

**ANNUAL REPORT AND  
ACCOUNTS  
1997**

**NATIONAL AQUATIC RESOURCES RESEARCH  
& DEVELOPMENT AGENCY  
(NARA)**

**CROW ISLAND, MATTAKKULIYA, COLOBMO 15.**

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## **MARINE BIOLOGICAL RESOURCES DIVISION**

### **INTRODUCTION :**

This division has carried out 12 research projects during the year 1997. These projects were carried out in relation to the 5 major programmes of the division, and they are namely,

- Programme (I). Survey and Investigations on Fisheries Resources.
- Programme (II). Assessment and Management of Fisheries Resources.
- Programme (III). Conservation and Management of Coral reef ecosystems.
- Programme (IV). Studies on marine mammals, turtles and other endangered animals.
- Programme (V). Management of the natural resources in the coastal environment.

The above programmes are funded both by the treasury funds as well as by funding from other sources.

### **Deep Sea Fishery Resources Survey :**

The work on this year project funded by the ADB was completed by this division during this year. The results of this survey has been presented as a report. Among the highlights of this report are the necessity for discouraging the use of gill nets for deep sea fisheries, promoting the use of long lining for deep sea fisheries, optimum number of crafts that could be employed for a sustainable harvest without over exploiting the deep sea fishery resources and the abundance of fish at various locations within the study area on a monthly basis.

### **Small meshed gill net fishery survey :**

The study scheduled for this year on small meshed gill net fishery was completed. The best fishing season for this fishery in the West coast was reported to be between August and December.

**Study of Prawn Resources :**

The prawn resources assessment work around Negombo Lagoon was completed. Partial funding for this study was provided by the UNDP. The purpose of this study was to have a comprehensive understanding of various stages of Prawns within the lagoon, at the sea and their migrations between the lagoon and the sea. A report has been prepared outlining the findings. A consultant was provided by the UNDP for this project.

**Population study of fish :**

This study was aimed at investigating whether the trenched sardine ( Hurulla ) populations from the Southern, Eastern and Western coastal waters of Sri Lanka belonged to a same maternal strain or not. The work on this project will continue onto 1998. This is a collaborative project between NARA and the Faculty of Medicine, Colombo and the work needed an extension onto 1998. This was the first time in Sri Lanka, where DNA was used to investigate fish populations.

**Coral Reef Research :**

Research required for the management of coral reefs was carried out along with the provision of expert technical advice for the regulation of marine ornamental fish trade. The updating of the list of fishes that could be exported which is carried out by the Department of Fisheries and Aquatic Resources, Department of Wild Life and NARA utilized these information.

**Publications and reports :**

- (I). Karunasinghe, W.P.N., Ivantsoff, W., Johnston, P. and Crowley, L.E.M.A population study of *Mugil cephalus* (Linnaeus) from the Pacific and Indian Oceans, 43 pp. ( Submitted to the Jour. Fish Biology 1997 )
- (II). Karunasinghe, W.P.N., Ivantsoff, W., Briscoe, D. and Crowley, L.E.M. Taxonomy and population variability of five species of Australian mullet

using allozyme variants, 22 pp. ( Submitted to the Jour. Fish Biology 1997 ).

- (III). Karunasinghe, W.P.N. and Dayaratne, P. (1997) Species composition and abundance in the small meshed gill net fishery carried out during 1995/96 period. ( Presented at SLAFAR Annual Sessions 1997 ).

**Trainings, Seminars and Workshops :**

- (I). Mr. P.A.A.T. Jayawardene - Fisheries management training programme at Southeast Asian Fisheries Development Centre, Thailand. 17<sup>th</sup> June to 15<sup>th</sup> July 1997.
- (II). Mr. D. Amarasooriya – Tute conservation training programme. 12 – 18<sup>th</sup> January 1997. Fisheries management training programme at Southeast Asian Fisheries Development Centre, Thailand. 17<sup>th</sup> June to 15<sup>th</sup> July 1997.

# INLAND AQUATIC RESOURCES AND AQUACULTURE DIVISION

## INTRODUCTION :

During the year 1997, the Inland Aquatic Resources and Aquaculture Division conducted 16 research projects under five main programmes. These projects were carried out by the Head Office at Colombo as well as by the Regional Research Centres at Kadolkelle and Kalpitiya.

Programme (I). Shrimp/prawn culture and resources management.

Programme (II). Ornamental fish culture.

Programme (III). Inland aquaculture and fisheries management.

Programme (IV). Sea farming.

Programme (V). Mangrove and wetland management.

These projects were mainly funded by Treasury allocation. The research projects under programme one were carried out in close collaboration with the Ministry of Fisheries of Northwestern Province.

### **Shrimp farming :**

The quality of the shrimp post-larvae produced from the hatcheries and the hatchery conditions that favour diseases in shrimp post-larvae were assessed. Recommendations were made to improve the quality of post-larvae and prevention of white spot disease. Moreover an awareness programme was carried out to educate the farmers on white spot viral infection and its prevention.

### **Disease occurrences in shrimp culture :**

Investigations were carried out to determine the favoring factors that cause viral infections in coastal shrimp culture in Sri Lanka. The results of these

studies were disseminated among the farmers in the form of leaflets and booklets.

**Discharge of waste water from shrimp culture ponds :**

Investigations were carried out to determine the types of waste products in discharged water and treatment systems were recommended to reduce the harmful waters.

**Inland fisheries management :**

Community participatory research work was carried out Udawalewe, Chandrika and Mutukandiya reservoirs to determine the effectiveness of the community participatory management of inland reservoirs.

**Ornamental fish culture and breeding :**

A resource survey was carried out to assess the abundance of threatened fish species with an ornamental value in selected areas of Sri Lanka and breeding trials were conducted on selected such species.

**Mollusc culture :**

Studies were carried out to determine suitable culture methods to grow bivalve mollusc species. Trials were conducted at Rumassala with a view to popularize mollusk culture practices in southern coast of Sri Lanka.

**Rice-fish culture :**

Community participatory research was carried out to ascertain the suitability of rice fields to raise fish fry to fish fingerlings along with the rice cultivation to address the shortage of infrastructure availability to raise fish fry to fingerling.

**Fattening of mud crabs :**

Crab fattening technique was developed by the Regional Research Centre at Kadolkelle, Negombo. This technique was used by the private sector to fatten crabs in Chilaw Lagoon.

**Breeding of ornamental fish for export :**

Breeding of brackish water ornamental fish species such as *Monodactylus argentius* and *Scato phagus argus* was tried at the Regional Research Centre in Kadolkelle, Negombo. The attempt to breed these fish species is needed as they are caught from the brackish and marine water for export and may face a reduction in population numbers.

**Breeding of sea cucumber :**

The ability to breed sea cucumber in captivity was tested at the Regional Research Centre at Kalpitiya as these species are threatened to decline in population numbers.



## **FISHING TECHNOLOGY DIVISION**

### **INTRODUCTION :**

During the year 1997, this division has carried out 03 research projects. They are as follows :

- Programme (I). Introduction of New Fishing Techniques.
- Programme (II). Construction of an artificial reef for habitat enhancement.
- Programme (III). Preparation of the Fishing Gear Catalogue.

### **Fishing Trials on Bottom Vertical Long Lines :**

Fishing trials were carried out off Hambantota banks to test the efficiency of bottom vertical long line to catch demersal fish species. Fishing trials were done with community participation. Results obtained so far indicate that this fishing technique could be successfully practiced only when the sea is very calm.

### **Construction of an artificial reef ( CASITA Project ) :**

CASITA deployment was done in several selected places on the South coast of Sri Lanka. This was done as a pilot project to enhance lobster habitats. Required funds were provided by the Southern Province Rural Development Project. 250 CASITAs were deployed off Kirinda, where as small number of CASITAs were deployed at other places.

### **Fishing Gear Catalogue :**

Information was collected on various fishing gear types. Information on Fishing gear and craft was collected from all areas except North and East.

Dr. D.S. Jayakody who worked as the Head of this Division was promoted to the post of Director General. He was also appointed as the Head of the Division to cover up duties of the Fishing Technology Division.

## OCEANOGRAPHY DIVISION

### INTRODUCTION :

The Oceanography Division has undertaken seven projects during the year 1997 under six major programs.

- |           |        |   |
|-----------|--------|---|
| Programme | (i)    | Studies of coastal upwelling around Sri Lanka.  |
| Programme | (ii).  | Investigations of salt water mixing into the major rivers.  |
| Programme | (iii). | Assessment of wave energy for electricity generation.   |
| Programme | (iv).  | Assessment of solar energy for electricity production.  |
| Programme | (v)    | Studies on dispersion of river water in the near shore.   |
| Programme | (vi)   | Research carried out under the financial assistance of Swedish Agency for Research Cooperation with Developing Countries (SAREC). |

### Study on upwelling :

The preliminary investigation was conducted to study near shore upwelling. The data collection was initiated from the river mouths of Kalani, Kalu and Nilwala. The dispersion of nutrient, surface and bottom water mixing were identified to carry out within the year. Due to the uncertainty of the ship, certain studies could not be completed, only preliminary investigations were completed.

### Classification of lagoons :

The studies were conducted to identify major mixing agents to use classify the lagoons. The mixing between sea water and river water of the Kelani and Nilwala were investigated. The length of saltwater intrusions into these river upstream was estimated.

**Studies of tide**

This study was carried out to further improve the available tide tables of the Sri Lanka coast. The data collected from tide gauges from Galle harbour and Kirinda harbour were used to produce tables. The tide tables were distributed among the relevant institutes for development activities.

**Ocean energy for electricity generation :**

Assessment of wave energy potential around southern coastal belt was started in 1996 and continued in 1997 too. Results of the 1996 and 97 show no remarkable difference in wave energy potential, Descriptive report of the project was submitted. Palatupana, Bundala, Godaweeye and Unawattuna areas were studied.

**Solar energy for electricity generation :**

Possibility of having solar pond power generation plant in dry coastal zone (Kalpity) was investigated. Due to the collapse of the pond, study was not successfully completed.

**Program funded by Swedish Agency for Research Co-operation with Developing Countries. :**

Under this program seasonal changes of the mixing/water exchange in the coastal lagoons of Sri Lanka was initiated. Intermittent closing and opening of the lagoon mouth causes water quality of the lagoons, and thus affect the fisheries. Therefore this program was selected. Malala lagoon studies were initiated on this regard.

**Publications and Reports :**

**Tennakoon T.K.D.,** *“Oscillating water column type Wave power plant with Tapered Harbour walls,”* Coastal zone 97, July’97, Boston, USA.

**Tennakoon T.K.D.,** *“Efficiency variation of Oscillating water column plant with tapered harbour walls”,* IOA 97, May’97, Singapore.

**Tennakoon T.K.D, Bhuvendralingam M,** *“Possibilities for OTEC plant in the South & North-East coast of Sri-Lanka”,* IOA 97, May’97, Singapore.

**E.M.S.Wijeratne**1997 Potential impact of accelerated sea level rise on beach erosion and inundation of lowlands of Southwest coast of Sri Lanka, report was submitted to the Ministry of Environment.

**E.M.S.Wijertne, K.Arulanathan., H.B.Jayasiri and J.K.Rajapaksa,** 1997 Physical Oceanographic Studies of the Coastal Water Bodies-Sri Lanka..

**E.M.S.Wijeratne,** 1997 Tide predictions (Galle and Kalpitiya) for year 1997 submitted to the CCD, Ports Authority, CFHC, Sri Lanka Navy, LHI and Ministry of Fisheries and Aquatic Resources Development,

**JK Rajapaksha,** 1997 Low Frequency Tidal Response and Water Exchange in a Restricted Lagoon; The Negombo Lagoon, Sri Lanka., MSc. Thesis submitted to the Gothenburg University Sweden.

**HB Jayasiri,** 1997 Seasonal water Exchange, Evaporite Deposit of Salt and Salinity Variation in the Mundel Lake, A Coastal Lagoon Sri Lanka., MSc. Thesis submitted to the Gothenburg University, Sweden.

**JK Rajapaksha, HB Jayasiri, K. Arulanathan, EMS Wijeratne,** 1997 Technical Report on Oceanographic Studies of Malala/ Embilikala System, submitted to the SAREC project.

**Trainings, Workshops, Seminars and Scholarships :**

- (1). Mr. H.B. Jayasiri, MSc. training at the University of Gothenburge, Sweden
- (2). Mr. J.K. Rajapaksha, MSc. training at the University of Gothenburge, Sweden
- (3). Mr. E.M.S. Wijerathne, Ph.D. training at University of Gothenburge, Sweden  
( 01/10/97 – 30/11/97 )
- (4). Mr. K. Arulananthan, Ph.D. training at University of Gothenburge, Sweden  
( 01/10/97 – 30/11/97 )

Mr. E.M.S. Wijerathne – Workshop on Coastal Zone Management, India.  
( 16/06/97 – 21/06/97 )

# NATIONAL HYDROGRAPHIC OFFICE

## **INTRODUCTION :**

The National Hydrographic Office has completed research & development projects under following 05 items during the year 1997.

- Programme (I). Seabed Mapping
- Programme (II). Production of Nautical Charts.
- Programme (III). Shoreline Detail Survey
- Programme (IV). Commissing of Survey Vessel "Sayuri"
- Programme (V). Making a Hydrographic Data Base.

## **Seabed Mapping :**

Hydrographic Survey of an area about 600 km covering Weligama Bay, approach to Puranawella Fishery Harbour, Dondra Point. 50% of the projected area has been completed during the year 1997. Shortage of qualified marine surveyors was the main reason for not achieving the targets.

## **Production of Nautical Charts :**

A survey vessel "Sayuri" has been used for hydrographic survey in the offshore areas and survey boat "Tharanga" in near shore areas. The nautical chart Approaches to Colombo Harbour was published in 1997. This nautical chart was first published by the British Admiralty in 1907. Now it has been updated and prepared to meet today's navigational requirements.

## **Shoreline Detail Survey**

Completed the shoreline detail survey of an area covering Galle, Unawatuna, Mirissa and Weligama.

**Commissioning of Survey Vessel “Sayuri” :**

The survey vessel “Sayuri” which was donated by the German Government has been commissioned in 1997. She was utilized for carry out offshore hydrographic surveys.

**Making a Hydrographic Data Base :**

All collected hydrographic data has been stored in the data base in a digital form. These data will be issued to various Government and non Governmental organizations on request for development purposes.



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

### **INTRODUCTION :**

Main objective of establishing this division was to study the changes in socio-economic status of the fishing community due to expansion of fishing industry, increased conflicts, depletion of coastal resources and over exploitation of resources.

### **Preparation of Annual Fisheries Year Book :**

This division was established in 1997. One of the major tasks of the division was to publish the fisheries year book. In 1997 the division had collected relevant data for the 1<sup>st</sup> fisheries year book.

### **Socio-economic information of shrimp farmers :**

A study commenced on shrimp farmers of Arachchikattuwa. However it was stopped halfway as the officer concerned left the country for higher studies.

### **Study on ice production :**

A study was completed in 1997 on present ice production by districts and estimated the demand for ice in year 2000. The report was submitted to the Ministry of Fisheries and Aquatic Resources Development for necessary interventions.

### **Comparative study on economics of small scale and large scale fishing operations :**

Data collection of the above study was started in 1997.

### **Publications and Reports :**

Ice production and requirement study in Sri Lanka, 14<sup>th</sup> December 1997.

**Staff recruitments :**

- (I). Dr. K. Rupamurthy, Head / Consultant Economist.
- (II). Miss S. Sugandi, Data Entry Operator.
- (III). Mr. K.H.M.L. Amaralal, Research Officer

**Resignations :**

None

**Trainings, Scholarships, Seminars and Workshops :**

Mrs. C. Perera, M.Sc., AIT, Thailand.

## **POST HARVEST TECHNOLOGY DIVISION**

### **INTRODUCTION :**

There is a considerable post harvest loss and quality deterioration since the harvesting of fish. There are some instances that there is a loss of protein more than 30% due to bad management practices.

Post harvest division is involved in investigating the contributing factors for these post harvest losses and measures to minimize those losses. In addition, post harvest technology division is engaged in research on introducing value added products from fisheries resources.

### **Microbial condition in shrimp culture :**

Selected farms in Puttlam and Chilaw together with the Dutch canal were monitored for microbial quality.

Total vibrio counts, total coliform counts, fecal coliform counts were studied. Comparison was made on chlorinated and non chlorinated ponds to evaluate the effects of chlorination on microbial quality.

Two research communications were prepared based on the findings of the study on microbial quality.

### **Improvement of traditional fish products :**

Studies were conducted on the quality improvement of traditional fish products such as "Jaddy". Packaging aspects and improvements in quality were the main issues handled in this study.

**Utilization of under-utilized fish resources :**

Under utilized fish resources were used to prepare value added and fast food products. Tilapia and other low value species were used. Development of instant soup types from under utilized fisheries resources was initiated.

**Processing of shark fins :**

Research on value adding on shark fin processing using different shark species were investigated. Several procedures were identified to maximize the value adding process. Two research communications have been prepared from this work.

**Use of mollusc varieties for human consumption :**

Molluscs harvested from the wild and cultured molluscs can contain harmful micro-organisms. Research was conducted to improve the quality of the molluscs for human consumption. An institutional report was produced on the findings.

**Extraction of fish oils :**

Experiments were carried out on extraction of oils from fish wastes. Preparation of shark liver oil and improvement of the quality of the fish oil was done under this project.

## ENVIRONMENTAL STUDIES DIVISION

### **INTRODUCTION :**

This division is responsible for the collection of baseline data on the state of the environment and monitoring with respect to the Coastal, Estuarine and Inland waters. Further, data already collected is updated periodically to ascertain changes in environmental conditions. These baseline data are necessary for the feasibility and EIA studies for development projects in the country.

### **Riverine inputs to the coastal environment ( Land Based Pollution ) :**

The above was studied by collection of samples from the coastal sea from Kalutara to Dondra head using our research vessel *Sayuri*. Sampling was done at different depths at points selected to estimate the water quality changes from Riverine and other inputs to the coastal environment. This study will be able to ascertain the impact of land-based pollution on the coastal environment.

### **Studies on Estuaries and Lagoons ( Coastal Waters ) :**

Studies on the water quality of the Bundala lagoon, Kirindi Oya Estuary, the Malala – Embilikala Lagoon System, Rekawa Lagoon and other selected sites were carried out.

### **Emergency Studies :**

This fund is kept for study of any sudden environmental disasters that may occur in our inland or coastal waters. The plane crash into the sea off Negombo in 1997 and its impact on the coastal waters was studied and reported.

### **Industrial Effluent Monitoring :**

The effluent discharges from industries can have detrimental effects on the receiving waters. Studies were done in the Export Processing Zones to estimate the quality of the effluents and to ascertain the conformity with discharge standards as set out by the CEA. Laboratory test services necessary for the

implementation of environmental protection licensing of CEA were also provided.

**Publications and Reports :**

- (I). Dessanayake N.H., Jayatunga Y.N.A. and Padmini de Alwis (1997). Water Quality of Hamilton Canal a man made water body associated with a coastal Wetland of Sri Lanka. presented at the Annual Sessions of the Sri Lanka Association for Fisheries and Aquatic Resources, Colombo.
- (II). De Alwis P. and Hemantha Dassanayake (1997) Correlation between the Water Quality and the Reduction of Plankton Biodiversity Conference on Asian Studies, Massey University, New Zealand, Nov. 1997.

**Trainings, Seminars & Workshops :**

Mr. Hemantha Dassanayake, Research Officer of the Environmental Studies Division attended the workshop on the Nutrient Analysis in Water and Waste Water organized by the Commonwealth Science Council held in Brisbane, Australia, March 1997.

## GENERAL

**(01).** Vacancies filled during 1997

**(a).** Permanent posts :

• Research Officers	—	05
• Diver Assistant	-	01
• Clerk	-	02
• Typist / Data Entry Operator	-	03

**(b).** Casual Appointments :

• Labourer	-	02
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**(c).** Contract Basis :

• Economist	-	01
• Chief Cartographer	-	01
• Skipper	-	01
• Marine Technician	-	02
• Coxswain	-	01

**(02).** Disciplinary inquiries :

Disciplinary inquiry against Mr. G. Lamahewa was completed. Disciplinary inquiries of minor nature were help within the Agency and action was taken accordingly.

**(03).** Promotions :

Staff members who completed the required qualifications were interviewed and promotions were given based on the recommendations given by the evaluation panel.

**(04). Services and Maintenance Division :**

Services and maintenance division was reorganized and the senior Mechanical Engineer was appointed as the Head of that Division.

**(05). Welfare :**

(a). A committee was appointed to study and report the salary anomalies of the staff members. Committee decision was subordinated for the approval of the Governing Board of the Agency. Some of the recommendations were implemented.

(b). New salary structure proposed by the salaries and cadre commission was implemented with effect from 1997.01.01

(c). Following transport facilities were provided for NARA officers.

Gampaha to NARA

Piliyandala to NARA

Kottawa to NARA

Colombo Fort to NARA to Ingurukade Junction ( only in the afternoon )

**(06).** Staff members went out of the country for workshops, Trainings and Seminars and also the staff members left the country for private matters are listed :



**ABROAD TOURS IN 1997 YEAR**

Name	Country	Purpose	Period	Duty leave / Leave
Mr. N.H. Dassanayake	Australia	Training workshop on nutrient Analysis in water & waste water	10/03/97 – 16/03/97	D/L
Dr. J.M.P.K. Jayasinghe	Thailand	NACA/FAO Regional workshop	21/05/97 – 23/05/97	D/L
Mr. P.A.A.T. Jayawardena	Thailand	Fisheries Management at "CEAFDEC"	19/06/97 – 14/07/97	D/L
Mr. R.W. Fernando	Middle East	For a Job	31/07/97 – 30/07/99	No-pay Leave
Mr. P.D.K.D. Amarasooriya	India	Northern Indian Sea Turtle workshop	12/07/97 – 18/07/97	D/L
Mr. P.D.K.D. Amarasooriya	Thailand	Fisheries Management at SEAFDEC	14/06/97 – 15/07/97	D/L
Mr. E.M.S. Wijerathne	India	Remote Sensing for Coastal Oceanography	16/06/97 – 21/06/97	D/L
Mr. E.M.S. Wijerathne	Sweden	For P.hD.	01/10/97 – 30/11/97	D/L
Mr. K. Arulanathan	Sweden	For P.hD.	01/10/97 – 30/11/97	D/L
Mr. D.A. Athukorala	Thailand	Geographic Information Systems in Watershed Management	14/11/97 – 29/11/97	D/L/
Mr. A.B.A.K. Gunarathne	Thailand	Geographic Information Systems in Watershed Management	14/11/97 – 29/11/97	D/L/
Mrs.P.K.M. Wijayagoonawardena	Iran	Training course in Aquaculture	30/11/97 – 12/12/97	D/L
Mr. A Rajasooriya	India	Workshop	15/12/97 – 17/12/97	D/L

**NATIONAL AQUATIC RESOURCES RESEARCH & DEVELOPMENT AGENCY**

**BALANCE SHEET AS AT 31.12.1997**

81,639,722.00	Balance Brought Forward			176,527,034.74
27,090,000.00	Government Grant for the Year	(11)		39,960,000.00
91,202,463.00	Revaluation Reserve	(12)		221,706,307.50
-	Foreign Grant for the Year	(13)		41,199,729.45
2,175,278.00	Local Grant for the Year	(14)		654,000.00
(25,580,428.00)	Excess of Expenditure Over Income			(66,129,673.55)
176,527,035.00				413,917,398.14
	<b>FIXED ASSETS</b>			
81,708,955.00	Free-hold Land	(15)	81,708,955.00	
9,493,508.00	Lease-hold Land	(15)	9,493,508.00	
7,815,063.00	Buildings	(15)	145,982,321.47	
538,884.00	Machinery	(15)	1,800,000.00	
17,419,014.00	Equipment	(15)	29,300,219.11	
2,443,390.00	Computers & Printers	(15)	4,997,196.13	
4,350,035.00	Vehicles	(15)	10,800,000.00	
157,975.00	Bicycles	(15)	803,625.00	
1,716,253.00	Furniture & Fittings	(15)	4,375,666.00	
1,872,759.00	Library Books	(15)	4,031,491.10	
	Fish Tank	(15)	142,335.00	
	Engineering & Tools	(15)	454,365.00	
11,209.00	Admiralty Charts	(15)	39,836.20	
12,053,183.00	Research & Development (Local)	(15)	16,250,003.35	
22,249,020.00	Research & Development (Foreign)	(15)	4,673,196.26	
13,949,151.00	Boats & Vessels	(15)	96,947,718.00	
175,778,399.00	<b>CURRENT ASSETS</b>			411,800,435.62
1,408,204.00	Stock as at 31.12.1997-	(16)	1,366,880.18	
6,518,837.00	Debtors & Prepayments	(17)	2,980,987.73	
167,472.00	Deposits	(18)	169,472.00	
2,588,012.00	Advances	(19)	1,397,177.75	
4,484,405.00	Debtors-Employees	(20)	5,608,269.95	
-	Cash in Transit		3,096,462.96	
-	Seven days Call Deposits		4,500,000.00	
3,530,711.00	Cash in Hand & at Bank	(21)	1,342,493.81	
18,697,641.00			20,461,744.38	
	<b>CURRENT LIABILITIES</b>			
11,790,271.00	Creditors & Accrued Expenses	(22)	11,494,876.01	
-	Bank Overdraft Acc. No. 2968		310,254.42	
224,344.00	Project Creditors	(23)	322,791.03	
254,600.00	Provisions	(24)	254,600.00	
1,431,102.00	Constancy Projects	(25)	99,677.40	
13,700,317.00			12,482,198.86	
4,997,324.00	Net Current Assets			7,979,545.52
(4,459,343.00)	Deferred Liabilities			(5,862,583.00)
176,316,380.00				413,917,398.14

**Prof. P. W. Epasingha**  
Chairman

**Dr. D. S. Jayakody**  
Director General

**Y. Samarathna**  
Accountant

NOTE OF THE AUDITOR GENERAL

The accounts of National Aquatic Resources Research and Development Agency for the year ended 31 December 1997 were audited 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.

My observations on these accounts that should be published in terms of Section 14(2)(c) of the Finance Act are contained in my report of even date addressed to the Chairman of the National Aquatic Resources Research and Development Agency.

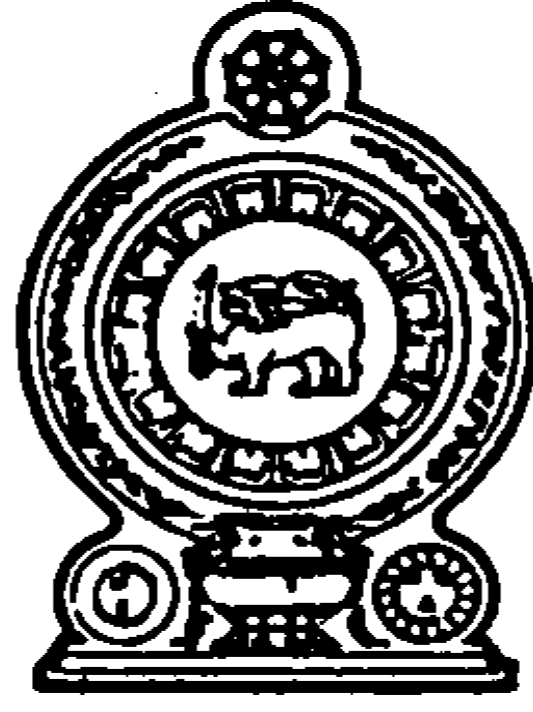
(Sgd. S.C. Mayadunne),  
Acting Auditor General,  
7 September 1999.  
Auditor General's Department,  
Colombo 07.

දුරකථනය  
தொலைபேசி  
Telephone } 691151

பெயர் செய்தி  
பக்கம் இல.  
Fax No. } 697451

මගේ අංකය  
எனது இல.  
My No. } VM/J/NARA/01/98

ඔබේ අංකය  
உமது இல.  
Your No. }



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கணக்காய்வாளர் தலைமை அறிப்பதி திணைக்களம்

சுதந்திர சதுக்கம், கொழும்பு 7, இலங்கை

AUDITOR-GENERAL'S DEPARTMENT  
INDEPENDENCE SQUARE, COLOMBO 7, SRI LANKA

දිනය/திகதி/Date: 27 September 1999

The Chairman,  
National Aquatic Resources Research  
and Development Agency.

Report of the Auditor General on the accounts of the  
National Aquatic Resources Research and Development Agency  
for the year ended 31 December 1997 in terms of  
Section 14(2)(c) of the Finance Act No. 38 of 1971.

The audit of accounts of the National Aquatic Resources Research and Development Agency (NARA) for the year ended 31 December 1997 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. In carrying out this audit, I was assisted by a firm of accountants in public practice. My 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 forwarded to the Chairman of the Agency on 3 February 1999.

1:2 Scope of Audit

Audit opinion, comments and findings in this report are based on a review of the financial statements presented to audit and substantive tests of samples of transactions. The scope and the extent of such review and tests were such as to enable as wide an audit coverage as possible within the limitations of staff, other resources and time available to me. The audit was planned and carried out in accordance with generally accepted auditing standards, methods and practices to obtain reasonable assurance as to whether the financial statements are free of material misstatements. The audit included examination of evidence supporting the amounts and disclosures in financial statements and assessment of accounting principles and significant estimates and judgements made in the preparation of financial statements, evaluation of their overall presentation and determining whether accounting policies adopted were appropriate, consistently applied and adequately disclosed. Sub-sections (3) and (4) of Section 13 of the Finance Act No. 38 of 1971 give discretionary powers to the Auditor General to determine scope and extent of the audit.

## 2. Accounts

### 2:1 Opinion

In view of my observations appearing in this report, I am unable to express an opinion on the accounts presented. Major deficiencies observed in this connection are given below.

Deficiency -----	Reference to paragraph in this report -----
(a) Accounting Policies	2:5:1
(b) Inappropriate Disclosures in the Accounts	2:5:2
(c) Omissions in the Accounts	2:5:3
(d) Overstatements and Understatements in the Accounts	2:5:4
(e) Accounts Receivable and Payable	2:5:5
(f) Lack of Evidence for Audit	2:5:6
(g) Non-compliance with Laws, Rules, Regulations, Management Decisions etc.	2:5:7
(h) Transactions not supported by Adequate Authority	2:5:8
(i) Unreliability of Financial Results and Financial Position	3:1
(j) Weaknesses in Systems and Controls	4

## 2:2 Financial Results

According to the accounts presented, the working of the Agency during the year under review had resulted in a deficit of Rs.68,412,195 as compared with the deficit of Rs.25,355,013 for the preceding year. The following statement gives a summary of the financial results for the year under review and the preceding year.

	Rs.	Year ended 31 December		Rs.
		1997	1996	
<b>Income</b>				
Government Contribution	39,000,000		29,072,200	
Sundry Income	1,419,533	40,419,533	3,721,446	32,793,646
<b>Expenditure</b>				
Administration	52,795,992		48,847,871	
Establishment	4,406,468		3,477,934	
Depreciation	54,539,434		19,521,183	
	111,741,894		71,846,988	
Less:				
Amount recovered from Projects	2,910,166	(108,831,728)	13,698,329	(58,148,659)
Deficit for the year		(68,412,195)		(25,355,013)
Accumulated Deficit Brought forward	(175,038,515)		(149,458,087)	
Prior Period Items	2,282,522	(172,755,993)	(225,415)	(149,683,502)
Accumulated deficit carried forward		(241,168,188)		(175,038,515)

### 2:3 Financial Structure

According to the accounts presented, the financial structure of the Agency as at 31 December 1997 compared with that as at 31 December 1996 is given below.

	As at 31 December			
		1997		1996
	Rs.	Rs.	Rs.	Rs.
<b>Resources</b>				
Government Contribution		177,513,380		137,553,380
Foreign Aid	151,186,985		109,987,256	
Adjustments for Special ) Dollar Account Balance )	(8,853,775)	142,333,210	(8,853,775)	101,133,481
Other Contributions		22,330,225		21,676,225
		342,176,815		260,363,086
Revaluation Reserves		312,908,771		91,202,464
Accumulated Deficit		(241,168,188)		(175,038,515)
		413,917,398		176,527,035
<b>Utilisation</b>				
Fixed Assets at written down value		293,929,518		127,737,700
Vessel "Samudra" Maru		96,947,718		13,949,151
Foreign Aid Projects (Net)		4,673,196		22,249,020
Other Projects (Net)		16,250,003		12,053,183
Net Current Assets		2,116,963		537,981
		413,917,398		176,527,035

## 2:4 Cash Flow

The following statement shows the cash flow of the Agency during the year under review and the preceding year.

	Year ended 31 December			
		1997		1996
	Rs.	Rs.	Rs.	Rs.
Cash Flows from Operating Activities				
Deficit for the year		(68,412,195)		(25,355,013)
Adjustments for Items not Involving Movement of Cash:				
Depreciation	54,539,434		19,958,164	
Provision for Gratuity	2,232,503		419,512	
Profit on Sale of Fixed Assets	-	56,771,937	(3,300)	20,374,376
		(11,640,258)		(4,980,637)
Prior Period Items		2,282,522		(225,415)
Operating Deficit before Changes in Items of Working Capital		(9,357,736)		(5,206,052)
Changes in Items of Working Capital				
Decrease/(Increase) in stock	41,324		(642,467)	
Decrease/(Increase) in Accounts Receivable	3,602,818		(9,574,641)	
Increase/(Decrease) in Creditors and Accruals	(295,395)		2,125,141	
Increase/(Decrease) in Project Creditors	98,447		(617,807)	
(Increase) in Consultancy Project	(1,331,425)	2,115,769	-	(8,709,774)
		(7,241,967)		(13,915,626)
Less: Payment of Gratuity		(829,262)		(274,363)
Net Cash Used in Operating Activities		(8,071,229)		(14,190,189)



Cash Flows from Investing Activities			
-----			
Acquisition of Fixed Assets	68,644,508	(18,995,890)	
Proceeds from Sale of Fixed Assets	-	3,300	
	-----	-----	
Net Cash Used in Investing Activities	(68,644,508)		(18,992,590)
Cash Flows from Financing Activities			
-----			
Grant Received - Government	39,960,000	27,090,000	
- Foreign Grant	41,853,729	2,175,278	
	-----	-----	
Cash Generated from Financing Activities	81,813,729		29,265,278
	-----		-----
Net Increase/(Decrease) in Cash and Cash Equivalents	5,097,992		(3,917,501)
Cash and Cash Equivalents at Beginning of the Year	3,530,711		7,448,212
	-----		-----
Cash and Cash Equivalents at End of the Year (Note 1)	8,628,703		3,530,711
	=====		=====

Note :1

	Year ended 31 December	
	-----	-----
	1997	1996
	-----	-----
	Rs.	Rs.
Bank Balances (net)	1,032,240	3,530,711
Cash in transit	3,096,463	-
Seven days Call Deposits	4,500,000	-
	-----	-----
	8,628,703	3,530,711
	=====	=====

## 2:5 Comments on Accounts

### 2:5:1 Accounting Policies

Following observations are made

- (a) Work in progress on long term contracts had not been valued as at 31 December 1997. The cost incurred has been set off against receipts from the customers and the surplus/deficit shown under creditors/debtors.
- (b) The Project expenditure totalling Rs.20,923,199 (net) as at end of the year under review had been shown as fixed assets viz. Rs.4,673,196 under Foreign Aid Projects and Rs.16,250,003 under Other Capital Projects. The project expenses were made up of both tangible and intangible assets. The project expenditure had been amortized on a straight line method at 20% on cost irrespective of intangible components. The amortisation so provided amounted to Rs.22,820,800.
- (c) Fixed assets disclosed in the balance sheet amounting to Rs.411,800,436 ~~were~~ not physically verified during the year 1997.
- (d) Motor vehicles have been depreciated at 10% per annum. The rate applied is inadequate.

### 2:5:2 Inappropriate Disclosures in the Accounts

Following inappropriate disclosures in the accounts were observed.

- (a) The deficit of Rs.32,321,249 arising on revaluation of equipment has been incorrectly debited to the revaluation reserve account.
- (b) Revenue expenditure of Rs.128,800 had been capitalised and disclosed in the equipment account.
- (c) Prepaid expenses totalling Rs.116,818 had been charged against income instead of being shown as a prepayment.

### 2:5:3 Omissions in the Accounts

Following omissions in the accounts were observed.

- (a) No provision had been made in respect of slow moving and obsolete stock amounting to Rs.53,150.
- (b) No provision had been made in the accounts in respect of long outstanding advances given to employees totalling Rs.122,559, the recovery of which is doubtful.
- (c) No provision had been made for obsolete stock of library books.

### 2:5:4 Overstatements and Understatements in the Accounts

Following overstatements and understatements were observed.

- (a) Buildings had been overstated by Rs.77,860,000 due to duplication of the Mattakkuliya property.
- (b) Accrued expenditure had been understated by Rs.853,263 due to the non provision for payments on unutilised medical leave for the year under review.
- (c) An expenditure of capital nature amounting to Rs.18,040 incorrectly had been written off to repairs and maintenance of buildings. As a result the capital expenditure had been understated.
- (d) Fully depreciated library books had not been removed from the cost. As a result, depreciation had been calculated on such books.

2:5:5 Accounts Receivable and Payable

Following observations are made.

- (a) Receivables amounting to Rs.472,042 did not represent any realisable value.
- (b) A sum of Rs.6,103,830 continued to be shown as arrears of rates and taxes payable to the Colombo Municipality for the period 1979 to 1996.
- (c) Out of debtors, deposits and advances, balances totalling Rs.1,404,643 and Rs.441,673 were outstanding for periods ranging from one to two years and over two years.
- (d) Out of the creditors, balances totalling Rs.2,323,000 and Rs.3,912,000 were outstanding for periods ranging from one to four years and over four years respectively.
- (e) Out of the project creditors balances, Rs.224,345 was outstanding for a period of over five years.
- (f) Petty cash advances totalling Rs.394,111 given to the staff during the period 1991 to 1997 had not been recovered upto end of the year 1997.
- (g) A sum of Rs.15,070 being surcharge recoverable from an employee in connection with a cash shortage in March 1993 had not been recovered upto end of the year.
- (h) Refundable tender deposits received during the period 1993 to 1997 totalling Rs.218,590 were remaining uncleared as at end of the year.

2:5:6 Lack of Evidence for Audit

The following items in the accounts could not be satisfactorily vouched or accepted in audit due to lack of evidence indicated against each item.

Item -----	Value Rs. -----	Evidence not made available -----
(a) Fixed Assets	411,800,436	(i) Properly maintained fixed assets register  (ii) Verification reports
(b) Motor vehicles	654,000	Registration books
(c) Debtors	2,806,762	) )
(d) Deposits	169,472	) )
(e) Purchase Advances	815,118	) )
(f) Service Advances	582,060	) )
(g) Bank balance (A/c No.2824)	342,075	Confirmation
(h) UNDP current account balance	23,214	-do-
(i) A copy of the Corporate Plan had not been submitted for audit.		

2:5:7 Non-compliance with Laws, Rules, Regulations, Management Decisions etc.

Instances of non-compliance observed in audit are given below.

Reference to Laws, Rules, Regulations and Management Decisions

Particulars

(a) Finance Act.

(i) Section 12

Approval of the relevant Minister with the concurrence of the Minister of Finance had not been obtained for the form and contents of the annual accounts.

(ii) Section 13(5)(b)

Report on stocks, stores, debtors and creditors had not been furnished to the Auditor General along with the accounts.

(iii) Section 13(5)(d)

An internal audit programme had not been settled in agreement with the Auditor General and half yearly internal audit reports for the year 1997 had not been submitted as prescribed.

(iv) Section 13(6)

Report on accounts as specified by the Auditor General had not been furnished along with the accounts.

Accounts were rendered for audit only on 26 October 1998.

(v) Section 14(1)

A copy of the draft annual report had not been submitted within 4 months after the end of the financial year.

(b) Treasury Circular No. 842 of 19 December 1978

Values of individual assets were not shown in the register of fixed assets.

(c) Sri Lanka Accounting Standards No. 11

Although research cost should not be capitalised, development costs amounting to Rs.9,396,976 have been capitalised without the five criteria stipulated in the standard having been satisfied.

(d) Sri Lanka Accounting Standard No. 16

Gratuity provision had not been made from date of appointment of employees.

(e) Lease Agreement dated 4 January 1990

Annual lease rental for 1995, 1996 and 1997 had not been paid to the Board of Investment.

### 2:5:8 Transactions not Supported by Adequate Authority

Following instances were observed.

(a) Out of the capital grant provided by the Government, a sum of Rs.15,969,957 remaining un-spent had been utilised to meet recurrent expenditure.

(b) Board approval had not been obtained to insure motor vehicles used by the Agency but, ownership of which remains with third parties.

## 3. Financial and Operating Review

### 3:1 Financial Results

The working of the Agency during the year ended 31 December 1997 had resulted in a deficit of Rs.68,412,195 compared with the deficit of Rs.25,355,013 for the preceding year.

In view of the material uncertainty reflected in the financial statements as described in paragraph 2:5 above, any attempt to analyse this variance is not likely to lead to any meaningful results.

The financial results disclosed in the annual financial statements of the Agency had been adjusted by the Agency for accounting errors, omissions etc. observed in the subsequent years as a regular feature. For instance, the deficit of Rs.25,355,013 shown in the accounts for the previous year had been adjusted during the year under review by Rs.2,282,522 (net). Similar adjustments made during the previous five years are given below.

Year	Financial Results	Adjustments made in subsequent years
	Rs.	Rs.
1991	(7,733,944)	(12,317,717)
1992	(8,163,129)	(16,294,750)
1993	(10,406,301)	(12,984,015)
1994	(11,875,069)	(1,144,081)
1995	(30,839,267)	(225,415)

In this context, the possibility of similar adjustments of the financial results and the financial position for the year under review in subsequent years cannot be ruled out. Therefore, no reliance can be placed on the financial results and the financial position reflected in the accounts.

### 3:2 Physical Performance

Neither the Project Performance Evaluation Reports had been prepared, nor adequate records had been maintained for the year under review. The progress of the projects and the Agency could not therefore be ascertained.

### 3:3 Apparent Management Inefficiencies

Following observations are made.

- (a) A sum of Rs.12,460 belonging to the Agency had been lying at the Hulftsdorp District Court since 1995. No action had been taken to settle this matter.
- (b) A sum of Rs.25,527 being surcharge recoverable from an employee in connection with a cash shortage in March 1993 had not yet been recovered.
- (c) The bank had debited to the Agency current account No. 2976 for an amount of Rs.107,280 incorrectly. Action had not been taken by <sup>the</sup> management to recover this amount.
- (d) Buildings have been erected on land in Trincomalee not belonging to the Agency. Buildings on this property had been revalued at Rs.4,031,200.



#### 3:4 Repairs and Maintenance of Research Vessel - "Samudra Maru"

The research vessel "Samudra Maru" handed over by the Ministry of Fisheries and Aquatic Resources Development in February 1985 remained inoperative until 31 December 1997 with a crew of five.

Following observations are made.

- (a) A total sum of Rs.14,034,524 had been incurred on repairs and maintenance during the 11 years ended 31 December 1996.
- (b) A sum of Rs.812,679 had been spent on repairs and maintenance during the year.
- (c) The cost of spare parts purchased by the UNDP amounted to Rs.20,310,000.
- (d) The annual cost of salaries and other related benefits of the crew of the vessel amounted to Rs.1,190,420.
- (e) The vessel "Samudra Maru" has been idling during the year due to major overhaul.

#### 3:5 Funding Arrangement for Provision for Payment of Gratuity

A sum of Rs.5,862,583 had been provided for payment of gratuity as at 31 December 1997. However, a fund to settle the liabilities in future had not been created by the Agency.

#### 3:6 Uneconomic Transactions

Following observations are made.

- (a) Although a sum of Rs.6,103,830 had been provided for rates payable to the Municipal Council since 1979, no action had been taken to settle the outstanding balance.
- (b) An advance of Rs.19,023 had been paid to a company, in January 1992 for purchase of library books. The books had not been received yet. However, no action had been taken by the Agency to recover this advance.

### 3:7 Idle Resources

Certain portion of the land, research vessel "Samudra Maru", six vehicles and some building space remained idle during the year under review. Suitable action had not been taken by the Agency to utilise these resources or to take appropriate alternative course of action. These resources were idling for periods ranging from one to eleven years.

### 3:8 Identified Loss

Three officers who had gone on a scholarship to foreign universities on a bond had not returned after completing the scholarship. The Agency has referred this matter to the Attorney General in order to take appropriate legal action to recover the cost of Rs.1,760,133.

### 3:9 Cost of Personnel

A comparative statement of average cost of personnel for the year 1997 and 1996 analysed under each category is given below.

<u>Category</u>	<u>No. of Employees</u>		<u>Average Cost per Employee</u>	
	<u>1997</u>	<u>1996</u>	<u>1997</u> Rs.	<u>1996</u> Rs.
Executives	64	55	125,906	122,716
Non Executives	226	228	63,013	51,767
	-----	----		
	290	283	76,893	65,556
	===	===		

### 3:10 Vehicle Utilisation

The Agency had a fleet of 30 vehicles as at the end of the year under review. Cost of running and maintenance of this fleet during the year under review could not be ascertained in the absence of proper accounting records showing these expenses under separate headings. The total cost of fuel of this fleet during the year under review was Rs.1,136,714 compared with Rs.1,286,528 during the previous year. It was also observed that the running charts and log books had not been properly maintained for individual vehicles indicating the distance travelled, fuel consumed, repair cost etc. Hence, it was not possible to determine the cost of fuel consumed by each vehicle, the average performance per litre and the cost of repairs per vehicle.

### 3:11 Budgetary Control

Significant variations were observed between budget and actual income and expenditure during the year under review thus indicating that the budget had not been made use of as an effective instrument of management control.

### 4. Systems and Controls

Deficiencies observed during the course of audit were brought to the notice of the Chairman of the Agency by my detailed report furnished in terms of Section 13(7)(a) of the Finance Act.

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

- (a) Fixed assets
- (b) Debtors and creditors
- (c) Advances for purchases
- (d) Budget
- (e) Vehicle utilisation
- (f) Review and appraisal of operations and records by the Internal Audit.
- (g) Tender procedure
- (h) Accounting

(S.C. Mayadunne)  
Acting Auditor General.

/mt.

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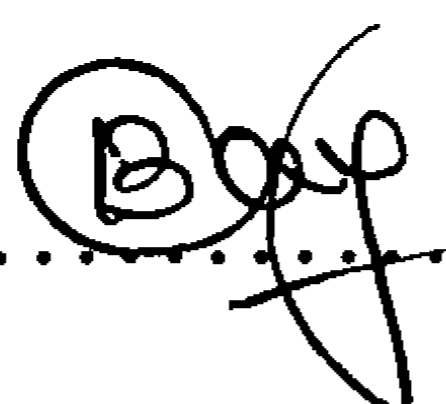
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