SCIENCE AND DEVELOPMENT

Appropriate application of science and technology is important for economic and social development as well as for the preservation of the environment. In order to help member countries face this particular challenge, the Secretariat, through the activities of the Commonwealth Science Council (CSC), has focused on three main areas of activity, biological diversity and genetic resources, water and mineral resources, and energy, which are crucial for sustainable development.

Since mid-1993, the Secretariat has continued to provide industrial support through the Chemical Research and Environmental Needs (CREN) project, in hazardous waste management and in mathematical modelling.

In carrying out these activities, a framework for South-South and North-South co-operation is provided by pooling scientific resources, knowledge and expertise from across the Commonwealth. This enhances the transfer of appropriate technology and maximises opportunities for development.

Biological Diversity and Genetic Resources

Many communities depend on biological resources for their subsistence and livelihood. Yet, as the 1992 'Earth Summit' in Rio de Janeiro noted, a number of biologically rich countries are economically disadvantaged.

Through the biological diversity and genetic resources programme, Commonwealth member countries receive practical assistance in the conservation of their biological resources and on their sustainable utilisation. Activities focus specifically on capacity-building through training, development of networks and assisting with the implementation of international conventions, such as the Convention on Biological Diversity.

Since mid-1993, more than 50 scientists, teachers, lecturers and representatives from NGOs have received assistance in training in fields relevant to the conservation of biological and genetic

A network on underutilised fruit has been set up to improve propagation, production and management of fruits

resources, such as mycology, plant tissue culture and herbarium curation. A syllabus for a 10-module multimedia training programme on biodiversity management was also developed as a joint initiative with the Commonwealth of Learning in 1994. These modules are being used for different target audiences, among them trainers in this field and policy-makers.

Part of the Secretariat's contribution to the Iwokrama International Rainforest Programme is to the research and development plan, especially in dealing with recording and encouraging ecological practices of indigenous Amerindian communities and the conservation of biological resources.

Scientific activities in agriculture have focused on two areas, underutilised fruits and the promotion of cassava as a staple crop, with a view to helping to improve nutrition and economic development.

The CSC helped set up, with the International Centre for Underutilised Crops, an Underutilised Tropical Fruit Network in Asia (UTFANET) to improve propagation, production and management of tropical fruits. Since then, other international organisations have joined the project and Britain's ODA is contributing towards the salary of a network co-ordinator. In April 1994, it was agreed to form an UTFANET Support Group and a one-year workplan was drawn up. In October 1994, a training course on plant genetic resources and their conservation and utilisation was held in Malaysia.

Cassava, a drought-resistant crop that grows well in poor, sandy soils, is being promoted in Zimbabwe as a crop which can improve the local and national economy as well as food security. Logistical, organisational and funding support has been given to the project which has also attracted support from national and international organisations. Since mid-1993, planting material has been distributed to small farmers in south-east Zimbabwe, project personnel, laboratory technicians and extension workers trained, and some commercial trials conducted. In addition, the most suitable technologies for processing cassava are being identified for adaptation and use in Zimbabwe.

The CSC has also contributed towards the design and establishment of a computerised database of legumes in South Asia.

Water and Mineral Resources

The development of water and mineral resources is strongly related to social and economic development. In many cases, the ability to provide potable water is one of the indices of development and it is now accepted that water availability is likely to be one of the major issues into the next century. Work in the geosciences and water resources is therefore important to Commonwealth countries.

In arid and semi-arid regions quality water supply is a priority issue

To help members produce targeted information on mineral resources, assistance is given in the use of geoscience database management techniques. A regional project, which started in Botswana has already been expanded to include all 11 countries in the Southern African Development Community (SADC) region and workshops have been held to define their needs. Some funding support has been received from donor agencies and development banks to implement the project.

Water is a finite resource which can limit economic growth and development. Groundwater now supplies a major proportion of the world's drinking water and is usually the only dependable source in small islands and arid or semi-arid areas. It is, however, very vulnerable to pollution and is very difficult to clean once contaminated.

To examine techniques for its exploration and management, a workshop was held in Malawi in July 1993 where scientists focused on techniques for improving its quality. Some techniques require the use of state-of-the-art technology, such as computer modelling. Countries are being helped to use computer models so as to understand groundwater systems and the CSC provides information on how to carry out modelling studies, supplies modelling software and demonstrates how such techniques could be used to assess contamination.

In September 1994, a group of experts suggested to the CSC three areas of focus for activities: water resources in small islands, arid and semi-arid lands, and water supplies in urban and rural areas. A workshop was held in Guyana for rural women to discuss methods of maximising the availability of good quality water to Amerindian women in the Iwokrama rainforest area. At the workshop, scientists introduced low cost, small-scale water treatment technology suitable for rural areas.

Work continues to help countries to eradicate waterweeds which choke waterways used for transport, fishing and drinking water. Choked waterways can cause severe social and economic problems because the rate of water loss from reservoirs and irrigation schemes is increased, the intake pipes of hydroelectric power stations clogged, a harbour is provided for disease vectors and the growth of indigenous plants and fish smothered. The worst weed infestations are caused by water hyacinth, water fern and water lettuce.

Biological control is a preferred, inexpensive, environmentally safe and permanent solution. The CSC assists and catalyses regional control programmes in Eastern and Southern Africa, through training local scientists, co-ordinating implementation of national and regional programmes and helping to establish local colonies of the natural enemies (insects or bacteria) that destroy these weeds. In February 1995, a pilot project was conducted on Lake Kyoga in Uganda to help develop a regional approach to controlling waterweeds on Lake Victoria. Another pilot project has been held on the Kafue River in Zambia.

An Integrated Pest Management Programme also aims at promoting the use of biological control techniques to combat infestations of whitefly, thrips and the Diamondback moth in the Caribbean.

Energy

There is a close link between development and the availability of high quality energy. Millions of people in the Commonwealth, particularly those living in rural areas, do not have access to mains electricity and yet the introduction of just one light point to a household can significantly improve quality of life.

The CSC focuses on rural and alternative energy projects, especially small-scale solar systems for rural areas and integrated biomass projects, and on energy conservation.

Solar power is a proven clean, cheap and renewable source of energy and even relatively small photovoltaic (PV) systems can provide sufficient power in the home for lighting kitchens and living rooms, and for small appliances. Energy requirements for small industries and schools can also be provided by suitably chosen PV systems.

Training for scientists to advance understanding of new technologies and new methods

In Tanzania, it is estimated that more than three-quarters of the population do not have electricity, and many schools, clinics and commercial establishments which are without electricity are in rural areas. With the Karagwe Development Association (KARADEA), an NGO, a regional solar training facility is being built. Courses are aimed specifically at rural-based students who are, or intend to be, involved in a rural solar industry and students from Kenya, Tanzania and Uganda have attended. In 1994, training was carried out for technicians in installing, repairing or upgrading local PV systems. Field trials are also being carried out on solar lanterns which have proved very popular as a relatively cheap and portable light source.

The CSC, in collaboration with a British private company, has proposed that renewable energy centres be established in various regions of the Commonwealth and several donor institutions have indicated their interest.

Hazardous Waste Management

Health and environmental concerns associated with hazardous wastes are of increasing concern to all countries. A project has been initiated with the Royal Society of Chemistry of Britain to enhance the scientific capability of developing countries in the management and disposal of toxic waste and the programme is being jointly executed with the UN Environment Programme.

Mathematical Modelling

Mathematical models, coupled with computer simulation, are widely used in science and engineering to study complex problems. Their low cost and flexibility offers advantages to developing countries. With funding from the Australian Government's Climate Assessment and Management Programme for Commonwealth countries, the CSC sponsored a workshop on climate data development for the Asia-Pacific region in October 1993. It is also helping to promote the establishment of regional engineering design centres in local universities as the most effective way of exploiting industrial mathematical modelling. Planning for these centres is very advanced in Sri Lanka and in Trinidad and Tobago. Twenty participants from the Caribbean were also trained in CAD/CAM techniques at a workshop held in Trinidad in June 1994.

Remote Sensing

Remote sensing and Geographical Information Systems (GIS) offer great promise for natural resource management by providing an opportunity to relate field data to satellite-derived images. In 1993, the CSC sponsored 12 participants from Africa and South Asia at a workshop on applications of remote sensing in Madras, India, and in 1994, the use of remote sensing for natural resource management helped 22 scientists from Eastern and Southern Africa at a workshop at the University of Nairobi in Kenya. Work has begun with the Canadian Centre for Remote Sensing and the Institute of Marine Affairs in Trinidad and Tobago to develop a curriculum for potential areas of Geomatics Technology. This curriculum will be used to train technicians from small island developing states on the use of this technology in integrated coastal zone management.

Industrial Support

Accurate monitoring of chemical changes in the environment is of fundamental importance when investigating the consequences of chemical pollution. Through the provision of seed-funding and assistance with co-ordination, the CSC is an active participant in Chemical Research and Environmental Needs, an Asia-Pacific project. Since mid-1993, workshops have been held on methane emission (India, September 1993), environmental analytical techniques (Malaysia, November 1993), acid rain (Malaysia, May 1994) and pesticide residues (India, October 1994). The project aims to increase the local capability to monitor and measure important environmental parameters.

Smart Partnerships

After six years serving as a co-operative network advising member countries on integrating technology management into their socio-economic and environmental planning processes, the Commonwealth Consultative Group on Technology Management (CCGTM) has been transformed from a unit within the Secretariat into a private company limited by guarantee.

The Commonwealth Partnership for Technology Management Ltd (CPTM) went into operation with support from the Secretariat, member governments and private sector companies from a number of Commonwealth countries. It will continue the operations of the CCGTM and promote a co-operative global approach to the harnessing of technology management for development through formal and informal partnerships between the public and private sectors–'Smart' Partnerships as they are called.

The change in status was largely prompted by the need to accommodate private sector needs and the growing inability of the CCGTM, which had a relatively small amount of core funding, to respond in terms of financial support to pump-prime and facilitate the growing number of targeted activities–about 70 requests for assistance are received each year and advisory services can be carried out on only about 30. Designing a new financial and organic structure for the CCGTM seemed the answer.

Following a decision at the Cyprus CHOGM, a working group, comprising representatives from governments, the private sector, the Secretariat and CCGTM networking members, recommended the establishment of a company limited by guarantee (that is, without shareholders) to replace the CCGTM and the CCGTM/Private Sector Partnership (CCGTM/PSP) which had been launched in early 1993.

In two years, the CCGTM/PSP has attracted much interest and involvement from banking, composites manufacturing, construction, electronics, petroleum, solar energy, telecommunications and textile companies in Barbados, Botswana, Britain, Hong Kong, Malaysia, Malta, South Africa, Sri Lanka and Zimbabwe.

The CPTM will effectively bind Commonwealth governments and private sector companies in operations of mutual benefit. As a largely decentralised, mission-oriented and customer-driven body with a self-organising network undertaking hands-on management by its participants, it will be able to respond quickly to requests from Commonwealth member countries. As with the CCGTM, it will work through co-operative action with local teams to enhance local technology management capacity, forming national consultative groups, national industry-government partnerships and nodes of excellence, as appropriate.

The CPTM will continue the operations of the CCGTM/PSP, which include CCGTM's first commercial contract, the development of an integrated strategic study (Vision 2020) in Mauritius, quality management projects in the Caribbean and assistance in resolving the implications of privatisation reforms for science and technology infrastructure. In July 1995, an annual international dialogue was launched at Langkawi, Malaysia, where representatives from governments and the private sector were brought together to share their experiences in technology management, with particular reference to best practices of 'Smart' Partnerships.

A mission, comprising public and private sector members, also visited South Africa in February 1995 to explore the benefits that the partnership's activities could bring to that country and a small team was invited by the Malawi Government and private sector to help set up a long-term strategy and to provide advice on how to improve inward investment.

A full list of CCGTM activities for 1993-1995 is at Appendix II.