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# Development Through Science

Skilled management of science and technology is essential for development. In order to help member countries increase their capability and expertise in these areas, the Secretariat, through the work of the Commonwealth Science Council (CSC), emphasises four main areas for action: management of biological diversity and genetic resources, water and mineral resources, energy, and capability-building. This last area was added at the 19th biennial meeting of the CSC in Malawi in May 1997.

At this meeting, the CSC adopted a new three-year work programme whose objectives include the application of science and technology towards poverty alleviation, effective networking of science and technology institutions, and increased participation on an equitable basis of women in science and technology. The CSC also hopes to further develop a culture of science and technology in member countries and address issues of special interest to small states.

## Biodiversity and Genetic Resources

Conserving and managing biological resources is as important for the economies of many Commonwealth countries as it is for the environment. The CSC concentrates on providing practical assistance for managing biological diversity, conserving natural environments and research on the utilisation of biological resources, especially for their economic value. It produces guidelines, provides training and assists countries in the implementation of international scientific agreements, such as the Convention on Biological Diversity.

Various fungi have been recognised as having medicinal properties, among other things, and are thus of potential economic gain. The CSC has helped set up a network for African mycologists to promote research in Sub-Saharan ecosystems and focus on the application of fungal diversity in rural and industrial development. At the end of 1995, mycologists

*Work continues to improve food security and generate income by promoting cassava both as a food and a cash crop*

and other scientists met at a workshop in Dar es Salaam, Tanzania, to discuss the status of mycology in their countries and to identify future needs in training and regional collaboration. Among other things, the workshop established a mycology network and initiated a *Sub-Sahara Mycology Network Newsletter*.

Activities have focused on two areas within genetic resources: underutilised crops which can be developed for food and other uses, and integrated pest management.

*The CSC encourages more women to participate in science and technology*

In August 1995, a workshop, run in conjunction with the International Centre for Underutilised Crops (ICUC) and the UN Food and Agriculture Organisation, in Nelspruit, South Africa, resulted in the establishment of the Southern and Eastern African Network for Underutilised Crops (SEANUC). At a subsequent meeting in Pretoria, South Africa, member countries identified bambara groundnut (*Vigna subterranean*) and a root called Plectranthus, or 'Livingstone potato' (*Plectranthus esculentus*), as priority species. For investigation, SEANUC has also agreed to focus on the sustainable production and processing of underutilised fruits.

In Asia, the Underutilised Tropical Fruits for Asia Network (UTFANET) was set up in 1995 with CSC and ICUC assistance. Jackfruit (*Artocarpus heterophyllus*), pummelo (*Pummelo citrus grandis*) and mangosteen (*Garcina mangostena*) have been identified as priority species for attention. The CSC is now working with ICUC to develop networks in other regions and, together with FAO, to form a global network for underutilised species.

Work continued in Zimbabwe to improve food security and generate income for rural communities by promoting cassava for food and as a cash crop for industry.

Biological control, or biocontrol, using natural enemies, is an environmentally friendly and relatively inexpensive method of controlling pests. The CSC has biocontrol projects in Africa on waterweeds and in the Caribbean on plant pests. Two types of beetles (*Neochetina eichornia* and *Neochetina brunii*) are being used to destroy water hyacinth in the waterways and lakes of Africa, notably Lake Kyoga in Uganda and now the Kafue River in Zambia.

*Solar energy is used for the drying of tropical fruits as in this project in Guyana*

In the Caribbean, the CSC is using the expertise of a CFTC consultant to control agricultural pests, notably the pink mealybug, which has caused serious damage to agricultural crops and ornamental plants. The project aims to give farmers the techniques for identifying the mealybug, and breeding and distributing two control agents. An information centre on pest management for the region is also being set up.

Following a CSC workshop in Malta in 1995, a group of experts devised a methodology for identifying and monitoring biodiversity which has been published as a booklet, *Biodiversity in Small Island States*. A multimedia training programme in biodiversity management has been developed and the results of a global survey of training materials have been published as a *Multimedia Directory on Biodiversity*.

**REMOTE SENSING**

Remote sensing is a technique by which data collected from aeroplanes or satellites is used to monitor changes in land or sea features. It is invaluable for natural resource management. A variety of remote sensing data is available at reasonable cost but to gain maximum benefit from the data collected it is necessary to expand the knowledge of its application.

Towards this aim, four workshops were held: on remote sensing and geographical information systems (GIS) for the Caribbean region (in Trinidad and Tobago, November 1995); on the use of satellite and synthetic aperture radar data for sustainable management of forestry, agriculture and marine resources, organised with Radarsat International of Canada (Malaysia, May 1996); on practical remote sensing using satellite and aerial data (South Africa, October 1996); and on remote sensing for coastal and forestry resource management (Sri Lanka, June 1997).

## Water and Mineral Resources

Development of water and mineral resources is another major Commonwealth concern. A number of CSC projects address aspects of geoscience, groundwater and oceanographic studies, and water information networks. All involve collaboration with other agencies to provide relevant scientific and technological information.

Potable water is becoming increasingly scarce and the CSC therefore supports projects on groundwater management through three focus areas of activity: small island states, arid and semi-arid areas, and water in urbanised areas.

A Small Island Water Information Network (SI-WIN) was set up in 1996 to work towards reducing the isolation of water professionals on small islands and provide them with up-to-date information. It is intended in time to develop this project into a Commonwealth Water Information Sharing Network. The SI-WIN is funded by Britain's Department for International Development and the British Geological Survey.

In the area of management of marine resources, a new collaborative project with African countries on the Indian Ocean seaboard, the Commonwealth Ocean Resources Programme for the Western Indian

Ocean, was launched in February 1996 to investigate the research needs and resources of the countries on the eastern seaboard of Africa. It is expected to lead to a network of institutions for the management of ocean resources in the western Indian Ocean. An initial study has been carried out for a similar scheme in the Caribbean.

## Energy

Better quality of life, especially in rural areas, is linked to access to high-quality energy. CSC activities therefore focus on renewable energy projects using technologies which are sustainable and can be maintained by the local population. Projects also aim to develop appropriate standards for equipment, installation and maintenance. The CSC's activities in this area include the solar drying of tropical fruits and other produce, as well as small-scale photovoltaic projects such as solar lighting.

*In Tanzania, training is provided for those wishing to start businesses in solar systems*

In July 1995, funding was obtained from the Ashden Trust, a British charity, to support work in Tanzania involving the rehabilitation of solar equipment, such as lighting units, radios and communications equipment, in a Masai training centre, and also for a project in Kenya involving credit mechanisms whereby people could gradually buy parts of electrical systems for their houses and start up a business in solar systems. The CSC also organised training courses in the installation and maintenance of solar systems together with the Solar Training Centre run by the Karagwe Development Agency, a Tanzanian NGO.

A project to demonstrate and evaluate affordable solar-powered systems for pastoralists in the Olkonerei area of Tanzania identified three commercially available portable lanterns, which were later distributed in the pastoralist community. The potential of solar dryers was examined at a CSC workshop in Guyana in May 1996, leading to the establishment of an export industry in dried exotic fruits. Training is also being provided in the processing, drying and marketing of these fruit.

Renewable energy sources are important for enhancing domestic energy options and contributing to the reduction of greenhouse gas emissions. The Secretariat co-organised with the UN Institute for Training and Research, the UNDP, Kestrel Solar Technology and

Malawi's Ministry of Energy and Mining a workshop in Malawi in late 1996 on establishing renewable energy training centres. It was agreed that such a centre was needed in the region, and a network of scientists and scientific institutions was established for the SADC.

### Industrial Support

Working with nine countries in the Asia-Pacific region, the CSC runs a project on Chemical Research and Environmental Needs – together with other agencies – to promote environmentally friendly industrial practices. Issues addressed have been pollution, especially gaseous emission and atmospheric acidification, and cleaner production. A seminar on monitoring pesticide residues in exportable commodities was held in Sri Lanka in April 1996 and training on air quality modelling and atmospheric acidification given at Dhanbad, India.

The CSC has promoted the use of mathematical models for industrial and technological development and for understanding and protecting natural resources. Following on from this work, a new programme on Productivity Enhancement through Engineering Analysis and Design is being developed. A planning meeting was held in December 1996.

### Hazardous Waste Management

The CSC and the Royal Society of Chemistry (Britain) have initiated a joint project to enhance the scientific capabilities of developing countries in the management and disposal of toxic waste. A network of regional centres has been established with bases in a number of countries, including Australia, Canada, India, Kenya and Malawi.