participated in training workshop on 'Effective policy paper writing' conducted by SLIDA from 21st to 25th May, 2012 at Sri Lanka Institute of Development Administration
3. Mr. KHML Amaralal and Mr. MMAS Maheepala, participated in a 5 day training workshop on 'Project Proposal Writing' conducted by SLIDA in, October, 2012 at Sri Lanka Institute of Development Administration.

Other developments:

Two Research Assistants Recruited to the Division

5.9 INFORMATION TECHNOLOGY DIVISION

Head of the Division: Mr. A.B.A.K. Gunaratne

Overview of the Year

Information Technology Division conducts research using Geography Information system (GIS) and Remote Sensing (RS) for resources planning identify suitable areas for aquaculture development and forecasting. GIS technologies applies in the diverse fields and committed to delivering high-quality spatial and attribute data to the internal researches as to allow better decisions to be made based on the best available information. Information Technology Division acts as a store room of spatial data of marine and terrestrial areas. Division is intended to facilitate as a platform to pool all data/information available in respect to aquatic resources, environment and users and develop products for environmental friendly economic development and scientifically based management of aquatic resources/environment.

The mission of the Information Technology Division is to provide the highest quality technology-based services, and support to the organization for its strategic goals and objectives as it applies to research activities and provide effective technology support for audio/visual, multimedia, desktop and web based applications and services.

The Information Technology Division is responsible to provide all aspects of IT and systems implementation for information gathering, processing, sharing and dissemination among all stakeholders for management, conservation and development of aquatic resources. It provides expertise in computing hardware and software support as well as LAN (Local Area Network) and WAN (Wide Area Network) connectivity to the staff and administrative support of computer networks. And also ITD maintains IT contracts and software licenses, and coordinates the procurement of IT related hardware and software.

Activities undertaken

Programme	Project	Allocation (Rs)	Officer Responsible	Period	
				From	To
Promotion of Sustainable aquaculture and inland fisheries production	Preparation of zonal plan for aquaculture development in Eastern Province	7,20,000.00	A.B.A.K. Gunaratne Dilhari Weragodatenna	2012	
Open access to knowledge and dissemination of information	Internet services and online information system	2,581,000.00	A.B.A.K. Gunaratne	2012	
	Production of NARA publication	455,000.00	A.B.A.K. Gunaratne	2012	
	Extension services	1,150,000.00	A.B.A.K. Gunaratne	2012	

Performance

Project 4.16: Preparation of zonal plan for aquaculture development in Eastern Province

Development of various types of aquaculture practices is one of the solutions to increase fish production as well as improve nutritional status and food security of the people. A number of aquaculture technologies are suitable for development in Batticaloa and Trincomalee districts, which are, shrimp farming, seaweed farming, sea cucumber culturing, sea bass culturing, Oyster, grouper, milk fish, crab.

Main objectives of preparing the zoning plan for Eastern Province were, proper management of the coastal zone with the introduction of suitable sites for different aquaculture practices as an environmentally friendly, socially acceptable and market-driven industry, minimize the conflicts between different resource user groups, sustainable use of environmental resources, protect the environment, while allowing the development process to continue in a planned manner, promote local and foreign private sector investments on development of aquaculture and Encourage private sector investors to commence aquaculture projects with community participation.

It was defined buffer zones for the potential aquaculture areas as well as environmental protected areas using spatial analysis tool. And also it was considered bathymetry, land use type, and soil information. Digital Elevation Model (DEM) was prepared as it is essential to illustrate river mouths, wetland and other floodable areas. Digital Elevation Model is required to identify potential areas to be caused for natural disasters. After analyzing the bathymetry, land contours (DEM), land use type, soil, river mouth, wetlands or protected areas, number of potential areas identified for aquaculture and other development activities. Oddamavadi, Thirukkondaiadimadu, Mankerni, Panichchankerni, Pulmoddai, Chenkaladi, Thannnmunai, Vavunatheevu, Arayampathy, Thethattive are the best location for aquaculture development practices in Batticalo Distric.

Progress (%) : Physical : 90% Financial: 95%

Project 6.1: Internet services and online information system

Main objective of the project is to disseminate the information via World Wide Web and to provide other Internet services for scientific staff of NARA and its stakeholder with a view of facilitating information sharing.

Web site and Mail servers were upgraded. Staff engaged with PC assembling, repairing and upgrading, 64 computers were repaired and 10 were upgraded. Software, network and configuration issues resolved day to day. Web page updating was carried out and new web pages were created, total number of web pages updated count was 69 pages and 65 pages were created for the new design. Inform Database that used to evaluate research cost of the institutions engaged in CARP network, was submitted to CARP.

Expected target was achieved during the period.

Progress (%) : Physical : 100 Financial: 100

Project 6.2: Production of NARA publication

Volume 41 of the NARA Journal is ready for printing. All the translations required for annual reports from year 2008 to 2010 were finished

Project 6.3: Extension services

The unit carried out public awareness programs, providing auditorium facilitates, printing services for printing annual report, forms etc. 18 Requests had been received from various institutions to take part their exhibitions. However, only 04 exhibitions could be attended due to financial constraints. 06 educational visits consisting more than 100 students were noted during the year.

Exhibitions

	Exhibition / School	Place	Period
1	Dayeta Kirula	Oyamaduwa	Feb. 04 th to 10 th , 2012
2	Rajatha Mela	Beruwala	Feb. 19 th to 25 th , 2012
3	Future Mind - Nalanda College	BMICH	June 21 st – 24 th 2012
4	Thakshila Maha Vidyalaya	Horana	October .19 th to 25 th , 2011

Progress (%) : Physical : 100 Financial: 100

NARA Annual Scientific Session - 2012

Scientific session was organized and held on 04th December. 53 abstracts have been published after reviewing by the Reviewing Committee

Consultancy Project involved

1. Initial Environmental Examination for the sand exploration project in the Negombo offshore, project implemented by Sri Lanka Ports Authority.
2. Environmental Impact Assessment for the Kokilai Lagoon, Mulative. Project implemented by Sri Lanka Road Development Authority.

Abstract

1. Dilhari Weragodatenna and A.B.A.K. Gunarathne, (2012), Detection of Submerged Seagrass beds using IKONOS, NARA Scientific sessions, 2012, p 61

5.10 LIBRARY AND INFORMATION DIVISION

Head of the Division: B.G.S. Kariyawasam

Overview of the year

The main responsibility of the library and information division is to ensure the information need of the readers engaged in the study and research of aquatic resources through the collecting resources, collection management and dissemination of new information in the field of aquatic resources.

As a special library, it is mainly focused in assisting the subject specialists to access the scientific knowledge disseminated from various information sources so that, they could be motivated in their innovative research studies.

At present, there are two professional librarians at the information division and vacancies exist for two more librarians and a data entry operator (English). Therefore the routine flow of effective services and the development activities of the library are curtailed due to the lack of staff

Activities undertaken

Project	Activities	Allocation	Office Responsible	Period (from-to)
Collection Development of Library Resources	Procurement of books and Journals	3.00	B.G.S. Kariyawasam R.S. Liyanarachchi	Jan– December
	Collecting Research Reports and Papers		B.G.S. Kariyawasam	
	Obtaining Donation		B.G.S. Kariyawasam	
Management of the library	Editing and updating of library catalogue Subject Classification & filing of library resources Conservation and Re-arranged the library collection		B.G.S. Kariyawasam	Jan– December
Information retrieval	Current Awareness Services (CAS)		B.G.S. Kariyawasam R.S. Liyanarachchi	Monthly

	Selective Dissemination of Information Service (SDI) Indexing Services Information Re-packaging programme Exchange Service Compilation of digital collection		B.G.S. Kariyawasam B.G.S. Kariyawasam R.S. Liyanarachchi -Do - B.G.S. Kariyawasam	Jan– December
Publishing Journal & Publicity Service	Distribution of NARA publication Assisting for Publishing NARA journal		B.G.S. Kariyawasam R.S. Liyanarachchi B.G.S. Kariyawasam	Jan – December

Performance

Project 1.1: Acquisition of Library Resources

Subscriptions were made for journals and books were purchased & donations were received.

Statistics of journals and books acquired are given below.

1.1.1. Method of Acquisition

Purchasing, Donating & Exchanging

List of purchased journals, books & Databases is given below

Journals –

1. ICES Journal of Marine Science
2. Journal of Anthropological Research
3. INFOFISH
4. Journal of Aquatic Food Product Technology
5. National Geographic
6. Asian Fisheries Science (Online)

Books – 09

Databases – 05 (JSTOR, EBSCOHOST, AGORA, AQUATIC COMMONS, DOAJ)

1.1.2 Donations

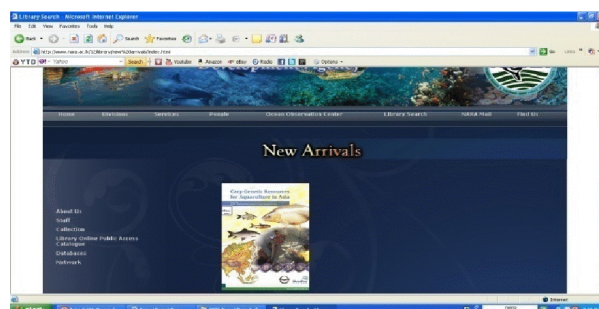
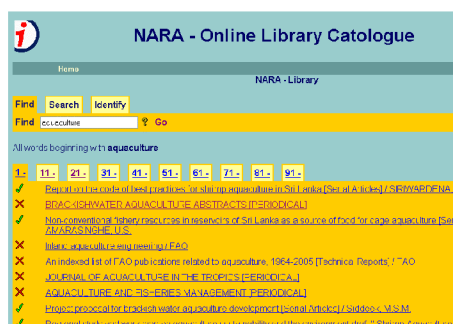
Journals	- 20
Books	- 119
Reports	- 23
Newsletters	- 32
Travel Reports	- 17

Research Reports and Theses

1.1.1 The collection of Sri Lanka, FAO & BOBP Collection, Reference and Lending were re-organized, 38 FAO Research reports, 04 CD ROMs', 01 postgraduate theses, 120 e-articles have been collected.

Project 1.2 Resource Management

Open Public Access Catalogue (OPAC) and Journal Article Index (JAI) database were updated and NARA new arrivals is included to the NARA web.



Project 1.3 Information Retrieval

In order to retrieve from Journal articles, Postgraduate theses, Research Reports, Research articles and Newspaper clippings, IT was used and 05 databases were compiled using WINISIS software. Details of data entry for the year are given below.

Name of the Database	Quantity of Data
Journal Article Index (JAI)	75
These Database	001
Research Reports Index	15

Research Article Index	120
Newspaper Article Index	1003

1.3.2 Electronic Articles database was compiled using GSDL software and collected 102 articles for the database.

1.3.3 Library has provided services for the under postgraduate, scientist and researchers who come from different institutions and universities. Total numbers of users were 166 Publication exchange programme was also carried out with other institutions

1.3.4. Library has jointed for the British Council Membership programme and Cooperate membership Service with ITI library.

1.3.5 has provided photocopy services - the total amount received through photo-coping during the year was Rs. 3123\=

Project 1.4: Library Management

1.4.1 Library conservation work was successfully completed.

1.4.2 Compiled a New Database for Newsletter articles.

1.4.3 Collected newspaper articles in related subjects separately.

1.4.4 Collected related news articles through 'Vidusara' Newspaper too.

Project 1.5: Publication and Publicity Service

1.5.1 Sales of NARA publication were done by the library & the total amount received through sale during the year was Rs. 247,788\=

1.5.2 NARA journal Vol. 40 was published & distributed and Vol. 40 edited 1st proof.

1.5.3 New information was given to update the institutional web page

1.5.4 Assisted to published Abstract of the NARA Scientific Session 2012

Project 6: Training Programme, Workshops & Committee Meetings attended.

Local

1. Committee meeting of special libraries - Organized by SLLA
2. National conference on library & information science - Organized by SLLA
3. Participated the workshop on Access to information –Multimedia materials Organized by SLLA
4. Participated AGRINET meeting at CARP
5. Participated seminar on library skill development programme - Organized by SLFI
6. Participated seminar on research methodology - - Organized by NL
7. 04 members of research staff were participated the Elsevier training programme on Scopus & ScienceDirect

Progress (%)

Physical (100%)

Financial (100%)

6. ANCILLARY SERVICES

6.1 PURCHASING & SUPPLIES UNIT

Head of Division: Ms A.T.P.Kumari De Silva

Introduction

The premier function of the division is to provide all necessary services and supplies in a formal and systematic manner in accordance with procurement guide lines in order to carry out research & development activities of divisions of National Aquatic Resources Research & Development Agency and Regional Research Centers.

Overview of the Division

Purchasing & Supply Division was established with effect from 23/05/2007. The functions and responsibilities of the unit are as follows.

- Supply goods and services relevant to the all divisions
- Handle all tender works
- Procurement works relevant to all divisions
- All insurance matters
- Prepared by payment voucher
- Air freight and clearance of goods
- Administration of main stores
- Auction work relevant to disposal items
- Provide details to all divisions on their requirement

Performance

1. Mainly purchase of equipments & Chemical for ongoing projects, acquisition of spare parts for vehicles and hiring of vehicles are performed by the division according proper tender procedures.
 - The selection of supplies is use of rainbow –pages.
 - Calling of tenders, quotations from local and foreign supplies for goods /equipments /Chemicals following tender procedures as per the given specifications.
 - Purchase of goods for day to day use by utilizing a petty cash imprested and maintain records.
 - For the year 2012, the division has maintained about 089 tenders following the tender procedures.
2. Clearance of goods received as donations, purchase of goods from foreign sources or airfreight of goods for repairs. Take actions where necessary to obtain tax relief when clearance of goods received from foreign sources are done & sending equipments for repair etc.: abroad subject to normal mail & airfreight charges.

3. Insure all vehicles /motor- cycles/equipment of NARA through proper tender procedures. obtain insurance coverage for the personal who perform duty at sea and land.(unsecured areas)
4. Distribution of goods ordered by this Division to respective divisions after updating ledgers in the Main stores.
5. Maintain buffer stocks of consumables in the main stores for day to day requirements of divisions, issue of goods receipt notes, produce documents for payments, submit report to respective divisions when requested are also performed by this Division.
6. To provide a smooth service to the NARA, the staff of the unit has been increased.

6.2 SERVICE AND OPERATION

Head of the Division: Mr N B P Punyadewa (01.01.2012 – 09.10.2012)

Mr C H T Gamage (10.09.2012 – 31.12.2012)

Overview of the Year

Service and Operation Division (S and O) is the supportive division of the institution. S and O division provide and maintain all the services and develop the infra- structure facilities in line with work programs of the institution.

Activities:

In Service and operation division has several activities. They are categorized as follows.

1. Rehabilitation of building , new buildings (under civil supervision)
2. Repair and maintenance of vehicles
3. Maintenance of Air conditioners and electronic appliances
4. Maintenance of electrical wiring of the institute

For the year 2012 below mentioned work has been completed and some activities are continuous.

Project 1: Rehabilitation of building, new building

Some areas of the NARA main building were renovated

1. Driver's rest room
2. IARAD Quarantine Building
3. IARAD Ornamental pond
4. Water Tank balance work completed
5. New building was constructed at Beruwala (Fish Market)

Project 2: Rehabilitation of Vehicles

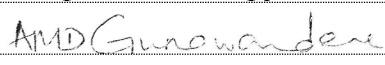


There are 27 Vehicles in NARA fleet and 08 of them fleet taken for rehabilitation during the year. The vehicle under rehabilitation were 58-1012, 251-0577, PA-5262, PB-8107, 61-0012, 50-4415, 61-4803

Project 3: Maintenance of Air conditioners and electronics appliances

The Identified ACs were repaired. The several electronic appliances belongs to the research divisions were repaired.

1. The Generator of the NARA also serviced
2. Control Pillar Replace
3. New wiring system for IARAD Ornamental
4. New installation for Driver's rest room

NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY		
CONSOLIDATED CASH FLOW STATEMENT FOR THE YEAR ENDED 31 ST DECEMBER 2012		
	31.12.2012	31.12.2011
CASH FLOWS FROM OPERATING ACTIVITIES	RS.	RS.
Surplus (Deficit) From Ordinary Activities	(93,909,305.99)	(41,313,222.55)
ADJUSTMENT FOR:		
Depreciation on property, plant and equipment	75,011,504.29	66,665,521.74
Amortization of deferred expenditure	(17,052,270.23)	(18,070,631.33)
Provision for retiring gratuity	10,323,286.37	7,614,942.34
Investment income	(12,609,975.60)	(13,651,102.87)
Non operating expenses	-	1,379,856.00
Gain (loss) on disposal of property plant and equipment		-
Operating profit/ (loss) before working capital changes	(38,236,761.16)	2,625,363.33
WORKING CAPITAL CHANGES		
(Increase)/decrease in inventories	680,927.22	(768,237.67)
(Increase)/decrease in trade & other receivable	12,273,041.31	7,710,133.71
(Increase)/decrease in prepayments	327,279.02	(345,331.38)
Increase/(decrease) in accounts payables	13,263,175.61	(8,663,196.30)
Increase/(decrease) in accrued expenses	38,511,783.67	945,763.03
Cash generated from/(used in) operations	26,819,445.67	1,504,494.72
Retiring gratuity paid	(981,380.99)	(3,814,213.84)
Interest paid		
Net cash generated from / (used in) operating activities	25,838,064.68	(2,309,719.12)
CASH FLOWS FROM INVESTING ACTIVITIES		
Purchase of property plant and equipment	(26,089,372.24)	(57,605,218.72)
Research vessel	(251,924,648.99)	(53,981,577.28)
Capital work in progress	(18,400.00)	(16,427,020.76)
Proceed from sale of property plant & equipments	2,226,601.51	-
Interest on treasury bills & fixed deposits	10,383,374.09	13,651,102.87
Non-operating expenses	-	(1,379,856.00)
Net cash generated from/ (used in) investing activities	(265,422,445.63)	(115,742,569.89)
CASH FLOWS FROM FINANCING ACTIVITIES		
Capital grants received	70,818,774.40	136,296,759.61
Net cash generated from/ (used in) financing activities	70,818,774.40	136,296,759.61
Net increase / (decrease) in cash and cash equivalents During the year	(168,765,606.55)	18,244,470.60
Cash and cash equivalents at the beginning of the year	200,755,932.31	182,511,461.71
Cash and cash equivalents at the end of the year	31,990,325.76	200,755,932.31
Analysis Of Cash & Cash Equivalents At The End Of The Year		
Cash at bank	5,695,435.74	13,568,926.95
Short term investments	26,294,890.02	187,187,005.36
	31,990,325.76	200,755,932.31
The significant accounting policies and notes annexed form an integral part of these financial statements.		

NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY					
STATEMENT OF FINANCIAL POSITION					
AS AT 31ST DECEMBER		2012		2011	
ASSETS	Notes	Rs.	Cts.	Rs.	Cts.
NON-CURRENT ASSETS					
Property, plant and equipment	1 - 2	1,376,638,289		1,106,428,325	
Capital work in progress	3	6,121,975		73,311,022	
		1,382,760,264		1,179,739,347	
CURRENT ASSETS					
Inventories	4	2,320,514		3,001,441	
Trade and other receivables	5	35,257,299		47,530,341	
Prepayments	6	292,511		619,790	
Short term investments	7	26,294,890		187,187,005	
Cash and cash equivalents	8	5,695,436		13,568,927	
		69,860,651		251,907,505	
TOTAL ASSETS		1,452,620,915		1,431,646,852	
EQUITY AND LIABILITIES					
Accumulated funds	9	1,243,899,857		1,190,018,336	
Reserves	10	46,719,598		140,628,904	
		1,290,619,455		1,330,647,239	
NON-CURRENT LIABILITIES					
Deferred income	11	-		115,017	
Provision for gratuity	12	67,767,275		58,425,370	
		67,767,275		58,540,387	
CURRENT LIABILITIES					
Accounts payables	13	29,482,293		16,219,118	
Accrued expenses	14	64,751,891		26,240,108	
		94,234,185		42,459,226	
TOTAL LIABILITIES		162,001,460		100,999,613	
Total equity and liabilities		1,452,620,915		1,431,646,852	
The significant accounting policies and notes annexed form an integral part of these financial statements.					
					
(Ms) Anoma Gunawardene					
DIRECTOR/FINANCE					
APPROVED AND SIGNED ON BEHALF OF THE BOARD.					
					
Dr. S.G Samarasundera				S. Suriyaarachchi	
CHAIRMAN				DIRECTOR GENERAL	
COLOMBO, 25th March, 2013					

NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY					
INCOME STATEMENT FOR THE YEAR ENDED 31 ST DECEMBER 2012					
		2012		2011	
FOR THE YEAR ENDED 31ST DECEMBER					
	NOTE	Rs.	Cts.	Rs.	Cts.
OPERATING REVENUE					
GOVERNMENT GRANT	15	203,514,262		191,982,238	
OTHER INCOME	16	25,280,146		41,235,702	
TOTAL OPERATING REVENUE		228,794,408		233,217,940	
OPERATING EXPENSES					
Personnel emoluments	17	142,392,014		127,402,152	
Travelling & subsistence	18	1,364,526		823,048	
Supplies & consumables used	19	2,629,602		1,833,538	
Maintenance expenditure	20	23,380,741		14,272,687	
Contractual services	21	28,464,678		26,909,468	
Research & development expenditure	22	54,053,594		45,666,861	
Depreciation & amortization expenses	23	75,011,504		66,665,522	
Other operating expenses	24	8,017,031		3,229,134	
TOTAL OPERATING EXPENSES		335,313,690		286,802,409	
SURPLUS (DEFICIT) FROM OPERATING ACTIVITIES		(106,519,282)		(53,584,469)	
NON OPERATING REVENUE / EXPENSES					
TOTAL NON-OPERATING REVENUE / EXPENSES		25	12,609,976	12,271,247	
NET SURPLUS (DEFICIT) FOR THE PERIOD		(93,909,306)		(41,313,223)	
THE SIGNIFICANT ACCOUNTING POLICIES AND NOTES ANNEXED FORM AN INTEGRAL PART OF THESE FINANCIAL STATEMENTS.					

The Chairman,

National Aquatic Resources Research and Development Agency.

Report of the Auditor General on the Financial Statements of the National Aquatic Resources Research and Development Agency for the year ended 31 December 2012 in terms of Section 14(2)(c) of the Finance Act, No 38 of 1971

The audit of financial statements of the National Aquatic Resources Research and Development Agency for the year ended 31 December 2012 comprising the statement of financial position as at 31 December 2012 and the income statement, statement of changes in equity and cash flow statement for the year then ended and a summary of significant accounting policies and other explanatory information, was carried out under my direction in pursuance of provisions in Article 154(1) of the Constitution of the Democratic Socialist Republic of Sri Lanka read in conjunction with Section 13(1) of the Finance Act, No.38 of 1971 and Section 32(3) of the National Aquatic Resources Research and Development Agency Act. No. 54 of 1981. My comments and observations which I consider should be published with the Annual Report of the Agency in terms of Section 14 (2) (c) of the Finance Act appear in this report. A detailed report in terms of Section 13(7) (a) of the Finance Act was furnished to the Chairman of the Agency on 17 May 2012.

1.2 Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Generally Accepted Accounting Principles and for such internal control as the management determines is necessary to enable the preparation of financial statements that are free from material misstatements, whether due to fraud or error.

1.3 Auditor's Responsibility

My responsibility is to express an opinion on these financial statements based on my audit. I conducted my audit in accordance with Sri Lanka Auditing Standards. Those Standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Agency's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Agency's internal controls. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. Sub – sections (3) and (4) of Section 13 of the Finance Act, No.38 of 1971 give discretionary powers to the Auditor General to determine the scope and extent of the Audit.

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

1.4 Basis for qualified Opinion

My opinion is qualified based on the matters described in paragraph 2.2 of this report.

2. Financial Statements

2.1 Qualified Opinion

In my opinion, except for the effects of the matters described in paragraph 2.2 of this report, the financial statements give a true and fair view of the financial position of the National Aquatic Resources Research and Development Agency as at 31 December 2012 and its financial performance and its cash flows for the year then ended in accordance with Generally Accepted Accounting Principles.

2.2 Comments on Financial Statements

2.2.1 Accounting Policies

The policy on provision for bad and doubtful debts of the Agency had not been disclosed.

2.2.2 Accounting Deficiencies

The following matters were observed.

- (a) The opening balance of receivable fixed deposit interest brought forward and the interest income receivable on investment in fixed deposit amounting to Rs.142,600 and Rs.290,612 respectively had been understated in the financial statements.

- (b) The value of investment in fixed deposits amounting to Rs.279,443 had been understated in the financial statements.

- (c) The expenditure incurred on the bounding wall and the park identified as an idle assets by the Agency and abandoned in the Kadolkele Regional Research Centre in Negombo amounting to Rs.470,234 had been shown under work in progress.
- (d) In the deformation of computers and equipment annually received as foreign grants, the differed revenue had been overstated by Rs.251,296 and understated by Rs.759,169 in the financial statements.
- (e) Expenditure incurred on fish stall being constructed at Beruwala town amounting to Rs.4,272,492 had been brought to accounts under advances instead of being accounted under work in progress.
- (f) The insurance premium of Rs.4,730,403 paid for the insurance of the research vessel for the year under review had been capitalized as capital expenditure.

2.2.3 Unreconciled Control Accounts

The following differences were observed between the financial statements and schedules.

Particulars	Balance as per financial statements	Balance as per schedule	Difference
-----	-----	-----	-----
	Rs.	Rs.	Rs.
Foreign Grants	220,528,683	54,576,186	165,952,497
Local Grants	24,538,781	6,967,343	17,571,438

2.2.4 Accounts Receivable and Payable

The following matters were observed.

- (a) The value of debtor balances as at the end of the year under review amounted to Rs.34,652,667 and out of which balances totalling Rs.4,816,690 had remained for more than 2 years as per the age analysis. Action had not been taken to settle those balances.

- (b) The value of creditors balances as at the end of the year under review amounted to Rs.28,841,961 and out of which a sum of Rs.1,887,342 had remained for over 4 years as per the age analysis. These balances had not been settled and continued to be brought forward.

2.2.5 Non – compliance with Laws, Rules, Regulations and Management Decisions

Non-compliances observed in audit are given below.

Reference to Laws, Rules etc. -----	Non – compliance -----
(a) Financial Regulations of the Democratic Socialist Republic of Sri Lanka F.R. 751	The research vessel and related accessories valued at Rs.307,824,862 purchased during the year under review had not been recorded in the stock books.
(b) Treasury Circulars -----	
(i) Circular No.842 of 19 December 1978	A proper register of fixed assets in respect of fixed assets valued at Rs.1,376,638,289 had not been maintained.

- | | |
|--|--|
| <p>(ii) Circular No.IA1/2002/02 of 28 November 2002</p> | <p>An updated register for computers and accessories value at Rs.51,595,553 had not been maintained.</p> |
| <p>(c) Management Services Circular No. 33 of 06 April 2007</p> | <p>Allowances totalling Rs.761,047 had been obtained by the Project Director, Project Supervisor and the Financial Controller by establishing a project management unit treated a supply of service by the Agency as a project.</p> |
| <p>(d) Paragraph 9.4 of the Public Enterprises Circular No. 12 of 02 June 2003</p> | <p>Despite it was informed that staff should not be released to the other institutions or to the line Ministry without Board approval, three officers in the Agency had been released to the Deputy Ministers office of the Fisheries and Aquatic Resources Development Ministry and a sum of Rs.1,323,200 had been paid as salaries during the year under review.</p> |

3. Financial Review

3.1 Financial Results

According to the financial statements presented the operation of the Agency for the year ended 31 December 2012 had resulted in a deficit of Rs.93,909,306 as compared with the deficit of Rs.41,313,223 for the preceding year, thus indicating a further deterioration of financial results by Rs.52,596,083. Increase in maintenance expenditure and other operating expenditure by 87 per cent and

148 per cent respectively had been the reason for the deterioration of financial results as compared with the preceding year.

3.2 Working Capital Management

Although the current ratio of an organization under normal condition should be 2:1, this ratio of the Agency had been 0.0 : 0.74. Accordingly, the agency had faced a drastic working capital crisis.

4. Operating Review

4.1 Performance

Grants received for research and development expenditure and the expenditure incurred thereon during the year under review and the previous 3 years are given below.

		Year			
		2012	2011	2010	2009
		-----	-----	-----	-----
Total Grants Received	(Rs.Mn)	274	311	218	246
Research and Development expenditure	(Rs.Mn)	54	46	37	36

The following observations are made in this regard.

- (i) Total grant received had decreased by Rs.37 million in the year 2012 as compared with the year 2011.
- (ii) The increase of total research and development expenditure incurred during the year 2012 amounted to Rs.8 million as compared with the year 2011.
- (iii) The expenditure incurred on research and development represented 20 per cent of the total grants.

4.2 Management Inefficiencies

The following matters were observed.

- (a) The vessel manufactured by incurring an expenditure of Rs.13,192,703 to be able to utilize research activities of the coastal areas had not been fully utilized for research activities up to now. However, a sum of Rs.1,106,569 had been spent during the year under review for the payment of salaries, security and overtime to employees who served in the vessel.
- (b) Action had not been taken to ascertain the discount benefit of Rs.124,336 by settling water bills on due dates.

4.3 Idle and Underutilized Assets

The following matters were observed.

- (a) A sum of Rs.120,000 had been paid for the purchase of “Thanduri Furnace” but it had been remained idle for more than 2 years.
- (b) A sum of Rs.272,160 had been incurred for the purchase of a software but it had been idle for more than 4 years.
- (c) Although a sum of Rs.855,938 had been spent for construction of a proposed canteen, it had been abandoned for more than 4 years.
- (d) Two boat engines valued at Rs.4,493,052 had remained idle for more than 2 years without being utilized.

4.4 Personnel Administration

The Cadre position of the agency as at 31 December 2012 is given below.

Staff Category	Approved Cadre	Actual Cadre	No . of Vacancies
-----	-----	-----	-----
Executive	165	79	86
Non-executive	258	211	47
	-----	-----	-----
Total	423	290	133
	====	====	====

As compared with the approved cadre, the vacant positions had increased over 31 per cent. The Chairman's reply was "Recruitments could not be done as no provision is made due to non-approval of the recruitment and promotion scheme".

5. Accountability and Good Governance

5.1 Internal Audit

A sufficient internal audit staff had not been recruited to perform the duties and responsibilities of the internal audit. Recruitment procedure had not been approved in a manner to include the posts of audit assistants to carry out the audit work of the Head office.

5.2 Procurement Plan

A procurement plan had not been prepared for the year under review.

6. Systems and Controls

Deficiencies in systems and control observed in audit were brought to the attention of the Chairman of the Agency from time to time. Special attention is needed in respect of the following areas of control.

- (a) Amounts Receivable and Payable
- (b) Human Resource
- (c) Investments
- (d) Fixed Assets
- (e) Computer Accessories
- (f) Procurements
- (g) Stock

H.A.S. Samaraweera
Auditor General

Actions taken by the Management on the Audit report issued by Auditor General's Department as per the section 14 (2) of the Monetary Act no 38 of 1971 regarding the financial statement for the year ended 31st December 2012

2.2 Comments on Financial Statements

2.2.1 Accounting Policies

Agree with the comments, However, Steps have been taken to disclose the policy of provisioning for Bad & Doubtful debts under Accounting Policies when preparing the accounts for the year 2013.

2.2.2 Accounting deficiencies

- (a) Agree with audit observation. However this will be rectified in the books of accounts in the year 2013.
- (b) Agree with audit observation. However this will be rectified in the books of accounts in the year 2013.
- (c) Agree with audit observation. However this will be rectified in the books of accounts in the year 2013.
- (d) Agree with audit observation. However this will be rectified in the books of accounts in the year 2013.
- (e) Agree with audit observation. , However this will be rectified in the books of accounts in the year 2013.
- (f) Agree with audit observation. , However this will be rectified in the books of accounts in the year 2013.

2.2.3 Un-reconciled control account

Agree with the Audit observation.

Foreign grants received prior to the year 2001 had not been set off in compliance with the relevant Accounting Standards. However, grants received after 2001 have been set off in compliance with the Accounting Standards. Under these circumstances, the grant received prior to the year 2001 has remained unamortized up to now at its original value. As a result of this, there is a difference between the ledger accounts and the schedule which will be rectified in the year 2013.

2.2.4 Receivable & Payable Balances.

(a) The details of receivables and their present situations are given below.

Age	Description	Amount	Present Position
<1	Debtors	292,568.70	Already settled.
<1	Project Debtors		
	Kokilai Lagoon ESD	25,965.99	Still operating
	POGO Visiting	74,002.12	Already settled.
	IFAD CIDA Project	12,015.00	Action has already been taken to settle.
	Brackish water Prawn Culture	21,521.47	This was due to an accounting error and will be ratified in the accounts of 2013.
		133,504.58	
<1	Deposits	150,000.00	These are the amounts deposited at the Ceylon Fisheries Corporation in respect of obtaining of fuel for vehicles. This will be confirmed.
> 5	Deposits	100,000.00	
		250,000.00	
	Advances		
	Purchase Advance		
<1	Data Master Technology	13,750.00	Already settled.
	United Stationers	47,260.00	Already settled.
		61,010.00	
<1	S.A. Electricals	352,800.00	Already settled.

	Consolidated Marine(outboard)	763,818.93	} Already settled.
	Consolidated Marine(outboard)	3,729,233.55	
		4,906,862.48	
1-2	H.N. Traders	26,400.00	Already settled.
	D.R. Industries	1,145.00	Already settled.
	Richerd Peiris	49,176.00	Already settled.
	Apex Management	35,791.39	Already settled.
	Quolikem International	806,880.00	The item ordered should be purchased by paying the balance payment. A disciplinary inquiry is pending.
		5,826,254.87	
	SERVICE ADVANCE		
<1	Sri Lanka Handicraft-Model Fish Market.	4,272,492.29	This amount represents the advance payment made to Sri Lanka Handicraft in respect of construction of a model fish market which is expected to be completed in 2013.
<1	D.V. Mahindra Gamini	73,000.00	This amount represents the advance payment made for a construction work. As the construction work has already been completed, this will be shown as assets of NARA in 2013.
<1	Neil Marine Engines	10,244.73	Already settled. Action has already been taken to charge as expenses in the year 2013
			This amount represents the advance payment made for the construction

1-2	Central Engineering Construction.	788,256.00	work. Since work has already been completed, this will be shown as assets of NARA in 2013.
2-3	CMC- Repair of Access Road	437,314.69	This amount represents the advance payment made for the construction work. Since, the work has already been completed this will be shown as assets of NARA in 2013.
3-4	Perfect Business Solution	272,160.00	Action has been taken to implement the software program in the year 2014
		5,853,467.71	
	Total	11,679,722.58	
<1	Staff Receivables	50,046.57	1) Rs 50,046.57 have already been settled. 2) Action has been taken to settle the amount of Rs.3000 given as travelling advance. 3) Remaining balance represents the salary receivable from the employees who have resigned from the Agency without giving one month notice
1 -2		207,939.60	
		257,986.17	
	ADVANCES		
<1	Festival Advance	138,000.00	These amounts represent the year end balances. All the due amounts have been recovered from the salaries of the respective employees except Rs.4,550 receivable from three employees.
	”	184,500	
4-5	”	4,550.00	
		327,050.00	
2-3	Salary Advance	4,341.95	Action has been taken to settle this advance.
		4,341.95	
<1	Travelling Advance	19,243.38	Already settled.

1 -2	”	2,500.00	This amount represents the advance made to employee recruited on daily paid basis. Board approval will be sought to write off the said balance as recovery of same is impossible.
		21,743.38	
<1	Distress loan	1,812,436.10	<p>These amounts represent the year end balances.</p> <p>(1) All the due amounts have been recovered from the salaries of respective employees except a sum of Rs.58,132.</p> <p>(2) Steps will be taken to recover the amount of Rs. 27,576.50 according to the order of Labour Tribunal to be delivered in respect of the pending legal action in Labour Tribunal.</p> <p>(3) The amount of Rs. 30,355.50 to be recovered when the time of releasing the gratuity.</p>
	”	2,755,588.77	
	”	2,252,916.62	
	”	1,438,284.62	
1 -2	”	8,599,880.14	
2-3	”	1,602,686.38	
3-4	”	6,875.00	
4-5	”	30,555.50	
> 5	”	27,576.50	
	”	18,526,799.63	
2-3	Book Loan	2,750.00	Already recovered
<1	Bicycle Loan	3,000.00	<p>Already recovered.</p>
	”	2,400.00	
	”	1,400.00	
	”	2,400.00	
1-2	”	600.00	
		9,800.00	
> 5	Special Cash Advance	23,576.30	This cash advance had been obtained from an employee who has been terminated from the agency on disciplinary grounds. Steps will be taken to recover the same according to

			the order of Labour Tribunal to be delivered in respect of the pending legal action in Labour Tribunal.
<1	Special Cash Advance	85,460.50	All dues have been recovered except a sum of Rs.65,000 Disciplinary inquiry is pending in this regard. Action will be taken according to the decision to be delivered at the inquiry.
	Total	19,259,237.93	
1 -2	Retention money receivable	733,059.60	Not yet settled. Disciplinary inquiry is pending in this regard. On receipt of the final report, action will be taken accordingly.
2-3	”	2,304,303.72	
	Total	3,037,363.32	

(b) Project and other creditors and their present positions.

Age	Description	Amount	present position
	<u>Project Creditors</u>		
<1	Miscellaneous Project creditors	9,365,666.96	Already settled.
	BOBLME	359,947.29	Operating
	Archeology gall face	695,192.00	Already settled.
	ESD oil exploration	8,684,304.90	Operating
	Hyundai en:MBRD	9,414.00	Already settled.
	Central cultural fund	381,713.05	Already settled.
	Bathymetric tangalle	516,838.00	Already settled.

	Training programme	365,317.49	Operating
	Upper kothmale hydropower	32,600.00	Already settled.
	Low enforce wildlife	432,495.00	Operating
	IEE Colombo port	377,980.32	Already settled.
	Boblme-MBRD	539,867.12	Operating.
	Train:pr:world vision	45,800.55	Already settled.
	Batheymatric survey	299,975.00	Already settled.
		25,010,815.65	
1 -2	Sea cucumber JAICA	453,196.52	Project completed. Approval of the Governing Board is sought in order to write off same from the books of accounts.
	Madabokka monitoring	847,025.00	Operating
		1,300,221.52	
2-3	FAO MBRD	967,959.00	Project completed. Approval of the Governing Board is sought in order to write off same from the books of accounts.
		967,959.00	
3- 4	-	-	
> 5	SIDA	192,816.98	Project completed. This amount denotes the remaining balance to be paid to the relevant organization.
	Preparation zonal plan batt	390,930.03	Project completed. Approval of the Governing Board is to be sought in order to write off same from the books of

			accounts.
	SAREC current account	51,776.46	Project completed. Approval of the Governing Board is to be sought in order to write off same from the books of accounts.
		635,523.45	
	Total	25,010,816.00	
	<u>Other Creditors</u>		
1 -2	Bank loan	17,681.84	Already settled.
<1	Retention money	16,274.40	This is an accounting error and will be rectified in the accounts of 2013
2-3	”	81,406.97	
3-4	”	137,523.80	
4-5	”	122,862.00	
> 5	”	1,128,957.15	
		1,487,024.32	
<1	Stamp duty	1620.00	Already settled
<1	Staff incentive payment	2,322,943.94	This amount represents the amount recovered and reserved from the consultancy projects which is to be distributed among the all staff members at the end of the year.
<1	Welfare	1875.00	Already settled
	Total	3,831,145.10	

2.6 Non-compliance with Laws, Rules, Regulations and Management decisions

	Reference to Laws, rules, Regulations etc	Non-compliance
(a)	Financial regulation no. 751	Agree with the audit observation. However, this will be rectified in the books of accounts in the year 2013.
(b) i	Treasury circular No.842 dated 19 December 1978.	Action has already been taken to prepare an asset register based on report of the Board of Survey carried out on 31-12-2012.
ii	Treasury circular No.IAI/2002/02 dated 28 November 2002.	Action has already been taken to prepare an asset register based on report of the Board of Survey carried out on 31-12-2012.
(c)	Management Service Circular No.33 dated 06 April 2007.	Disciplinary inquiry is pending; on receipt of the inquiry report action will be taken accordingly.
(d)	Public Enterprises Circular No. 12(9.4) Dated 02 June 2003.	NARA has paid Rs.1,323,200= for the three employees released to the Ministry of Fisheries & Aquatic Resources Development during the year under review. Governing Board has decided to call back these employees to the agency and release them only when and where the services of these employees are required to the Ministry.
(e)	Public Finance Circular No. 437 dated 18 September 2009	Agree with audit observation. However, we would like to inform that Tender has been awarded to the lowest bidder i.e MBSL Insurance subsequent to calling bids from several institutions including Insurance corporation

3. Financial and Operating Review

3.1 Financial Review

3.1 Financial Results

Agree with audit observations, It was noted to pay more attention in order to improve the financial result.

3.2 Management of working capital

Agree with audit observations, granting of an additional allocation to settle the overdue payments, will help to improve the financial result.

4. Operating Review

4.1 Performance

1. During the year under review, the allocation of capital grant has decreased by Rs. 53 million when compared with the previous year. This position denotes through the details given below.

		2011	2012
Recurrent Grant	Rs.	146,667,000	149,331,543
Capital Grant	Rs.	112,440,000	59,301,583
Treasury Deposits	Rs.	<u>52,300,000</u>	<u>65,700,000</u>
Total	Rs.	<u>311,407,000</u>	<u>274,333,036</u>

- II. During the year under review, Research & Development expenditure has increased approximately by Rs. 8 million when compared with the previous year. The reason for this significant increase was due to continuous efforts made to monitor and supervise the progress of Research & Development activities very closely particularly at the monthly meetings of Heads of the Division and Head of Institutions meetings at the Ministry of Fisheries & Aquatic resources Development.
- III We accept the fact that the expenditure of Research & Development has increased from 14% to 20% during the year under review out of the total capital grant as you mentioned.

4.2. Management Inefficiencies

- (a) Subsequent to the completion of construction of Boat “Tharani”, it was launched to Hamilton Canal on 16.12.2011. Then the secretary to the ministry of fisheries’ & Aquatic Resources Development has instructed, NARA to refrain from spending further on this Boat. However, in order to maintain and safeguard the Boat, NARA has to incur the expenditure to a certain degree. Minimum crew such as Coxswain, engine room technician, and Deck hand were detailed. Mentioned should be made that NARA utilized this Boat particularly for its research activities whenever possible. At the moment, this Boat has been anchored at the Dikowita Fishery Harbour.
- (b) Due to delay in obtaining funds from the Treasury, we were unable to settle the water bills within due dates so that this discount was not granted.

4.3 Idle and underutilized assets

- (a) Action has been taken to use this equipment at NARA canteen.
- (b) Agree with the auditor’s observation. However, action has been taken to install and operate the system at the Finance Division.
- (c) There seems to be a considerable delay in attending to civil work due to non availability of a Civil Engineer for the agency in order to supervise and coordinate the civil work. Action will be taken to expedite the work once an engineer is recruited.
- (d) An inquiry is pending in respect of the two out boat engines, amounting to Rs. 4,493,052 and instruction had been given to NARA not to dispose of these items until the inquiries/ investigations are over conducted by the relevant authorities . Under the circumstances, the said items are kept at the stores in safe custody.

4.4 Personnel Administration

The staff carder of 423 for NARA has been approved on 15-08-2011. Out of these, 82 are newly created posts. Recruitment for the existing vacancies could not be made due to non receipt of approval for the schemes of recruitment and promotion prepared in accordance with the management services circular No. 30.

The Schemes of recruitment and promotion have been submitted to the National Salaries and Carder Commission on 18.10.2012 for approval. The approval has been granted on 16.04.2013 by National Salaries and Carder Commission.

However, the recruitments approved by the Department of Management Service have been made during the year under review.

5 Accountability and Good Governance

5.1 Internal Audit

The required numbers of personnel to carry out duties of the Internal Audit Division has been included in the re-structuring plan. Accordingly, the following positions have been approved by the Department of Management services

Chief Internal Auditor 01

Internal Audit Office 01

Management Assistant 02

However, the recruitment for Audit Office was not made both in the year 2012 and 2013 due to non availability of sufficient funds.


The steps will be taken to fill this vacancy during the year 2014.

5.2 Procurement Plan

Agree with Audit Observations. Mention should be made that the procurement plan for the year 2013, has been prepared and implemented same within the agency.

5.3 Systems and Controls

Action has already been taken to pay special attention to the areas you have mentioned in the report.



Dr. S.G Samarasundara
Chairman- NARA