RESEARCH IS THE FOUNDATION OF KNOWLEDGE

VIDYA

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Inauguration of S&T Exhibition

Honourable Batty Weerakoon, Minister of Science and Technology inaugurated an Exhibition on **"Resources and Services available at the S&T (SLSTINET) Libraries in Sri Lanka"** held at the National Science Foundation from 1 – 2 December, 1998.

Prof. Kapila Dahanayake, Chairman, NSF, Mr M. Watson, Acting Director and Ms D. Talagala, Director/Information were also present at the inauguration ceremony. A large gathering of distinguished academics and library professionals attended the ceremony.

The coordinator of the SLSTINET released the updated issue of the Union List of Current Periodicals in S & T libraries in Sri Lanka (CLIST) on this occasion.

The following institutions participated in the exhibition.

- Health Literature and Library Information Services (HELLIS)
- Environmental Library Net work (ENLINET)
- Sri Lanka Scientific and Technical Information Network (SLSTINET)
- Telecommunications Regulatory Commission (TRC)
- International Irrigation Management Institute (IIMI)
- Sri Lanka Standards Institution (SLSI)
- Coconut Research Institute (CRI)
- Industrial Technology Institute [(ITI - (formerly CISIR)]
- National Library Services Board
- Centre for Industrial Technology information services (CITIS)

Hon. Batty Weerakoon, Minister of Science and Technology lighting the oil lamp to inaugurate the exhibition. Prof. Kapila Dahanayake, Chairman – NSF is associated with the Minister.

A theme seminar on **"Sharing Information for a Networked Society"** was also held in the NSF Auditorium. It was attended by library professionals and general public. The objectives of the seminar were to (i) create an awareness among the general public and the scientific community of the resources and services available at the S&T libraries and information centres (ii) promote cooperation among libraries (iii) introduce new information technologies and (iv) provide a forum to demonstrate the use of such technologies in the information management.

This event was co-sponsored by the Computer and Information Technology Council of Sri Lanka (CINTEC). ♦

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About the NSF.....

The NSF is a state funded institution reconstituted in 1998, by the Science and Technology Development Act of 1994, and is one of the key organisations under the Ministry of Science and Technology. It is the successor to the Natural Resources Energy and Science Authority of Sri Lanka (NARESA) which was set up in 1981. NARESA itself succeeded the National Science Council (NSC). The NSC was set up in 1968.

The NSF like its predecessors is governed by a statutory board. The Board of Mangement of the NSF consists of the Chairman, Director and members nominated by the Honoerable Minister of Science and Technology. The Director functions as the chief executive.

The functions of the NSF are:

(a) to initiate, facilitate and support basic and applied scientific research by universities, science and technology institutions and scientists, with a view;

(i) to strengthening scientific research potential, including research in the social sciences, and science education programmes;
(ii) to developing the natural resources of Sri Lanka;
(III) to promoting the welfare of the people of Sri Lanka; and
(iv) to training research personnel in science and technology;

(b) to foster the interchange of scientific information among scientists in sri Lanka and foreign countries;

(c) to award scholarships and fellowships for scientific study or scientific work at science and technology institutions;

(d) to maintain a current register of scientific and technical personnel, and in other ways to provide a central clearing house for the collection, interpretation and analysis of data, on the availability of, and the current and projected need for, scientific and technical resources in Sri Lanka, and to provide a source of information for policy formulation on science, technology and other fields;

(e) to popularise science amongst the people by funding programmes for that purpose.

The NSF has established Working Committees to facilitate the discharge of its functions. The Working Committees are made up of eminent scientists drawn from universities, and public/private sector institutions.

The Working Committees assist the NSF in promoting research and development. Besides the Working Committees other technical committees are appointed from time to time to oversee specific projects or programmes initiated by the NSF . The National Committee on Man and the Biosphere (UNESCO) also functions as a Working Committee of the NSF.

The award of research grants is one of the main activities of the NSF in its endeavour to promote scientific and technological research in the country. The scheme provides funds to enable researchers to obtain equipment and consumables, to hire personnel to help in their work, and to travel to field sites.

The NSF also serves as the national focal point for many overseas bodies including the following institutions.

- Association for Science Cooperation in Asia (ASCA)
- Association of Asian Social Science Research Councils (AASSREC)
- Committee for Science and Technology in Developing Countries (COSTED)
- Commonwealth Science Council (CSC)
- International Centre for Genetic Engineering and Biotechnology (ICGEB)
- International Council of Scientific Unions (ICSU)
- Regional Network for the Exchange of Information and Experience in Science and Technology in Asia and the Pacific (ASTINFO)
- South Asian Association for Regional Cooperation (SAARC) - Sub nodal point for the Technical Committee on Science and Technology
- Swedish International Development Cooperation (SIDA)
- Third World Academy of Sciences (TWAS)

Indo - Sri Lanka Science and Technology cooperation - Biotechnology Programme also functions under the NSF.♦

Science & Technology for Sri Lanka

There has never been a greater need than today for Science and Technology to contribute towards national development.

Globalization and dismantling of tariff barriers have placed on Sri Lanka several major challenges. Unless we can make our products competitive in comparison to those of other countries, Sri Lanka will suffer in two ways. Firstly, cheaper imported goods of quality (and even services) will flood the local market displacing Sri Lanka's industry and increasing unemployment. Secondly, our exports will dwindle, for example, the export of garments will no longer be based on quotas specially reserved for Sri Lanka; developed countries will be freely importing good quality garments at competitive prices from other countries.

Therefore, it is necessary that scientists and technologists exert cohesive and united efforts to improve the quality of Sri Lankan products. For this purpose, our efforts to a large extent should be oriented towards applied research and development from the laboratory to the shop floor. The petty differences that some of us have had, in criticizing the other party that "the research was good but the shop floor could not follow properly" should no longer continue. The scientists and technologists should work hand-in-hand with industry to meet customers' demand, having due regard to environmental aspects. This does not mean that the fundamental sciences should be completely forgotten; it just emphasizes the necessity to do more Research and Development solving problems of critical importance.

Talking about the crisis in the energy field, in ten years time our oil/coal import bills may quadruple. Since the hydro potential is limited, effective local, preferably renewable sources, should be identified and developed. These will not only save large amount of foreign exchange but also will help increasing employment opportunities, reducing Co2 emission and global warming, rising of sea level etc.

The message is clear. The fruits of science and technology should directly reach people. We all should gather and act in a united manner to meet the challenges of the future.

Prof. K.K.Y.W. Perera
Chairman /NSF Working Committee on Energy

A computer Resource for Biotechnology through ICGEBnet

ICGEBnet is a central biocomputing resourc which currently provides biocomputing facilities to over 400 registered users world wide via LAN, Internet and X.25 connections. ICGEnet offers a computer environment that allows molecular biologists to analyze nucleotide and protein sequences and to access to a larger variety of data bases related to molecular genetics and structural biology. Various electronic communication tools such as electronic news, mail and wide area information services are also provided. Access to ICGEBnet is available free of charge to all ICGEB Member Country scientists. ICGEB is a member of EMBnet, the European Biological Information Network.

Please refer to page 24.

More information on ICGEBnet can be obtained from the NSF.

Diary of National Scientific Events

The NSF maintains a diary of scientific events [e.g. seminars, workshops, conferences etc.] organized by the universities and other institutions accessible through the NSF web site.

www.naresa.ac.lk/news/diary/event.htm

The information on events for inclusion in the web site can be sent to

wasantha@naresa.ac.lk

Assessment of the feasibility and the effectiveness of a new restorative technique in mobile out-reach dental clinics in rural community in Sri Lanka

This report is based on the research done under the NSF Research Grant RG/98/D/1. The investigations were carried out by Dr U.S. Usgoda Arachchi of the National Institute of Health Services, Kalutara.

The aim of this study was to test the effectiveness of the use of Glass Ionomer Cement (GIC) in out-reach dental clinics. The Study design was the comparative longitudinal evaluation of two restorative procedures.

Three School Dental Therapists (SDTT) were randomly selected considering their work experience. They were given a training on the use of GIC. Following this, they were instructed to conduct out-reach clinics. One group of children was treated with GIC and the other group with Amalgam. The children were monitored for a period of six months. The examinations were conducted at one, three and six monthly intervals. The quality , durability, occurrence of post-operative complications of the restorations and the work output of the two restorative interventions were assessed. Moreover, the cost for restorations, assessment of logistical difficulties and the fulfillment of the operators expectations by the use of GIC were taken as indicators to test the effectiveness.

SDTT were able to place GIC restorations similar to that they placed Amalgam restorations in terms of quality and durability, and with the absence of post-operative complications. Furthermore, with the use of GIC, they were able to produce more work output than that of using Amalgam. Accordingly, GIC seemed to be a more efficient restorative material. The cost for a GIC filling was lower than that of an Amalgam restoration and it was cost-effective too. Moreover, there were no apparent logistical difficulties concerning the introduction of GIC in out-reach dental clinics. It has been proved that GIC fulfils the SDTT's expectations as a new restorative material.

Thus, the use of GIC in out-reach dental clinics seems to be a more effective method of provision of restorative care rather than the use of Amalgam. Moreover, with the other advantages of the GIC, its introduction to school dental service would be a better strategy for the provision of restorative care. ♦

Establishment of norms for the time of eruption of the permanent dentition in Sri Lankan children of low and high socio-economic status

Studies on the chronology of tooth eruption have been reported from many parts of the world. This data has been of importance in clinical, anthropological and medico-legal work.

Very little information is available regarding the chronology of eruption of the permanent dentition in Sri Lankan children. Nothing is known about the eruption times of the permanent teeth in the three major ethnic groups in Sri Lanka, namely Sinhalese, Sri Lankan Tamils and Sri Lankan Moors. The present study was undertaken to establish norms for permanent tooth eruption times in the high and low socio-economic groups in the three major ethnic groups in sri Lanka.

A total of 8129 Children - 3278 Sinhalese (1602 males, 1676 females), 2350 Sri Lankan Tamils (1200 males, 1150 females) and 2501 Sri Lankan Moors (1154 males, 1347 females) in the age range of 5 to 19 years se-

lected by a multistage sampling scheme covering all provinces in Sri Lanka was examined. The children were grouped according to sex, age and socio-economic status. The analysis of data was carried out using the method of probit analysis with the aid of the 'SAS' programme. Mean age of eruption separately for males and females in the two socio-economic groups for the Sinhalese, Sri Lankan Tamils and Sri Lankan Moors were obtained.

Most of the teeth in the females erupted significantly earlier than the corresponding teeth in the males in all three ethnic groups. A definite influence of the socio-economic status on tooth eruption was evident from the results of this study, the children of high socio-economic group showing advanced eruption times. Using the eruption times, the sequence of eruption of the permanent teeth for the three ethnic groups and a common eruption sequence for Sri Lankans have been established.

The average number of permanent teeth present at each age between 5 to 19 years was calculated (eruption charts) and a dental growth curve formulated for the Sri Lankan children irrespective of the socio-economic status and ethnicity.

It is envisaged that these eruption charts and the growth curve would be of great value in assessing the dental age, both in clinical and medico-legal studies.

This research project was carried out by Prof. M.S. Chandrasekera and Dr C.D. Nanayakkara of the University of Peradeniya. The project was funded by the NSF under the Research Grant RG/96/M/4. ♦

Candidate peptide and DNA vaccines for falciparum malaria - synthesis and immunogenicity in laboratory animals

A malaria vaccine will greatly aid eradicate the disease. Merozoite surface proteins [e.g. MSA1 and MSA2] and proteins binding erythrocytes [e.g. EBP] are candidates for vaccine development. MSA2 and a portion of MSA1 were cloned into eukaryotic expression vectors and their expression was studied in cultured cells. Polymers of selected peptides from MSA1, MSA2 and EBP were synthesised. Two epitopes from MSA1 and 2 were also cloned into cowpea mosaic plant virus. A recombinant MSA2 fusion protein was expressed in *Escherichia coli* and purified. MSA2 RNA was also prepared by in vitro translation for studies of RNA vaccination. The immunogenicity of the different vaccine constructs were tested in rabbits an mice. Antibodies were detected by immunofluorescence, ELISA and western blotting. Therefore, the research involved the examination of the four major types of possible synthetic vaccines, viz. synthetic peptide, recombinant protein, DNA and RNA vaccines and recombinant viral vectors. The recombinant viral vectors did not yield specific antibodies on immunisation. the peptide polymers yielded high titre antibodies against peptides but these reacted poorly with native proteins, due to conformational differences. The results showed the potential for nucleic acid vaccination and vaccination with recombinant proteins. However, merozoites resist complement mediated lysis caused by antibodies binding to the merozoite surface. The research illustrates the need for developing an *in vivo* system for testing the efficacy of candidate vaccines against asexual blood stages of *P. falciparum*.

This article is based on the research carried out by Dr R. Ramasamy at the Institute of Fundamental Studies under the NSF Research Grant RG/95/BT/06. ♦

The final reports of* the above research projects *are available in the NSF library for reference.

Impact of Buffalo Research on the Livestock Sector and the Farming community

Introduction

Most Sri Lankans as known, particularly the urban elite, have been used to look at the buffalo with certain amount of prejudice. They considered it as "an ugly slow-moving beast wallowing in muddy water holes most of the day and causing obstruction to vehicular traffic on outstation roads." These people carried such a poor opinion of the buffalo, because of their ignorance of the value of this animal in the agrarian economy of the country and its potential as a dairy cow. The domestic water buffalo has been an integral component of the agrarian society in Sri Lanka from ancient times. It was used for land preparation and post harvest processing (threshing) of rice and other drought related activities. Even in the recent times it has been shown that one third of the farm power required for rice cultivation in Sri Lanka is met by animal power, buffalo being the main contributor. About milk production, it is estimated that out of the country's total milk production (approximately 28 million litres) 25% come from the buffalo. The studies have also shown that the Lanka buffalo is the most efficient converter of poor quality roughage into good quality meat. This also proves the potential of this animal as a source of meat despite the prejudice in this country against the consumption of buffalo meat. So the potential of the buffalo as a valuable source of farm power, milk, meat and manure should be recognized. Although the buffalo population in the country is around 0.76 million, the bulk of the animals is indigenous and relatively poor in milk production. The average daily yield is about 1.5 to 2 litres. It has been shown that planned cross breeding of indigenous buffalos with Indian types (Murrah, Surti etc.) could improve the dairy potential of these animals. Only some buffalo population comprises of these dairy breeds and their crosses. They are confined mostly to the State livestock farms and some urban and suburban dairy farms in the private sector. The trend for crossbreeding of indigenous buffaloes with dairy breeds like Murrah and Nili Ravi has been increased in the recent times due to the increased demand for buffalo milk and curd which are rich in fat and proteins.

The water buffalo was a neglected subject of research in spite of its great potential as a dairy/drought animal that could do relatively well under harsh environment and poor quality feeds. Although the local scientists wished to conduct research in this area, they experienced difficulties in obtaining funds for their investigations.

However, the situation was changed in the mid nineteen seventies when many international donor agencies expressed their interest to assist Sri Lanka in research and development efforts.

The Swedish Agency for Research Cooperation (SAREC) was one of the agencies who was interested in supporting buffalo research and development in Sri Lanka. The SAREC sponsored a workshop which they held in November 1980 for the Sri Lankan scientists to review and critically evaluate the research conducted locally on water buffaloes. Consequently, a multidisciplinary research programme was launched in 1983 and has already lasted for nearly fifteen years by now.

The Buffalo Research Programme

The SAREC funded the programme, NARESA being the local coordinator and administrator. Funding came in three phases. In the first two phases the programme was focused on research into fundamental aspects of breeding and reproduction, physiology and nutrition, diseases, production and management, socioeconomic and surveys on management and productivity. Two buffalo research stations were also established to enhance research facilities for the scientists. Research emphasis in the second phase was focused mainly on applied aspects of the improvement of buffalo production. The Scientists from the University of Peradeniya and Ruhuna and the Veterinary Research Institute (VRI) participated in the programme. The third phase of the programme -the Buffalo Information Dissemination Programme, began in 1994. The objectives of the third phase were to bring the knowledge gained through research and transfer the new technologies to the end-users (rural farmers). The Scientists of the University of Peradeniya are carrying out this programme in collaboration with other State and private sector organizations involved in livestock production.

The outcome of the first two phases of the research programme was as follows;

a) Valuable baseline information on production and management systems and the identification of constraints to buffalo production has been obtained.

b) New information on fundamental aspects of physiology and nutrition, reproduction, production management and disease control has been generated. More than one hundred research publications of international standard have come out from this programme.

c) Improvement of research skills and facilities in terms of
   - the establishment of two research stations (farms)
   - strengthening of research facilities in participating research institutions
   - training of young scientists and providing opportunities to senior scientists to present research findings and share their experiences at international meetings.

d) Technology generation and transfer through the application of farming systems approach (FSA) in research.

e) Financial support to conduct three scientific conferences on the "water buffalo," at national and international level in 1980, 1989 and 1995, to review the research findings.

During the past few decades a considerable amount of funds (both local and foreign) has been spent on livestock and agriculture research. However, it is believed that the impact of this research on the farming system and the rural community has been least due to the following reasons.

- The research scientists working in the agricultural sector have failed, to a large extent, to generate and transfer appropriate technologies, in such manners that was applicable for adoption by the rural farmers.

- Research projects have been focused mainly on problems of fundamental and academic nature and were usually laboratories oriented.

- Scientists had little or no direct interaction with the farming community. Therefore they had not adequate knowledge about the farming environment and the farmers' needs and aspirations.

To understand and solve farmers' problems which are generally multifaceted, require a multidisciplinary approach. Farmers' participation in the research process is also considered vital, to produce good research results that are applicable, acceptable, adaptable and sustainable to a given farming condition. Very little attention has been paid to these factors in the past resulting failures in appropriate technology generation and technology transfer.

Therefore, it is extremely important that the research institutes, universities and funding agencies direct and encourage research scientists towards applying novel approachable methods for technology generation and technology transfer, and bring in the rural farmer (end-user) to the center stage, because the entire scientific community is committed for his upliftment.

The methodology adapted by the Buffalo Information Dissemination Programme - special features of the experimental design

Livestock (cattle and buffaloes) played a vital role in the smallholder farming systems in Sri Lanka. However, the farmers managed the animals extensively on communal scrub lands. The quality of stock, their management and productivity were rather poor. With the intensification of land use for crops and human settlements, ability to sustain the extensive system was threatened. Therefore, to develop a low-cost model for intensive dairy/buffalo production was essential. The objective of the programme was to fulfil the above needs.

The scientists made a novel approach for technology generation and technology and technology transfer by working directly with the rural small holder farmers in the Dry and Intermediate Agro-ecological Zones and the Coconut Triangle of Sri Lanka (viz. Mahaweli systems H, C and N W P).

The methodology was based on that the technology generation required the background information of the farmer [e.g. the family and the resources, attitudes, priorities, aspirations, constraints]. The information was used throughout the process of technology generation and technology transfer. This mode included the following.

(A) The selection of the target group among the farmers (B) diagnoses of farming systems, family constraints etc. (C) on-farm trials for appropriate technology generation. (D) distribution of a farmer approved technologies wider to groups of beneficiaries.

SIMBU model

The cattle shed, "Smallholder Intensively Managed Buffalo Unit" (SIMBU model) was designed and constructed with low-cost material, but with appropriate built-in features to ensure the welfare of the animals and hygienic milk production. Activities of the farm were totally managed by family labour. Besides providing of a balanced diet to the animals, the management package included a preventive health care system (strategic deworming and immunization) and reproductive management. The feeding systems were based on natural grass, tree legumes, and crop residues such as straw as the basal diet, with the use of urea-molasses multinutrient mixture (UMMM) as a catalytic feed supplement. The scientists developed a feeding and management programmes, tested and refined them first in the research station and subsequently in the small holder farmers premises over several years. They conducted the experiments at Thambuththegama in Mahaweli settlement area H where individual land holdings were relatively small. A field Research and Demonstration Unit (RDU) was established in the Mahaweli livestock farm at Niraviya, before the setting up of the model units in the farmers' homesteads.

The results of the study of the SIMBU model for intensive farming

The scientists were able to generate a wealth of valuable information on new and appropriate technologies from this study. This information could be used to overcome most of the problems encountered by livestock farmers by improving the productivity and by that the farm income under ural farming conditions. The farmer is free to select one or more of the technologies that are applicable to him and could be adapted to his farming system.

The salient feature of this model and its benefits may be summarized as follows.

a) It confirmed the view that an appropriate intensive management system can be developed under land limiting situations even in the dry zone, to replace the traditional system of "extensive management" of buffaloes.

b) Appropriately built low-cost animal housing provided with adequate ventilation, hygienic floor, feed and water troughs and storage space for crop residues was designed

c) Sprinkling of water or pouring a few buckets of water over the animals at frequent intervals during mid day reduced the heat stress on them and could therefore be used as an alternative to wallowing. A low-cost sprinkler devise could be made with perforated 0.5"PVC pipes, if an overhead storage tank was available on the farm.

d) Feeding based on available grass and rice straw supplemented with leguminous tree fodder (Gliricidia, Ipil) with urea molasses multinutrient mixture (UMMM) has been a satisfactory diet for buffalo cows. The milk production was increased up to 6-8 litres per day.

e) The heat stress, timing of a service and pregnancy rate of cows were properly monitored.

f) The early resumption of sexual cycles after each calving was achieved.

g) The assessment of the growth, reproductive status and productivity of the cow/heifer on a scale of 1-5 (Body Condition Score) was done.

h) The improved health care package adapted has reduced the mortality rate and increased the growth rate of calves. It has also reduced the age at first calving of heifers. The main components of the package were:

- Strategic deworming of calves at 10-16 days of age to control the common round worm infection (*Toxocara vitullorum*)

- Immunization against the common infectious diseases of cattle and buffaloes (eg. Haemorrhagic Septicaemia, Food and Mouth Disease, Black Quarter).

I) Farmers learnt through experience the benefits of the method of crop/livestock integration.

J) The proper maintenance and the use of farm records have been accepted as a useful tool for effective progress monitoring and decision making.

K) The establishment of a strong linkage between the research scientist and the farmer (end-user). Successful adaptation of new technologies through active involvement of farmers in the research and development process.

L) The overall socioeconomic benefits accrued to the farmers such as the increase of the daily income, improvement of health, profitable use of labour animal products, wastes etc.change of attitudes and confidence with respect to the adaptation of new technologies. In this context the farmer has also become an Agent or a DemonstrationFarmer (DF) in the village who is involved in the lateral transfer of technologies to the fellow farmers.

Dr D. H. A. Subasinghe, writer of this article was a member of the group that coordinated and conducted research work of the Buffalo Research Programme of the NSF.

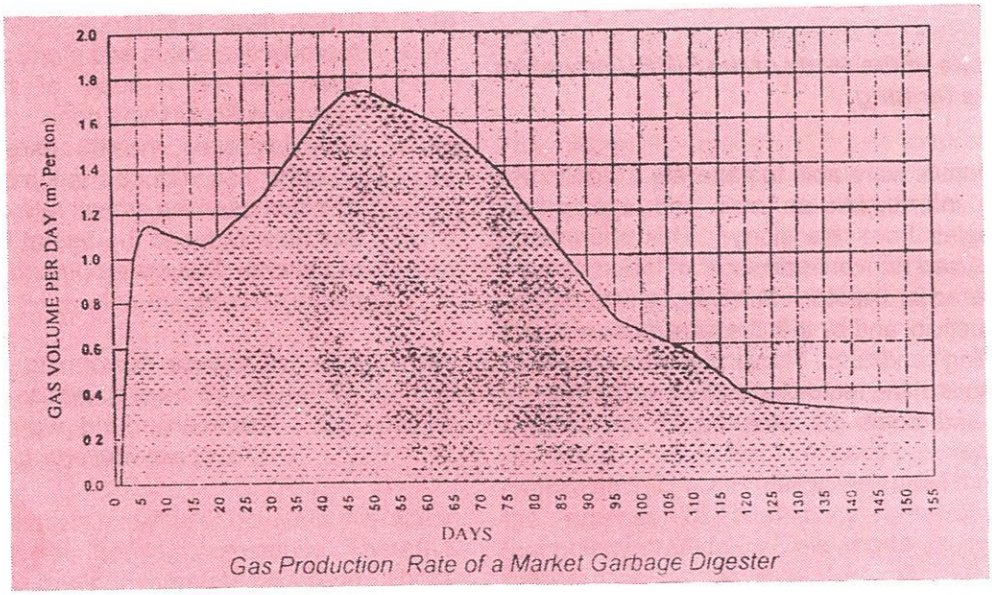
Pilot Market Garbage Digesting Project of Kirulapone

The NERD Centre has developed a new method for biogas generation using market garbage. This technology which is patented under the Sri Lanka patent No. 11086 is different from the traditional Indian and Chinese technologies.

The NERD Centre was awarded for a similar invention (dry batch system) at the International Invention Exhibition held in Geneva in 1996. The same theory is applied to the method using agro-waste such as market garbage and straw. The principle is that the anaerobic digestion of organic mater results in emission of two valuable products: biogas and organic fertilizer. The market garbage is an acute environmental pollution problem. The safe and productive disposal of it is the advantage of this technology.

Vidya Jothi Dr A.N.S. Kulasinghe, the former Chairman of the NERD Centre initiated the project in 1997. The project is funded by the NSF . It is sited at Kirulapone.

The NERD Centre initially constructed a 300 metric ton digester as a pilot unit for market garbage digestion. With the assistance of the Colombo Municipal Council and the State Engineering Cooperation the NERD Centre set up the other required equipment at the site. At present, four digesters with average biogas yield of 0.8 m^3 per metric ton per day are available at the site and the biogas produced here is used to run a 3 kW electric generator to operate a bakery oven.♦



Gas Production Rate of a Market Garbage Digester

Recent NSF Events

Workshop on " Agricultural Research Management"

A workshop on Agricultural Research Management organised by the NSF Committee on Agriculture and Animal Husbandry was held from 23-24 November 1998 at the PGIA, University of Peradeniya. The workshop was aimed at the researchers of the National Agricultural Research Systems and the academics of the Sri Lankan Universities. It was jointly sponsored by the NSF and the Council for Agricultural Research Policy (CARP).

The objective of this workshop was to apprise the researchers of the principles of agricultural research management. These were considered to be very important eventhough not adequately addressed by the Sri Lankan Agricultural sector.

The inaugural address was delivered by Dr R.O.B. Wijesekera, the Chairman of the National Science and Technology Commission (NESTEC). The other topics discussed at the workshop were :

- setting for agricultural research planning and directing research
- identification and prioritization of research programmes
- resource allocation
- human resource management
- leadership building
- performance evaluation
- managing external linkages
- review and monitoring research etc.

43 participants attended the workshop. ♦

Recent Earth Tremor in Kandy

A panel discussion on the recent earth tremor jointly organized by the NSF and the Geological Society of Sri Lanka was held in the NSF Auditorium on 9 December 1998.

Prof. Kapila Dahanayake, Chairman, NSF and Senior Professor of Geology, University of Peradeniya, Mr N.A. Amaradasa, Deputy Director, Department of Meteorology, Mr D.A. Kaththriaracchi, Deputy Director, Geological Survey and Mines Bureau, Mr H.A. Dharmagunawardene, Senior Lecturer, Department of Geology, University of Peradeniya, Mr R.M. Amaranayake, Residential Project Manager, Victoria Reservoir Project, Dr G.M. Fonseka, Vice President, Geological Society and Mr S.G.K. Nawaratne, Mahaweli Authority of Sri Lanka served in the panel and answered the questions posed by the media representatives. Journalists from Silumina, Daily News, Dinamina, Nawayugaya, Mihira, Island and MTV were present. At this discussion, the need to install a network of Seismometers was highlighted.♦

CSC Advisory Group on Biodiversity and Genetic Resources

Mr L.C.A de S. Wijesinghe, Chairman of the National Committee on Man and the Biosphere has been nominated to serve as a member of the CSC Advisory Group on Biodiversity and Genetic Resources.

Kodagoda Commemoration Volume

Prof. Nandadasa Kodagoda Commemoration Volume of VIDURAVA Science Magazine was presented to Mrs Ratna Kodagoda by the Chairman of the NSF, Prof. Kapila Dahanayake at a ceremony held at the NSF on 1 December 1998. This volume was brought out by the Working Committee on Science Education of the NSF in appreciation of Prof. Kodagoda's services to science, medicine and arts. The members of the Board of Management and Working Committees of the NSF, the members of Prof. Kodagoda Memorial Trust and media representatives were present at the ceremony. Prof. K. Dahanayake, Prof. Priyani E. Soysa, Prof. Carlo Fonseka, Dr U.M. Senanayake, Prof. V. Basnayake and Mr T. Malalasekera delivered speeches on this occasion. Dr Pandit W.D. Amaradeva's presentation was followed by a song, lyrics of which were written by the late Prof. Kodagoda. ♦

Prof. Kapila Dahanayake, Chairman, NSF handing over the Commemoration Volume to Mrs Kodagoda

Exhibition at Galle

Mr A.W.J. Karunasinghe, Scientific Officer of the NSF explaining a model to students

A three-day exhibition on Technical and Energy Conservation (Energy 2000) was held from 26 to 28 November 1998 at the Galle Town Hall. The NSF organised a stall at this exhibition. The posters on energy-related research projects funded by the NSF, publications of the NSF and models on lightening effect and solar tea drying were among the exhibits displayed at the stall. The exhibition was organised by the Technical Club Foundation and was open to students, teachers and general public. The Mayor of the Galle Municipal Council and Mr A.W.J. Karunasinghe, Scientific Officer of the NSF inaugurated the exhibition on the 26th and 28th November respectively. ♦

NSF Working Committees (1999 - 2001)

Agricultural Science & Forestry

Prof. H.P.M. Gunasena (Chairman)	*Director Postgraduate Institute of Agriculture, University of Peradeniya*
Dr M.P. Dhanapala	*Director, Rice Research and Development Institute*
Prof.(Ms) Savithri Gunatilleka	*Department of Botany, University of Peradeniya*
Dr D. Keerthisinghe	*Executive Director, Sri Lanka Council for Agricultural Research Policy*
Dr H.M. Manthritilleka	*Director, Upper Mahaweli Environmental & Forest Conservation Division, Mahaweli Authority*
Dr.(Ms) Hemanthi Ranasinghe	*Department of Forestry & Environmental Science, University of Sri Jeyewardenepura*
Prof. S. Sandanam	*Head Department of Export Agriculture, University of Sabaragamuwa*
Prof. Ranjith Senaratne	*Dean, Faculty of Agriculture, University of Ruhuna*
Dr C.S.Weeraratne	*9, Ratmal Mawatha, Sirimal Uyana, Ratmalana.*
Prof. (Ms) Anoja Wickramasinghe	*Department of Geography, University of Peradeniya*

Ms Seetha I. Wickremasinghe (Coordinator)

Biological Science

Prof. (Ms) K. Abeynayake (Chairman)	*Dean, Faculty of Science , University of Colombo*
Prof. N.K.B. Adikaram	*Head, Department of Botany, University of Peradeniya*
Dr M.P. De Silva	*Department of Botany, University of Ruhuna*
Dr D.S. Jayakody	*Director General, National Aquatic Resources Agency*
Prof. Upali Jayasekara	*Dean, Faculty of Agriculture , University of Sabaragamuwa*
Dr T. Jayasingham	*Dean, Faculty of Science, Eastern University Sri Lanka*
Prof.(Ms) Manthri Ramasamy	*Institute of Fundamental Studies*
Ms S.I. Vitharana	*Research Officer, Tea Research Institute*
Prof. M.J.S Wijeratne	*Dean, Faculty of Science, University of Kelaniya.*
Dr Devaka Weerakoon	*Department of Zoology, University of Colombo*

Ms Rohini Wijayaratne (Coordinator)

Biotechnology

Prof. S. Widanapathirana (Chairman)	*Department of Microbiology, Faculty of Science, University of Kelaniya*
Dr (Ms) Priyani. Amarasinghe	*Head, Department of Molecular Biology & Biotechnology, University of Peradeniya*
Prof. .J.M.R.S. Bandara	*Department of Agricultural Biology, University of Peradeniya*
Dr Y.M.H.B. Yapa Bandara	*Research Officer, Industrial Technology Institute*
Dr (Ms) Sirimalie Fernando	*Department of Microbiology, Faculty of Medicine, University of Sri Jayewardenepura*
Dr (Ms) Maya B. Gunasekara	*Department of Chemistry, University of Colombo*
Dr Magdon Jayasuriya	*Director, Plant Genetic Resources Centre, Gannoruwa, Peradeniya*
Prof. Eric Karunanayake	*Department of Biochemistry, Faculty of Medicine, University of Colombo*
Dr (Ms) Sriyani E. Peiris	*Department of Crop Science, University of Peradeniya*
Prof. Upali Samarajeewa	*Department of Food Science, University of Peradeniya.*

Dr (Ms) Thamara F Dias (Coordinator)

Chemical & Earth Sciences

Prof. R.P. Gunawardane (Chairman)	*Dean, Faculty of Sceince, University of Peradeniya*
Prof. Ajith Abeysekara	*Department of Chemistry, University of Sri Jayewardenepura*
Prof. H.D. Gunawardena	*Department. of Chemistry, University of Colombo*
Dr (Ms) R. Hewamanna	*Radio Isotope Centre, University of Colombo*
Dr V. Mathavan	*Head, Department of Geology, University of Peradeniya*
Dr L.P. Mendis	*Director, Samsons Reclaim* Rubber Ltd.
Dr A.M. Mubarak	*Head, Chemical and Environmental Technical Division, Industrial Technology Institute*
Dr Gamini Rajapaksa	*Department of Chemistry, University of Peradeniya*
Prof. S.V.R. Weerasooriya	*Institute of Fundamental Studies*,Kandy
Dr N.P. Wijayananda	*Director, Geological Survey & Mines Bureau*,Dehiwala
Dr (Ms) Thamara F Dias (Coordinator)	

NSF Journal

Prof. R. Ramasamy (Chairman)	*137/3, Kirula Road, Colombo 5.*
Prof. B.A. Abeywickrama	*Department of Botany, University of Colombo*
Dr Malcolm de Alwis	*7/25, Rosamund Place, George E. de Silva Mawatha, Kandy*
Prof. F.P. Amarasinghe	*Head, Department of Zoology, University of Peradeniya*
Prof. Laxman Dissanayake	*Department of Physics, University of Peradeniya*
Prof. A. Gunatilleka	*Consultant Geologist, Central Cultural Fund*
Prof. E.R. Jansz	*Faculty of Medical Sciences, University of Sri Jayewardenepura*
Prof. (Ms) Shanthi Mendis	*Department of Medicine, University of Peradeniya*
Prof. Y.D.A. Senanayake	*No. 532/12, Siebel Place, Kandy.*
Prof. Gamini Seneviratne	*Head, Department of Mathematics, University of Peradeniya*
Ms Seetha I. Wickremasinghe and Ms C.G. Yapa (Coordinators)	

Energy

Prof. K.K.Y.W. Perera (Chairman)	*Director, ADB Project, Ministry of Science & Technology*
Mr Shavi Fernando	Deputy General Manager,*Ceylon Electricity Board*
Dr G.M. Fonseka	*Department of Physics,Open University of Sri Lanka*
Dr A.N.S. Kulasinghe	*Batagama Estate, Ja-ela*
Dr M. Kurukulasooriya	*UN Consultant on Energy*
Mr Victor Mendis	*Chairman, National Engineering, Research & Development Centre*
Prof. S.K. Ranatunga	*Dean, Faculty of Engineering, University of Peradeniya*
Dr Nalin Walpita	*Managing Director, Industrial Production & Efficiency Ltd.*
Dr Priyantha Wijethunga	*Department of Electrical Engineering , University of Moratuwa.*
Mr. Ray Wijewardana	*133, Dharmapala Mawatha., Colombo 7*
Dr S.R. Fernando (Coordinator)	

Engineering & Built Environment

Prof. Sam Karunaratne *(Chairman)*	*Vice Chancellor, University of Moratuwa*
Dr S.A.K. Abeywardena	*Technical Director, Uni Lever Ceylon Limited*
Dr G.E. Amirthanathan	*Head, Department of Civil Engineering,, University of Peradeniya*
Prof. Ranjith Arthenayake	*Vice Chancellor, Open University of Sri Lanka*
Prof. L. Balasuriya	*Head, Department of Architecture, University of Moratuwa*
Prof. Nimal De Silva	*Chairman, Urban Development Authority*
Prof. S.S.L. Hettiarachchi	*Head, Department of Civil Engineering, University of Moratuwa*
Dr V. Muttukumaraswamy	*Department of Electrical Engineering, University of Peradeniya*
Mr Frank Perera	*Operations Manager, Lanka Electricity Company*
Prof. M.P.Ranaweera	*Faculty of Engineering, University of Peradeniya*
Dr S.R. Fernando (Coordinator)	

Health Sciences

Dr C.G. Uragoda (Chairman)	*President, Sri Lanka Medical Council*
Prof. V.K. Gunawardena	*Head, Department of Paraclinical Studies, Faculty of Veterinary Science, University of Peradeniya*
Dr S. Mahalingam	*Faculty Veterinary Science, University of Peradeniya*
Prof. Ranjith Mendis	*Faculty of Dental Sciences, University. of Peradeniya*
Prof. Susirith Mendis	*Dean, Faculty of Medicine, University of Ruhuna*
Dr Adly Mohamed	*Consultant Dental Surgeon, Health Education Bureau*
Prof. Ralph Panabokke	*Chancellor, University of Peradeniya*
Dr Upali Pilapitiya	*Director, Bandaranaike Memorial Ayurvedic Research Institution*
Prof. N. Senanayake	*Dean, Faculty of Medicine, University. of Peradeniya*
Prof.(Ms) Kumudu Wijewardene	*Department of Community Medicine & Family Medicine, University of Sri Jayewardenepura*
Ms C.G. Yapa (Coordinator)	

Man and the Biosphere

Mr Leslie Wijesinghe (Chairman)	*No. 05, 2nd Lane, Dehiwala.*
Prof. B.A. Abeywickrama	*Department of Botany, University of Colombo*
Mr R. Algama	*Environmental Foundation Ltd.*
Mr. H.M. Bandaratilleka	*Conservator of Forests, Forest Department*
Dr D.S. Epitawatte	*Department of Geography, University .of Sri Jayewardenepura*
Dr Ranjan Fernando	*Wildlife & Nature Protection Society*
Prof. R.N. de Fonseka	*Department of Botany, University of Colombo*
Prof. I.A.U.N. Gunatilleka	*Department of Botany, University of Peradeniya*
Dr J.M.P.K. Jayasinghe	*National Aquatic Resources Agency*
Dr Premadasa Udagama	*Secretary General, National Commission for UNESCO*
Ms Anusha Amarasinghe (Coordinator)	

Natural Resources

Prof. P.G. Cooray (Chairman)	*No. 426, Mahakanda Road, Sarasavigama, Hindagala.*
Dr (Ms) Mala Amarasinghe	*Department of Botany, University of Kelaniya*
Dr V.T.L.. Bogahawatte	*Director, National Building Research Organization*
Mr T.S Dharmaratne	*Head, Oceanography Division, National Aquatic Resources*
Mr Priyalal Dias	*Managing Director, Foundation and Waterwell Eng. Pvt. Ltd.*
Mr Dayananda Kariyawasam	*Project Director, Upper Watershed Management*
Dr (Ms) P.R.T.Kumaranatunga	*Department of Fisheries Biology, University of Ruhuna*
Prof. R.B. Mapa	*Department of Soil Science, University of Peradeniya*
Dr Bandula Perera	*Managing Director, Ceylon Glass Company Limited*
Mr R.A.D.B. Samaranayake	*Manager, Coastal Resources Development*
Ms Anusha Amarasinghe (Coordinator)	

Physical & Mathematical Sciences

Prof. M.A. Careem (Chairman)	*Head, Department of Physics, University of Peradeniya*
Prof. T.R. Ariyaratne	*Department of Physics, University of Colombo*
Prof. C. Dahanayake	*No. 410/120, Bauddhaloka Mawatha, Colombo 7.*
Prof. B.S.B. Karunaratne	*Department of Physics, University of Peradeniya*
Prof. S. Kumaravadivel	*Department of Physics, University of Jaffna*
Dr A.W. Mohottala	*Director, Department of Meteorology*
Dr W. Ramasinghe	*Department of Mathematics, University of Colombo*
Dr W.P. Siripala	*Department of Physics, University of Kelaniya*
Prof. P.K. Tantrigoda	*Department of Physics, University of Sri Jayewardenepura*
Prof. K. Tilakaratne	*Deputy Vice Chancellor, University of Kelaniya.*
Mr A.W.J. Karunasinghe (Coordinator)	

Science Education & Popularization

Prof. W.R. Breckenridge (Chairman)	*Principal, Trinity College, Kandy*
Prof. V. Basnayake	*No. 25/4, Loris Road, Colombo 03.*
Mr A.S. M. Farook	*Public Relations Officer, Ministry of Science & Technology*
Mr Upali Gunasekera	*Principal, Isipathana College, Colombo 06*
Dr Chandana Jayaratne	*Department of Physics, University of Colombo*
Dr (Ms) Sunethra Karunaratne	*Science Education Unit, University of Peradeniya*
Mr N.I.N.S. Nadarasa	*Deputy Government Analyst, Government Analyst's Department*
Mr T. Malalasekera	*Public Relations Officer, Health Education Bureau*
Dr U.M. Senanayake	*Research Officer, Industrial Technology Institute*
Dr Buddhi Weerasinghe	*Director, Media Unit, Open University of Sri Lanka*
Mr A.W.J. Karunasinghe (Coordinator)	

Social Sciences

Prof. S.T. Hettige (Chairman)	*Head, Department of Sociology , University of Colombo, Colombo 3.*
Prof. Ranjith Amarasinghe	*Head, Department of Political Science, University of Peradeniya,*
Dr S.U. Deraniyagala	*Director General, Department of Archeology*

Prof. (Ms) Sharya de Soysa	*Dean, Faculty of Law, University of Colombo*
Prof. (Ms) Chandra Gunawardena	*Dean, Faculty of Humanities and Social Science, Open University of Sri Lanka*
Dr Kamal Karunanayake	*Department of Economics, University of Kelaniya*
Prof. V. Nandakumar	*Department of Geography, University of Peradeniya*
Prof. Nandasena Ratnapala	*Department of Sociology & Anthropology, University of Sri Jayewardenepura*
Prof. Sudarshan Seneviratne	*Department of Archeology, University of Peradeniya*
Prof. Tudor Silva	*Department of Sociology, University of Peradeniya*
Ms S. Tillekeratne (Coordinator)	

S&T Information

Prof. V.K. Samaranayake (Chairman)	*Chairman, Computer & Information Technology Council of Sri Lanka*
Ms H.N.J. Fernando	*Asst. Director/Head, Documentation Services Division, Sri Lanka National Library Services Board*
Dr Lalith Gamage	*Director, Computer Services Centre, University of Moratuwa*
Dr Keerthi Liyanage	*Department of Elecrical Engineering , University of Peradeniya*
Prof. Rohan Samarajeewa	*Director General, Telecommunications Regulatory Commission*
Mr N.T.S.A. Senadheera	*Librarian, University of Peradeniya.*
Ms Dilmani Warnasuriya	*Manager, Information Services Division, Industrial Technology Institute,*
Dr. K.D.G. Wimalaratne	*Director, Department of Archives*
Dr Gehan Wickrmanayake	*Department.of Statistics and Computer Science, University of Colombo*
Mr N.U. Yapa	*Librarian , International Irrigation Management Institute*
Ms Deepali Thalagala (Coordinator)	

Zoological Survey

Prof. K.D. Arulpragasam (Chairman)	*Vice Chairman (Planning) National Education Commission*
Mr Lyn de Alwis	*30, Hotel Road, Mount Lavinia.*
Ms J.D.S. Dela	*International Union for Conservation of Nature*
Mr Anselem de Silva	*Faculty of Medicine, University of Peradeniya*
Prof. J.P. Edirisinghe	*Department. of Zoology, University of Peradeniya.*
Prof. S.U.K. Ekaratne	*Staff Development Centre, University of Colombo*
Prof. J. Jinadasa	*Department of Zoology, University of Sri Jayewardenepura*
Mr L. Joseph	*Aquatic Resources Management Specialist, Fisheries Community Division & Resource Management Project*
Ms Y. Mapatuna	*Asst. Director, Department of National Museums*
Mr H.D. Ratnayake	*Deputy Director (Research & Training), Department of Wildlife Conservation*
Ms Rohini Wijayaratne (Coordinator)	

Publications

Current List of Scientific and Technical Periodicals in Sri Lankan Libraries

Compilation of a Union List of Scientific and Technical Periodicals was one of the major tasks undertaken by the Sri Lanka Scientific and Technical Information Centre (SLSTIC) of the NSF. SLSTIC as the coordinator of Sri Lanka Scientific and Technical Information Network (SLSTINET) recognised the importance of compiling the List as an essential tool for sharing resources in a computerized network. The availability of the List will not only promote the Inter Library Loan System but also prevent unnecessary duplication of serial acquisition to the libraries. Consequently, this will enhance more economical use of funds by the libraries.

The Union List of Periodicals (UNILIST) was first published in 1977 by the SLSTIC. It comprised of two volumes and included holdings in each library. A supplement to this was published in 1981. The SLSTINET members mentioned the importance of updating the UNILIST and requested the SLSTIC to continue with it further. Subsequently, in 1994, the SLSTIC revived the activities.

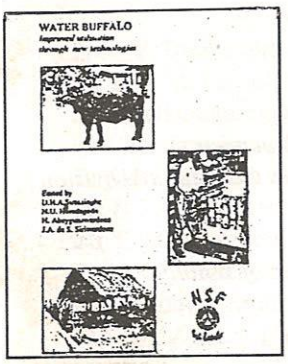
In 1995, the SLSTIC developed a computerized information network. One of the major objectives in developing the network was to establish local databases. Hence SLSTIC was able to develop UNILIST as a data-base. Since the collection of information on periodical holdings from libraries was tedious it was decided to develop a Current List of Periodicals (CLIST) available in Scientific and Technical Libraries initially.

Seventy-five major libraries have contributed with information for the database.The NSF greatly appreciate the cooperation rendered by the member libraries to lead this project to a success.

The printed version of the CLIST as well as the database on diskettes are available now. Micro CDS/ISIS software is used to develop the database. Any comments on the data base will be greatly appreciated .

Please contact the Director/ Information for further details.
E-mail: library@naresa.ac.lk♦

Water Buffalo



Edited by
D.H.A. Subasinghe
N.U. Horadagoda
H. Abeygunawardena
J.A.de S. Siriwardene

This is a book resulting from a SAREC granted research programme. The findings of the second phase of research are presented in this publication. It also includes the information relating to the development of appropriate management procedures through a farming system research approach. The book is targeted at general readership, teachers, high school students and farm managers and extension workers. This publication constitutes a further attempt to provide readers with information to popularize buffalo farming and stimulate better utilization of the animal.

The book contains 11 chapters:-

Chapter 1. *Water Buffalo: Classification, Origin, Distribution, Myths and Misconceptions*

Chapter 2. *Water Buffalo Farming in Sri Lanka: Production Systems, Uses, Potentials and Constraints*

Chapter 3. *Buffalo as a Source of Farm Power*

Chapter 4. *Milk and Milk Products*

Chapter 5. *The Buffalo - A Potential Source of Meat*

Chapter 6. *Physiology and Reproduction in the Buffalo*

Chapter 7. *Feeds and Feeding of Buffaloes*

Chapter 8. *How Buffaloes Utilize Fibrous Feed*

Chapter 9. *Common Diseases of the Buffalo*

Chapter 10. *Healthcare Management in the Buffalo*

Chapter 11. *Technology Development and Transfer through a coordinated Research and Farming System Approach*

A list of references for further reading is provided at the end of the book . All the listed references can be accessed at the Buffalo Information Centre located in the library of the Department of Animal Production Health, Peradeniya. ♦

Travel Grants

Assistance for International Travel (September - December 1998)

Name & Affiliation	Event
Dr B.R.K. Obeysekera, Department of Mechanical Engineering, Faculty of Engineering University of Peradeniya	World Renewable Energy Congress V Florence, Italy (20th – 25th September)
Mr R. de S. Ariyabandu, Hector Kobbekaduwe Agrarian Research and Training Institute (H.K.A.R.T.I.)	International Symposium and Second Chinese National Conference on Rainwater Utilisation China (08th – 14th September)
Dr L.S.R. Arambewela, Industrial Technology Institute (ITI)	Ninth Asian Symposium on Medical and Other Natural Products Vietnam (24th – 28th September)
Dr M. Gunatilleke, Department of Physiology, Faculty of Medicine, University of Colombo	FAOPS, FAONS, APPS, PSNZ, Congress Brisbane (27th September - 1st October)
Dr V.T.L. Bogahawatte, National Building Research Organisation (NBRO)	Seminar on Design Development of Fibre Reinforced Composites Bangalore, India (15th – 19th September)
Dr S. Pathmarajah, Faculty of Agriculture, University of Peradeniya	International Agricultural Engineering Conference 1998 Bangkok, Thailand (07th – 10th December)

Dr (Ms) G.H.U. Karunaratne, Department of Civil Engineering, University of Moratuwa	Second International Symposium on Environmental Hydraulics Hong Kong (16th- 18th December)
Prof. (Ms) Jennifer Perera, Department of Microbiology, Faculty of Medicine, University of Colombo	Sixth Western Pacific Congress on Chemotherapy and Infectious Diseases Kuala Lumpur, Malaysia (29th November - 3rd December)
Dr K.V.W. Kehelpannala, Institute of Fundamental Studies, Kandy	International Seminar and Field Seminar on the Precambrian Continental Crust in Eastern and Central India Bhubaneswar, India (22nd October. - 3rd November)
Mr L.R.A.K. Bandara, Department of Physics, University of Peradeniya	Sixth Asian Conference on Solid State Ionics New Delhi, India (29th November - 04th December)
Ms R.L. Haturusinghe, Mahaweli Authority, Colombo	International Conference on Women in Science Mumbai, India (08th – 11th October)
Prof. K.N.J. Katupotha, Associate Professor, Department of Geography, University of Sri Jayewardenepura	IGCP 396, Continental Shelves in the Quaternary' 3rd Annual Conference Goa, India (26th – 31th October)
Prof. Nimal Senanayake, Faculty of Medicine, University of Peradeniya	Second congress of the Asian & Oceanian Epilepsy Organisation (AOEO) Taipei, Taiwan (05th – 08th November)
Dr D. Chamara K Illeperuma, Department of Food Science & Technology, University of Peradeniya	Fourth Asia Pacific Food Analysis Conference Chaiang Mai Thailand (16th – 19th November)
Mrs S. Jayasinghe, Industrial Technology Institute (I.T.I.)	Fourth Asia Pacific Food Analysis Conference Chaiang-Mai, Thailand (16th – 19th November)
Dr W.L. Sumathipala, Open University of Sri Lanka	International Meeting on Frontiers of Physics Kuala Lumpur, Malaysia (25th – 29th October)
Dr (Ms) Ajantha Horadagoda, Faculty of Veterinary Medicine and Animal Science, University of Peradeniya	Fifth International Veterinary Immunology Symposium Punjab, India (08th – 13th November)
Dr J.M.P.K. Jayasinghe, National Acquatic Resources Agency (NARA)	Fifth Asian Fisheries Forum Chaiang-Mai, Thailand (11th – 14th November)
Dr W.M.T.B. Wanninayake NARA	Fifth Asian Fisheries Forum, Chaiang-Mai, Thailand (11th – 14th November)

Mr W.D.L. Stanley Regional Agricultural Research & Development Centre, Makandura	International Conference on Watershed Management New Delhi, India (08th – 10th December)
Ms K. M. Weerasinghe, National Building Research Organisation (NBRO)	International Workshop on Landslide Hazard and Risk Assessment, and Damage Control for Sustainable Development New Delhi, India (06th – 10th November)
Dr Dharshani Kumaragamage, Department of Soil Science, University of Peradeniya	International Conference on Environment and Agriculture Kathmandu, Nepal (01st - 03rd November)
Prof. H.N. Seneviratne, Department of Civil Engineering, University of Peradeniya	International Workshop on Landslide Hazard and Risk Assessment, and Damage Control for Sustainable Development New Delhi, India (06th – 12th November)
Mr L.P. Titus, Department of Fisheries Biology, University of Ruhuna	Fifth Asian Fisheries Forum Chiang-Mai, Thailand (11th – 14th November)
Dr (Ms) P.R.T. Cumaranatunga, Department of Fisheries Biology, University of Ruhuna	Fifth Asian Fisheries Forum Chiang-Mai, Thailand (11th – 14th November)
Ms S.F.M. Sulaiman, Regional Agricultural Research & Development Centre, Gonawila	Third International Pineapple Symposium Pattaya, Thailand (17th – 20th November)
Prof. S. Widanapathirana, Department of Microbiology, Faculty of Science, University of Kelaniya	International Centre for Genetic Engineering & Biotechnology, The Meeting of the Board of Governers Trieste, Italy (28th – 30th September)
Dr Boniface D. Peiris, Department of Botany, University of Kelaniya	National Symposium on Future Goals of Physiological Research for the Improvement of Plant Resources, Tamilnadu, India (18th – 20th December)
Dr Sarath Amunugama, Department of Modern Language, University of Kelaniya	II e Congress International de l AITF (Francophone Writers) India (13th – 17th December)
Mr S. Karunaratne, Piligalla, Handessa	Hands-on Training for Amphibian Field Techniques, Identification and Taxonomy Kempholey/Gundia forest reserve Western Ghats, India (01st – 18th December)
Dr (Ms) W.P.N. Karunasinghe, National Acquatic Resources Agency (NARA)	International Symposium on Large Marine Ecosystems Kochi, India (25th – 27th November)

Guidelines for the disbursement of International Travel Grants

(to be effective from 1 March 1999)

The requests for NSF support for international travel to attend scientific meetings/workshops/short term training programmes are considered on the basis of three geographical regions. (i.e. SAARC, Asia-Australia and Africa-America-Europe regions).

The applications from state and private sectors are categorized into four major groups (A, B, C & D) according to the age/qualifications as follows.

Group	Age (yrs)[1]	Minimum Qualifications
Group A	40 and below	Master's degree
Group B	41 - 50	Master's degree and evidence of continuing research
Group C	51 – 65	Master's degree, evidence of continuing research and good research record
Group D	66 and above	In addition to the minimum qualifications given under Group C, the applicants should be eminent persons who have held responsible positions during their career

1. Scientific meetings/workshops

1.1 SAARC Region (Regional /International)

Group	Requirement	Support (maximum 7 days)	Remarks
A	Presentation not Compulsory	Full support[2]	-
B	Presentation of paper/poster	Full support	Partial support without presentation
C	Presentation of paper/poster	Full support	-do-
D	presentation of paper and/or Chairman of session, keynote speaker, chief guest	Full support	-do-

1.2 Asia – Australia region (Regional/ International)

Group	Requirement	Support (maximum 7 days)	Remarks
A	Presentation of paper /poster	Full support	Partial support without presentation
B	Presentation of paper/poster	Partial support	
C	Presentation of paper/poster	Partial support	
D	presentation of paper and/or Chairman of session, keynote speaker, chief guest	Partial support	

[1]Age on the date of commencement of the event.

[2]Full support means economy class cheapest return air ticket by most direct route and subsistence and/or incidental expenses at rates to be determined by the Board of Management in accordance with government financial regulations.

1.3 Africa – America and Europe (International)

Group	Requirement	Support	Remarks
A	Presentation of paper/poster	Full support	Strong recommendation from the Head of the Institution
B	Presentation of paper/poster	Partial support	
C	Presentation of paper/poster	Partial support	
D	presentation of paper and/or Chairman of session, keynote speaker, chief guest	Partial support	

2.0 Training Programmes

1. Applications from Group A will be considered for a maximum period of one month for the SAARC region and maximum of two weeks for other regions.
2. These applications will be considered on their own merits and the decision of the NSF Board of Management will be final.

3.0 Applications for International Travel Grants

3.1 Conditions for submission of applications

1. The applications for full support can only be considered from the state sector. Those from the private sector and non-governmental organizations can be considered only for partial support.
2. Preference will be given to the SAREC/NSF grantees wherever applicable..
3. Travel funds can be provided for only one applicant from one institution for a given event.

3.2 Application Procedure

1. The application forms for international travel grants can be obtained from the NSF office.
2. The Applicants for international travel funds are required to strictly adhere to the practice of forwarding the original of the completed application form and all connected documents only to the Director, National Science Foundation, 47/5, Maitland Place, Colombo 07 under registered post. They are kindly requested to treat all correspondence relating to the application as confidential in order to facilitate the administration of the International Travel Fund.

3. The complete applications should be received by NSF before the end of a given month for consideration at the Board of Management meeting of the following month. The grants are awarded on approval given by the Board of Management of the NSF according to the above guidelines. The decision of the Board will be final. However, the Board of Management may deviate from the guidelines under exceptional circumstances. No applications will be entertained for reimbursements.

4. Payments are made according to Government financial regulations.

5. Scientists on their return are required to submit a detailed report on their participation. They are encouraged to conduct a seminar/discussion on the conference attended for the benefit of scientists who did not have the opportunity to participate in that event.

6. Scientists who receive NSF funds will be eligible to apply again only after the lapse of at least one year from the date of return from their last funded visit.

International Centre for Genetic Engineering and Biotechnology (ICGEB)

ICGEB is an international, intergovernmental organization conceived as a Centre of Excellence for research and training in genetic engineering and biotechnology with special attention to the needs of the developing world.

Sri Lanka is a full member of the ICGEB and the NSF is the National Scientific Focal Point .

The research, training schemes and services of ICGEB represent an innovative and comprehensive approach to promote biotechnology internationally. The Centre aims at helping developing nations to help themselves and holds out the prospect of advancing knowledge and applying the latest biotechnological techniques in public health, nutrition, industrial production of high added-value commodities, environmental protection/remediation and energy saving.

ICGEB provides a scientific and educational environment of the highest standards. It brings biotechnology to developing countries by strengthening their research capabilities. Its laboratories develop state-of-the-art research of importance to bio-industries in Member States.

Located in Trieste, Italy and new Delhi, India the Centre forms and interactive network with Affiliated Centres in Member States.

Research at ICGEB

The following research projects, approved by the Council of Scientific Advisers, are implemented in the ICGEB laboratories:

***Molecular and Cellular Biology* (Trieste)**
focus: mechanisms of DNA expression and replication in normal and cancerous tissues; molecular genetics
targets: identification of human DNA replication origins and of the mechanism regulating their functions; medical applications of molecular genetics, including gene therapy approaches.

***Human Parasitology* (New Delhi)**
focus: novel recombinant vaccines and drugs for parasitic diseases
targets: malaria

***Microbiology* (Trieste)**
focus: microbial biotechnology
targets: molecular genetics; novel host vector systems

***Molecular Immunology* (Trieste and New Delhi)**
Focus: recombinant monoclonal antibodies; novel vaccines
targets: characterization of antigenic determinants of tumour and virus infected cells; mechanisms of immunoglobulin maturation

***Molecular Pathology* (Trieste)**
focus : infectious diseases; extra-cellular matrix: molecular genetics
targets: hepatitis C, vaccines, granulocyte pathology, dyslipidemia, hypertension, fibronectin functions; cystic fibrosis

***Plant Biology* (New Delhi)**
focus: crop improvement by the use of molecular biology approaches
targets: novel methods to obtain transgenic plants; stress resistance (insect and viruses) in rice and cotton

***Protein Structure and Function* (Trieste and New Delhi)**
focus: biocomputing and protein engineering
targets: structure/function relationships in cytokines and DNA-binding proteins; production of conformationally restrained peptides;

***Virology* (Trieste and New Delhi)**
focus: molecular biology of human viruses
targets: human papilloma viruses, hepatitis B, C and E, HIV and rotaviruses

Industrial Biotechnology **(Trieste and New Delhi)**

focus: mammalian gene products

targets: erythropoietin, human growth hormone, interferon, insulin, granulocyte colony stimulating factor, multiepitope antigens.

Training Programmes

ICGEB assists its Member States by training their scientists. It has developed short and long-term training programmes, through which the scientific communities of Member States have the possibility to interact with the forefront of internationally recognized science.

Long term training programme consists of fellowships for an average duration of two years, and open to post-doctoral scientists, who are fully incorporated in the various research groups in the two Components or within Affiliated Centres. Moreover , in collaboration with the International School for Advanced Studies, in Trieste, and with the Jawaharlal Nehru University, in New Delhi, ICGEB provides a pre-doctoral fellowship scheme of thirty-six months duration, leading to a doctoral degree in molecular genetics.

Collaborative Research Programme

This is another important aspect of the ICGEB mandate. It relates to the collaboration of the Centre with its network of Affiliated Centres; these are national laboratories (or clusters of laboratories), located in a Member State, with which ICGEB establishes a special relationship. With the recent approval by the Board of Governors of three new Affiliated Centres, the ICGEB network can now count on 30 such centres which have a direct access to the Collaborative Research Programme (CRP). **Through this programme, ICGEB finances research projects of major impact to the needs of the Member State (or the region) concerned, while assisting the investigating scientists with its expertise and training programmes.** With 15 new projects awarded for financing in the course of 1996, the total number of grants approved by ICGEB since 1988 amounts to 138, for a global financial commitment exceeding US$ 7 million.

Patents

Whenever the results obtained in the laboratory contain a potential interest for the industrial sector, the Centre protects its know-how through patents. Accordingly, four patents have been filed by the ICGEB over these past years relating to (i) a new vaccine against hepatitis B, (ii) an innovative methodology for the design of new vaccines and or diagnostic kits, (iii) a new technology for the production in yeast of *Penicillin G amidase* and (iv) a technique for the slow release of erythropoietin. Several other projects should soon result in the filing of other patents.

Relations with the Industrial Sector

ICGEB is now entering into a series of industrial agreements with industries in Member States for the transfer of specific know-how which could lead to new products, manufactured locally in developing countries. As such, an Indian company will soon be launching a new diagnostic kit for the screening of AIDS, based on technologies transferred by the Centre, while an Argentinean company will shortly be in a position to start the production of important bio-pharmaceuticals using recombinant DNA technologies developed by the ICGEB scientists. Furthermore, the Centre aims at fostering an innovative approach for industrial relations at the global level, enhancing the finalization of joint ventures and other partner oriented approaches for the commercialization of the results of research in biotechnology. In this context, the Trieste Component has started in 1997 the activities of a "Biotechnology Transfer Unit, aimed at providing specific training and transfer of know-how to companies and entrepreneurs-to-be in Member States.

Technical Support Services

Bioinformatics and Computer Resources

ICGEB meets developing countries' computing needs by providing access to an advanced

computer service laboratory sited at the Trieste Component. The laboratory provides remote access to a range of major U.S. and European public domain databases, in addition to those of the Centre and its software library. Scientists from developing countries, visiting the Centre, have direct access to the full range of state-of-the -art biocomputational facilities. Remote accessing of the Centre's computer facilities is operated through existing telematic networks; where appropriate, accessing by satellite link is envisaged.

Other Technical Support

ICGEB provides technical support to Member States by acting as a culture bank of commonly used strains of microorganisms and by suppling synthetic polypeptides and oligonucleotides.

Advisory Services

ICGEB provides technical advice to Member States for the:

- formulation of national bioscience policy;
- definition of research goals;
- development of national bioindustries;
- establishment of national biotechnology laboratories

Institutional Activities

ICGEB, by its nature, mandate, structure and activities, is establishing effective cooperation with the international community and with the United Nations system on issues related to sustainable development, particularly with regard to the use of biotechnology and genetic engineering in developing countries. Such cooperation may also be targeted on the realization of the objectives set by the United Nations Conference on Environment and Development (UNCED), especially in the framework of Chapter 16 of UNCED's Agenda 21, focused on the environmentally sound management of biotechnology.

Furthermore, being within the Centre's mandate to set up adequate mechanism aimed at capacity building, human resource development and, in general, the development of endogenous capabilities for the management and the use of advance/novel technologies in the developing countries, **ICGEB provides its expertise in setting-up adequate guidelines on major issues such as biosafety, boidiversity and the protection of intellectual property rights in biotechnology.** ♦

ICGEB COLLABORATIVE RESEARCH PROGRAMME - 1999

This call for Collaborative Research Proposals is open only to the ICGEB Affliated Centres.

Programme Priorities:
Only projects addressing original scientific questions will be considered; among these, preference will be given to projects providing a clear indication towards practical application(s).

ICGEB PRE-DOCTORAL FELLOWSHIP PROGRAMME

1999

ICGEB Trieste, italy (in Molecular Genetics) in collaboration with the International School for Advanced Studies (ISAS/SISSA), Trieste

ICGEB New Delhi, India (in Molecular Biology) in colaboration with the Jawaharlal Nehru University (JNU), New Delhi

Applications are invited from candidates from ICGEB Member States and must be submitted through, and endorsed by, the ICGEB National Scientific Focal Point in the applicant's country of origin.

Endorsed Applications for both Courses must arrive in Trieste on, or before , 30 April 1999

ICGEB Meetings and Courses 1999

• **Practical Course - Bioinformatics:**
Computer Methods in Molecular Biology
9-16 July 1999, Trieste-Italy

• **Theoretical Course**
RNA Structure and Function
12-15 April 1999, Trieste-Italy

• **Theoretical and Practical Course**
Yeast Molecular Genetics
22-26 March 1999, Trieste- Italy

• **Symposium**
Common Themes in
Transcription and RNA Processing
6-8 September 1999 Buenos Aires -Argentina

• **Workshop**
Science and Policy in Risk
Assessment of Transgenic Plants: A Case Study Approach

26-30 April 1999, Trieste-Italy

♦ **CSIR/TWAS Fellowships for Postgraduate Studies and Postdoctoral Research**

♦ **TWAS**
1999 Awards in Basic Sciences

(For more dcetails please contact the NSF)

Visit of SAREC Officials

The SAREC delegation which comprised of Mr Rolf Carlman and Dr Afzal Sher visited Sri Lanka from 6 -14 October 1998. The purpose of the visit was to review the progress of the ongoing research projects and initiate discussions on the new projects under the 1999-2001 agreement period. The other objective was to attend the Information Technology Conference which was held from 7- 8 October 1998 at the BMICH, Colombo 10.

The delegation met all the project leaders of the ongoing SAREC programmes and respective Heads of organisations at the Hotel Renuka on 14 October 1998, with a view to explain the new trends in the SAREC funding policies and what they expect from the Sri Lankan counterpart research institutions in the forthcoming agreement period. The representatives from the Swedish Embassy, Ministry of Science and Technology, NSF, National Acquatic Resources Agency (NARA), The Department of External Resources, TRI and Universities were present at the meeting. The present SAREC allocation under the Sri Lanka-Sweden bilateral research cooperation is approximately Rs 240 million per year. The delegation agreed to keep the same level of funding during the next agreement period. However, the R & D programmes with respect to economic growth and governance will be considered as high priority under the new agreement.

The major issues that affect the research performance were raised by the researchers (e.g. Goods and Services Tax (GST) etc). The delegation requested the relevant authorities, the Department of External Resources, NSF and University of Colombo to look into the matter and get an exemption from GST for research equipment. Furthermore, the delegation suggested to open a foreign currency account to transfer the research funds in order to prevent the money depreciation due to the fluctuation of currency rates and avoid extra payments as Bank charges when exchanging foreign currency.

The researchers were requested to make use of the Urgent Spare Part Fund administered by the NSF to repair the research equipment. The delegation further stated that the SAREC allocation for the Research Grant Scheme of the NSF be utilized for smaller research projects. According to a decision taken at the meeting a set of new guidelines have been drafted by the NSF to use the International Travel Fund more productively . The new guidelines will be implemented from March, 1999.

Mr Calman Stressed the need of and additional monitoring system with their involvement which will assist carrying out the activities of the projects in a more progressive manner. He proposed the Embassy of Sweden to take part in this process with the concurrence of local authorities.