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REVIEW

INTERNATIONAL CO-OPERATION IN SCIENCE & TECHNOLOGY

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Abstract: The term, "economic and technical aid", was in use in the 1940s. In the 1960s, this was changed to "technical co-operation" as the donor, who offered aid, and the recipient, who received it, took more seriously the mutual co-operation that was needed. From the early 1970s, two new dimensions in technical co-operation were evolved by UN: (i) the country programme approach and (ii) mutual Technical Co-operation among Developing Countries (TCDC). International co-operation programmes by National Science Foundation are discussed.

Key words: International Co-operation, science.

The necessity of international co-operation and of global interdependence in science and technology for the benefit of both developed and developing countries became apparent over the years and countries and institutions evolved through time while functioning and interacting with scientists and institutions. The realization that, for sustained development, scientific and technological co-operation with other nations has become an essential factor was universally accepted or absorbed into the process at some point in time. This was inevitable by virtue of the mobility of science and technology, since it can jump barriers of race and language easily. The fact that this mobility is still increasing is justification enough to strengthen international cooperation.

International co-operation became indispensable with the progress made in science and technology and the large scale of funding required for the implementation of projects. It is also indispensable in aspects that require action on a global scale, such as environmental protection, green-house effect, introduction of GMO (Genetically Modified Organisms), intellectural property, quarantine and other common issues affecting human kind such as the fight against diseases. International co-operation will be the great equalizer in the process of globalization.

International co-operation is S&T involving NSF* evolved through the years by virtue of its objectives, the change in the global situation for co-operation making a welcome addition towards this process.

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By Act No. 78 of 1981, NARESA became the legal successor to NSC which had been established in 1968 by an Act of Parliament (NSC act no. 9 of 1968). In April 1998 Science and Technology Development, Act No. 11 of 1994 was gazetted and NARESA became the National Science Foundation (NSF).

The functions of the Authority include in addition to advising the Minister on policy with respect to S & T, the initiation and promotion of research, collection and dissemination of information relating to scientific and technical matters, publication of reports, presentations and papers on scientific and technical matters and the establishment and maintenace of liaison with scientific institutions and scientists working in other countries in matters relating to science and scientific research.

All these functions contribute towards the development of the economic resources of the country, promotion of the welfare of the people and the advancement of science and scientific research in Sri Lanka.

In order to carry out such functions, a strong mechanism was built up for the evaluation of project project proposals put up by researchers for funding and for the monitoring of the progress of projects. The Steering Committees (Working Committees as they were termed originally) were established with powers to appoint eminent scientists in the country to serve this important oyroise. Through this mechanism, the confidence of the scientists and administrators in the country and outside the country was built up. Thus the infrastructure required for international co-operation for science and technology was established within the first few years of the existence of the Institution.

In addition to science and technology, the importance of the support service of accessibility to scientific information was recognized and the Information Centre was set up with international collaboration. This has now developed into a fully fledged Information Centre for S&T with Information Technology.

Support from International Bodies or Agencies

Tracing the co-operation received from the international scientific bodies or agencies it can be seen that this started as far back as 1971, e.g. Co-operation between NARESA, NSC and foreign scientific agencies began in 1971. The majpr landmarks in such International Co-operations are given in Annex I.

In addition to the research grants scheme of NARESA, indigenous research had the support of several foreign agencies. In addition to those listed in Annex I, some research grants awarded by WHO, the McArthur Foundation USA, and Harvard University, USA were also channelled through NARESA. This was

done at the request of the recipients of the grants. SAREC/SIDA continues its support for research and information services and the fact that SAREC/SIDA approved a Rs.40,000,000/= grant in 1997/1998 confirms that the infrastructure of NARESA where Steering Committees comprised of eminent scientists from Universities and Research Institutions monitor the projects, is acceptable to foreign organizations.

International Seminars and Meetings

By virtue of it being the focal point for interaction with foreign scientific bodies, International Organizations and regional networks, NARESA had the opportunity to organize international seminars and workshops in collaboration or/and with sponsorship of such organizations to bring the scientists together on common fora. Some of these are given in Annex II.

International Collaboration in Science and Technology

The role of NARESA in the international arena from almost its inception (as the NSC) indicates international collaboration has helped in scientific activities in aspects of training, research, participation in international conferences, seminars and workshops and also the interaction with internationally recognised scientists on their visits to Sri Lanka. It has also given Sri Lankan researchers the opportunity to be selected and receive international awards such as by TWAS and UNESCO.

NARESA serves as the national focal point for a number of international collaborative programmes in science and technology. It is also a member of a regional network on information. These memberships have served as a structural foundation for activities that benefit the scientific community. These include collaboration with:

CSC	-	Commonwealth Science Council
TWAS	-	Third World Academy of Sciences
ICSU	-	International Council of Scientific Unions
COSTED	-	Committee for S & T in Developing Countries
IFS	-	International Foundation for Science (Sweden)
ASCA	-	Association for Science Cooperation in Asia
AASREC	-	Association of Asian Social Science Research Councils
SAARC	-	South Asian Association for Regional Cooperation (Sub nodal point for the Technical Committee on S & T)
ICGEB	-	International Centre for Genetic Engineering and Biotechnology
UNISIST	-	World Information System for Science and Technology

NTIS - National Technical Information Service (U.S.A.)
ASTINFO - Regional Network for the Exchange of Information and Experiences in Science and Technology in Asia and Pacific
RINSCA - Regional Informatics Network for South and Central Asia.

SAREC/SIDA

NARESA's collaborative programmes with SAREC date back to 1977 when the first grant of Sw Kr 800,000 was approved by SAREC for three projects, which were:

(i) The Liver Disease Project - Medical Faculty, Peradeniya Campus (now the University of Peradeniya)
(ii) Ecology and Environment study project - Colombo Campus, (now the University of Colombo)
(iii) Plant Virology Project - CARI, Gannoruwa.

Following this, in 1983, SAREC agreed for the first time to award a sum of Rs.300,000/- for research in social science and humanities. However, the project that had an impact is the Buffalo Research Project which was an integrated approach to research on buffalo. This grant was the result of joint consultations between NARESA and NLDB in 1985. An agreement was signed for the establishment of a research farm for buffalo research at the Narangalle Farm in Kuliyapitiya.

Throughout the duration of the project, up to its completion in 1996, SAREC officials visited NARESA and with NARESA officials they visited the project sites. This created a good working relationship between SAREC and the scientists in Sri Lanka through NARESA and funds for the project continued culminating in the establishment of the Buffalo Information Centre at the Head Office of the Department of Animal Production and Health, for dissemination of research results of the buffalo research programme to grass-root level. Model farm units have been established at Thambuthegama, Kuliyapitiya and Pannala regions. This is one instance of benefits accrued by a nationally important sector as a result of the co-operation of SAREC.

In addition, under a SAREC grant, based on the findings of research under the Coastal Ecology Research Programme, a "Coastal Management Plan" was published. Research on Coral Reefs, eels, prawns, and clams were also completed, thus contributing to economically important areas. Other projects

funded are the "Energy Efficiency of Buildings" and the project on "Solar Energy for Tea Drying".

SAREC has approved a grant of Rs.40,000,000/= for 1998 , for the Coastal Ecology Programme, the Energy Project, support for NARESA grants under biotechnology, energy and social sciences, the Science Policy Projects and International Travel. NARESA is looking forward to the support that can be provided to important areas and the scientific community, under the grant.

SAREC Urgent Spare Parts Fund

Apart from research, SAREC came forward through NARESA to be of assistance to scientists by providing a fund to air-freight urgently needed spare parts for equipment used in the laboratories. This was a highly appreciated gesture and was a solace to the scientists, introduced at a time when, due to foreign exchange restriction it was difficult to get urgently needed spare parts. This scheme filled a gap in the system and NARESA, an important objective was fulfilled.

SAREC International Contacts Fund

A long felt need in the country was the provision of opportunities for scientists to attend international conferences, workshops and seminars. Realizing the importance of participation of scientists in international fora, NARESA established the International Contacts Fund in 1976 with SAREC funds. The International Contacts Fund was launched to enable scientists who are invited to present papers at international fora, to attend these by providing them with funds for travel or accommodation. The criteria evolved later to provide funds for both travel and accommodation if it was deemed essential. SAREC has supported this fund to date and NARESA is hopeful that it will be continued in the future. NARESA has seen to it that the experience gained by the scientists at these conferences is shared by them with other scientists in Sri Lanka by organising public seminars on the visits.

SAREC Scientific Capacity Building Programme

The scientific capacity building programme comprised the strengthening of the Electronic Repair Facility at the University of Peradeniya, the Glass Blowing Facility at the University of Colombo and the Glass Blowing Facility at the University of Moratuwa. These needed a considerable amount of collaboration work between SAREC and NARESA.

Commonwealth Science Council (CSC)

As far back as 1972, NSC took membership in the Commonwealth Scientific Committee (later to be called the Commonwealth Science Council). It proved to be a synergy of two scientific bodies giving sustainable support for participation in the international arena. The CSC has provided opportunities for training programmes, and participation at international conferences such as those on Research Management and on energy projects funded by the CSC. It also provided funds to hold workshops in the country giving the opportunity for many scientists to meet and interact with scientists from other countries.

The association of NARESA with the CSC also resulted in the steps taken to establish a National Engineering Design Centre (EDC). The idea of a national EDC emerged from discussions at the end of the Pan Commonwealth Workshop on Mathematical Modelling Circuit Design organised by the CSC in collaboration with NARESA, in 1972 at the University of Peradeniya. A planning meeting and planning visits were organised by the CSC to set up a basis for such EDCs in the developing commonwealth countries at the request of the member countries, Sri Lanka, Trinidad and Tobago and Kenya. This resulted in a report outlining recommendations for EDCs for developing countries. Discussions were held with the Universities, representatives of the industry and officials by a visiting CSC team in 1995. A project proposal for the establishment of an EDC in the country was prepared which was accepted by the Ministry of Science and Technology. The approval of the Cabinet of Ministers was obtained in 1996 for setting up the EDC. The ceremonial inauguration of the setting up of the EDC at the University of Peradeniya was held in 1997. The sub-centres identified are CISIR and NERD Centre. A Road Show was also organised by the CSC with the support of the Department of Trade and Industry (U.K.) and with the collaboration of the Ministry of Science and Technology, NARESA, CISIR and the Universities of Peradeniya and Moratuwa. The objective of the Road Show being to provide insight into:

* Collaborative projects undertaken by such centres and other University/ Industry collaboration in the U.K.

* The latest CAD software in mechanical and electronic engineering application which can be used in Sri Lanka.

This exercise depicts clearly collaboration permeating through institutions and bringing together the scientific community over national barriers.

United States AID Programme (USAID)

In 1983 NARESA signed an agreement with USAID in terms of which a grant of US $ 117,704 was made by USAID to finance three research projects. The project proposals were submitted by the researchers and forwarded by NARESA after evaluation by Steering Committees, to USAID. USAID being satisfied with the mechanism available at NARESA for the evaluation of applications, monitoring of progress of work and the disbursement of funds, continued its support for a few years to award twelve research grants providing equipment, chemicals research assistants and in some instances vehicles for researchers to work on projects of a larger scale than those funded by NARESA at the time.

Canadian International Development Agency (CIDA)

In 1983, CIDA invited NARESA to co-ordinate and administer the research component of the Canadian Potash Grant to Sri Lanka. This invitation was accepted by NARESA. Accordingly, using the mechanism available at NARESA, applications were called and the first set of eleven grants were awarded in 1983. This allowed a collaborative approach for the scientists to do research which is required to find solutions to problems of economically important crops.

United Nations Development Programme (UNDP)

In 1981, when UNDP offered assistance, a decision was taken to develop the Information Centre of NARESA , realising the importance of this service sector. Under this UNDP sponsored programme for S & T information, NARESA (NSC at the time) was able to purchase the required equipment, provide training abroad to the Documentalists in the Information Centre and also help other libraries. Under the programme, seven photocopying machines were acquired and issued to the main library and the medical library of the University of Colombo, the main library, the medical library and the library of the engineering faculty of the University of Peradeniya, the main library of the University of Sri Jayewardenepura and also the library of the National Museum. NARESA received equipment such as the off-set printing system, a microfiche system, an audio-visual pool and a computer system. This assistance strengthened the role of the institution in S & T information dissemination and other areas such as off-set printing of documents, for publication. Thus began the road to development of the Sri Lanka S & T Information Centre which became the focal point for a network of S & T libraries, numbering over one hundred, in the country. The service that this centre has been able to provide to the information community gathered momentum from then onwards, and now it is a fully fledged centre for S & T information and connected services using facilities such as Internet and CD-ROMs. This progress would not have been possible if not for international co-operation.

SAREC funds for the development of S & T Information Services

With the UNDP funds received as far back as 1981 NARESA had developed the infrastructure necessary for the Information Centre to develop further if the opportunity arose.

Thus, when SAREC was receptive to this aspect, a project proposal to "Develop a National Information Network for the Exchange of S & T Information with NARESA as the Pilot Co-ordinating Site" was submitted to SAREC. A generous grant, Rs.15,350,000/= was received on the acceptance of the project by SAREC/SIDA. Under this it was possible to establish a LAN with fifteen workstations with five multimedia PCs on the network with a server, Internet on-line with the NARESA network connected to LEARN hub at Sri Lanka Telecom. The two routers configured by NARESA provide on-line connectivity to the Internet. The members of the executive staff and the Documentalists of the library have been assigned access facilities to the network. In addition to a number of services and facilities, a membership scheme has also been worked out for the benefit of institutions, scientists and students.

This grant received from SAREC/SIDA has opened doors for many an activity helping NARESA and the scientific community to benefit from the progress made in science and technology. The relationship maintained by NARESA with SAREC throughout the years has thus helped the scientific community.

Australian Centre for International Agricultural Research (ACIAR)

A project on the "Biological Control of Salvinia", initiated by one of the scientists, used the infrastructure available at NARESA for international collaboration, and a successful programme was launched. NARESA approved the Sri Lanka - Australia project under which an amount of A $ 75,400 was provided for NARESA to co-ordinate and implement the R & D programme. Facilities provided under the programme for a multi disciplinary project is an example of the necessity of international collaboration for the progress of science. Scientists at five different locations and working on different disciplines collaborated for a successful outcome to biologically control the spread of Salvinia using the weevil *Cyrtobagous salviniae*. This also included visits to Australia for a briefing on quarantine aspects and the provision of a vehicle. The project was successfully completed, extension work carried out, video films made and the implementation thereafter was assigned to the Department of Agriculture.

UNESCO-Collaboration

In 1971, a National Committee for the UNESCO sponsored Man and Biosphere (MAB) Programme with provision for awarding multidisciplinary research grants was established. NARESA being the focal point for the MAB programme of UNESCO - a multidisciplinary project with assistance from UNESCO was launched on the Integrated Study of Mangroves of Sri Lanka. The study included social science aspects in addition to all the other disciplines. Under this programme the scientists were able to interact with UNESCO and with scientists in other countries.

UNESCO also provided assistance in 1985 to initiate the first phase of the Science Indicators and Statistics Study Programme, which involved a country wide study of financial resources, physical infrastructure and high level human resources devoted to scientific work in Sri Lanka. This project set the foundation for science policy studies vital to develop S & T in the country. UNESCO has also provided funds for workshops and regional meetings which were organised by NARESA.

UNESCO appointed NARESA as the national distributor for CDS/ISIS (Software package). This service has been a very useful one in the library and information field.

ASTINFO - Regional Network for the Exchange of Information and Experience in S&T in the Asia Pacific

In 1974 a committee for UNISIST was formed by UNESCO for S & T information. This evolved into two different S & T information networks for the region one for Latin America and the Caribbean and the other for the Asia Pacific region of which Sri Lanka is a member. The latter became ASTINFO, the Regional Network for the Exchange of Information and Experience in S & T in the Asia Pacific which functions under UNESCO. The Consultative Committee meetings and the seminars are held biennially hosted by different member countries. NARESA hosted the fourth ASTINFO Consultative meeting in 1986, in Sri Lanka. Under ASTINFO, NARESA being the focal point in Sri Lanka, many services were provided. Coupons were provided by UNESCO to obtain reference articles under BLDDS - coupons were also provided to obtain articles from the Australian National Library, one of the biggest in the region. The meetings held biennially allow information personnel from all member countries to meet and discuss common issues, collaborative projects, training programmes for information personnel, new tools, future programmes and packages for information services and also visit reputed institutions in the region. Provision is made to contact the focal point in any member country for requirements in information

services. Sri Lanka being one of the smallest has benefited immensely from the membership in this regional network. There is provision under ASTINFO for member countries to receive grants for projects on information needs, computers and consultancy for training programmes etc. ASTINFO has provided strength to the information personnel in member countries, through the focal points in the countries.

Third World Academy of Sciences (TWAS)

The TWAS, for which NARESA is the focal point in Sri Lanka, is a non-governmental, non-political and non-profit making organization. The objectives are to recognize and promote high calibre scientific research carried out by scientists from developing countries, to facilitate their mutual contacts, strengthen their scientific research work and foster it for the development of the Third World and in the service of mankind.

The TWAS was officially launched in July 1985, by the then United Nations Secretary General Mr J. Perez de Cueller, in Trieste, Italy. The Academy was granted official NGO status by the United Nations Economic and Social Council in 1985.

The current membership of the Academy is comprised of one hundred and fifty fellows, coming from forty five developing countries and forty nine associate fellows. The academy is the first international forum composed of eminent scientists from Third World countries designed to promote, both by example and through its programmes the future development of basic and applied science in these countries.

There are many programmes under TWAS that are beneficial to the member countries.

(1) TWAS South-South Fellowship programme. Under this programme the Academy has been awarding fellowships since 1986 to scientists of proven research ability to enable them to pursue research and/or undertake lectureships, by working with colleagues in developing countries other than their own. Sri Lanka has received five fellowships under the TWAS South-South Fellowship Programme

(2) TWAS/ICTP Regional Fellowship Programme, the purpose of which is to promote research collaboration between scientists and scientific institutions in the Third World within the same geographical region, thereby improving relations between their scientific institutions. This fellowship programme was established in 1987.

(3) TWAS/CAS Fellowship Programme for Research and Training in Chinese Institute. The purpose and nature of this programme being to award grants to research scientists of proven ability, working and living in developing countries other than China, for pursuing research, learning new techniques, or undertaking some other form of training by working with colleagues in Universities and Research Laboratories in China. The programme will promote the transfer of advanced scientific research result from these institutions to the rest of the Third World through the establishment of institutional links and long term co-operation. TWAS provides international travel to the host country and back through funds received from the Italian Ministry of Foreign Affairs, while local living expenses are provided by CAS.

(4) TWAS Research Grants Programme, in pursuance of the objective of providing promising scientists in the Third World with the conditions necessary for the advancement of their research work, awards research grants on a cost-sharing basis for high-level and promising scientific research projects to be carried out in developed countries by the individual scientists named. The purpose is to strengthen endogenous capacity in science. Sri Lanka has received two grants under this programme.

(5) TWAS Associate Membership Scheme. The aim of the scheme is to counteract the brain drain, alleviate the problem of isolation of talented scientists in developing countries, and strengthen the research programme of centers of excellence in the South. There are many centres located in different countries participating in this programme.

(6) The lectureships/professorships programme was initiated in 1987 by ICSU and TWAS. This was later joined in 1989 by UNESCO and CSC. The objective of this programme is to provide those associated with scientific and other appropriate institutions in developing countries with the opportunity to establish and enhance collaboration with colleagues in all fields of science, technology and key areas of environment and development. The prospective hosting institutions can invite eminent experts in science, technology and sustainable development, to lecture and hold discussions in these countries.

In addition to these, other programmes are launched by TWAS from time to time.

International Centre for Genetic Engineering and Biotechnology (ICGEB)

NARESA took membership in ICGEB in November 1992, being convinced that NARESA will benefit financially and also by training programmes sponsored by the ICGEB. In 1993 NARESA was designated as the focal point for Sri Lanka by the ICGEB, and since then steps have been taken to establish mutually beneficial collaborative links between ICGEB and the scientific community in Sri Lanka. In 1994, at the request of ICGEB, membership of the ICGEB gave the scientific community in Sri Lanka access to programmes such as the UNIDO/ICGEB Post-Doctoral Fellowship programme, Pre-Doctoral fellowship programme , the Collaborative Research Projects and participation at symposia, conferences, meetings, courses and workshops, nominations being made by NARESA.

In 1995, NARESA nominated IFS, as the Affiliated Centre for ICGEB for it to coordinate with a network of institutions composed of MRI, CISIR, the Faculty of Agriculture, University of Peradeniya and the Department of Botany, University of Kelaniya. The nomination was accepted by the ICGEB in November 1995.

One of the objectives of the ICGEB is to promote international co-operation in developing and applying peaceful uses of genetic engineering and biotechnology in particular for developing countries and *"to develop and promote the application of genetic engineering and biotechnology for solving problems of development, particularly in developing countries"*.

NARESA looks forward to collaboration with ICGEB in this important field of biotechnology in helping with the objective to serve the scientific community in Sri Lanka.

Indo-Sri Lanka S & T Co-operation - Biotechnology Programme

In 1993, NARESA was identified as the co-ordinator of the biotechnology programme to be carried out under the Indo-Sri Lanka Co-operation in Science and Technology, the responsible Steering Committee for the programme being the Steering Committee on Biotechnology. Eight areas were identified for co-operation with the respective local and Indian counterpart institutions, namely, (1) Tissue culture techniques for multiplication of elite species for forestry, horticulture, floriculture and other biomass covers, (2) Immunodiagnostics and vaccines, (3) Biotechnological approaches to vector borne diseases like malaria. filariasis, (4) Biological pest control in important crops, (5) Embryo transfer for improving genetic stock of animals, (6) Medicinal plants, (7) Nutrition and Food Crops and (8) Agriculture Biotechnology projects.

Projects required an Indian Counterpart Institution and these arrangements were made with respect to six out of twelve projects and budgets were submitted. With the intervention of the Ministry of Science and Technology problems with respect to collaborative aspects with Indian Institutions were discussed at meetings convened by the Ministry and arrangements were made for scientists to visit India in January 1997.

Committee on Science and Technology in Developing Countries (COSTED)

COSTED is a non-governmental international organization, mandated to promote co-operation in science and technology. It incorporates International Bioscience and other scientific networks. NARESA is the focal point for COSTED in Sri Lanka.

COSTED was established in 1966 at the General Assembly of ICSU held in Bombay India. In 1994 the 24th General assembly of ICSU decided to merge COSTED and IBN. The objectives of COSTED - IBN are specifically to link science and technology to sustainable development, the general objective being to act as an advisory group to ICSU and UNESCO on the range of activities in science and technology for developing countries, their potential applications to social and economic development and how these relate to other international development efforts. The scientific objectives are implemented through activities such as, thematic seminars and workshops, preparation of inventories and directories, publications and newsletter series, regional meetings in broad areas of science in order to strengthen co-operation between the countries of the region, and increase the capacity to address regional and global problems as in environment related topics. This also help to enhance the credibility to mobilise funds from donor agencies.

NARESA has had the opportunity to do its functions as the focal point in programmes such as the COSTED Fellowships Programme, the Travel Grants programme and other areas where an intermediary was necessary.

Association for Science Co-operation in Asia (ASCA)

NARESA is the Sri Lanka national focal point for ASCA. ASCA was established in 1970, as recommended by the organizational meeting of AMSA held in Manila in 1970. The task entrusted to ASCA is to coordinate assessment, utilization and improvement of the technical and scientific resources of the region in order that science and technology can play a more meaningful role in the process of national development. The objectives include, the exchange of information on national scientific resources and research programmes, identify areas of common scientific or technical interest, examine means for providing solutions to priority

problems on a bilateral or multilateral basis through resources and facilities of existing agencies such as UNESCO or such other avenues as may be more appropriate and beneficial, provide advisory services as requested in the field of science and technology to existing international and Asian regional organisations and review progress in the implementation of plans and programmes for the advancement of science and technology in the countries in Asia.

NARESA has been represented at ASCA meetings where country papers on selected subjects are presented and co-operative project proposals are discussed. NARESA provides information required by ASCA questionnaires on science cooperation and also contributes information on NARESA activities to the ASCA Newsletter. Co-operative project proposals also have been submitted by NARESA. As the focal point in Sri Lanka the recommendations of NARESA on projects submitted by member countries have been requested and these have been provided with the advice of the Steering Committees.

International Council of Scientific Unions (ICSU)

NARESA became the national scientific member of ICSU as far back as 1972. NARESA also had representation on several of its international unions such as IURS, IUPAC, IUPS and IUGS. In most cases however it was nothing more than receiving information and reports with little interactions. In 1989 a meeting was held with the local bodies which were represented in the international union, such as the Nutrition Society of Sri Lanka, the Arthur C. Clarke Centre and the Geological Survey Department. The meeting endorsed:

(1) that while NARESA should continue to be the subscribing member of the parent body ICSU, wherever possible other local institutions should be the adhering body for international unions and programmes (e.g: IGBP),

(2) that where a local institution functions as an adhering body it is preferable to form a Committee to include scientists from other institutions as well,

(3) the need for representation in IUBS, IUPAP, IUPS, and IUGG,

(4) the need to look into the participation in ICSU Committees (e.g.: COSTED).

Participation of adhering bodies in congresses, conferences and meetings continued and NARESA receives information and reports on these activities, which however minimal it may seem, contributes to international co-operation in many fields of science and technology.

International Foundation for Science (IFS) Sweden

NARESA (NSC at the time) became a member of IFS, Sweden in 1974. This coincided with the IFS grants activities which began in 1974. IFS is a international non-governmental, non-profit foundation which has a membership of ninety one scientific, academic and research councils in seventy six countries, of which three fourths are in developing countries.

The purpose of the Foundation is to promote and support scientific capacity building through meritorious research in the developing regions of the world for the benefit of these regions. The Foundation provided young scientists and technologists of outstanding merit from developing countries with financial and other support in their work. In selecting grantees IFS looks for proposals that are scientifically promoting, ecologically, socially, and economically sustainable and relevant to the needs of the developing countries. For Sri Lanka, recommendations are required by IFS from NARESA for the grants. The Foundation also facilitates for members to interact, among themselves and with the foundation by arranging meetings regularly, consulting members individually or in groups on scientific and organizational matters of the Foundation.

To date, seventy two scientists from Sri Lanka have received support under the IFS grant scheme. This is from a total of two thousand five hundred grants to scientists in ninety three developing countries.

	First	**Renewal**
Grants 1974 - 1994	71	47
Amount in SEK	6,143,000	3,483,000

Travel grants are also awarded to allow grantees to attend conferences and visit research institutions. Seventy four travel grants have been awarded to Sri Lankan grantees, the amount being SEK 1,225,000. IFS also has awards schemes e.g.: Seven Brohult Award for which nominations are requested by the IFS through the member organisations, which is NARESA for Sri Lanka.

IFS also supports workshops on request, one example being the workshop on the Repair of Scientific Instruments.

South Asian Association for Regional Co-operation (SAARC)

In the year 1983, with the establishment of the SAARC Technical Committee on Science and Technology, NARESA was designated the sub-nodal point for the co-ordination of all activities of the Committee.

Consequent to the Twelfth meeting of the Technical committee on Science and Technology held in Kathmandu in 1983, Sri Lanka was identified as the Technology Information co-ordinator. Networking arrangements in selected fields were established and in Sri Lanka the following were nominated as nodal points.

- Plant Genetic Resources Centre, Gannoruwa - for Biotechnology and Genetic Engineering
- National Engineering Research and Development Centre, Ekala - for Energy Modelling Techniques
- Ceylon Institute of Scientific and Industrial Research, Colombo - for Technology Information
- National Building Research Organization, Colombo - for Low Cost Housing and Building Technologies

NARESA being the SAARC sub-nodal point on S & T, reports on all projects in Sri Lanka at the regular meetings of SAARC. Regular State-of-the-art reports on the required topics, reports, nominations for Expert-Group-Meetings and other networking activities are some of the responsibilities of NARESA.

Asian Development Bank (ADB) Project

In 1996 NARESA collaborated with the Ministry of S & T to support the ADB consultants working on a project on Tertiary Education in Sri Lanka. The ADB team operated from NARESA premises, NARESA providing administrative assistance required. Two officers were also released to work on the project in order to provide training.

One of the recommendations made by the ADB consultants was to: *"Establish a National S & T Manpower Information System at NARESA for supporting educational planning through a continuous Labour Market Analysis and estimation of S & T manpower requirement, supply and anticipated gaps"*.

It was stated that such an information system requires extensive data collection, computerisation, conducting a variety of analytical studies, and close organisational linkages, with planners on the one hand and higher education and training institutions on the other.

Acting on this recommendation a project proposal on "Setting up and Running an S & T Manpower Information System" was submitted to the ADB by NARESA. This project proposal has been accepted and approved by the ADB. Duration of the project will be five years. Included under the project are consultants, exchange visits and overseas training, in addition to equipment and

other facilities to establish an Information System. It is understood that NARESA will appoint a co-ordinator, provide office facilities etc. and collaborate with the Ministry of S & T to see the project through. The total grant for a period of five years is US $ 388,350.

STEPAN - Science and Technology in the Asia Pacific

STEPAN was established in the Centre for Research Policy of the University of Wollongong, Australia. NARESA is the focal point for STEPAN in Sri Lanka. Many activities such as regional workshops and collaborative research projects were initiated and carried out by STEPAN with sponsorship from international organizations such as UNESCO, IDRC, and the member countries hosting the workshops. Important aspects such as Commercialization of Research under which important and current topics were discussed by eminent personnel giving an opportunity for member countries to address such issues in their countries to enable them to face challenges of the year 2000 have been taken up. STEPAN will work towards a better understanding of management technology, private sector participation, develop expertise for programme management and implementation, expand information network services, increase collaboration with member groups operating in the region and develop programmes relevant to small developing countries.

These ideals coincide with the objectives of NARESA and NARESA will continue to integrate and work towards achieving these goals. Science and Technology is a shared heritage of mankind and cannot thrive in isolation. Active international interchange is required and will be required in the future for the survival of science and technology. It is hoped that the efforts made by NARESA in the past and steps being taken now will meet this requirement. The combined efforts, the joint endeavour in science becoming the unifying force among nationalities in the world should be the goal of international collaboration.

NARESA in the recent past through the British VSO received the services of a MIS specialist to work in the Information Centre. By this means computer services have been provided to a wide spectrum of scientists and information providers. NARESA, hopefully will have the mechanism to continue to obtain services through international collaboration to meet the demands of a fast changing and progressing field, Science and Technology.

"The Trieste Declaration" adopted in 1988 at the inaugural meeting of the Third World Network of Scientific Organizations where fifteen Ministers of Science and Technology, twelve Presidents of Academies and seventeen

Chairpersons of National Research Councils, representing thirty six third world countries met states:

> *"Recognising the fundamental importance of science in socio-economic and cultural development and technological progress, and keeping in view the recommendations of the South Commissions pertaining to the crucial role of science in the Third World, as mankind approaches the 21st century, the members of the Third World Network of Scientific Organizations present at the meeting held in Trieste from 4-6 October 1988, resolve to work towards giving science and technology a position of highest priority in their own countries and to strengthen their collaboration with other countries of the South as well as of the North".*

Hopefully NARESA will be able to play a key role in collaborative efforts required of the commitment.

References

1. Documents in NARESA files on the subjects.
2. Abdus Salam *Notes of science, technology and science education in the development of the South* - TWAS. (Prepared for the 4th and 5th meetings of the South Commission 10-12 December 1988, Kuwait and 27th - 30th May 1989, Mozambique.)
3. TWAS publications.

Annex I

The Major Landmarks on International Co-operation

1971	-	National Committee for the UNESCO sponsored MAB Programme.
1972	-	A proposal to set up a National Scientific Documentation Centre was made and necessary steps were taken to obtain assistance from UNDP for the establishment of the Centre.
1972	-	(NSC) became associated with international scientific organisations such as (a) The Commonwealth Scientific Committee (later known as CSC, (b) ICSU, (c) IURS.
1974	-	(NSC) became a member of ASCA and IUPS.
1974	-	Formation of the National Committee for UNISIST.
1974	-	Membership of IFS Sweden, and IUNS.
1976	-	The NSC was named as the National Co-ordinating Body for the Indo-Sri Lanka Scientific and Technological Co-operation Programme for the period March 1976 - February 1978 by the Ministry of Industries and Scientific Affairs.
1976	-	Exploratory discussions with the representatives of SAREC were held to establish the research fund for (a) the purchase of scientific equipment, (b) international travel to attend scientific meetings, (c) exigency purchases of spare parts for scientific equipment.
1977	-	Under the Indo-Sri Lanka Scientific and Technological Programme two study tours were undertaken by Sri Lankan scientists. One Indian scientist spent three weeks in Sri Lanka to study low-cost housing.
1977	-	The first SAREC grant of Sw Kr/800,000 was approved for three research projects.
1977	-	The designation of NSC as the focal point for the preparation of Sri Lanka National Paper for the United Nations Conference on Science and Technology for Development.
1978-1979	-	UNESCO Aid for MAB work (Volkswagen Passat Station Wagon, Field Lab. equipment, microscopes and glassware)
1979	-	As National member of CSC, NSC agreed to participate and be in the International Steering Committee for the Commonwealth Regional Asia/Pacific Rural Technology Programme.
1980	-	On the advice of SLSTIC, which is the information division of NARESA, RERIS was established with the objective of helping scientists and technologists to obtain current information on solar, wind, biomass and OTEC energy resources.

1981 - Under the UNDP sponsored programme for S & T Information, seven photocopying machines were acquired and issued to the libraries of universities. An off-set printing system, a microfiche system, an audio-visual pool and a computer system to strengthen the institution's role in S&T information dissemination were also acquired. UNDP also provided funds for the training abroad of library personnel.

1981 - The Sri Lanka National Paper for the Second Conference of Ministers Responsible for the Application of Science and Technology for Development, and those responsible for Economic Planning in Asia and Oceania (1982) CASTASIA II, was prepared by the Institute for UNESCO.

1982 - NARESA was invited by USAID to co-ordinate and assist in the selection of R & D projects for funding by USAID.

1982 - On the invitation of SAREC, NARESA agreed to function as the focal point in Sri Lanka for Research Co-operation with SAREC.

Apart from the first three projects funded by SAREC, it agreed to support the Buffalo Research Programme, the Inland Fisheries Research Programme and the Scientific Capacity Building Programme comprising the strengthening of the electronic equipment repairs facility at the University of Peradeniya, the glass-blowing facility at the University of Colombo, and at the University of Moratuwa.

1983 - SAREC agreed for the first time to award a sum of Rs.300,000/- for research in Social Sciences and Humanities.

1983 - On the invitation of CIDA, NARESA agreed to co-ordinate and administer the research component of the Canadian Potash Grant to Sri Lanka. Accordingly applications were called and the first set of 11 grants were awarded in 1983.

1983 - An agreement was signed in 1983 with USAID in terms of which a grant of US $ 117,704 was made by USAID to finance three research projects.

1983 - With the establishment of the SAREC Technical Committee on Science and Technology NARESA was designated the focal point for co-ordination of all activities of this Committee.

1984 - SAREC funding was received for the projects under the Zoological Survey of Sri Lanka, a programme initiated by NARESA.

1985 - NARESA assumed the Chairmanship of the SAARC Technical Committee on S & T for 1985 - 1986.

1985 - UNESCO assistance was received by NARESA to initiate the first phase of the Science Indicators and Statistics Study Programme, which involved a country wide study of financial resources, physical infrastructure and high level human resources devoted to scientific work in Sri Lanka.

1986 - NARESA approved the Sri Lanka Australian Project for the Biological Control of Salvinia under which A $75,000 was to be provided for NARESA to co-ordinate and implement the R & D Programme.

1987 - NARESA was designated the national distributor for the CDS/ ISIS library software package, by UNESCO.

1989 - Under a programme sponsored by the British Council, NARESA organised and co-ordinated a workshop at CISIR to train technicians on use, maintenance and repair of analytical instruments.

1989 - USAID provided financial support and collaboration for the preparation of a Natural Resources Profile of Sri Lanka.

1990 - NARESA became the participating agency in the Natural Resources Environmental Policy Project (funded by USAID) for the establishment of a Natural Resources Information Centre.

1990 - The Authority initiated its second multidisciplinary research programme titled, the Coastal Ecology Research Programme, to be funded by SAREC .

1994 - SAREC/SIDA awarded a grant of Rs.15,354,000/= for the establishment of a computer network for the exchange of S & T information via e-mail with NARESA as the focal point. This included:

(A) Local Area Network (LAN) with fifteen work stations and ten CD-ROM platters

(B) Internet connectivity

(C) Development of online databases

1997 - As a result of discussions held at the end of Pan Commonwealth Workshop on Mathematical Modelling in Circuit Design organised by CSC and NARESA at the University of Peradeniya in 1992, a CSC team visited Sri Lanka in 1995 and held discussions with the Universities, representatives of the industry and relevant officials and prepared a project proposal for establishing Engineering Design Centres in the country. This was accepted by the Ministry of S&T and the approval of the Cabinet of Ministers for setting up the EDC was obtained in 1996. The inaugural ceremony and a road show were held in 1997.

Annex II

International Seminars/Meetings

1970 - With the collaboration of the US-National Academy of Sciences and the Ministry of Industries, Science and Technology held a seminar on "Organization and Management of Scientific and Industrial Research".

1972 - NSC/UNESCO with the University of Ceylon (Peradeniya) - held a workshop on "The Early Evolution of Life".

1974 - NSC/UNESCO - held the UNISIST meeting of experts on "Regional Information Policy Development in South Asia".

1975 - NSC with COSTED and the University of Sri Lanka held a meeting on the "Present Role of Universities in Scientific Development".

1976 - NSC with USIS - held a seminar on "Science Policy and Planning" where the guest speaker was Prof. Micheal J. Moravesik, Professor of Physics and Director of the Institute of Theoretical Sciences, University of Oregen, U.S.A.

1976 - NSC with the German Cultural Institute organised a seminar on "Man and his Environment", where the guest speaker was Dr Hansjorg Oeltzschner, official of the Bavarian State Authority on Environmental Protection, Federal Republic of Germany.

1976 - NSC with the Australian High Commission held a seminar on "Sun Drying Methodology".

1978 - NSC with UNESCO held an International Symposium on "Information Analysis and Consolidation".

1979 - NSC with the USIS organised a User Seminar to introduce NTIS services.

1979 - NSC with COSTED and the Sri Lanka Foundation Institute organised a Workshop on "Demonstration Experiments in Physics".

1980 - NSC with the US National Academy of Sciences and the Sri Lanka Foundation Institute organised a Workshop on "Post Harvest Food Losses".

1980 - NSC with CSC held a planning meeting for the project on "Cultivation and Processing of Medicinal Plants", of the Commonwealth Asia/Pacific Rural Technology Programme.

1980 - NSC with CSC and the NERD Centre held a planning meeting for the project on "Organising the Traditional Light Engineering Industry", of the Commonwealth Asia/Pacific Rural Technology Programme.

1980 - NSC with CSC and the Ministry of Fisheries held the planning meeting for the project on "Development of Inland Fisheries", of the Commonwealth Asia/Pacific Rural Technology Programme.

1981 - NSC with UNDP held a National Workshop on "Library and Information Services for Science Information Personnel".

1981 - NSC with CSC held the second programme review meeting on "Management of Water Hyacinth", under the Commonwealth Regional Rural Technology Programme.

1982 - NSC with the FAO, WHO, and ADAB and the Centre for Overseas Pest Research, held the International Workshop on "Resistance to Insecticides Used in Public Health and Agriculture".

1983 - NARESA with CSC held the Final Review meeting on the "Commonwealth Regional (Asia/Pacific) Rural Technology Programme".

1983 - NARESA with CSC held an International seminar on "Land and Marine Plants of Potential Medicinal Value".

1983 - NARESA with COSTED and the Asian Science Commnication Organization held a seminar on "Standards for Editing and Publishing Scientific Journals".

1983 - NARESA with IFSSO held the 6th General Conference of the "International Federation of Social Science Organizations".

1984 - NARESA with CSC held an International Workshop on "Integrated Energy Systems for Rural Development".

1986 - NARESA with SLAAS and SCAMAP held a seminar on "Photochemical and Biological Investigations on Medicinal Plants".

1986 - NARESA with UNESCO held a National Seminar on "Scientific and Technical Information Policy".

1986 - NARESA with UNESCO held a Regional Seminar on "National Information Policy and Transborder Data Flow".

1986 - NARESA held the 4th ASTINFO Consultative meeting.

1987 - NARESA with CSC held an International Workshop on "Management and Evaluation of Multidisciplinary Research".

1987 - NARESA with UNESCO World Heritage Conservation and USAID held a Regional Training Workshop on the "Ecology and Conservation of Humid Tropical Forests of the Indo-Malayan Realm".

1987 - NARESA with IDRC held a Workshop on "CDS/ISIS Software". NARESA became the National distributor for the software package.

1987 - NARESA with UNESCO held a Regional Meeting of the "National Co-ordination of the Regional Information Network of South and Central Asia (RINSCA)".

1988 - NARESA with CSC and the Department of Agriculture held a Regional workshop on "Conservation Methodology".

1988 - NARESA with the Asia Pacific Centre for Transfer of Technology and the CISIR held a national workshop on "Information Systems for Promotion and Utilization of Technology".

1989 - NARESA with STEPAN, Australia held a workshop on the "Development of Practical S & T Indicators for Economic Development".

1980 - NARESA with USAID held a workshop "To Identify Priorities for Long Term Research in Tropical Forests and Coral Reefs in Sri Lanka".

1989 - NARESA with SAREC held a Regional Seminar on "Buffalo Research".

1990 - NARESA with UNESCO held an International Symposium on "Ecology and Landscape Management in Sri Lanka".

1992 - NARESA, with CSC and the University of Peradeniya held the "Pan-Commonwealth Workshop on Mathematical Modelling in Circuit Design".

1992 - NARESA with CIDA held the final review seminar on CIDA funded "Potash Fertilizer Research Programme".

1992 - NARESA with SAREC held a seminar on "Curd Production - Buffalo Research Programme".

1996 - NARESA with UNESCO under the MAB Programme held a regional seminar on "Forests of the Humid Tropics of South and South East Asia".

1996 - NARESA with CSC held an international seminar on "Problems of Monitoring Pesticide Residues in Exportable Commodities *viz.* rice, fish and minor crops.

1997 - NARESA with CSC held a workshop on "Remote Sensing".

1997 - NARESA with AgEnt of USAID held a seminar on "A Partnership of Science and Industry Toward 2000 AD".

Abbreviations

ACIAR	-	Australian Centre for International Agricultural Research
ADB	-	Asian Development Bank
AgEnt	-	Agro Enterprise
AMSA	-	Association of Ministers of Science in Asia
ASCA	-	Association for Science Co-operation in Asia
BLDDS	-	British Library Document Delivery Service
CARI	-	Central Agricultural Research Institute
CAS	-	Chinese Academy of Sciences
CDS/ISIS	-	Computerized Documentation Service/Integrated Set of Information Systems
CIDA	-	Canadian International Development Agency
CISIR	-	Ceylon Institute of Scientific & Industrial Research
CSC	-	Commonwealth Science Council
COSTED	-	Committee on Science & Technology in Developing Countries
IBN	-	International Bioscience Network
ICGEB	-	International Centre for Genetic Engineering & Biotechnology
ICSU	-	International Council of Scientific Unions
ICTP	-	International Centre for Theoretical Physics
IFS	-	Institute of Fundamental Studies
IFS	-	International Foundation for Science
IFSSO	-	International Federation of Social Science Organizations
IUBS	-	International Union of Biological Sciences
IUGG	-	International Union of Geology & Geophysics
IUGS	-	International Union of Geological Sciences
IUNS	-	International Union of Nutritional Sciences
IUPAC	-	International Union of Pure & Applied Chemistry
IUPAP	-	International Union of Pure & Applied Physics
IUPS	-	International Union of Physiological Sciences
IURS	-	International Union of Radio Science
LAN	-	Local Area Network
LEARN	-	Lanka Educational Academic & Research Network
MAB	-	Man and the Biosphere
MRI	-	Medical Research Institute
NARESA	-	Natural Resources, Energy & Science Authority
NERD	-	National Engineering Research & Development Centre
NLDB	-	National Livestock Development Board
NSC	-	National Science Council
RERIS	-	Renewable Energy Resources Information Service
SAREC	-	Swedish Agency for Research Cooperation in Developing Countries

SCAMAP	-	South & Central Asian Network on Medicinal & Aromatic Plants
SLSTIC	-	Sri Lanka S & T Information Centre
SLT	-	Sri Lanka Telecom
TWAS	-	Third World Academy of Sciences
UNDP	-	United Nations Development Programme
USAID	-	United States, AID Programme
UNISIST	-	United Nations Information Systems on S & T
VSO	-	Voluntary Service Organization
WHO	-	World Health Organization