

National Science Foundation
47/5, Maitland Place
Colombo 07.

13.08.2001

Hon. Minister of Science & Technology
Ministry of Science & Technology
320, T B Jayah Mawatha
Colombo 10.

Honourable Sir,

**Annual Report of the Natural Resources, Energy & Science Authority of Sri Lanka
for the period 1st January to 31st December 1997**

In terms of Section 16(III) of the Natural Resources, Energy and Science Authority of Sri Lanka Act No. 78 of 1981, I have the honour to submit the Annual Report of the Natural Resources, Energy and Science Authority of Sri Lanka for the period 1st January to 31st December 1997 together with -

- (a) A copy of the Audited Income and Expenditure Account
- (b) A copy of the Audited Balance Sheet
- (c) Auditor General's Report

Yours sincerely,



M Watson
Director
NATIONAL SCIENCE FOUNDATION

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Introduction

Natural Resources Energy and Science Authority (NARESA) was established by Parliamentary Act No. 78 of 1981 on 01/01/1982. It is the successor to the National Science Council (NSC) which was set up by Act No. 9 of 1968 on 28/02/1968.

NARESA was then brought under the umbrella of His Excellency the President, but is now under the Ministry of Science and Technology.

The main objectives of NARESA are:

to advise the Hon. Minister of Science and Technology regarding

- i. Measures for the promotion and development of self-reliance in the application of Science and Technology for the benefit of the people of Sri Lanka.
- ii. Policy and measures for the management and development of the natural resources of Sri Lanka in a manner consonant with national interests.
- iii. Allocation of funds for the development of natural resources, energy and for scientific and technological research.
- iv. Initiation, sponsoring and support of S&T research with the following objectives:
 - (a) the development of the resources of Sri Lanka,
 - (b) the promotion of the welfare of the people of Sri Lanka and the advancement of S&T in general in Sri Lanka.
- v. Collection, collation and dissemination of information, publication of reports, periodicals and papers relating to natural resources and their systematic and co-ordinated exploitation and development, the exploitation and use of energy resources and the conservation of energy and other aspects relating to Science & Technology and education of the public thereof.
- vi. Establishment and maintenance of liaison with individuals, associations or institutions in Sri Lanka and in other countries relating to the development of natural resources and conservation and development of energy and other areas of Science & Technology.

The work covered in 1997 has adhered to the above defined objectives. The work has expanded with an allocation of Rs. 22m as the capital expenditure for scientific research during 1998. However there were constraints to all the activities during the year, due to budget cuts.

Financial Status during the Year

NARESA's request for consolidated funds was Rs. 26,250,000/= for the year 1997. Out of this Rs. 22,000,000/= was granted. Subsequently in January 1997, a 20% cut was imposed on a few items of the consolidated budget.

The approved foreign aid estimate for the year 1997 was Rs. 13,250,000 and the approved recurrent estimate was Rs. 19,500,000. In January 1997, a 20% cut was imposed on a few items of the recurrent budget.

Special Activities

1. Commissioned Research Scheme

With the view of funding projects of national importance, NARESA initiated the commissioned research scheme.

The Steering Committees were requested to select areas under each field for Commissioned Research. These priority areas were advertised in the newspapers calling for well formulated multidisciplinary project proposals for consideration and inviting scientists to indicate their areas of interest. The applications received were evaluated by the Steering Committees.

A workshop was held with the chairpersons and two members of each Steering Committee, Heads of Research Institutions, eminent scientists and the staff of NARESA participating. The objective of the workshop was that the discussion of such a scientific group will lead to the formulation of project proposals to be funded under Commissioned Research. Several researchers indicated their willingness to submit proposals and participants discussed important areas of research.

2. Applied Research Grants Scheme

A brain-child of NARESA during 1997 was the above scheme. This scheme was initiated to establish an interaction between the public and the private sector. This scheme was approved by the Board of NARESA and was advertised in the newspapers. Under this scheme grants are to be awarded to researchers in the universities and research institutions to carry out projects in collaboration with one or more industries as partners.

Criteria for project selection are:

- * Applied research or experimental developments carried out mainly in the universities/institutions.
- * Projects in the areas involving technologies of national strategic interest.

Consideration being given to aspects such as new linkages, innovative projects which support the further development of centres, promotion of interdisciplinary and inter-institutional team work, enhancement of existing industrial support for science and technology, provision of support to new industries in addition to existing industries, help in the development of special skills and enterprise, and also that expertise resulting from the work could be applied commercially in industry.

3. **The Zoological Survey of Sri Lanka - ZSSL**

The Zoological Survey of Sri Lanka, the revival of which was approved by the Board in November 1996, was initiated with the appointment of a Special Committee for the ZSSL. The ZSSL was necessary in order to establish a permanent Zoological Survey of Sri Lanka for the purpose of taxonomic documentation and maintenance of a "Zoological Collection." With the current emphasis on biodiversity this has become an urgent need for the country. Sri Lanka is one of the world's hotspots of biodiversity and this invaluable national heritage needs to be documented and conserved.

The Committee members of ZSSL are;

Dr. K.D. Arulpragasam
 Prof. H.H. Costa
 Prof. W.R. Breckenridge
 Prof. F.P. Amarasinghe
 Dr. C.R. Panabokke
 Mr. Lyn de Alwis
 Mr. N.W. Dissanayake
 Mr. K.D.R.N. Wijesinghe
 Mr. S. Lakdusinghe
 Miss. J.D.S. Dela

Under the ZSSL, the Committee will organise integrated, multidisciplinary studies aimed at describing critical ecosystems, as a prelude to formulating plans for conservation and management of such ecosystems. The main functions of the Committee are the facilitation of taxonomic studies, the building up of a national zoological collection and the creation of a national faunal database.

4. **Intellectual Property Rights**

Intellectual property rights issues have assumed great importance in science and technology, particularly with the establishment of the World Trade Organization (WTO) and entry into force of the Trade Related Intellectual Property Rights Agreement (TRIPS) in January 1995. Recognizing the importance of this issue, NARESA formed an IPR cell in April 1997 with the following functions.

- (i) To advise the Ministry on issues concerning patent rights associated with scientific discoveries, inventions and other intellectual property.
- (ii) To support the Registrar of Patents and Trade Marks in the screening and evaluation of patent applications pertaining to scientific intellectual property.
- (iii) To study developments pertaining to international issues concerning scientific and technological IPR , where necessary with outside expert support.
- (iv) Collect information with regard to IPR and related policy issues.
- (v) Develop an appropriate position to be taken up by Sri Lanka with respect to the enforcement of the provision of the TRIPS Agreement.
- (vi) Any other functions that may from time to time become relevant with respect to the Sri Lankan situation regarding IPR.

Mr. M. Watson, Director Scientific Affairs, visited India on a weeks' study tour. The primary objective of this visit was to familiarize himself with programmes and structures in the Indian Science and Technology institutions for intellectual property rights management.

A literature resource base on IPR is being built up. About 75 papers including articles from journals/books, press clippings and other publications have been collected.

Sponsorship of Scientific Research

The Research Grants Scheme

Under this scheme, applications are invited for grants for research projects by advertisement in national newspapers annually. Applications received are screened and evaluated by the Steering Committees and recommendations are made on a priority basis for approval by the Board of Management. The grants awarded are monitored regularly through progress reports submitted and progress review seminars. Once the research project is completed, a final report is submitted by the grantee, which is evaluated by a specialist appointed by the Steering Committee. The evaluation takes into account any post graduate degrees awarded to personnel associated with the project and also the intrinsic scientific contributions made towards widening the horizons of knowledge and/or application of science and technology for development.

Details of grants awarded during the year are given in the Tables annexed.

Progress Review Seminars for NARESA grants

As is customary, NARESA held progress review seminars to evaluate the progress of projects in different disciplines. In addition to Steering Committee members and grantees, guest scientists participated in these seminars by invitation and contributed their expert opinions. The details of these seminars are given below.

Discipline	Date	No. of Presentations
Agriculture	28 th November	07
Chemistry	04 th December	06
Chemistry	18 th December	08
Energy	29 th October	05
Medical & Vet. Sciences	13 th November	08
Physical, Engineering & Mathematical Sciences.	15 th December	07
Science Education	20 th November	04

Measures taken for Enhancing Self-reliance in Science and Technology.

The following seminars and workshops were held during 1997, in order to enable scientists/researchers to share experiences, to update knowledge and also to provide fora for discussions.

Date	Theme
7 th -8 th March	<p>Popular Science Writing Organized by - The Steering Committee on Science Education Venue - NARESA No. of Resources Persons - 14 No. of Participants - 36</p>
9 th April	<p>Establishment of a Centre for Bioactivity Testing and Research Organized by - The Steering Committee on Chemical Sciences Venue - NARESA No. of Resources Persons - 08 No. of participants - 36</p>
17 th May	<p>Globalization Organized by - The Steering Committee on Social Sciences Venue - NARESA No. of Resources Persons - 04 No. of Participants - 13</p>

- 4th-11th June **Remote Sensing for Coastal and Forestry Resources Management**
Sponsored by - NARESA and Commonwealth Science Council
Venue - NARESA
No. of Resources Persons - 04
No. of Participants - 38 (representing 13 countries)
- 22nd August **Impact of Research on the National Health Policy**
Organized by - The Steering Committee on Medical, Veterinary & Dental Sciences
Venue - NARESA
No. of Resources Persons - 03
No. of Participants - 40
- 18th September **Geographical Information Systems**
Venue - NARESA
No. of Resources Persons - 06
No. of Participants - 100
- 12th September **Preparation of Project Proposals and Final Reports.**
Organized by - The Steering Committee on Agriculture and Animal Husbandry
Venue - NARESA
No. of Resources Persons - 02
No. of Participants - 45
- 28th October **Alternatives for Coral Based Lime for use in the Building Industry.**
Organized by - The Steering Committee on Natural Resources
Venue - NARESA
No. of Resources Persons - 06
No. of Participants - 25
- 05th December **Partnership of Scientific Research and Industry towards 2000 AD**
Organized by - The Steering Committee on Biological Sciences
Venue - Hotel Trans Asia
No. of Resource Persons - 03
No. of Participants - 80

Public Awareness Seminar Series - "Science for Everyday Life"

In keeping with its policy to create public awareness and interest among school children and the general public, a series of seminars was conducted through the Steering Committee on Science Education on the central theme of "Science for Everyday Life".

The objectives of this seminar series are to create general awareness of the usefulness of science and educate selected sectors of the population on the use of science and simple technologies to enrich life and living. Five seminars were held in different districts on “Climate Change and Environment”, “Maternal Nutrition” and “Landslides”.

22 nd September	<p>Climate Change and Environment Venue - Sangamitta Balika Maha Vidyalaya, Galle No. of Resource Persons - 02 No. of Participants - 200 Participants - School teachers, students</p>
24 th October 1997	<p>Landslides Venue - Rodgewell Hall, Kandy No. of Resource Persons - 02 No. of Participants - 150 Participants - School teachers, students, samurdhi officers, youth service trainees, grama seva niladharis</p>
12 th May 1997	<p>Maternal Nutrition (a) Venue - Castle Street Hospital No. of Resource Persons - 03 No. of Participants - 95 Participants - Mid wives, nurses, pregnant women</p>
27 th June 1997	<p>(b) Venue - Pradesheeya Saba Office, Matugama No. of Resource Persons - 03 No. of Participants - 120 Participants - School teachers, students, samurdhi officers, grama seva niladharis</p>
03 rd October 1997	<p>(c) Venue - Pradesheeya Saba Auditorium, Elpitiya No. of Resources Persons - 03 No. of Participants - 100 Participants - School teachers, students, samurdhi officers, grama seva niladharis</p>

Presentations Based on Research Grants

A lecture was delivered on 27th June by Prof. U. Samarajeewa on ‘**Histamine in market fish products in Sri Lanka - Incidence, formation and effect of processing**’ based on the results of the research project No. RG/95/BT/10. The lecture discussed the concentrations of histamine present in fresh fish, dried-fish, canned fish, maldive fish and other fish products available to the consumer. Conditions that lead to accumulation of histamine, effects of processing and cooking, analytical

methods and the current international regulatory status were also discussed.

Review of Significant Research Findings

(1) A survey on the existing turtle hatcheries and mapping of the nesting beaches of turtles along the North-West, West, South-West, South and South-Eastern coasts of Sri Lanka

According to the above survey no turtle nesting beaches were found to remain in the Puttalam and Gampaha Districts. Some beaches in the Colombo, Kalutara and Matara districts were occasionally nested by turtles. The good nesting beaches were mainly located in the Galle and Hambantota districts. Kosgoda-Induruwa area (in Galle District) and Rekawa beach (in Hambantota District) have been identified as turtle rookeries.

Three beaches, Kosgoda-Induruwa, Rekawa and Bundala are still being regularly visited by all the five species of turtles inhabiting Sri Lankan waters.

The following have been identified as the main threats to the turtle fauna of Sri Lanka.

Man included -

1. Exploitation of turtle eggs right along the coastal line
2. Current practices of existing hatcheries
3. Fishing mortality
4. Destruction of nesting and foraging habitats
5. Exploitation of nesting animals

Natural -

- Beach erosion
- Natural predation

The following recommendations have been made based on this study.

- 1 Declaration of Kosgoda - Induruwa beach as a protected area
- 2 Strict implementation of the law regarding the offences related to the turtles
3. Research and educational programmes to be established at the major nesting beaches
4. The concept of turtle based eco-tourism to be implemented at the major nesting beaches

(RG/95/B/2 - Dr. D. Amarasooriya, Dr. P. Dayaratne)

(2) Studies on sarcocystosis in cattle and goats in Sri Lanka

The findings of this study indicate that a large proportion of the Sri Lankan cattle and goat population remain as a potential source of Sarcocystosis infection. Based on the morphological features, three species of *Sarcocystis*, viz. *S. Cruz*, *S. Hirsuta* and *S. hominis* were infected with *S. Cruz* which is considered to be the most pathogenic *Sarcocystosis* species in cattle. Only one species, *S. capracanis* was found in goats in the country. Certain *Sarcocystis* species, e.g. *S. hominis* are pathogenic to man and reported to have caused gastroenteritis characterised by nausea, abdominal pain and diarrhoea.

(Dr. G.S.P. de S. Gunawardena, Dr. M.B. Navaratna, Ms. H.A.M.L.K. Algama - RG/95/V/1).

(3) Prevalence of Hepatitis B virus serological markers in multi-transfused haemolytic anaemia children

Hepatitis B virus is linked to primary liver cancer and chronic liver diseases. An effective vaccine is available to prevent this infection. Studies so far, have shown that Sri Lanka has an HbsAg carrier rate of less than 1 percent in the general population. However, few studies have been done to identify prevalence of infection in high risk groups. Thus, the objective of this study was to determine the prevalence of HBV markers mainly in children with thalassaemia and also others receiving regular blood transfusions.

This study has shown that in Sri Lanka thalassaemic children and other multi-transfused children are a high risk group for HBV infection and should receive vaccination against Hepatitis B virus infection. In addition, risk of transmission of HBV infection through transfusions should be minimized by the use of voluntary donations, stringent donor selection measures and the use of sensitive screening assays.

(Prof. Lalitha Mendis, Dr. Sunethra Gunasena - RG/95/M/14).

(4) Nosocomial infections in the Intensive Care Unit and the Dialysis Unit - General Hospital Colombo.

The following observations were made by grantees based on the results of this study.

PART A: Infections in the intensive care units; National Hospital of Sri Lanka.

- * Nosocomial infections in the intensive care units in the National Hospital Sri Lanka is a common occurrence.
- * The micro organisms responsible are usually Gram negative bacilli.
- * Steps should be taken to improve microbiological diagnosis as the identification of the causative agent is helpful in the proper management.
- * More emphasis should be given on the prevention of these infections.

PART B: Complication of peritoneal dialysis; dialysis unit, National Hospital of Sri Lanka.

- * Peritonitis was the commonest complication of acute peritoneal dialysis leading to a high mortality.
- * Coliforms were the major causative agent in peritonitis during acute peritoneal dialysis. The low incidence of gram positive organisms would have been due to the prior antibiotic therapy before commencing the peritoneal dialysis.
- * Rational use of antibiotics should be encouraged as it will decrease the risk of emergence of resistant organisms.
- * Isolation of the causative agent and the knowledge on antibiotic sensitivity pattern will provide the key to the successful management of peritonitis. Therefore routine culture of dialysis effluent during peritoneal dialysis is recommended.
- * More emphasis should be given to the maintenance of strict hygienic conditions in the dialysis unit.

(Dr(Ms) J.K.P. Wanigasuriya, Prof. R. Sheriff - RG/95/M/17)

(5) Development of low cost colorimeter and low cost analytical experiments for undergraduate teaching and research.

Construction of a low cost colorimeter was achieved. Based on the cost and the accuracy of the instrument the Steering Committee on Chemical Sciences had suggested that it be introduced into the A/L syllabus. Fine tuning of the instrument is being done before negotiating with the Education Department with the view of producing many instruments.

(Dr. S.A. Fernando - RG/95/C/03).

(6) Development of a kinetic analytical method for the determination of trace amounts of mercury.

The reaction of hexacyanoferrate (II) and nitrosobenzene which is catalyzed by mercuric ions has been successfully used to determine trace amounts of mercuric ions. This method is one of the most sensitive analytical methods to determine mercuric ions especially considering the simple instrumentation involved.

In this method a linear relationship between a rate parameter and the concentration of mercuric ions is considered for calibration purposes, thus, deviating from the conventional analytical methods.

(Dr. J.H. Wimalasena - RG/93/C/02)

(7) Development of solar cells on sensitized colloidal TiO₂ films

Preparation and characterization of high surface area nanoporous colloidal titanium dioxide films have been achieved. Attachment of dyes to such surfaces via surface chelation has been successfully carried out. Although the quantum efficiencies observed are too small to be of any practical significance, fabrication of novel photovoltaics of the type TiO₂/dye/SC where SC is a p-type semiconductor with high efficiencies is a practical possibility.

(Prof. O.A. Ileperuma - RG/92/C/08)

(8) A method to forecast extreme weather systems over Sri Lanka during winter monsoon period

The grantee has analysed the data existing in the Meteorology Department including

- Daily rainfall at meteorological stations
- Upper wind observations (Radar & Pilot)
- Synoptic surface wind data
- synoptic surface data\
- satellite data

The significance in experiencing rain over most parts of the island on and the day after the days with easterly waves active over Colombo can be considered as important in preparation of short range weather forecasts specially for agriculture.

The grantee has come out with some interesting findings which are useful to weather forecasters.

(Mr. K.R.A. Bandara - RG/94/P/1)

(9) Electrodeposited Cuprous Oxide for solar cell application

It has been discovered that electrodeposition of cuprous oxide under potentiostatic condition produces good quality films and by annealing in air at or below 300⁰ C the n-type behaviour of the films can be improved. Rectifying contacts can be made with various metals in order to use them in solar cells. ITO/Cu₂O/Cu₂S system demonstrates the possibility of developing a low-cost solar cell by improving the fabricating parameters. The grantee has developed techniques for the preparation of thin films of n-Cu₂O.

(Dr. W.P. Siripala - RG/94/P/3)

(10) Impact of droughts on rained crops in the Hambantota District

The author emphasizes the need for stabilization of chena lands in the Hambantota District. The author proposes to provide irrigation facilities for those lands. Rehabilitation of abandoned small tanks, a major irrigation scheme and construction of agro-wells are proposed as potential solutions to mitigate drought hazards.

Clear land ownership should be established in those chena lands, which now is an impediment to chena stabilizations. The author proposes also to introduce drought tolerant crops to the district. The introduction of water harvesting and water saving techniques would also help to stabilize chena lands.

It is recommended to introduce an assured price for selected rainfed crops. It will help to promote valuable and low input food varieties like Kurakkan, Sesame, Gingerly etc.

Establishment of permanent crops, specially Kadju is one of the solutions proposed to mitigate hazards of droughts. Kadju is a profitable crop. Kadju nuts have an export value too. The production of Jam out of Kadju fruit is one of the proposed activities.

The author recommends also to conduct activities to supply information on technologies, market prices and profitable crops to farmers.

It is imperative to introduce soil conservation technologies to those chena lands if stabilization is undertaken. There is also a potential to establish forest plantations in those lands.

(Mr. M. Ratnayaka - RG/96/SS/03)

(11) A study on the attitudes related to science of secondary school students of Sri Lanka with special reference to Galle District

A sample of five hundred and ten students were selected from twenty three schools by the random and stratified method of sampling. Sixty nine teachers handling the science teaching learning process at secondary level were selected through the stratified and random method. Discussions were held with curricula developers. Conclusions were reached based on answers to questionnaires and discussions.

The following conclusions could be reached from the results of the study:

- (i) In preparing the secondary level science curriculum currently in use in Sri Lanka, science related concepts have not been directly incorporated into the objectives
- (ii) The awareness of the science related concepts in interpreting the objectives of the curriculum is poor in teachers handling the science teaching process.

- (iii) Although more than 75% of the students held scientific concepts which lead to the investigative process, less than 25% of students had a scientific approach which would lead to the proper application of a scientific result.
- (iv) Students as a whole have a positive attitude towards science
- (v) Although the attitude towards science varies according to the type of school, class and the curriculum, there is no difference based on the gender.

(Mr. W.G. Karunaratna, Ms. N.A. Amarasinghe - RG/97/SE/01)

(12) Investigation of the Principal's leadership qualities that contribute to teachers' motivation and loyalty with special emphasis on Science Education.

The main objective of this study was to investigate the leadership qualities of the principal which will enhance motivation and loyalty in the staff. The positive features of the leadership role of the principal, the leadership style adopted by the principal, the welfare measures taken to stimulate motivation in teachers, programmes introduced to improve the teacher motivation in curricular and extra curricular activities and the factors that have contributed to the improvement of teacher motivation were investigated by the researcher.

Over 80 per cent of the teachers agreed that there are positive features in the principal's leadership role (such as possession of educational and professional qualifications to suit the school, exemplary behaviour, possession of grades suited to a principal, possession of a good personality), that even within an official framework, participatory style of administration was being practised, and that essential teacher welfare activities are carried out. All the groups of teachers agreed that although the teacher welfare activities and extra curricular activities in operation and the enthusiasm of students, the leadership role of the principal, the popularity of the school were all contributory to the stimulation of teacher motivation, the principal's leadership role was the strongest contributory factor.

(Mr. S.A.M. Hettige - RG/95/SE/07)

(13) Preparation of a comprehensive database on selected industrially important medicinal and aromatic plants of Sri Lanka .

Collection of information on botany and cultivation, chemistry and activity and industrial applications of selected medicinal and aromatic plants is in progress.

A computerized database using CDS/ISIS software will be compiled.

Using the computerized information, booklets are expected to be compiled for each plant.

(Mrs. D.S.T. Warnasuriya, Mrs. H.N.K. Dissanayake - RG/96/IS/01)

(14) Optimizing amyloglucosidase and citric acid production from *Aspergillus niger*

The research carried out can be described under three headings, namely

1. Strain improvement of *Aspergillus niger* for citric acid production
2. Optimizing fermentation conditions of surface liquid culture for citric acid production by *Aspergillus niger*
3. Down stream processing of citric acid strain improvement and optimization of medium for efficient citric acid production in liquid surface culture were carried out simultaneously and thereby the fermentation time for citric acid production was shortened from 22 to 8 days with concurrent increased production of citric acid from 1 to 58 gl^{-1} (glucose).

(Prof. K. Balasubramaniam - RG/93/BT/01)

(15) Antisense oligonucleotides for analysing functions of *Plasmodium falciparum* proteins as potential therapeutic agents for malaria.

The use of synthetic oligonucleotides as potential therapeutic agents for malaria has been investigated using in vitro culture of *Plasmodium falciparum*.

Antisense effects with oligonucleotides could not be observed, presumably due to their inability to cross the three membranes shielding the intracellular parasite. However a strong, dose-dependent non-specific inhibition of merozoite invasion was observed with oligonucleotides and a polyanion dextran sulphate. Polyanions are therefore candidate therapeutic agents for the treatment of acute, drug resistant and complicated cases of malaria.

(Prof. R. Ramasamy - RG/95/BT/03)

(16) SIDA Research Programme on Renewable Energy & Energy Efficiency

Solar energy in tea drying process

The two year period of phase I, ended in December 1996. The project progressed with the guidance of Dr. A.N.S. Kulasinghe, the consultant.

Size of the collector was 6' x 2.34' and the average weight was about 34 kg. The target of fabricating 200 collector frames using Zinc Alum for the outer frame and normal GI roofing sheets for the absorber plate was achieved.

Construction of a structure adjacent to the factory to instal these collectors was continued. The collectors will be connected to the furnace/heat exchanger through a ducting system to transfer the pre-heated air.

(Dr. Ziyad Mohamed, Mr. S. Koneswaramoorthy - SAREC/EP/01)

Energy efficiency in buildings

Lighting study

The first phase of the research project was basically to measure the existing illuminance levels in corridors, bedrooms, bathrooms and kitchens of six large hotels, Selected hotels were from the city of Colombo and outstation beach resorts. About ninety foreign guests had been interviewed to get their perception of the existing illuminance levels used in various places in these hotels.

Under office lighting, the illuminance/visual performance relationship using "Landolt" rings for employees such as clerks, typists, computer operators, executives etc. were determined. About 120 persons were selected statistically from representative firms/institutions.

Assessment of optimum illuminance/productivity relationship in 05 garment factories was also carried out. The studies revealed that the overseas standards of illuminance set for various activities studied are higher than what is actually required. Therefore, required illuminance levels for Sri Lanka could be less than those of developed countries. The recommended illuminance levels are as follows.

Hotel Interior	Illuminance in Lux
Bedroom	15 - 30
Bed head	120 - 175
Bathroom (General)	130 - 150
Bathroom Mirror	200 - 225
Corridor	25 - 50
Office Workers	300

(Mr. S. Fernando - SAREC/EP/02)

Thermal efficiency study

This study involved literature survey and software design for calculation of the thermal performance index levels of buildings. Two case studies were done to compare the accuracy of the automated process. The Watt per square metre of two buildings of recent construction studied indicates that the figures are comparatively high.

A draft guideline for EEBC has been worked out and areas of further studies have been identified.

Mr. Jeevan Jayasooriya the research student of the thermal study joined AIT, Bangkok to follow a M.Sc. Course.

(17) Pilot Project on “Disposal of market garbage producing biogas and fertilizer”.

One main problem faced by NERD officers was the leaking of biogas from outlets and gas holder (Rexene cloth). Special gas tight plaster was applied to all three digesters to avoid leaking of air from the concrete walls as the digester walls had not been constructed according to gas tight conditions. The digester was replastered using Bondkote. As the Rexene cloth of the gas holder collapsed due to rain and other factors a fiber glass material was introduced for the holder.

(Mr. Victor Mendis)

Communiqués sent to Respective Institutions

- (i) On a request made by UNESCO, a detailed review of two international biosphere reserves, Sinharaja and Hurulu, was submitted to the UNESCO secretariat, Paris. The objectives of this periodic review is to update information and to evaluate how the biosphere reserves which have been designated so far ten years or more fulfil the criteria as recently refined. This review is a positive exercise aimed at making each biosphere reserve fully functional, and should provide opportunities for an in-depth discussion among all the stake holders involved in the biosphere reserve.
- (ii) Guidelines for the conservation of turtles were prepared and submitted to the Department of Wildlife conservation. These guidelines were prepared for a workshop proposed to be conducted at the Department of Wildlife to prepare scientific guidelines in relation to turtle hatcheries. No progress has been made on this matter to date due to many changes in the Department of Wildlife.
- (iii) A draft joint cabinet memorandum on Genetically Modified Organisms (GMOs) to be presented by the Ministry of Environment and the Ministry of Science & Technology was studied at the request of the latter and comments submitted. The recommendations made were:

- (a) That a Biodiversity Research Coordinating Unit be established under H.E the President with a mandate to monitor and regulate where necessary, biodiversity research conducted in the country and to receive, process, modify, reject or approve all research proposals with foreign collaboration in the field of biodiversity.
- (b) That no exotic biological matter including microorganisms, Living Modified Organisms (LMO) or Genetically Modified Organisms (GMO) shall be brought to the country without prior approval from the unit.

Inter Institutional Linkages Developed

- (1) A meeting was held on 7 May 1997 with the Southern Development Authority (SDA) to discuss possible ways of dealing with problems associated with coral mining in the context of the development programmes planned for the southern coastal areas.

It was highlighted that the main problem in controlling off-shore coral mining is the lack of alternative sources of livelihood for those engaged in coral mining. Although there had been some success in the Special Area Management Project at Rekawa, the problem continues to prevail in other areas.

The following were among the possible steps that were discussed.

- (a) The SDA could offer attractive alternative employment giving priority to the coral mining community in their development projects - Hambantota being developed into 'Ruhunupura' :- the International Airport and Sea Port in Hambantota, Super Highway between Colombo and Matara, Ornamental Fish Industry, Eco-Tourism.
 - (b) Conduct awareness programmes to educate the public.
 - (c) Identify responsibilities which can be offered to school leavers (Grade 9, O/L, A/L) as Natural Resources Protectors in the Conservation of turtles and protection of migratory birds and tourist guides for Eco-Tourism.
- (2) A preliminary discussion on "**Alternatives to coral based lime for use in the building industry**" was held on 22 September 1997 in order to decide upon the topics to be addressed at a workshop on the said theme. The organizations represented at the meeting were; Institute for Construction, Training and Development (ICTAD), Sri Lanka Standards Institution (SLSI), Building Materials Corporation (BMC), Ceylon Institute of Scientific and Industrial Research (CISIR), University of Moratuwa, Puttalam Cement Company, Coast Conservation Dept.(CCD), Forest Department, Geological Survey and Mines Bureau.
 - (3) Request for the protection of the springs at the Thambiligala estate within the catchment area of the Udagama Village in Ulapane.

The above mentioned water source is found 150-200 yards ahead of the 17th mile post on the Gampola-Nawalapitiya main road. Enquiries into the protection of the catchment revealed that about 1/4 of an acre of the catchment area had been identified by the Forest

Department to be planted under the tree planting programme during 1997. The area will be planted with suitable species under the participatory Forestry Project.

Inter - Ministerial Meetings

Date - 05/06/1997
 Venue - Ministry of Fisheries and Aquatic Resources Development
 Theme - Recommendations made for the conservation of mangroves, shrimp farming & coral reefs.

The Man and the Biosphere (MAB) National Committee prepared the recommendations on sustainable development of shrimp farming, conservation of mangroves and coral reefs. These recommendations were submitted to the Hon. Minister of Science and Technology for implementation. At the request of the Minister of Science and Technology, an inter-ministerial meeting was held with the Ministry of Fisheries to discuss the issues. Environmental degradation of the coastal areas was discussed at this meeting. A coastal zone remote sensing project and a wind energy project were also discussed.

It was decided to set up three Inter-Ministerial Committees, one of which was on coastal resources to propose specific actions for implementation. However this did not materialise consequent to a change in Ministry personnel.

Parliament Consultative Committee Meetings

A Parliament Consultative Committee meeting was held on 06-05-1997 at the Parliament. Annual Reports and the performance review of scientific institutions under the Ministry of Science and Technology were discussed.

Publications and Periodicals

Regular Publications

(1) Journal of the National Science Council

Vol 25, No.1, 2 and 3 (March, June, September 1997)

The Editorial Board of the JNSC decided to publish a JNSC special issue to mark the 25th anniversary of the publication of the journal. The title is : "Impact of Science & Technology on Development in Sri Lanka in the period 1972 - 1997". Several eminent scientists were

invited to contribute articles on themes identified by the Board. During the year articles submitted were being reviewed.

(2) **Sri Lanka Journal of Social Sciences**

Vol. 19, No. 1 and 2 (June, December 1996)

Newsletters

Four issues of the NARESA Newsletter were printed.

Vidurava - Science New Bulletin.

- Vol. 18 No 3 & 4 - "Library - Then & Now" - English and Sinhala - printed.
- Vol. 19 No (1) - "Indigenous Knowledge" - English and Sinhala - articles were processed.
- Vol. 19 No (2) - "Commemorative volume on late Prof. N. Kodagoda" - articles were processed.
- Vol. 19 No (3) - "Solar Energy" - English and Sinhala - articles were processed.

Science Education Series

"Commonsense about our environment" - by Prof. P.G. Cooray. The Steering Committee on Science Education recommended that the articles which were already published in the Island newspaper under the series "Habitat", should be published under the NARESA Science Education series too. Consequently work was underway during the year to bring out this publication.

Science and Technology Investigations Series

After studying the Presidential Task Force reports on Education, the Committee decided to initiate the publication of Science & Technology Investigations with a view to supporting the implementing of the recommendations given in this report. Prof. V. Basnayaka, submitted a proposal for the above for consideration by the Board.

Proceedings of Seminars

Proceedings of the Seminar on "Silica Based Industries-Future Prospects" which was held on 13-09-1997 were published.

Natural Resources Series

The Natural Resources of Sri Lanka 2000: Conditions and Trends

The revision of the Natural Resources of Sri Lanka started with Dr. K.D. Arulpragasam as the general Editor. Writers to whom the chapters were assigned are given below. Expanded contents of the chapters were received and the work was in progress during the year. The data in each chapter would cover the period up to and including the end of 1998.

Chapters	Writers
01. Introduction - Heritage in Natural Resources Management	Dr. K.D. Arulpragasam
02. Population	Dr. A.T.P.L. Abeykoon
03. Economic Conditions and Trends	Dr. N. Sandaratne
04. Energy Resources	Prof. K.K.Y.W. Perera
05. Land Resources	Prof. C.M. Madduma Bandara
06. Water Resources	Prof. C.M. Madduma Bandara
07. Water Pollution	Dr. A.M. Mubarak
08. Mineral Resources	Prof. C.B. Dissanayake
09. Forest Resources	Mr. L.C.A. de S. Wijesinghe
10. Biological Resources	Mr. L.C.A. de S. Wijesinghe
11. Coastal and Marine Resources	Dr. K.D. Arulpragasam
12. Inland Aquatic Resources	Dr. J.M.P.K. Jayasinghe
13. Toward Sustainable Development	Dr. K.D. Arulpragasam
14. Legal Framework	Mr. L de Silva

Special Publications

(1) Printing of the following publications was in progress.

(i) **Some common vegetables of Sri Lanka**

(ii) **NARESA - March for Conservation Publications**

Sinharaja Rain Forest
 Beyond the Seas
 Mammals of Sri Lanka
 Birds of Sri Lanka
 Medicinal Plants

(2) **Revision of the Flora of Sri Lanka**

With the ending of the British Overseas Development Agency/Government of Sri Lanka project on forestry in December 1996, (this project started in 1991) the ODA provided direct support to the project personnel up to May 1997. It is now envisaged to complete all the editorial work of the project by June 1998. A sum of Rs. 109,750/= was allocated by NARESA for this purpose.

During the year, work continued on the last four volumes to be published under this project. The proofs of Vol. XII were checked, material for Vol. XIII prepared for printing, and Vol. XIV (Index) compiled. Vol. XV comprising the ferns and fern allies is under preparation.

Other Reports

A chapter "Meeting Challenges of the year 2000" was written and submitted to the Ministry of Science & Technology, to be included in the publication to commemorate the 50th Anniversary of Independence of Sri Lanka.

A chapter was written for the publication "Progress for 03 years" by the Ministry of Plan Implementation and Parliamentary Affairs.

Awards for Science Achievements made during the Year

(1) **NARESA Merit Awards for Scientific Research**

This scheme of awards was instituted in order to bestow on researchers who have attained a high level of excellence in their research work, the recognition they deserve for their contribution to the advancement of science. These awards are also meant to motivate recipients of research grants from NARESA to achieve and maintain high standards of scientific research.

Merit Awards are awarded biennially for research work of outstanding merit carried out on NARESA supported grants. The Award consists of a cash prize of Rs. 7000/- and a certificate.

The regulations governing the selection of winners are :-

- (a) Recipients of research grants awarded by NARESA, who have completed their projects and submitted comprehensive final reports, are eligible for consideration.
- (b) Awards will be made once in two years for research in all branches of science for which grants have been made by NARESA.

- (c) Nominations will be made by the Steering Committees on the basis of the final reports submitted by the recipients of grants the criteria being (i) originality of material presented (ii) intrinsic scientific merits of the findings (iii) inventive or innovative features of the work (iv) usefulness of the findings to the institution in which work has been carried out (v) possible impact of the findings on the national development programmes.

The award ceremony was held on the 9th of November 1997 in the NARESA Auditorium. Presentations were made by the Hon. Indika Gunawardhana, Minister of Housing and Construction, deputizing for Hon. Bernard Soysa, Minister of Science and Technology. The welcome address was given by Prof. Priyani Soysa, Director General, NARESA. Winners presented their work to an

audience of Board members, Ministry Officials, Heads of Scientific Institutions, Vice Chancellors of Universities and eminent scientists.

For 1997, the winners were:

- (1) Physical, Engineering & Mathematical Sciences and Built Environment

Dr. S.S.L. Hettiarachchi, Head, Department of Civil Engineering, University of Moratuwa

For his work on "The use of management frame works for the environmental protection of coastal zone". Research Grant No: RG/93/E/2.

- (2) Chemical Sciences

Dr. A.S. Amarasekera, Department of Chemistry, University of Colombo

For his work on "Studies on the use of arylhydrazones as 1-Azadienes in the (4+2) cycloaddition". Research Grant No: RG/92/C/01.

- (3) Biotechnology

Dr. C.P. Kodikara & Prof. S. Widanapathirana, Department of Microbiology, University of Kelaniya

For their work on "Determination of virulence factors in food isolates of Listeria". Research Grant No: RG/94/BT/1.

Summary

(1) **The use of management frameworks for the environmental protection of coastal zone**

The research report describes the findings of an investigation on the development of and the use of Management Frameworks for the planning, implementation and management of coastal zone activities in Sri Lanka with emphasis on environmental impact and sustainable multiple uses of the coastal zone. The project successfully commissioned two linked research tasks, namely.

- (i) Review of existing status with regard to mechanisms relevant to planning and management in the coastal zone.
- (ii) Develop methods and tools forming an appropriate Coastal Management Framework as a coherent, defined process applicable in the overall planning and management of coastal zone development work.

The study has investigated different types of Management Frameworks and recommends the development of an Integrated Coastal Management Framework as the most appropriate to satisfy the current and projected demands on the coastal zone. Such a framework will provide a clear executive procedure applicable to the evaluation, in socio-economic and environmental impact terms of a wide range of coastal activities, both new developments and remedial measures. In this context the study has identified issues and parameters in the form of coastal characteristics and usage, coastal forcing and coastal response as applicable to the coastal zone of Sri Lanka. These variables will form the principal components of the coastal data base. The wide range of issues and a parameter set has been applied to several trial study areas on the Southwest coast of Sri Lanka to test the applicability and the relevance of the set to practical problems.

The study has focused on the importance of establishing coastal cells and assessing the sediment budget in understanding the impact of erosion. The coastal cells are identified to provide a sound foundation to the Integrated Management Framework. The research study has recognised the manner in which a Coastal Protection Plan can be developed as apart of an overall Coastal Zone Management Plan and focused on how mathematical modelling can be incorporated effectively as an active component within an Integrated Management Framework to evaluate measures designed to mitigate the adverse effects of development or to assist with optimization of a scheme.

The University of Moratuwa in association with the Coast Conservation Department forwarded a proposal to the British Overseas Development Administration (via British Council) seeking funds to implement the principal recommendation of the study namely, the establishment of a fully operational Integrated Coastal Management Framework in Sri Lanka. The British ODA via the South East Asia Development Division (SEADD) has accepted on

principle to find a major project on Improved Coastal Zone Management covering a wider domain of activities.

(2) **Studies on the use of arylhydrazones as 1-Azadienes in the (4+2) cycloaddition.**

Dr. Amarasekera has, in his project, demonstrated his expertise in the field of organic synthesis by developing novel methodology for the synthesis of substituted pyrroles utilizing a hetero Diels-alder reaction. He has identified a number of heterocyclic cycloaddition products which were prepared from a variety of starting compounds. Some of the initial cycloaddition products were unstable, undergoing further reaction, usually by elimination or aromatization.

Dr. Amarasekera was able to complete his work, identify even the unstable cycloaddition products formed and develop routes to several heterocyclic compounds. Many heterocyclic compounds are known to be biologically active and are commercially sold as drugs. Since Dr. Amarasekera's work concerns reactions which could be utilized to develop new routes for heterocyclic compounds, it is potentially of commercial use.

As part of his project, the previous work on reactions between hydrazones and sulphynylamines have been surveyed and discussed. It is noted that an excellent piece of synthetic work has been carried out in Sri Lanka in spite of many constraints to such work.

(3) **Determination of virulence factors in food isolates of *Listeria***

The study describes haemolysin production by 37 cultures of *Listeria monocytogenes*, isolated previously by the authors from foods in Sri Lanka. Haemolysin is suggested to be the virulence factor associated with *Listeria monocytogenes*. The important contributions made in this study are,

- (a) Isolation of *Listeria* from foods of Sri Lanka, which is reported for the first time. (*Listeria* is a pathogen that is being studied in detail elsewhere since 1980s due to its involvement in food borne diseases).
- (b) Establishment of a simple and effective method to detect the haemolysin activity by *Listeria monocytogenes* which may find application in routine monitoring of the foods.

(2) **National Awards for Scientific Achievements (NASA)**

The National Awards for Scientific Achievements are made every three years for up to two achievements. These awards are in recognition of outstanding achievements in scientific research or development, considered on the basis of their originality and intrinsic merits. The awards are given also for work, the importance of which lies in its potential application in Sri Lanka.

The first prize named the President's Award for Scientific Achievements constitutes an award valued at Rs. 100,000/= and a certificate.

The second prize named The Natural Resources, Energy & Science Authority's award for Scientific Achievements constitutes an award valued at Rs. 50,000/= and a certificate. Entries are accepted only from citizens of Sri Lanka or institutions in Sri Lanka for work done in Sri Lanka.

Nomination may be made by:

- (i) Universities and research establishments
- (ii) Academies of Science and other professional scientific bodies
- (iii) Qualified individuals
- (iv) Self recommendations (supported by three referees)

For the awards in 1998, applications were called by advertisement in the newspapers. A Special Panel of Judges was appointed by the Board of NARESA, for the evaluation of applications.

The winners for 1998,

Presidents' Award

Prof. Nimal Senanayake, Faculty of Medicine, University of Peradeniya and **Dr. Lakshman Karaliedde**, Associate Professor and Head Department of Anaesthesiology, University of Peradeniya, for their work titled, "Studies on Organophosphorus Insecticide Poisoning"

NARESA Award

No selections made.

(3) Third World Academy of Sciences/NARESA Prizes for Young Scientists

the above scheme of awards was instituted by NARESA for the annual award of prizes for young scientists with financial assistance from the Third world Academy of Sciences. The prizes are intended to give recognition to talented young scientists who have attained a high level of excellence in their research work. The prize consists of US \$ 500/=.

The following were awarded the TWAS/NARESA Prizes (1996) for Young Scientists.

(1) Prize for Chemistry

Ms. W.M.A.P. Wanigasekera of IFS - For her work on "**the isolation of two new coumarins from Calophyllum species**"

(2) Prize for Physics

Mr. G.R.A. Kumara of IFS - For his work on **“the development of a novel dye-sensitized solid state solar cell”**.

Summary

- (1) Some coumarins isolated from *Calophyllum* species have been found to be effective against the AIDS virus, the Human Immunodeficiency Virus (HIV). They have been found to interact with the HIV-1 Reverse Transcriptase (HIV-1 RT) enzyme and thereby inhibit the replication of Virus HIV-1.

The Sri Lankan members of the genus *Calophyllum* had been extensively studied by Professor Sultanbawa and his group long before AIDS or HIV were known.

Ms. Wanigasekera's work which was supervised by Dr. Ranjith Dharmaratne of the IFS, was concerned with re-examining the genus with a view to isolating compounds which could be used against HIV.

A pyranocoumarin isolated by her, soulattrolide has shown high activity against HIV-1 RT in the Reverse Transcriptase assay, while yet another, cordatolide B, looks promising and is under further investigation. Her work which has been published as two papers in international journals and four communications, also led to the isolation of two new coumarins from *Calophyllum* species. Ms. Wanigasekera has been awarded the M.Phil. degree for her work.

- (2) The research group of Mr. G.R.A. Kumara and Prof. T. Tennakone of the Institute of Fundamental Studies, Kandy has developed a novel all solid state, dye-sensitized photovoltaic cell based on a n-type, nano-porous film of TiO_2 film, and a p-type semiconducting cuprous iodide.

At present, the use of silicon solar cells for photovoltaic solar energy conversion is very much limited due to the high cost of these cells and solar panels. The high cost is attributed to the cost of manufacturing single crystals of silicon. Dye sensitized photo electrochemical solar cells can offer a low cost technique for the fabrication of solar cells, but the liquid electrolyte in these cells leads to several technological problems including cell-degradation. Research on developing an all solid state solar cell has been a challenge to Physicists, Chemists and Material Scientists for the past many years.

With 800 W m^{-2} simulated sunlight, the cell could deliver short circuit photo currents of about 5 mA cm^{-2} and open circuit voltage of about 500 mV. The energy conversion efficiency of the cell is estimated to be 3-4% under filtered UV light.

As the major contributor for the fabrication of this solid state photovoltaic cell using dye sensitised semiconducting material which could achieve relatively high conversion efficiencies, Mr. Kumara was commended by awarding the TWAS Young Scientists Award.

The prizes were awarded to winners at the Merit Awards Ceremony held on 6th November 1997 at NARESA.

(4) Sultan Qaboos Prize for Environmental Preservation - 1997

The Sultan Qaboos Prize for Environmental Preservation 1997 was awarded to the team nominated by NARESA;

Forest Department of Sri Lanka
 Dr. C.V.S. Gunatilleke
 Dr. I.A.U.N. Gunatilleke
 Dr Peter S. Ashton
 Dr. Mark S.P. Ashton

UNESCO awarded the prize jointly to this team and the Department of Environmental Sciences of the Faculty of Sciences at Alexendria university in Egypt.

The certificate and the cheque for US\$ 10,000 due to the joint team nominated by NARESA was presented to the winners by the Director General NARESA at a simple but impressive ceremony held on 17 December 1997 in the NARESA Auditorium in the presence of a distinguished gathering.

The research carried out by the four scientists over the past three decades and the persistent work done to conserve the fragmented rain forest of Sri Lanka were highlighted.

Activities of the Director General during the Year

January 1997

- 16th Steering Committee on Science & Technology Information -
Public Seminar - Address by the Director-General
- 18th Annual General Meeting - Nutrition Society of Sri Lanka
- 29th M.Sc. Community Medicine/Dentistry, PGIM - Nutrition Module -1st Term -
Lecture on "Current concepts in infant feeding"
- 31st SLSTINET - Annual General Meeting - Address by the Director-General

February 1997

- 3rd National Health Policy Implementation- Action -Presidential Task Force - Committee member
- 7th Research Policy Action Plan - CARP
- 10-12th ANF Symposium on "Nutrition related chronic diseases of Asia" India (Private visit)
- 14th COLA - 1997 -National Library Services Board - Chief Guest
- 19th Presidential Task Force -National Health Policy Implementation Meeting
- 27th Presidential Task Force - National Health Policy Implementation Meeting

March 1997

- 5th Regional Workshop on Low Cost Electronic Materials & Solar Cells, Colombo , organized by Universities of Sheffield and Peradeniya.
- 10th Technical Committee of the Sri Lanka National Inventors Commission (SLIC) - attended as Member
- 14th National Action Plan on Climatic Changes - Workshop organized by the Ministry of Environment, Transport & Women's Affairs
- 14th Budget 1998 - Discussion - Ministry of Science & Technology and Human Resources Development
- 26th Sri Lanka Medical Association (SLMA) - Pre-congress Workshop - Chief Guest - Getting Research Into Practice
- 27th Project Monitoring & Performance Review - Ministry of Plan Implementation & Ethnic Affairs

April 1997

- 3rd Chaired a Session on Ageing at CENWOR
- 9th Workshop on the Establishment of a Centre for Bioactivity Screening and Research - Welcome Address

21-25th 23rd Session - WHO South East Asia Advisory Committee on Health Research,
Chiang Rai, Thailand - Overseas leave to attend above as adviser to WHO/SEARO

May 1997

- 2nd Guest of Honour - South Asian Regional Congress of Family Physicians (SARC-FP)
- 6th Parliamentary Consultative Committee on Science & Technology and Human Resources Development
- 9th Workshop on CDS-ISIS - Welcome Address
- 14th Ladies College Lecture on Nursery Teacher Training Programme on Preschool Child Development

June 1997

- 4th Commonwealth Science Council (CSC) Workshop on Remote Sensing - Welcome Address
- 5th Interministerial Meeting - Ministry of Science & Technology and the Ministry of Fisheries - Discussion on research on Coast Conservation
- 12th Ministry of Science & Technology - Briefing on S & T by the Minister after reappointments
- 19th Meeting at Treasury - Funds for 1998
- 27th Seminar on Histamine in Market Fish Products in Sri Lanka- Welcome Address
- 30th Incentive Scheme for Research Officers of the Agricultural Sector - Panel of Judges meeting (Presidential Secretariat) chaired by Mr. Balapatabendi, Secretary to H.E. the President

July 1997

- 17th Presidential Task Force Meeting on Science & Technology - First Meeting
- 31st Meeting with Dr. Olof Linden, SIDA

August 1997

- 2nd Sarvodaya Women's Movement - Lecture on "Breastfeeding"
- 6th Faculty of Engineering, Peradeniya - Annual Research Session - Address as the Chief Guest
- 7th Presidential Task Force - Integrated Research Programme in Science & Technology - (Second meeting)
- 12th Meeting with Dr. Clive Palmer - S & T Management Consultant-Commonwealth Science Council (CSC)
- 13th Project Monitoring and Performance - Ministry of Science and Technology held at the Presidential Secretariat under the Chairmanship of Hon. Jeyaraj Fernandopulle, Minister of Plan Implementation and Parliamentary Affairs
- 22nd Seminar on Impact of Research on the National Health Policy held at NARESA and convened by the Steering Committee on Medical, Dental and Veterinary Sciences - Welcome Address and Resource Person's speech (20 minutes)
- 25th Presidential Task Force- Sub-Committee on Health and Nutrition (3rd meeting)

September 1997

- 5-11th IFS /TWAS 8th Assembly, Rio de Janeiro, Brazil
- 18th GIS Seminar - Opening Address given at a meeting of experts.
- 18th Member of Presidential Task Force - Integrated Research Programme on S & T Meeting attended and given assignment to give priorities in Nutrition. Subsequently organized a Sub-committee to discuss the above. Three meetings held and priorities identified were submitted to the main Task Force.
- 20th Chief Guest - College of General Physicians - 23rd Annual Academic Sessions - A Keynote Address was given.
- 22nd Presidential Task Force - Sub-Committee on Health and Nutrition
- 29th Visit of SIDA delegation to discuss work done in 1996. Special point made of constraint of budgetary provisions viz. lack of inclusion in the estimates in March 1996

October 1997

- 2nd Attended NARA Workshop on Research Findings and Issues Related to Conservation and Management of Marine Turtles and Coral Reefs of Sri Lanka
- 3rd Visit of SIDA delegation - Conclusion of discussion on Programme, Budget and new Proposals
- 7th CENWOR Workshop on Occupational Health - Chaired Session
- 10th Presentation of Dr. Panabokke's book on "Soils - Address by Director-General at formal presentation of "Soils and Agro-economical environments of Sri Lanka"
- 16th Presidential Task Force - Integrated Research Programme on S & T
4th meeting to discuss Interim report to be presented to H.E. the President
CARP Workshop - Wadduwa -
- 17th Safe Motherhood Workshop - Commonwealth Medical Association
- 24th Presidential Task Force - Integrated Research Programme on S & T
- 28th NARESA Workshop on Alternatives to Coral Based Lime for use in the building industry - Welcome Address given by the Director-General
- 29th Seminar on Research Grants on Energy - Welcome Address

November 1997

- 12th Ceremonial Release of 'PURNA' Integrated Library Automation System by Hon. Bernard Soysa, Minister of S & T - Address by the Director-General

December 1997

- 1st Commonwealth Science Council - Inauguration of the Engineering Design Centre - Univ. of Peradeniya - Welcome Address by the Director-General
- 9th International Symposium on "Meaningful Development" held during the 53rd Annual Sessions of the SLAAS - Opening Remarks on "Health & Nutrition" by the Director-General at the Ruhuna University
- 17th Sultan Quaboos Awards - Welcome Address

In - House Support Activities

(1) Staff Training

- (a) As a means of giving more opportunity to the staff to improve their communication skills, a training programme in English was organized. The course which was of six months duration was conducted by Mrs. O. Jansz of the Dept. of English, University of Sri Jayawardenepura.
- (b) Mr. A.W.J. Karunasinghe attended an international training course on "Planning for Energy and Environment for Sustainable Development" at the University of Twente, Netherlands from 20th May 1997 to 21st June 1997. This course was funded by the Ministry of Foreign Affairs of the Government of Netherlands.

(2) Staff Achievements: Participation at Conferences, Seminars and Workshops

30 th January	Training workshop on "Conservation of small cetaceans for professionals in the state sector", Koggala Beach Hotel - Mrs. S.P. Prelis.
14 th February	Workshop on "Sri Lanka National Consultation Rio + 5", BMICH - Mr. M. Watson.
14 th March	Workshop on "Preparation of a National Action Plan on Climate Change", Sausiripaya - Mr. M. Watson
16 th - 23 rd March	UNESCO workshop on IDAMS Software, New Delhi, India - Mrs. D.D.D. Talagala.
23 rd - 24 th April	WIPO National Seminar on "TRIPS Agreement and the Promotion of Inventive and Innovative Activity", National Library Services Board - Mr. M. Watson.
27 th April	Seminar on "Biodiversity Conservation and Biotechnology - Indian and Sri Lankan Perspectives", Hotel Taj Samudra - Dr(Mrs) T.F. Dias.
15 th May	Workshop on "Mangrove and Related Ecosystems", NARA - Mrs. R. Wijyaratna.
04 th - 11 th June	Workshop on "Remote Sensing for Coastal and Forestry Resources Management", NARESA- Mrs. R. Wijyaratna, Mrs. S Wickremasinghe.

21 st - 26 th July	Asia - Pacific workshop on “Biosafety:Environmental Impact analysis of Transgenic Plants”, Chennai, India - Mr. M. Watson.
08 th - 20 th September	ASCA workshop on “Internet Resources and Technology Applications”, Taipei, Taiwan - Mrs. D.D.D. Talagala.
26 th September	Workshop on “LINUX - the Programme Language”, Open University of Sri Lanka - Dr. S. Fernando.
13 th November	Symposium on “Research for Industry”, Univ.of Moratuwa - Dr. S. Fernando.
08 th -12 th December	Workshop on “Designing Ways and Means to Achieve Integrated Management and Sustainable Development in Coastal Regions and Small Islands.” Coral Sands Hotel - Ms. A. Amarasinghe
16 th -20 th December	SAARC workshop on “Development, Acquisition and Transfer of Technology in the Small and Medium Industrial Sector”, Hotel Holiday Inn- Mr. M. Watson.

Participation in Committees by Staff Members

1. Forestry Sector Research Committee (Forest Department) - Mr. M. Watson.
2. Inter-agency Coordinating Committee on Sustainable use of Coastal and Marine Resources (Ministry of Environment) - Mr. M. Watson.
3. Coordinating Group on the Conservation of Biological Diversity (Ministry of Environment) - Mr. M. Watson.
4. NEAP Update 1997-2001 Subcommittee on Forests and Biodiversity (Ministry of Environment) - Mr. M. Watson.
5. Working Group 4 of the NEAP Update 1997-2001 Subcommittee on Forests and Biodiversity (Ministry of Environment) - Mr. M. Watson (Convenor).
6. LEARN Management Committee - Mrs. D.D.D. Talagala
7. Committees on AGRINET and NATNET LANKA - Mrs. D.D.D Talagala.
8. Steering Committee on Telecommunication based Networking for Education, (Open University) - Mrs. D.D.D. Talagala

9. Working group on Library/Documentation (Sri Lanka Standards Institution) - Mrs D.D.D. Talagala.

Research Co-ordination Activities

(1) Zoological Survey of Sri Lanka (ZSSL)

(i) Scientific Study of the Horton Plains Ecosystems

A team of scientists was selected by the ZSSL Committee to discuss the project "Scientific Study of the Horton Plains Ecosystems". This selected study was an in depth and multidisciplinary survey of the unique ecosystem of Horton Plains.

Aspects included were:-

- (1) Basic geographical data of Horton Plains and surrounding ecosystem
- (2) Vegetal cover, density and distribution
- (3) Soil systems
- (4) Geology of the Horton Plains
- (5) Hydrology
- (6) Characteristics of waterways - physical, chemical and biological aspects
- (7) Climatology
- (8) Small and medium size mammals (large animals, general fauna, amphibians and reptiles)

The aim of the project was to carry out a rapid ecosystem survey which would generate a holistic assessment of the current status of the Horton Plains as an ecosystem. The results of the study will serve as baseline data for management of the park and will also be the first step in a more detailed study of biodiversity.

This study was completed and reports were submitted.

(ii) The Rodney Jonklaas Sea Shell Collection

On the recommendation of the NARESA Committee for the Zoological Survey of Sri Lanka, Board approval was obtained for the purchase of the Rodney Jonklaas Collection of Sea Shells. The decision was taken by NARESA considering the Rodney Jonklaas Collection as a national treasure that should not leave the shores of Sri Lanka. Steps will be taken to inventorise it and index it fully.

(2) Unauthorized Collection and Export of Fauna and Flora

NARESA appointed a special Committee to study the issue of Unauthorized Collection and Export of Fauna and Flora and recommendations were made by this Committee which were submitted to the relevant Ministries and Her Excellency The President.

One of the recommendations is that manuscripts be prepared on the protected plants and animals in the fauna and flora protection ordinance (Amended Act No. 49 of 1993) for the use of customs officials and the public.

NARESA has initiated this study and has decided to prepare manuscripts on the protected animals and plants. A meeting was held with the customs officials who are engaged in identifying the protected fauna and flora and the scientists nominated by NARESA to obtain their views on the preparation of material for the identification of the protected species. Samples have been requested from the expert scientists on the following groups of protected fauna and flora.

- Freshwater fish
- Amphibians
- Reptiles
- Ferns and Lycopodiums
- Angiosperms

International Scientific Activities

SIDA Programme - Research Cooperation between Sri Lanka and Sweden.

(1) Buffalo Information Dissemination Programme

A package on management of buffaloes has been developed under the buffalo information dissemination programme. The package includes technological know-how on farming systems, diseases, feeding, recycling of animal waste and crop residues, reproduction and value addition. The Ministry of Livestock Development has requested the research group to assist its programme on buffalo/cattle farming in other areas of the country.

The Buffalo Information Dissemination Programme has conducted ten farmer - training programmes on the management of intensive buffalo farming system. More than 200 farmers have been trained under this programme.

Extension of the popularization of intensive farming system was continued. A unit has been established to produce Urea Molasses Mineral Blocks as a supplementary feed for buffaloes/cattle.

- (2) Dr. M.C.L. de Alwis was assigned to prepare a report on all the work done under the buffalo research programme. The report has been submitted to the Board of Management of NARESA.
- (3) Dr. H. Abeygunawardena and Dr. N.U. Horadagoda attended the World Buffalo congress held in Italy in October 1997. The following papers were presented.
- (a) Farming system research approach to technology generation and transfer in small holder buffalo production system in Sri Lanka.
 - (b) Clinical and haematological responses of buffaloes following intravenous administration of endotoxin extracted from *Pasteurella multocida* serotype B2.
- (4) Proceedings of the symposium on 'The role of the buffaloes in rural development' was published. The publication was made available for sale at NARESA at Rs. 350/= per copy.
- (5) A delegation from SIDA visited Sri Lanka on 28 September - October 1997 to
- * review progress of ongoing projects
 - * discuss the possibility of providing Internet access to collaborative institutions in Sri Lanka.

The delegates held discussions with the Ministry of Science & Technology, CINTEC, ICT, NERD, University of Moratuwa, University of Ruhuna, UGC and NARESA.

(6) **Coastal Ecology Programme**

The concluded project on "Puttalam/Mundel Estuarine System" under the SIDA/NARESA Coastal Ecology Programme highlighted the coastal resources management issues for sustainability of the ecosystem and suggests the options for mitigation.

The report published by NARA/NARESA/SIDA on "Puttalam/Mundel Estuarine System and Associated Coastal Waters" based on the comprehensive work carried out by NARA at the Puttalam/Mundel Estuarine System, provides an insight into the degradation of natural resources and identifies the immediate action needed for an improved management of the estuarine system.

Implementation of the recommendation of the study were looked after by the interministerial Committee comprising of members from the North Western Provincial Council and NARA, CEA, Forest Department, Department of Wild Life, Irrigation Department, Water resources Board and Coast Conservation Department.

The recommendations of the workshop on "Research for the management of Coastal resources in the tropics" held in October 1996 were published and circulated. Based on the

recommendations, the following proposals were submitted for SIDA funding. SIDA funded the two projects with the given allocations.

Grant no	Grantees/Institutions	Title/Durations	Total Allocation Rs.
SAREC/CE/14	Dr(Ms) P. Dayaratne Dr(Mrs) C. Amarasiri NARA	Research on the Natural Resources, Management in the coastal environment of Sri Lanka 3 years	SEK 1,430,000
SAREC/CE/15	Dr(Ms) P.R.T. Cumararatunga Univ. of Ruhuna Matara	Enhancing the capacity of the Dept. of Fisheries Biology, University of Ruhuna to carry out marine environmental research 2 years	SEK 1,010, 000

(7) International Contacts Fund

Forty four travel grants were approved under the SIDA funded International Contacts Fund, both for local scientists travelling abroad as well as for visiting foreign scientists to facilitate interaction among scientists.

Six follow up public seminars were organized for ten scientists to share their experiences with others.

Date/Theme of International Event	Participant	Date/Theme of the Public Seminar
06-16 January 1997 5 th International Symposium on Protein Structure Function Relationship Karachi	Dr(Mrs) Priyani A Paranagama	16.01.97 - Effect of Azadirachtin on the Incorporation of radiolabelled Amino-Acids into Proteins of the Locust <i>Schistocerca gregaria</i>
26-30 November 1996 International Conference on "Plants and Environmental Pollution" Lucknow, India	Dr. M.P. de Silva Dr. P.A.J. Yapa	20.02.97 -Plants and Environmental Pollution

11-17 November 1996 International symposium on "Maximizing Sustainable Rice Yield Through Improved Soil and Environment Management" Khon -Kean, Thailand	Prof. K.D.N. Weerasinghe	20.02.97 - Maximizing Sustainable Rice Production in Acid Soils through soil and Water Management
16-19 April 1996 7 th International Conference of Applied Algology, South Africa	Prof. S.A. Kulasooriya	20.02.97 - Algae as a biofertilizer for rice of the International Association
06-09 December 1995 "6 th International Conference on Environmetrics", Malaysia	Mr. T.S.G. Peiris	20.02.97 - Parsimonious Crop Weather Modelling in Coconut
-do-	Dr. A.P. Premawardene	-do-
03-05 April 1997 The Information Frontier: "Linking People and Resources in a Changing World" Tucson - Arizona, USA	Mr. N.U. Yapa	04.07.97 - The Integrated Library System CDS/ISIS
26-30 March 1997 "19 th Congress of the International Commission on Large Dams", Florence, Italy	Eng. S.C.H. de Silva	28.07.97 - Sedimentation of Reservoirs
20-23 November 1996 3 rd SAARC Lighting Conference Kathmandu, Nepal	Mr. S. Ranasinghe	21.08.97 - Lighting and Architecture

(8) Urgent Spare Parts Fund

Requests from various organizations for spare parts were forwarded to Sweden. The total request exceeded US \$ 6500.

Commonwealth Science Council (CSC)

(1) Workshop on Remote Sensing for Coastal and Forestry Resources Management

The workshop on Remote Sensing was organized by the Commonwealth Science Council, UK, and the Natural Resources, Energy and Science Authority (NARESA) during 4-11 June 1997 at NARESA. The resource persons were Prof. Philip Howarth and Dr Paul Treitz from the Departments of Geography at the University of Waterloo and York University, Canada, respectively. There were 25 local participants and 13 foreign participants. The workshop was inaugurated by Hon. Bernard Soysa, Minister of Science and Technology and Human Resources Development. The welcome address was given by Prof. Priyani E Soysa, Director General, NARESA. The British High Commissioner, H.E. David Tatham was among the distinguished scientists and guests present at the inauguration.

Satellite images are being used throughout the world to provide earth resources information. The science and technology of acquiring these satellite images and extracting information from them is known as remote sensing. In this workshop a broad overview of the latest developments in remote sensing was presented. The emphasis was on applications of remote sensing in the study of renewable natural resources and their management that were of relevance to Sri Lanka and other countries in the region.

The workshop covered the following areas of Remote Sensing

1. Basic Principles
2. Satellites and Sensors
3. Digital Image Analysis
4. Image Interpretation
5. Radar Images, Satellites and Sensors and their interpretation

At present Sri Lanka gets the satellite images from foreign countries and the participants were of the view that Sri Lanka should have a receiving centre. The various types of satellites for the analysis of various ecosystems were discussed.

The workshop included a visit to the Survey Department and a field excursion to the Environment and Forest Conservation Division of the Mahaweli Authority at Polgolla.

(2) Engineering Design Centre (EDC)

The Ministry of Science and Technology, the Natural Resources, Energy and Science Authority (NARESA), and the University of Peradeniya in collaboration with the Commonwealth Science Council announced the setting up of the Engineering Design Centre at University of Peradeniya. Sub-centres would function at the Ceylon Institute of Scientific and Industrial Research, and the National Engineering Research and Development Centre.

The aims of the EDC are:

- * The enhancement of existing industries and facilities
- * Enhance the capability to develop new products
- * Making available productivity enhancement tools provided by information technology and necessary abilities to use and exploit them
- * Introducing the latest practices in the traditional, new and emerging technologies

The Commonwealth Science Council, with the support of the Department of Trade and Industry of U.K., and with the collaboration of the Ministry of Science and Technology, NARESA, and the Universities of Peradeniya and Moratuwa, organised a Road Show at the University of peradeniya on 01-12-97 and 02-12-97 and at the University of Moratuwa on 03/12/1997, 04-12-97. The Road Show provided insight on:

- * Collaborative projects undertaken by such Centres and other University/Industry collaborations in the U.K.
- * The latest CAD software in mechanical and electronic engineering applications which are used in such work.

(3) Commonwealth Science Council - Travel Grant Scheme

The purpose of this travel grant scheme is to help scientists from member countries of the Commonwealth Science Council to attend international conferences, major meetings and short technical in-service training courses. Grants cover the actual costs of the return airfare and registration upto a total of f 1000.

During the year 1997, forty two scientists were awarded grants by CSC under this scheme.

South - Asian Association for Regional Co-operation (SAARC)

The following directories were compiled under the programme of the Technical Committee on Science and Technology and forwarded to the Ministry of Science & Technology.

1. The directory on specialized analytical instrumentation facilities and techniques - SAARC Region.
2. The directory on Process Engineering/Pilot Plant Facilities in Agro-Food Processing Area-SAARC Region.

A workshop on 'Development, Acquisition and Transfer of Technology' was held from 16-20 December. NARESA assisted the Ministry of Science and Technology in organizing the workshop.

Indo - Sri Lanka Joint Sub-Commission on Science and Technology

Indo-Lanka Joint Sub-Commission on Science and Technology, in April 1994, identified biotechnology as the priority area of collaboration between the two countries. It was agreed that Sri Lanka would submit preproposals and identify names of the investigators and institutions and the

Indian side would organize a joint workshop to firm up specific proposals, involving counterpart Indian investigators and institutions.

A joint Indo-Sri Lanka workshop on biotechnology was held from 30-31 January at the National Institute of Immunology, New Delhi. Drs(Mrs) N. Withana, J. Goonaratna, L. Arambewela and Profs. S. Widanapathirana and R. Ramasamy participated from Sri Lanka. Eight pre-proposals were discussed and accepted and it was agreed to develop them into complete project proposals. The group expected the implementation of the projects at an early date.

International Centre for Genetic Engineering and Biotechnology (ICGEB)

International Centre for Genetic Engineering & Biotechnology (ICGEB) is engaged in research on Agro-biology, human health, biomass conversion and improvement of group species. It provides great scope for collaborative research.

NARESA is the National focal point for ICGEB. It coordinates all the activities of ICGEB in Sri Lanka through the Steering Committee on Biotechnology of NARESA.

After pre-selections done by the Steering Committee on Biotechnology three applications were forwarded to ICGEB Trieste, Italy for the Pre-doctoral fellowship programme 1997 at ICGEB New Delhi.

Applications to Foreign Agencies

A project proposal on "A partnership of science and industry" was submitted to the Commonwealth Partnership for Technology Management Limited.

Science and Technology Indicators Unit

Science and Technological Indicators Unit which was set up to support all aspects of scientific studies required for policy aspects continued their work during the year. The stock of science and technological personnel in the country has been updated for 1997. More emphasis was made on the higher education sector and the private sector where the response in the earlier survey was not satisfactory.

The stock of science and technological personnel has been analysed and the results will be reported. Arrangements have been made to publish a directory on scientists with post-graduate qualifications.

A comprehensive survey was carried out to measure the R&D expenditure in the country in 1996. The UNESCO guidelines were used to conduct the survey with a view to comparing the results internationally. The results show that the percentage of R&D expenditure to GDP in 1996 is 0.16%.

Data base on ongoing research has been updated for 1995/1996. The draft of the directory has been prepared.

The following policy studies have been commenced.

1. Identification of policy issues for the utilisation of R&D results taking into account the S&T problems related to the rubber industry in Sri Lanka.
2. Development of performance indicators for S&T institutions and universities.

The services of a consultant Ms. C.M. Fernando was obtained (for 3 months) to consolidate the work of the S&T unit (for training in concepts, planning, analysis and presentation of data).

Sri Lanka Scientific & Technical Information Centre (SLSTIC)

NARESA established the Sri Lanka S & T Information Centre (SLSTIC) in 1979. SLSTIC was identified as the national focal point of information networks on science and technology. Hence SLSTIC established the **Sri Lanka S & T Information Network (SLSTINET)** of which about 120 S&T libraries are members. The key objectives of this network are:

- I. to support to build an effective information infrastructure in the field of S & T
- II. to take the lead in the organisation of information on the S & T subset of the national information super highway
- III. to help end users to define their needs, learn to use the available system and gain access to the information need
- IV. to share resources available at member libraries

To achieve these objectives SLSTIC developed a National Information Network for the exchange of S & T Information with SLSTIC as the pilot co-ordinating site. A project proposal was submitted to SAREC (Swedish Agency for Research Corporation in Developing Countries) and a generous grant was received on the acceptance of the project by SAREC/SIDA. With this grant SLSTIC has developed the mechanism to store, access, retrieve and utilise information. The improvements to SLSTIC under this grant is listed below.

1. **A Local Area Network (LAN)** running on Novel 4.1 has been fully implemented with fifteen workstations with five multimedia PCS on the network with a server. All the workshops are configured to access the Novel Server (through IPX) as well as the Internet (through IP).

2. **Internet on-line**

NARESA Local Area Network is connected to **LEARN (Lanka Educational Academic and Research Network)** hub at the Sri Lanka Telecom (SLT). The two routers, one at NARESA and the other at SLT, were provided and configured by NARESA. These routers are connected through a 64 kbps leased data circuit providing on-line connectivity to the Internet.

A **PC based UNIX server** has been configured as the main mail server and the Domain name server for NARESA. This acts as a temporary FTP server and the only machine with a Telnet Facility. This acts as the main Internet Machine on the Network for the moment and it monitors the network for security and trouble shooting purposes.

Another PC UNIX server was commissioned in March and this hosts the Webserver "**VIDYA**" which provides an online database of all the research co-ordinated by NARESA. The newly acquired remote access server is being configured to provide access to remote R & D institutions in Sri Lanka.

3. **Network Access**

All the members of the executive staff and the documentalists at the library have been provided with access facilities to the Network with exclusive work space on the network.

Users can log in to the Novell server and they are presented with a menu through which they can easily select any CD database or local database (maintained by NARESA). If the users select the Internet facility then the IP connectivity is invoked and the user can access the Internet facilities such as the E-mail, Gopher, FTP, Telnet and the WWW. Remote network access is provided through a dial in router.

There is a common account for the general users to search for available CD-ROM databases.

4. **CD-ROM Services**

The following CD-ROM databases are available for general access.

- * **SIRS Researcher** (a reference tool that contains full text articles on a wide variety of science, social science and world affairs topics).
- * **Dissertation Abstracts**
- * **Derwent Biotechnology Abstracts** (Information derived from primary journals, conference proceedings and patents).

- * **Life Sciences Collection**
- * **EI Energy & Environment**
- * **S & T Encyclopaedia (Multimedia)**

Instead of building up a comprehensive collection of books and periodicals SLSTIC pays more attention in developing a collection of reference books which are not available in other network libraries. As the national Information Centre SLSTIC 's main emphasis is to collect, process and disseminate S & T information among local users (scientists and researchers). To fulfil this SLSTIC has developed the following data bases.

- I. **UNILIST-** **Union list of periodicals available in Sri Lankan libraries** (this may be linked with the periodicals projects granted to the Universities).
- II. **SLSTEP -** **Directory of S&T Personnel in Sri Lanka.**
- III. **SLSI -** **Sri Lanka Science Index** (includes local Pamphlets, Reports and Seminar proceedings on S & T).
- IV. **DBSOR -** **Ongoing research in Sri Lanka** (updated every year).
- V. **'SLSTIC -** **SLSTIC library collection**
- VI. **RGRA -** **S & T research sponsored by NARESA** (this is now online on Internet and Vidya).

In addition to these databases arrangements have been made to survey present status on **Climatic Information** in Sri Lanka and to develop a database on databases.

Users at NARESA can access the information through a menu which makes it easy for them even without networking knowledge. Users of the library can access these databases through a general account. Two workstations are available for this at the library.

Membership at SLSTIC

In addition, a remote search service was also initiated for the benefit of those who do not have on line access at present. Requests for searches on these databases were accepted through a general E-mail account and the search results were transferred via E-mail. This service and free searching on Internet was offered until the end of 1996. Presently a membership scheme has been introduced. This includes three types of membership:

- * Institutional Membership
- * Personal Membership
- * Student Membership

Publicity through Internet

NARESA home page at the NARESA WWW server (<http://www.naresa.ac.lk>) is maintained by SLSTIC. This page contains details of the steering committee activities, publications by

NARESA, abstracts from the databases and many more S&T information. Since NARESA is the only S&T institution online on the Internet at present, it has undertaken to publish home pages for other S&T institutions in Sri Lanka and at present is keeping brief pages for 16 institutions. NARESA also maintains home pages for the following institutions on its server:

- i. Alcohol & Drug Information Centre
- ii Birth Research Unit
- iii CISIR
- iv Coconut Research Institute
- v National Aquatic Resources Agency
- vi Sri Lanka Institute of Architects
- vii Sri Lanka Standards Institute
- viii Sri Lanka Library Association

Other than the NARESA Newsletter (Internet edition), SLSTIC maintains the Newsletters from Birth Research Unit of Kandy General Hospital, CISIR and Sri Lanka Library Association. A heavy duty printer and a PostScript laser printer are installed on the network for the users to take hard copies of the information, if required.

Newly configured Scanner at NARESA provides an opportunity to publish graphical information on the Network and an Optical Character Recognition software provides a means of converting scanned text documents into editable text files.

Workshops and Seminars

Workshops/Seminars and demonstrations for the scientific community were organised at the Universities and other Institutes. These were aimed at creating an awareness among the scientific community about the services available at NARESA. Seminars on retrieval of information through CD-ROMs and Internet, is also a continuing activity to update the knowledge of scientists and information officers on the utilisation of new technologies.

As the national distributor of CDS/ISIS software SLSTIC has been actively engaged in publishing handbooks to assist the users. Presently the following publications are available:

- I. CDS/ISIS Simplified manual
- II. Common Bibliographic Format for CDS/ISIS

SLSTIC also has been able to provide an integrated library automation system "PURNA" to enable the libraries using this software to develop their data bases. This package was introduced only in November 1997 and to date 12 libraries have obtained it.

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New Grants awarded in 1997

Discipline : Agriculture & Animal Husbandry

Grant No	Grantee/Institute	Project Title/Duration	Total Allocation Rs.
RG/97/AG/1	Dr(Ms) CS de Silva Div. of Agricultural Engineering Open University	Identifying optimum agrowell dimensions to sustainable irrigation in Anuradhapura district 2 years	157550
RG/97/AG/2	Dr. PLAG Alwis Dept. of Agricultural Engineering Fac. of Agriculture Univ. of Ruhuna	Development of swinging lugs reversible cage wheels for small and medium power tractors 2 years	338750
RG/97/AG/3	Dr. WAJM de Costa Dept. of Crop Science Prof. RB Mapa Dept. of Soil Science Fac. of Agriculture Univ. of Peradeniya	Evaluation of salt technology in upcountry wetzone tea plantations in Sri Lanka 3 years	771500

RG/97/AG/4a	Dr. RS Wilson Wijeratna Post Harvest Technology Divison CISIR	The testing of specific pre and post harvest treatments for reducing the incidence of chilling injury in pineapples 3 years	1221750
RG/97/AG/4b	Prof. W. Herath Dept. of Agricultural Biology Fac. of Agriculture Univ. of Peradeniya	The testing of specific pre and post harvest treatments for reducing the incidence of chilling injury in pineapples 3 years	1297000
RG/97/AG/4c	Prof. NKB Herath Dept. of Botany Univ. of Peradeniya	The testing of specific pre and post harvest treatments for reducing the incidence of chilling injury in pineapples 3 years	1322000

New Grants awarded in 1997

Discipline - Biotechnology

Grant No	Grantee/Institute	Title/Duration	Total Allocation Rs.
FG/97/BT/01	Dr. (Ms) D.P. Padmini de Silva Mr. M. Dharmadasa Export Agriculture Research Station, Matale.	Screening black pepper vines against Piper yellow mottle virus by Polymerase Chain Reaction (PCR) and adoption of dot blot hybridization technique for mass scale screening of pepper plants 2 years	350000
PG/97/BT/02	Dr. (Ms) W.P.N. Karunasinghe NARA, Crow Island, Mattakkuliya Prof. Eric Karunanayake Dept. Of Biochemistry, Univ. Of Colombo	Analysis of the <i>Amblygaster</i> sirm populations from southern, western and eastern coastal waters of Sri Lanka and adjacent waters 1 years	346000
FG/97/BT/03	Dr. S.B.P. Athauda Dept. Of Biochemistry Univ. Of Peradeniya	Characterization and cDNA cloning of acid proteinases from insectivorous plant genus <i>Nepenthes</i> 3 years	541000

2

<p>RG/97/BT/04</p>	<p>Dr. (Ms) W.T.P.S.K. Senerath Univ. Of Sri Jayawardenapura</p>	<p>In vitro propagation of Cosciniun fenestratum Colebr.</p>	<p>222576</p>
<p>3 years</p>	<p>Dr. (Ms) W.T.P.S.K. Senerath Univ. Of Sri Jayawardenapura</p>	<p>3 years</p>	<p>222576</p>
<p>Dr. (Ms) W.T.P.S.K. Senerath Univ. Of Sri Jayawardenapura</p>	<p>3 years</p>	<p>3 years</p>	<p>222576</p>
<p>Dr. (Ms) W.T.P.S.K. Senerath Univ. Of Sri Jayawardenapura</p>	<p>3 years</p>	<p>3 years</p>	<p>222576</p>
<p>Dr. (Ms) W.T.P.S.K. Senerath Univ. Of Sri Jayawardenapura</p>	<p>3 years</p>	<p>3 years</p>	<p>222576</p>

MANUSCRIPT NUMBER 10 1994

New Grants Awarded in 1997

Discipline - Biological Sciences

Grant No.	Grantee/Institute	Project title/Duration	Total Allocation
RG/97/B/1	Dr BMP Singhakumara Dept. of Forestry & Environmental Sciences University of Sri Jayewardenepura Nugegoda.	Seedling growth of four late-successional tree species in different light and soil nutrients environments. 3 years	Rs.243,000/-
RG/97/B/2	Dr(Ms) MGW Wickramasinghe Ms WTSD Premachandra Dept. of Zoology University of Ruhuna Matara.	Identification and isolation of entomopathogenic nematodes found in the coastal belt of Southern Sri Lanka and its potential in the control of insect pests of rice and vegetables. 1 year	Rs.149,360/-
RG/97/B/3	Dr(Ms) M. Hettiarachchi Dr Asoka Pathiratne Dept. of Zoology University of Kelaniya Kelaniya.	An investigation on the epidemiology of white spot disease outbreaks in <i>Penaeus monodon</i> cultured in North Western Province, Sri Lanka. 2 years	Rs.488,000/-

New Grants awarded in 1997

Discipline - Chemical Sciences

Grant No.	Grantee/Institute	Title/Duration	Total Allocation Rs.
RG/97/C/01	Dr W.S.J. Silva Dept. of Chemistry Univ. of Sri Jaywardenepura.	The development of a theoretical quantitative structure - activity relationship for antitumor Guanidinothiazole carboxamides using molecular mechanics and quantum mechanics 02 years	177000
RG/97/C/02	Dr K.R.R. Mahanama Dr D.P. Dissanayake Dept. of Chemistry Univ. of Colombo.	Method development for analysis and control of organic pollutants in diesel exhaust. 02 years	415000
RG/97/C/03	Dr (Mrs.) D.T.U. Wijayaratne Dept. of Chemistry Univ. of Colombo.	Bioassay directed isolation of antifungal and antibacterial compounds from fungi 02 years	242000
RG/97/C/04	Dr P.A. Paranagama Dept. of Chemistry University of Kelaniya.	A study of the effects of Azadirachtin and other polar components in neem seeds (<i>Azadirachta indica</i>) on specific tissues of cockroches (<i>Periplaneta americana</i>) 02 years	448500

Grant No	Name/Address	Project title/Duration	Total Allocation
			Rs.
RG/97/C/05	Dr (Mrs.) J. Goonaratne Agro & Food Technology Division CISIR Colombo 7.	Utilization of Cucurbitaceae spp for food industry. 03 years	326000
RG/97/C/06	Dr G.M.K.B. Gunaherath Chemistry Division OUSL Nugegoda.	Chemical investigation of fern flora of Sri Lanka 03 years	850000
RG/97/C/07	Dr S.A. Fernando Department of Chemistry University of Colombo.	Design and construction of a low cost colorimeter suitable for use in GCE Advanced Level teaching 04 months	60000

New Grants Awarded in 1997

Discipline - Medical, Veterinary & Dental Sciences

Grant No	Grantee/Institute	Title/Duration	Total Allocation Rs.
RG/97/M/1	Dr. SBP Athauda Dept. of Biochemistry Fac. of Medicine Univ. of Peradeniya	Isolation, purification and characterization of clinically important proteinases of filarial parasites 3 years	743500
RG/97/M/2	Prof. Lalitha Mendis Dept. of Microbiology Fac. of Medicine Univ. of Colombo	Diagnosis, subgrouping and serotyping of Group A rotaviruses 2 years	228000
RG/97/M/3	Dr. H Senanayake Fac. of Medicine Univ. of Colombo Dr. H. Ratnayake Dr. S. Gunawardena Medical Research Institute	Study of antitetanus antibody titres in material and cord sera 1 year	71600
RG/97/M/4	Dr. Chandu de Silva Dept. of Pathology Fac. of Medicine Univ. of Colombo	Study of congenital malformations in perinatal deaths occurring at the De Soysa Hospital for women, Colombo. 1 year	194000

Grant No	Grantee/Institute	Title/Duration	Total Allocation Rs.
RG/97/M/5	Dr AS Dissanayake Dr. H Janaka de Silva Dr TGHC Ferdinandis Fac. of Medicine Univ. of Kelaniya	Esophageal motor functions in chronic alcoholic patients 1 1/2 years	178710
RG/97/M/6	Dr. Malee Fernando Dept. of Pathology Fac. of Medicine Univ. of Colombo	How useful is histological examination to differentiate between tuberculous and non-tuberculous mycobacterial infection 1 year	109840
RG/97/M/7	Dr. W Abeywickreme Dept. of Parasitology Fac. of Medicine Univ. of Colombo	An epidemiological study on cutaneous leishmaniasis in Sri Lanka 2 years	404620
RG/97/V/1	Dr. RPVJ Rajapakse Dr. NU Horadagoda Dept. of Veterinary Paraclinical Studies Fac. of Vet. Med. & Animal Sciences Univ. of Peradeniya	Studies on the pathogenesis of Haemonchosis in goats 2 years	862600

RESEARCH GRANTS AWARDED IN 1997

Discipline:- PHYSICAL, ENGINEERING, MATHEMATICAL SCIENCES & BUILT ENVIRONMENT

Grant No.	Name & Address	Project Title & Duration	Total allocation Rs.
RG/97/P/01	Mr A.S. Pannila Mr S.P.N.J. Gunasekera Calibration & Measurement Unit CISIR Colombo 7	To determine optimum dimensional and material parameters for low cost ventilated noise attenuating elements (2 yrs.)	286000/=
RG/97/P/02	Dr W.P. Siripala Dr K.A.K.D.D. Jayasuriya Department of Physics Univ.of Kelaniya Kelaniya	Electrodeposited Cuprous Oxide for solar cell applications (2 yrs.)	454000/=
RG/97/P/03	Mr K.R. Abhayasingha Bandara Department of Meteorology Colombo 7.	For an area of 100 km around Colombo: Identifying damages to life and property by lightning discharges and developing a technique of forecasting movement of thunderstorms using wind field (2 yrs)	201000/=
RG/97/BE/01	Dr Ranjith Dayaratne Dept.of Architecture Univ.of Moratuwa Moratuwa.	Guidelines for developing place sensitive towns in Sri Lanka (1 yr.)	21500/=
RG/97/BE/02	Dr Ranjith Dayaratne Dept.of Architecture Univ.of Moratuwa Moratuwa.	Guidelines for developing habitable town centers and its applicability towards the creation of habitable urban environment (1 yr.)	26200/=

Discipline :- Social Sciences

GRANT NO.	NAME/ADDRESS	PROJECT TITLE/DURATION	TOTAL ALLOCATION (RS)
RG/97/SS/01	Mr. K L S Kusumaratne No. 5F, Mattegoda, Polgasowita.	A Sociological analysis of the Ayurveda System in Sri Lanka 02 years	94,000.00
RG/97/SS/02	Mr. R Srikanthana Dept. Of Geography Univ. Of Colombo, Colombo	Differentials in fertility and contraceptive behaviour in the Nuwara Eliya District 01 year	73,300.00
RG/97/SS/03	Prof. S T Hettige Dept. Of Sociology Univ. Of Colombo, Colombo 3.	Impact of economic liberalization on suburban growth in the Colombo Metropolitan Region 01 year	412,000.00

New Grants awarded in 1997

Discipline - Natural Resources

Grant No	Grantee/Institute	Project Title/Duration	Total Allocation Rs.
RG/97/NR/01	Mr. N.M.S.I. Arambepola National Building Research Organization 99/1, Jawatta Road Colombo 5.	Risk assessment and environmental protection in landslide prone areas 1 year	368,000/-

New Grants awarded in 1997

Discipline - Science & Technology Information

Grant No	Grantee/Institute	Project Title/Duration	Total Allocation Rs.
RG/97/IS/01	Prof. W.R. Breckenridge Univ. of Peradeniya Peradeniya	Biography of Prof. Hilary Cruz 08 months	25,000/-

New Grants awarded in 1997

Discipline : SCIENCE EDUCATION

Grant No.	Grantee /Institute	Title/Duration	Total Allocation (Rs.)
RG/97/SE/01	Mr. W.G. Karunaratne Faculty of Science University of Colombo	A study on the attitudes towards science of secondary school students of Sri Lanka. (with special reference to Galle district)	Rs. 22960.00
	Ms. N.A. Amerasinghe	01 year	

Science Education Grants 1997

Grant Allocation for 1997

Grants sponsored by NARESA

Status summary during 1997

Discipline	Agriculture & Animal Husbandry	Biological Sciences	Chemical Sciences	Energy	Information Sciences	Medical Veterinary & Dental Sciences	Physical & Engineering Sciences	Social Sciences	Biotechnology	Science Education	Natural Resources
Total No. of grants operating during 1997	10	24	25	03	03	40	24	14	22	04	03
Grants awarded 1997	04	03	07	-	01	08	05	03	04	01	01
Amount allocated for 1997 (new and ongoing Rs.)	3,421,350	1,936,890	2,562,250	81,914	268,850	3,773,600	1,705,200	540,300	2,271,866	118,960	714,785
Grants completed 1997	-	03	06	-	-	05	02	02	02	03	-
Grants withdrawn 1997	-	-	-	-	-	-	-	01	-	-	-
Grants terminated 1997	-	-	01	-	-	-	01	-	-	-	-
RA's appointed 1997	01	02	06	01	-	08	04	14	-	01	03
Thesis PG 1997	-	01	none	-	-	-	01	-	-	01	-
Registered for PG 1997	-	02	05	-	-	02	02	-	-	01	-
New application 1998	06	07	15	03	-	13	10	09	05	-	01
Funds requested for 1998 (Rs.)	4,058,608	4,043,917	2,209,829	3,191,000	-	1,978,561	7,526,780	1,101,647	1,509,220	-	20,000
Grants approved for 1998 (up to January)	-	04	08	01	-	04	03	03	05	-	-

Grants sponsored by Foreign Agencies

Status summary during 1997

Foreign Agency/Discipline Status	SAREC Buffalo Research Programme	SAREC Coastal Ecology Research Programme	SAREC Renewable Energy & Energy Efficiency	Mac Arthur Foundation
Total No. of grants operating during 1997	01	04	02	01
Grants awarded - 1997	-	02	01	-
Amount allocated - 1997 (new and ongoing Rs.)	1,500,000	2,000,000	1,875,000	452,309
Grants completed - 1997	08	-	01	-
Grants withdrawn - 1997	-	-	-	-
Grants terminated - 1997	06	-	-	-
RA s appointed - 1997	01	-	-	-
Registered for PG - 1997	-	-	01	-
Thesis PG - 1997	-	-	-	-
New applications - 1998 (Rs)	-	-	-	-
Funds requested for 1998 (Rs)	2,500,000	16,000,000	1,800,000	-
Grants approved for 1998 (upto January)	-	-	-	-

Handwritten notes and numbers at the bottom of the page, including "1500000" and "1450000".

NAURAL RESOURCES ENERGY & SCIENCE AUTHORITY OF SRI LANKA

Balance Sheet as at 31.12.97

As At 31.12.96

Funds Employed				
(1803338.71)	NARESA Fund	(23212904.48)		
2090000.00	Add: Drawings from Treasury	443000.00		
(15943338.71)			(22769904.48)	
(7269565.77)	Less: Excess of Expenditure over income		(5264929.29)	
(23212904.48)				(28034833.77)
5434111.14	Documentation Unit Capital Fund	5954350.14		
527000.00	Add: Drawings from Treasury	388000.00		
	Acquisitions of assets	73581.53		
5961111.14			6415931.67	
6761.00	Less: Net Expenditure Note 1.1		544.70	
5954350.14	Research Grant Fund	3986075.07		6415386.97
6678519.89	Add: Drawings from Treasury	16793520.00		
6452824.00				
13131343.89	Less: Net Expenditure - Note 1.2			
9145268.82	Man & the Biosphere Fund	1898551.97		
3986075.07	Add: Drawings from Treasury	80000.00		
1950877.32				3948472.53
60000.00	Less: Net Expenditure - Note 1.3			
2010877.32	Miscellaneous Fund	797539.45		
112325.35	Add: Drawings from Treasury	623000.00		
1898551.97				1899261.70
799663.47	Less: Net Expenditure - Note 1.4			
670000.00	Scientific Man Power Project Fund	153497.94		
1469663.47	Add: Drawings from Treasury			
672124.02				
797539.45	Less: Expenditure			
153497.94				
153497.94				
153497.94				
153497.94				

Working Committee Fund	1034025.20	1034025.20	1034025.20	1034025.20
Add: Drawings from Treasury	-	-	-	-
Less: Expenditure	1034025.20	1034025.20	1034025.20	1034025.20
Foreign Aid Fund	67486584.73	67486584.73	67486584.73	67486584.73
Add: Drawings from Treasury	9517000.00	9517000.00	9517000.00	9517000.00
Treasury Deposit	6281123.00	6281123.00	6281123.00	6281123.00
Less: Net Expenditure - Note 1.5	83284707.73	83284707.73	83284707.73	83284707.73
Capital Reserves	8721868.16	8721868.16	8721868.16	8721868.16
Current Liabilities	1704355.32	1704355.32	1704355.32	1704355.32
Creditors	665613.47	665613.47	665613.47	665613.47
Accrued Charges	6406978.06	6406978.06	6406978.06	6406978.06
Provisions	4167.76	4167.76	4167.76	4167.76
Store - keepers refundable security deposits	35450.00	35450.00	35450.00	35450.00
Tender Deposits	4947.25	4947.25	4947.25	4947.25
Suspense A/c	8821511.86	8821511.86	8821511.86	8821511.86
	118076326.45	118076326.45	118076326.45	118076326.45


1034025.20
 1034025.20
 67486584.73
 9517000.00
 6281123.00
 83284707.73
 8721868.16
 1704355.32
 665613.47
 6406978.06
 4167.76
 35450.00
 4947.25
 8821511.86
 118076326.45
 =====

As at 31.12.96		Cost as at 01.01.97	Additions/ Disposals	Accumulated Depreciations	Net Balance
	Represented by				

	Fixed Assets				

42325515.45	Land	42325515.45	-	-	42325515.45
1208181.86	Buildings	3409942.37	175968.44 (10000.00)	2326197.51	1259713.30
7413096.53	Office Equipment & Furniture	13994720.19	2579347.60	9079217.66	7484850.13
3692863.35	Motor Vehicles	8766836.60	(442960.80)	5456787.45	2867088.35
63860.00	Motor Bicycles	342719.18	(61033.04)	233791.14	47895.00
-	Bicycles	8770.50	4400.00	9870.50	3300.00
-	Sports Equipment	1504.00	-	1504.00	-
81215.38	Accessories & Miscellaneous	333223.15	42694.60	288400.77	87516.98
472014.50	Library Books	1424137.67	65801.36	995180.17	494758.86
4779703.31	Scientific & Laboratory Equipment out on loan	29984667.53	392400.00 (155034.00)	26820523.22	3556544.31
1244489.99	Documentation Equipment	5547242.12	2154411.53	4621114.13	2925505.52
61280940.37		106139278.76	4745995.69	49832586.55	61052687.90
-	Sea shells collection	=====	650000.00	=====	=====
13953.64	Telephone Installation		13953.64		
	Current Assets		-----		663953.64

709847.69	Stocks		715738.80		
5184710.90	Debtors		5147247.82		
716728.13	Prepayments		987745.44		
70109.45	Deposits		70109.45		
40289075.42	Treasury Deposits		46570198.42		
1032686.82	Balance at Bank - A/C No. 4530 800 224	976358.94			
99537.43		4530800232			
244152.96		4530124768			
7991.46		4530204966			
12500.00	Petty Cash		12500.00		
-	Petty Cash Imprest - Sales outlet		-		
13721.94	Cash in hand		10933.19		
3640.54	National Savings Bank A/C		4167.76		
109679596.83			2868644.98		56359684.91
					=====
					118076326.45
					=====


 Director-General
 Natural Resources, Energy &
 Science Authority of Sri Lanka
 17/5, Maitland Place, Colombo 7

NATURAL RESOURCES ENERGY & SCIENCE AUTHORITY OF SRI LANKA

Income & Expenditure A/C for the year ended 31.12.97

As at 31.12.96				
15075000.00	Drawings from Treasury			17410000.00
	Income for the year			
164168.16	Interest received	207703.70		
28545.50	Sundry Income	42139.00		
279024.50	Sale of Publications	400431.50		
7150.45	Photocopy receipts	13068.10		
211729.66	Receipts from Printing outside jobs	201387.81		
	SLSITC Income	50122.34		
26826.90	Profit on sale of fixed Assets	-		
	10% Administration cost - Foreign Aid	1750000.00		2664852.45
15792445.17				20074852.45
	Less: Expenditure for the year			
	Authority Expenditure			
41828.00	Travelling & Allowances for Authority members			
36589.68	Entertainment	34514.00		
1013.50	Printing & Publications	40346.80		
		13257.50		
79431.18				86118.30
	Staff Emoluments			
7624618.34	Salaries & Allowances	8726876.12		
1109555.03	Employees Provident Fund	1231964.46		
216028.25	Employees Trust Fund	246118.45		
516405.00	Provisions for Retiring Gratuity	1112123.00		
260908.94	Overtime	136257.14		
45036.20	Holiday payment	5220.60		
64315.80	Uniforms	62129.80		
11650.00	Staff Training	39900.00		
9848517.56				11560589.57

Office Administration			
2727.50	Travelling (Official)	6360.50	
521701.53	Stationary & Consumables	480995.60	
296710.60	Electricity	381956.24	
270950.50	Telephone	322450.46	
85436.10	Postage	95424.90	
95000.00	Audit fees	95000.00	
-	Legal fees	3353.00	
9720.00	Bank charges	12275.00	
46170.45	Medical expenses	56555.79	
139660.00	Advertising	143945.00	
832257.50	Maintenance of Motor Vehicles	721631.67	
249910.56	Maintenance of Office Equipemnt & Furniture	286422.52	
153856.13	Maintenance of Building	145156.04	
50000.00	Staff Welfare	69400.00	
110189.11	Insurance	185605.66	
80684.20	Water Consumption Charges	75442.00	
262863.00	Security Services	287324.90	
5360590.75	Depreciation	5630065.00	
219266.14	Sundry Expenses	100781.51	
2099633.19	10% Administration cost expenditure	1750000.00	
13286.04	Exhibitions	-	
-	Provisions for doubtful debtors	79407.04	
-	Bad Debts A/C	0.12	
-----		-----	
10900713.30		10929552.95	
	Other		
112.50	Science Technology Indicators Unit	24702.50	
168286.75	National Awards	30403.00	
184002.74	Steering Committees Note 1.6	217145.50	
688533.71	Sri Lanka Scientific & Technical Information Centre - Note 1.7	1346264.47	
125014.00	Consultancies for NARESA work	182415.00	
829967.47	Subscriptions to International Scientific Organisations	931027.20	
8484.50	Publications arising out of Steering Committees	11488.00	
-	Local experts	80000.00	
-----		-----	
2004401.67	Excess of Expenditure over Income	2823445.67	25401706.49
(7040618.54)		-----	-----
(228947.23)	Less : Prior Year Adjustment (Net)		(5326854.04)
-----			61924.75
(7269565.77)			-----
			(5264929.29)
			=====

Notes on Accounts

1. General Accounting - The Financial Statements have been prepared in accordance with generally accepted accounting principles on a historical cost basis. The fundamental accounting assumptions and policies relevant in accounting have been adhered to on a consistent basis as in the previous year.

The ten percent of foreign donor funds received which is for covering overheads, has been taken credit in the Income and Expenditure Statement.

1.1 Documentation Unit Capital Fund Expenditure

1. SLSTIIC Equipment	321,005.00
2. SLSTIC Books	65,801.36
3. SLSTIC Workshop & Seminars	544.70

	386,806.36
Less: Cost of Equipment & Books	386,806.36

	544.70
	=====

1.2 Research Grants Expenditure

Actual expenditure for the year	16,610,440.28
Zoological Survey	703,899.57
Add: Expenditure on AEA Capital Budget	975,000.00

	18,289,339.85
Add: Provisions for balance funds	-

	18,289,339.85
Less: Cost of Sea shells	650,000.00

	17,639,339.85
Less: Prior year adjustments (Net)	808,217.31

	16,831,122.54
	=====

1.3 Man & the Biosphere Expenditure

1. MAB/93/01	34,401.50
2. MAB/1.3/3	44,888.77

	79,290.27
	=====

1.4 Miscellaneous Fund Expenditure

	Rs.
1. Participation in International Scientific Work	59,573.93
2. Seminars & Symposia	403,638.07
3. Special Publications	159,267.00

	622,479.00
 Add: Prior year adjustment	 56.00

	622,535.00
	=====

1.5 Foreign Aid Expenditure

	Rs.
SAREC Expenditure	9,880,668.70
Less: Cost of Equipment	756,022.60

	9,124,646.10
 Less: Prior year adjustment (Net)	 359,337.94

	8,765,308.16
 Less: Money received from sale of buffaloes	 43,440.00

	8,721,868.16
	=====

1.6 Steering Committees Expenditure

	Rs.
1. Agriculture & Animal Husbandry S/C	12,580.00
2. Biotechnology S/C	16,758.00
3. Biological Sciences S/C	16,719.00
4. Chemical Sciences S/C	14,539.00
5. Editorial S/C	25,248.00
6. Medical & Vet. Sciences S/C	17,974.50
7. Natural Resources S/C	32,011.00
8. Physical & Engineering Sciences S/C	11,403.00
9. Social Sciences Research S/C	10,890.00
10. Science Education Research S/C	13,492.00
11. S & T Information S/C	8,902.00
12. Energy S/C	8,480.00
13. Zoological Survey S/C	28,149.00

	217,145.50
	=====

1.7 Sri Lanka Scientific & Technical Information Centre
Expenditure

	Rs.
1. SLSTIC Maintenance & repairs	161,080.86
2. SLSTIC Periodicals	226,421.71
3. SLSTIC In house Printing & Binding	32,317.15
4. SLSTIC Consumables	679,289.02
5. SLSTIC Miscellaneous	21,227.28
6. SLSTIC Services	12,468.75
7. SLSTIC Publications & Publicity	213,459.70

	1,346,264.47
	=====

2. Assets & the basis of their Valuation
Depreciable assets & Depreciation

Depreciation has been provided on Original Cost or at valuation on a straight line basis consistent with that of the previous year and is calculated to write off the assets over their estimated useful lives.

2.1 Debtors

	Rs.
Total Debtors	5,240,832.78
Less: Provision for doubtful debts	93,584.96

	5,147,247.82
	=====

Provision has been made for debts outstanding for over 03 years.

3. Liabilities

3.1 Creditors

Creditors amounted to Rs. 1,704,355.32 represents monies held by NARESA as given below,

	Rs.
1. CSC A/C	59,901.00
2. CSC funds received for Remote Sensing Seminar	24,098.13
3. Sundry Creditors	580,811.08
4. Fauna & Flora A/C	174,860.00
5. Genetic Resources A/C (CSC funds)	104,815.00
6. Mobile Science exhibition A/C	7,991.46
7. MAB Seminar A/C	227,162.00
8. RG/89/IS/03 A/C	65.75
9. RG/95/MAF/ A/C	421,483.82
10. Staff Creditors	10,519.00
11. Funds received for preparation of Bio-diversity report	11,648.08
12. Purna A/C	81,000.00

	1,704,355.32
	=====

3.2 Employees Benefit

All employees are covered by EPF and ETF except the National Apprenticeship Board Trainees. An approved Medical Scheme is provided in addition to the normal Welfare facilities available.

3.3 Retiring Gratuity

Provisions have been made in the accounts in respect of liability for retiring gratuity.

Amount paid for the year	
Provisions for the year	Rs. 1,112,123.00
	=====

4. Publications for the value of	Rs. 2,683,100.50
	=====

(valued at selling price) is available with us.

5. NARESA Owns : 19 Vehicles. They are located as follows,

With NARESA	-	11
With Research Grantees	-	8
		--
		19
		==

6. Funds drawn from the Treasury during 1997

Consolidated Funds	-	Rs. 18,327,520.00
		=====
Recurrent Funds	-	Rs. 17,410,000.00
		=====
Foreign Aid Funds	-	Rs. 11,267,000.00
		=====

8. All Fixed Assets except Scientific Equipment out on loan which were fully depreciated has been revalued.



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கணக்காய்வாளர் துணைமை அபிப்பதி துணைக்களம்
AUDITOR-GENERAL'S DEPARTMENT



මගේ අංකය
எனது இல. }
My No. }

EC/R/NRESA/FA/

මගේ අංකය
உமது இல. }
Your No. }

දිනය
திகதி }
Date }

8 June 1999

Director General,
Natural Resources, Energy and Science Authority of Sri Lanka.

REPORT OF THE AUDITOR GENERAL ON THE ACCOUNTS OF THE NATURAL RESOURCES, ENERGY AND SCIENCE AUTHORITY OF SRI LANKA 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 Natural Resources, Energy and Science Authority of Sri Lanka 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. My observations which I consider should be published with the annual report of the Authority 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 Director General of the Authority on 23 October 1998.

1:2 Scope of Audit

Audit opinion, comments and findings in this report are based on a review of the financial statements presented to audit and substantive tests of samples of transactions. The scope and extent of such review and tests were such as to enable as wide and 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 assessments 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.

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කොළඹ 7.

අනුමත අනුකූල,
කොළඹ 07.

**INDEPENDENCE SQUARE,
COLOMBO 7.**

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2. Accounts

2.1 Audit Opinion

Except for the effects of the adjustments arising from the matters referred to in paragraph 2:5 of this report, I am of opinion, that the financial statements have been satisfactorily prepared to present fairly in all material respect, the financial position of the Authority as at 31 December 1997 and the results of the operations for the year then ended in accordance with the generally accepted accounting principles.

2:2 Financial Results

The activities of the Authority are operated under General Fund and 6 special Fund Accounts. According to the accounts furnished, the financial results arising out of the activities of the Authority's General Fund for the year ended 31 December 1997 was a deficit of Rs. 22,736,854 as compared with the deficit of Rs. 22,115,619 for the previous year before taking into account the Government Grant for recurrent expenditure. After taking into account the Government Grant of Rs. 17,410,000 received for recurrent expenditure for the year under review, the deficit for the year had decreased to Rs. 5,326,854 and after taking into account the Government Grant of Rs. 15,075,000 received for recurrent expenditure for the preceding year, the deficit for that year had decreased to Rs. 7,040,619.

The financial result of the activities under special funds was a deficit of Rs. 26,255,361 before taking into account the government grant and foreign aid for activities of the special funds as compared with the deficit of Rs. 21,034,846 for the preceding year. After taking into account the government grant (including foreign aid) of Rs. 33,756,226 received for the activities of the special funds for the year under review, the surplus for the year was Rs. 7,500,865 and after taking into account the government grant (including foreign aid) of Rs. 29,460,207 received for the activities of the special fund for the previous year, the surplus for that year was Rs. 8,425,361.

2:2:2 General Fund

A summary of the financial results of the General Fund for the year under review and the preceding year is shown below.

Year ended 31 December

Income	1997		1996	
	Rs.	Rs.	Rs.	Rs.
Receipts for foreign aid administration cost	1,750,000		-	
Sale of publications	400,432		279,025	
Interest on Treasury deposits	207,704		164,168	
Provision of printing services to outsiders	201,388		211,729	
Receipts from photocopies	13,068		7,150	
Miscellaneous	42,139		28,546	
Profit from sale of fixed assets	50,122		26,827	
		2,664,853		717,445
<u>Expenditure</u>				
Office administration	10,929,553		10,900,713	
Staff salaries	11,560,590		9,848,518	
Board of control	88,118		79,431	
Others	2,823,446	25,401,707	2,004,402	22,833,064
Deficit before Government grant		(22,736,854)		(22,115,619)
Less: Government grant for recurrent expenditure		17,410,000		15,075,000
Deficit for the year		(5,326,854)		(7,040,619)
Balance of the fund Brought forward	(23,212,905)		(18,033,339)	
Prior period items	(61,925)		(228,947)	
Grant received from the Treasury	443,000	(22,707,980)	2,090,000	(16,172,286)
Balance of the fund carried forward		(28,034,834)		(23,212,905)

2:2:2 Special Funds

The following statement shows the financial results of each special fund for the year under review and the preceding year.

	Year ended 31 December			
	1997		1996	
	Rs.	Rs.	Rs.	Rs.
<u>Research Grant Fund</u>				
Government grant	16,793,520		6,452,824	
Less : Expenditure	16,831,123		9,145,269	
Deficit		(37,603)		(2,692,445)
<u>Documentation Unit Capital Fund</u>				
Government grant	461,583		527,000	
Less : Expenditure	545		6,761	
Surplus		461,038		520,239
<u>Foreign Aid Fund</u>				
Receipt of Foreign Aid	9,517,000		16,000,000	
Treasury Deposits	6,281,123		5,750,383	
Less : Expenditure	15,798,123		21,750,383	
	8,721,868		11,098,361	
Surplus/(Deficit)		7,076,255		10,652,022
<u>Man and Biosphere Fund</u>				
Government Grant	80,000		60,000	
Less : Expenditure	79,290		112,325	
Surplus		710		(52,325)
<u>Miscellaneous Fund</u>				
Government Grant	623,000		670,000	
Less : Expenditure	622,535		672,124	
Surplus/(Deficit)		(465)		(2,124)
Net Surplus/(Deficit) from Special Funds		7,500,865		8,425,367

2:3 Financial Structure

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

As at 31 December

	<u>1997</u>	<u>1998</u>
	Rs.	Rs.
<u>Resources</u>		
Capital Reserve	48,478,160	44,960,000
General Fund of the Authority	(28,034,834)	(23,212,905)
<u>Special Funds</u>		
Foreign Aid Fund	74,562,840	67,486,585
Research Grants Fund	3,948,473	3,986,075
Documentation Unit Capital Fund	6,415,387	5,954,350
Man and Biosphere Fund	1,899,262	1,898,552
Miscellaneous Fund	778,004	797,540
Working Committee Fund	1,034,025	1,034,025
Scientific Manpower Project Fund	153,498	153,498
	-----	-----
	109,254,815	103,057,720
	=====	=====
<u>Utilisation</u>		
Fixed Assets (at Written Down Value)	61,716,642	61,294,894
Net Current Assets	47,538,173	41,762,826
	-----	-----
	109,254,815	103,057,720
	=====	=====

2:4 Cash Flow

According to the accounts presented, the cash flow of the Authority during the year under review and the preceding year are shown below.

	Year ended 31 December			
	1997	1996		
	Rs.	Rs.	Rs.	Rs.
Cash flow from operating activities				
Net deficit for the year (Note I)		(5,534,558)		(7,204,787)
Adjustments for items not involving movement of cash				
Provision for gratuities	1,112,123		516,405	
Depreciation for the year	5,634,740		5,360,691	
Adjustments for profits on sale of fixed assets	-		(26,827)	
Provision for doubtful debts	79,407		-	
Provision for foreign aids	940,421	7,766,691	-	5,850,269
Prior period items	61,295	2,232,133	(228,947)	(1,354,518)
Add: Adjustments for items not involving the cash flow	2,711	64,936	(88,152)	(317,099)
Operating surplus/(deficit) before changes in items of working capital		2,296,769		(1,671,617)
Changes in items of working capital				
Decrease in stocks	(5,891)		49,117	
Increase/decrease in debtors	37,463		(1,172,933)	
Increase in pre-payments	(271,017)		(62,325)	
Increase/(decrease) in creditors	131,734		(180,089)	
Increase/(decrease) in accrued expenses	17,763		(618,435)	
Increase/decrease in other liabilities	(448)		5,921	
Decrease in provisions	-		(3,627,411)	
Increase in tender deposits	-		440	
		(90,396)		(5,605,715)
Payment of gratuities		2,206,373		(7,277,332)
		-		(73,120)
Cash generated from/(used in) operating activities		2,206,373		(7,350,452)

Cash flows from investing activities		

Purchase of fixed assets	(2,546,864)	(10,634,727)
Proceeds from sale of fixed assets	-	27,045
Receipts of interest income	207,074	164,168
Treasury deposits	(6,281,123)	(5,750,383)

Cash used in investing activities	(8,620,283)	(16,193,897)
Cash flows from financing activities		

Government grant	34,125,643	9,799,824
Foreign aid	(8,721,868)	21,750,383
Research grant fund	(16,833,081)	(9,588,553)
Documentation Unit fund	(545)	(6,761)
Man and Biosphere fund	(79,290)	(112,325)
Micellaneous fund	(622,535)	(672,124)
Foreign aid (expenditure)	-	(10,642,385)

Cash generated from financing activities	7,868,324	10,528,059

Net increase/(decrease) in cash and cash equivalents	1,454,414	(13,016,290)
Balance of cash and cash equivalents at beginning of the year		
	1,414,231	14,430,521

Balance of cash and cash equivalents at end of the year (Note I)	2,868,645	1,414,231
	=====	=====

Note I	97.12.31	96.12.31
Operating deficit	(5,326,854)	(7,040,619)
Interest receipts for Treasury deposits	(207,704)	(164,168)
Net operating deposit	(5,534,558)	(7,204,787)

Note II	96.12.31	96.01.01
Cash and cash equivalents	96.12.31	96.01.01
Bank balance in the cash book	2,841,044	1,384,368
Petty cash balance	12,500	12,500
Cash in hand		
Balance in the savings accounts	10,933 4,168	13,722 3,641
	2,868,645	1,414,231

2:5 Comments on Accounts**2:5:1 Accounting Deficiencies**

The following accounting deficiencies were observed.

- (a) A sum of Rs. 30,085 and sum of Rs. 271,580 were due from the National Livestock Development Board for sale of buffalo milk and buffalos of the Narangalla Animal Farm which belonged to the National Livestock Development Board. This was in relation to the Water Buffalo Project and had not been brought to accounts as receivables and income.
- (b) Receipts of cheques in respect of sale of publications to foreigners are being deposited in the bank without entering in the cash book and of that a sum of Rs. 29,735 being the value of unrealised cheques had been shown as debtors in the accounts.
- (c) 5 vehicles purchased by the Authority in respect of Projects had been fully depreciated at the balance sheet date and had been utilised for Projects. The value arising from the revaluation of those vehicles had not been brought to account under assets.
- (d) Out of the provision given by the Treasury to the Authority for research activities, a sum of Rs. 975,000 had been released to the Atomic Energy Authority which had no connection with the activities of the Authority.

2:5:2 Assets at Book Value

A physical verification of fixed assets had not been carried out during the year under review or at the end of the year under review and the fixed assets had been shown in the accounts at book value.

2:5:3 Suspense Account

A suspense account balance of Rs. 4,947 brought forward for several years had not been settled even during the year under review.

2:5:4 Lack of Evidence for Audit

Fixed assets valued at Rs. 17,478,123, stocks amounting to Rs. 715,739, creditors amounting to Rs. 1,704,355, imprests released to researchers amounting to Rs. 832,024, Treasury deposits amounting to Rs. 46,570,198 and balance of the bank current account amounting to Rs. 2,841,044 could not be satisfactorily vouched or accepted in audit due to the absence of board of survey reports, registers of fixed assets and confirmations.

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

Following instances of non-compliance were observed in audit.

Reference to Laws, Rules, Regulations etc.	Particulars
-----	-----
(a) <u>Finance Act.</u>	
(a) <u>Finance Act.</u>	
(i) Section 8(3)	A draft income and expenditure account and a projected balance sheet had not been prepared with the budget for 1997.
(ii) Section (13)(5)(b)	Minimum internal audit programme had not been determined by the Authority with the concurrence of the Auditor General.
(iii) Section 13(6)	The report on accounts had not been forwarded together with the accounts for the year 1997.
(b) <u>Establishments Code</u>	
(i) Section 2:10 of Chapter VI	According to this Section, particulars of termination of services, disciplinary action, resignations, retirements, deaths etc. should be reported to the Auditor General. However, this had not been complied with.
(ii) Section 10:3 of Chapter VIII	A register had not been maintained by the Authority to record the details of work done at weekends and public holidays as per requirement of the Establishments Code.

(c) Treasury Circular

(i) No. 44 of
25 September 1987 Accounts had not been prepared in general format specified by the Treasury.

(ii) No. 842 of
19 December 1987 Action had not been taken in terms of the 9th schedule of the circular in respect of fixed assets released to the Ministry of Science and Technology.

(d) Public Administration Circular.

(i) No. 41/90 of
10 October 1990 Fuel consumption of vehicles had not been checked by the Authority.

(ii) No. 7/92 of
18 February 1992 The Chief Accountant and two Directors had used official vehicles to travel between the residence and office without the Cabinet approval.

(e) Circular No. 1/93 of
27 May 1993 of the
Ministry of Policy
Planning and
Implementation. Although the monthly fuel allowance for travelling of the Director General of the Authority was Rs. 8,000, expenditure of Rs. 14,333 had been incurred during the year under review exceeding this limit.

(f) Decisions of the
Board of Directors. The decision taken by the Board of Directors in the month of August 1996 to sell a motor vehicle by auction had not been implemented.

2:5:6 Transactions not Supported
by Adequate Authority.

The following observations are made.

- (a) According to the Public Enterprises Circular No. 95 of 14 June 1994, benefits specially approved by the Cabinet, Ministry of Public Administration or Treasury with the approval of their Governing Bodies alone could be paid as allowances to employees. However, without a specific approval a sum of Rs. 846,296 being bonus, a sum of Rs. 516,340 being allowances for medical leave and a sum of Rs. 56,556 being medical leave allowances had been paid to the officers and employees of the Authority.
- (b) Contrary to the objectives of the Authority payments had been made for conferences of the following institutions.
- (i) A sum of Rs. 50,000 for the 110th conference of the Sri Lanka Medical Council.
 - (ii) A sum of Rs. 45,000 for the expenses of South East Divisional Conference.
 - (iii) A sum of Rs. 35,000 for the expenses of 9th Annual conference of the Postgraduate Institute of Agriculture of the University of Peradeniya.
 - (iv) A sum of Rs. 19,800 for expenses of the 30th Annual conference of Lanka Medical College.
 - (v) A sum of Rs. 15,000 for 37th Annual conference of the Library Council.

3. Financial and operating review

3:1 Financial results

The activities of the Authority during the year under review had resulted in a deficit of Rs. 5,326,854 as compared with the deficit of Rs. 7,040,619 in the previous year thus showing an increase in financial results by Rs. 1,713,765. It could be analysed as follows.

	<u>Variance</u>		Rs.
	<u>Favourable</u> Rs.	<u>Adverse</u> Rs.	
<u>Income</u>			
Receipts regarding foreign aid administration cost	1,750,000	-	
Sale of publications	121,407	-	
Interest of loans	43,536	-	
Provision of printing services to outsiders	-	10,342	
Receipts from photocopies	5,918	-	
Miscellaneous	13,593	-	
Profit on sale of fixed assets	-	26,827	
Investigation income from outside activities	50,122	-	
Government grant for recurrent expenditure	2,335,000	-	
	4,319,576	37,169	4,282,407
	=====	=====	
<u>Expenditure</u>			
Office administration	-	28,839	
Staff salaries	-	1,712,072	
Board of control	-	8,687	
Others	-	819,044	
	-	2,568,642	(2,568,642)
	=====	=====	
Net increase in financial results			1,713,765
			=====

3:2 Adjustment of Financial Results

The financial results and the financial positions disclosed in the accounts for an accounting period had been adjusted for accounting deficiencies, omissions etc. observed in subsequent years as a regular feature of the Authority. For instance, the net deficit for the preceding year had been adjusted by Rs. 61,925 during the year under review. Such adjustments made during the 5 preceding years are shown below.

Year	Financial Results as per Accounts (Deficit)/Surplus	Adjustments Made in the Subse- quent Year	(Deficit)/Surplus After Adjustments
	Rs.	Rs.	Rs.
1991	(2,870,487)	(42,276,985)	(45,147,472)
1992	(3,800,520)	(63,901)	(3,684,421)
1993	(4,364,152)	(379,802)	(4,743,954)
1994	(4,789,206)	(1,597,227)	(6,386,434)
1995	(2,232,285)	228,947	(2,461,232)

In this context, similar adjustments to the financial results shown in the accounts for the year under review in subsequent years cannot be ruled out.

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3:3 Performance

The Authority assists individuals and institutions for research activities. According to the information furnished, the particulars of research projects carried out during the year under review compared with these of the preceding year are given below.

Research Project	Projects Funded by NARES Institutions		Projects Funded by Foreign Institutions	
	<u>1997</u>	<u>1996</u>	<u>1997</u>	<u>1996</u>
Projects in progress at the commencement of the year	172	119	08	07
Researches newly commenced during the year	37	55	03	Nil
Total	209	174	11	07
No. of research projects completed during the year	23	30	09	01
Projects abandoned during the year	01	02	06	Nil
Projects withdrawn during the year	02	01	-	Nil
No. of projects in progress at the end of the year	183	141	-	06
	===	===	==	===

The number of Projects implemented during the year had been shown as 11. However, when showing the number completed and abandoned, the total had been reported as 15. The Chairman informed me that the Water Buffalo Project consisting of 15 Sub Projects had been treated as one and accordingly there were many projects during this year. The Authority and foreign institutions had utilized grants amounting to Rs. 16,610,420 and Rs. 9,880,669 respectively for the year under review.

3:4 Project Administration

The following deficiencies were observed at a test check carried out in respect of Research Projects conducted by the Authority.

- (a) Although the due dates of the final reports that should be sent after completion of the researches of Projects had lapsed, the officers in charge of the projects bearing the following Project Numbers had not sent the reports on the due dates.

<u>No. of the Project</u>	<u>Due date of the report</u>	<u>The date on which the report was furnished</u>
RG/95/B/10	20 December 1996	Report had not been furnished upto 30 June 1998
RG/95/SE/02	December 1997	- do -
RG/96/M/03	March 1997	- do -
RG/96/M/04	October 1997	- do -
RG/97/M/07	July 1997	- do -
RG/96/SS/01	June 1997	- do -
RG/96/BT/02	June 1997	- do -
RG/96/BT/6	September 1997	- do -
RG/96/BT/8	September 1997	- do -
RG/95/C/14	December 1997	- do -

- (b) Funds had been released by the Authority to Universities for research activities. Although the research activities had been completed, action had not been taken to return the cash balances to the Authority. The Authority was not interested in recovering the cash for to 2 to 6 years. Two instances observed according to a sample test are shown below.

<u>Universities</u>	<u>Cash Balance</u> Rs.
University of Kelaniya	29,642
Sri Jayawardanapura University	64,282

3:5 Uneconomic Transactions

The following observations are made.

A machine had been purchased for a sum of Rs. 130,000 to produce mineral mixed food for buffalo using "Molasses" for Water Buffaloes Project and it had been installed in the Narangalle Animal Farm spending a sum of Rs. 104,053 on manufacturing activities and obtaining electricity. However, as the electricity capacity was not sufficient, this had been transferred to Galpokuna Animal Farm and due to the failure of manufacturing activities this had been again handed over to the Gorakele Animal Farm belonging to the Ministry of Livestock Development.

3:6 Cost of Personnel

Details of staff of the Authority, normal pay and overtime cost and the average cost per employee for the year under review as compared with those of the preceding year are shown below.

Category of Staff	Number		Salary Cost				Average Cost per Employee			
			Normal Time		Overtime		Normal Time		Overtime	
	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Executives	32	29	4,692,400	4,131,400	5,220	45,036	146,600	142,462	163	1553
Clerical and Allied Grades	47	46	3,964,300	3,672,400	5,180	41,463	84,347	79,835	110	901
Minor Employees	19	18	1,108,900	960,000	131,076	49,445	58,363	53,333	6,899	2747
	98	93	9,765,600	8,763,800	141,476	135,944	99,649	94,234	1,444	1462

3:7 Vehicle Utilisation

The Authority had 21 vehicles during the year under review. Of these, 11 vehicles had been used for the services of the office and 10 vehicles had been released to research projects. According to the information made available, the data relating to the utilisation of 9 vehicles consisting of 8 passenger vehicles and 1 motor bicycle that had been used ~~at~~ the office as compared with the preceding year are shown below.

	Petrol				Diesel		
	1997		1996		1997	1996	
	Type of vehicle	Type of vehicle	Type of vehicle	Type of vehicle	Passenger Vehicles	Passenger Vehicles	
	Passenger vehicles	Motor cycles	Passenger vehicles	Motor cycles	Passenger Vehicles	Passenger Vehicles	
Number of vehicles utilised	4	1	5	2	4	4	
Distance travelled - Kilometres	41,788	6,179	43,119	5,409	24,835	36,144	
Fuel consumed - Litres	5,797	175	6,430	203	3,170	3,736	
Total expenditure on fuel	Rs. 288,074	8,750	273,669	8,680	58,576	59,761	
Expenditure on repairs and maintenance (including insurance and licences)	Rs. 199,621	6,437	246,341	5,562	410,691	459,328	
Drivers' remuneration, bats and overtime	Rs. 76,902	-	71,849	-	14,600	22,407	
Depreciation	Rs. 520,775	15,965	520,775	15,965	305,000	305,000	
Total cost	Rs. 1,085,372	31,152	1,112,634	30,207	788,867	846,136	
<u>Performance per Kilometre</u>							
Average performance per litre	Km.	7.20	35.31	6.70	26.64	7.83	9.67
Average expenditure on fuel per kilometre	Rs.	6.89	1.41	6.34	1.60	2.38	1.65
Average expenditure on repairs and maintenance per kilometre	Rs.	4.77	1.04	5.71	1.02	16.54	12.70
Average expenditure on drivers' remuneration per kilometre	Rs.	1.84	-	1.66	-	0.58	0.61
Average expenditure on depreciation per kilometre	Rs.	12.46	2.58	12.07	2.95	12.28	8.43
Overall average expenditure per kilometre	Rs.	25.97	5.04	25.78	5.58	31.76	23.41

3:8 Corporate Plan

A corporate plan had not been prepared in terms of Section 7(1) of the Finance Act and Treasury Circular PCD 52 and 16 June 1989.

3:9 Budgetary Control

Significant variances were observed between the estimated and actual income and expenditure. Therefore, it was observed that the budget had not been made use of as an effective instrument of management control during the year under review.

4. Systems and Controls

Deficiencies observed during the course of audit were brought to the notice of the Director General of the Authority by my detailed report in terms of Section 13(7)(a) of the Finance Act. Special attention is needed in respect of the following areas of control.

- (a) Cash
- (b) Debtors and Creditors
- (c) Assets
- (d) Research Projects
- (e) Accounting

(S.M. Sabmy)
Auditor General.

-/dk.

2:5 Comments on Accounts

2:5:1 Accounting Deficiencies

- a) SAREC Buffalo Project - During 1997 we have had correspondence, but these figures have not been confirmed. Hence we have not taken these amounts as funds receivable in 1997.
- b) Sale of Publications - We do enter the foreign currency value in the cash book at the time we issue the receipt. Once the foreign cheque is realized we account for the realized rupee value.
 RS. 26,172/= out of the RS. 29,735/= has been realized in 1998.
 The balance RS. 2,481/= was accounted in year 2000
- c) Grant Vehicles - It was the condition that the vehicles purchased for Research Work (under the grants) be transferred to the relevant institution after the project. Since all the grants have now been completed arrangements have been made to transfer them.
- d) RS. 975,000 - This RS. 975,000/= had been granted to Atomic Energy Authority to purchase Scientific Equipment.

2:5:2 Assets valued at Book value

A physical verification has been carried out during 1998, to verify the following assets as at 31.12.97.

1. Office furniture fittings and equipment
 2. Motor Vehicles
 3. Motor Bicycles
 4. Push Bicycles
 5. Miscellaneous & Accessories
 6. Documentation equipment
 7. Stock
 8. Library books
- } In the premises of our Institution

2:5:3 Suspense Account

Though the total amounts have not been identified. We have identified amounts and accounted for accordingly. The balance as at 31.12.2000 is only RS. 10.65 in the suspense account.

2:5:4 Lack of evidence for the Audit

Fixed Assets	}	The Board of Survey Report has been received.
Stock		- A Physical Verification has been carried out during 1998, to verify the following assets as at 31.12.97.

- | | | |
|--|---|------------------------------------|
| 1. Office furniture fittings and equipment | } | In the premises of our Institution |
| 2. Motor Vehicles | | |
| 3. Motor Bicycles | | |
| 4. Push Bicycles | | |
| 5. Miscellaneous & Accessories | | |
| 6. Documentation equipment | | |
| 7. Stock | | |
| 8. Library books | | |

Fixed Assets Register - We maintain fixed assets registers since 1983, according to Kalamazoo system. These registers have been checked by the Govt. Auditors.

Cash Imprest

Confirmation Letters - Letters which we have sent and the confirmations received are available with us for inspection.

Treasury Deposit - We have received the confirmations. Copies were submitted to the Auditors.

Bank Current accounts - Confirmation letters have been signed and accepted by one of the Auditors.

2.5:5 Non compliance to Laws, Rules, Regulations & Management decisions**(a) Finance Act**

- (i) Budget – Budgets are prepared according to the Circulars issued by the Treasury/ Ministry each year.
- (ii) We have already established an Internal Audit Unit. The Auditor General has granted approval for same.
- (iii) Copies of the Annual Report (draft) have been forwarded to the Auditor General & to the Ministry of Science & Technology at the time of presenting the final Accounts.

b) Establishment Code

- (i) Auditor General has been informed with regard to the appointments made to the institution. It was noted to inform the Auditor- General regarding resignations, retirements, etc. in the future.
- (ii) A file is maintain^{ed} with full records (names of the officers, designations, work, date and time) in respect of the overtime work.

(c) Treasury Circular

- (i) We have prepared our accounts in the format, we have been preparing for the last so many years.
- (ii) We have not transferred any fixed Assets to the Ministry of Science & Technology during 1997.

(d) Public Administration Circular

- (i) Arrangements have already been made to check the fuel consumption of the vehicles.
- (ii) Common transport facilities is provided for 03 senior officers (Grade I) using 01 vehicle as decided by the Board of Management.
- (e) Director General has paid to the Authority when she exceeded the entitled petrol allowance.
- (f) Relevant vehicle has already been disposed.

2:5:6 Transactions not supported by adequate Authority**(a) Annual Payment**

We have been acting as the administration centre for funds on bilateral research collaboration on behalf of the SIDA (former SAREC) organization & the Sri Lankan Government since 1982. Accordingly funds had been spent on various research & development programmes through NARESA. Therefore SAREC organization which provides funds for bilateral research collaboration and the NARESA as the Institution which administers the funds and monitors the research programmes have agreed to allocate a small amount of funds for the administration of these projects. Approval has been obtained from the Dept. of External Resources for this. Annual payment is made out of these foreign funds with the approval of the Board of management since 1991.

Payment for unavailed Medical Leave

Since 1984 NARESA has been paying its employees for unavailed sick leave according to the basis given in circular No.326 of 23-11-83 of the

then Ministry of Industries and Scientific Affairs on the approval of the Board of management.

Medical Assistance Scheme

Medical Bills for the value of RS. 500/= per employee per year is reimbursed. This is paid with the approval of the Board of Management.

- (b) These payments are within the objectives of NARESA. One of the objectives of NARESA is to support Scientific Activities, please refer NARESA Act. No. 78 of 1981 - Part II - 9f(iii) and g. which states

(9) (f) (iii) (g) the advancement of Science & Technology in general in Sri Lanka and to do such other things as may be necessary for the development of Science & Technology in Sri Lanka.

3:4 Project Administration

- (a)
- | | | |
|-------------|---|---|
| RG/95/B/10 | - | Grant terminated April 1998 |
| RG/95/SE/02 | - | Final Report submitted - in Aug. 1998 |
| RG/96/M/03 | - | Grant Terminated - Sept. 1998 |
| RG/96/M/04 | - | Final Report received - July 1998 |
| RG/97/M/07 | - | Ongoing grant |
| RG/96/SS/01 | - | Final report submitted on 20.06.99 |
| RG/96/BT/06 | - | Final Report received - 11 th Nov. 1998 |
| RG/95/C/14 | - | Final Report received |
| RG/96/BT/02 | - | Final Report received - 13 th July 2000 |
| RG/96/BT/08 | - | Final Report received 17 th January 2000 |

- (b) University of Sri Jayawardenepura and University of Kelaniya has refunded the relevant funds to us. It is incorrect to state that we have not taken an interest to recover the balance. It is due to our interest only we are able to obtain the refunds.

3:5 Uneconomical Transactions

The primary objective of the installation of the UMMB plant at Narangalle was to facilitate the production of UMMB which is a low cost nutritional animal feed for distribution among the farmers in the area. Despite the change of the location of the installation, the production of UMMB continued at Horakele on a commercial basis, fulfilling the objectives. Therefore the cost incurred has been productively utilized.

3:8 Corporate Plan

The existing Corporate Plan is for the period 2001-2005.

3:9 Budgetary Control

The Budget is prepared almost one year before the expenditure is incurred. As far as possible we use the Budget as an instrument of control.

04. Systems Controls

Auditor General's Comments on Section 13 (7) a) of the Finance Act received our attention. Our reply to these Comments were forwarded to the Auditor General.