

Chapter 5

Implementation and Action Plan

(a) Implementation

We have been advised on the various ways in which these programmes and projects could be implemented, whether through regional programmes, projects, special networks, special coordinators or steering committees. We have both noted the variety of research, training and activities to disseminate information that these projects involve and also the steps in implementation of special programmes (See Volume on 'Background Papers' CSC(84)EG-2). Though it will be necessary to ensure the involvement of good, committed scientists from the various research and development sectors, if the Council's purpose in this expanded programme of science for technology for development is to be achieved, we do not see any necessity for drastic changes in the *implementation* of future programmes.

(b) Action Plan

Costing

The recommendation for programme activities in the various subject areas have been classified into high, medium or low priority. Programmes of low priority have not been costed, nor have those of medium priority for, though we did consider them to be worthy, we did not feel costing at this stage was justified. So, only recommendations of high priority have been costed. Moreover, since it is rarely possible to predict with any degree of accuracy what technical developments are likely to follow from research findings, it is impossible to make precise costings of all these scientific activities. This uncertainty is increased in those scientific activities which have a multilateral base, where the

vagaries of fluctuating exchange rates or the unknown, unpredictable responses of government authorities make themselves felt. Yet a third factor influenced our inability to make precise costings at this stage: there are wide divergences of opinion about what facilities or manpower will be needed in order to reach an objective.

The 'standard' network that we have used as our basis for programme costing assumes adequate but not luxurious funding. There are 9 categories of activity, or staff, within each network and these are defined and costed immediately following this section. The lifespan of each network is assumed to run for five years and in ten countries and little or no equipment will be required. Where any project is specific to a region three networks on the same topic have been assumed. Where a project, for example, information dissemination, calls for activities somewhat less than those demanded by a full network, the costs are based on the costs of those activities within a network.

	<i>Cost (£)</i>	<i>Secretariat Manpower (Man Months)</i>
(a) Initial Survey (Consultant)	10,000	1
(b) Meeting of Scientists/Workshop/Planning Meeting	20,000	2
(c) Information Dissemination (at £2,000 pa)	10,000	5
(d) Fellowships (2 per country)	100,000	2
(e) Consultancies (2 @ £5,000)	10,000	2
(f) Mid-term Meeting	20,000	2
(g) Final Meeting	20,000	2
(h) Publication of Handbooks/ Reports/Results	10,000	3
Sub-total	200,000	19
(i) Secretariat Staff: time for reference work	68,000	
Total	£268,000	24
say	£250,000	24

Note: The Secretariat cost to maintain one project officer is £2,830 per month. All costs are at 1984 prices.

For example: A network of information only might consist of items (a), (b), (c), and (h) of the above list, giving a cost of £50,000.

Using the standard cost estimates given above and calculated on 1984 prices, all the high priority actions recommended have been costed. But taking into account the global economic situation presently prevailing, the high priority recommendations have been categorised even further. In Table 4 (Page 65) each scientific programme area has been costed into three separate categories:

- (A1) Activities such as training activities and meetings which could be easily initiated but which would not sustain a research programme;
- (A2) Activities which would contribute to a minimal programme (for example, research and training), but which, without critical supplementary funds, could not achieve the Council's overall objective of enhancing indigenous capability for development; and
- (A3) Activities which would contribute to a desirable programme of research and training and which would both achieve the Council's overall purpose and also attract significant external funds for further work.

The total cost of the expanded programme of scientific cooperation is:

- £4,230,000 over five years (£846,000 per annum) for an initial programme level;
- £8,490,000 over five years (£1,698,000 per annum) for a minimum programme level; and
- £13,740,000 over five years (£2,748,000 per annum) for a desirable programme level.

These costs include overhead administrative costs which are in the council's Regular Budget. However, they do not include external and national funds allocated to projects and programmes which are not managed by the Council, although we assume that they would inevitably attract these.

These estimates for implementing the expanded programme of scientific contribution are composed of the following components (Table 5, Page 76):

- (i) a CFTC contribution of £1,115,000 over five years (£223,000 per year), which is not expected to increase significantly;
- (ii) external funds of £195,000 over 5 years (£39,000 per year) in the present economic climate, is difficult to assure and is therefore kept static;

- (iii) the Council's Regular Budget of £1,745,000 over five years (£349,000 per year). This represents a 10.8% increase over the 1983/84 Budget, sufficient, that is, to accommodate an increase of one project staff member over the present six, to cover the diversity of subject areas considered in the expanded programme;
- (iv) the Council's Project Budget of:
- £1,175,000 over 5 years (£235,000 per annum) for an initial programme level;
 - £5,435,000 over 5 years (£1,087,000 per annum) for a minimum programme level;
 - £10,685,000 over 5 years (£2,137,000 per annum) for a desirable programme level.

(c) Programme Finance

(i) Existing

The Regular Budget of the Council is made up of contributions from the 31 member nations on an agreed scale. Five countries, Australia, Britain, Canada, India and New Zealand contribute 82.4% of the budget, while the other 26 countries contribute the remaining 17.6%. Over the last 5 years this budget has been a modest one (£193,000–£315,000) with very little increase from year to year, and specifically designed to meet the administrative costs of the Council's Secretariat in London. Extra funds for programmes are provided by the Commonwealth Fund for Technical Cooperation (CFTC) and other agencies. In addition, it has been possible to allocate a small proportion (5.1%, £16,000) to commission studies on a project basis only. But normally programme finance is not included in the Council's regular budget. So far as funding of the recommended project areas is concerned, the administrative costs associated with programme development and management, with project coordination and those activities of network development such as pre-project commissioned studies, network meetings, programme advisory meetings, and regional meetings of Council members, could be reflected and borne by the Council's regular budget.

The Project Fund consists of unexpended balances from the Council's small Regular Budget, which are held in a separate account established under the provisions for programme finance. It is an unpredictable quantum, and its growth up to 1981–82 has been somewhat erratic because of some unpaid contributions from member nations. In June 1982, the Fund amounted to a total of £157,258 with an outstanding contribution of £80,645. Thus the net sum available was £76,613. Even this sum cannot be utilised fully because of the need for a threshold

cash flow position. Although the Council has no funds for programme activities, this Project Fund has contributed modestly to programme development, fellowships, equipment purchase, and to complement regular and other forms of programme finance.

The Commonwealth Fund for Technical Cooperation (CFTC) has been the regular and major source of programme funds (60%), and its allocations to the Council's programme activities have been increasing annually, comparable to other functional Division of the Commonwealth Secretariat. These funds are restricted to multilateral training needs (e.g. courses, seminars and workshops) of member nations. They were once available for programme development and project management meetings but this is no longer the case. They are not available for research cooperation unless this has a training element (e.g. internship, supervision), nor for the purchase of scientific equipment. It would be reasonable to expect a slight increase in CFTC's contributions to the training components of Council's programmes, with the accommodation of those training elements involved in research cooperation.

(ii) *Future*

Provisions exist in the Memorandum of Understanding on the Council for a Project Budget, based on voluntary and external donations and miscellaneous income. However, we were surprised to learn that the Council has no funds for its programmes, nor provision for contributions by member nations towards programme finance. This is unusual for an intergovernmental organization involved in programmes, and generates undue stresses and frustrations when undertaking programme development and collaborative activities. The Council should therefore regularise its Project Budget for financing programme activities, such that this budget is of suitable and effective size; say,

- £5.5 million over 5 years (£1.1 million per annum) for a minimum programme level, and
- £10.7 million over 5 years (£2.2 million per annum) for a desirable programme level (Table 5).

Contributions towards the Council's Project Budget for financing programmes should be on a voluntary, pledged basis. In view of the prevailing economic conditions, the Council should aim for a Project Budget initially of £5.5 million over 5 years (£1.1 million per annum) to develop a minimum level of programme activities. When global economic conditions improve, the Council should aim for a Project Budget initially of £10.7 million over 5 years (£2.2 million per annum) to develop a desirable level of programme activities.

These sums are not substantial in view of the fact that mechanisms are already in place for scientific cooperation. They would ensure the involvement of the Council in areas of science of developmental significance, including new emerging areas, and raise the level of Commonwealth cooperation. A core programme finance on a continuing basis, commensurate with the scope of the Council's programme activities, would ensure both a more secure basis for programme and project planning and development, and the attraction of external and national funds, either on a regular or special project basis.

(iii) *External Sources*

Two major external sources, the Overseas Development Administration (ODA) of Britain and United Nations Environment Programme (UNEP), have provided funds to specific projects during 1979-84. Some minor grants have also been received from the Commonwealth Foundation, United Nations Centre for Human Settlements (UNCHS), and United Nations Educational Scientific and Cultural Organisation (UNESCO), but these amount to less than 40% of total funds for the Council's programmes, and are unlikely to increase on a regular basis. In addition, member nations have contributed to programmes in the form of local costs for meetings, workshops, training courses and research. However, since the extent of support varies for each nation it cannot be fully quantified. In any case, whatever increase in funds may be made available by the CSC, as a result of this Group's recommendations, these programmes will still depend on other sources of external support and funding.

In the past the Council's most successful projects were those with adequate external funds for research, training and information dissemination. Examples are the Water Hyacinth Project supported with UNEP funds, the Asia/Pacific Metrology Programme with ADAB funds, the Rural Energy Survey with CFTC funds, the African Energy Projects with ODA funds, and the various training and information dissemination activities with CFTC funds. International funds for scientific research, in the less advanced nations especially, are generally scarce. Universities and scientific institutions in these nations are usually entirely dependent on government grants which barely cover their administrative and management costs and leave little or no funds for research activities. In some cases, a national science infrastructure exists, so that research grants occasionally become available through National Science Councils, University Grants Committee and similar bodies. Again, these funds originate from the national treasury and are inadequate for sustained research in science. Furthermore, other factors affecting the situation: industrial or private foundations are not well established in these nations; the chronic shortage of foreign currency

experienced by many of these nations hinders overseas training, information acquisition, and procurement of equipment and consumable materials. Research in developing countries is therefore unable to generate the necessary momentum for enhancing indigenous scientific and technological capabilities, to the extent that technological dependence can be reduced. Funds are therefore necessary for catalysing scientific research, training and information dissemination in these nations.

International funds abound for large scale research and implementation programmes and projects (Table 6; Page 72). While effective in developing an administrative infrastructure, especially in governmental systems, they are less effective in generating relevant research especially around good individual scientists. The Council has not sought these funds in the past, and, since these funds are usually given to governments, would be unable to do so in the future.

By contrast a variety of funds also exist for small-scale research projects. These are effective enough in stimulating research but often ineffective in developing infrastructure. The Council has had some experience in obtaining these grants and should continue to do so.

Only a few international agencies finance individual research efforts. While effective in reaching good individual scientists and generating interesting research, these have not been effective in developing infrastructure, and the Council has not utilised this avenue of research financing. It would appear necessary therefore for the Council to diversify its sources of external funds for research to keep good individual scientists in place.

A variety of intergovernmental, national and multilateral, non-governmental and private organisations provide funds for scientific and technological research, training and information dissemination (Table 7; Page 74). Intergovernmental organisations that finance science and technology activities insist that requests for funds are sent through appropriate government channels. This makes them virtually unavailable for the Council's scientific and technological programmes. Nevertheless, the Council needs to develop a closer liaison with national central agencies which are the contact points with these funds. The Council should continue seeking direct funds on behalf of participating member nations for specific projects with organisations like UNEP and UNDP.

Several national and multilateral organisations (Table 8; Page 74) such as Australian Development Assistance Bureau (ADAB), UK's Overseas Development Administration (ODA) and the International Development

Research Centre (IDRC) of Canada, have supported the Council's activities. Once again, these agencies require requests to be submitted by member nations for bilateral or multilateral financing. The Council should continue to seek funds from these organisations, since their potential in the Council's expanded programme of scientific cooperation is promising.

Among non-governmental organisations (Table 9; Page 75), only the Commonwealth Foundation has hitherto supported the Council's training activities through fellowships, participation in meetings and financial resource for personal professional development. These organisations should be further explored as a source for fellowship, exchange visits and research. Hitherto, no serious attempts have been made to seek funds from private organisations (Table 10; Page 81). Although these organisations may prefer not to extend support to an intergovernmental body like the Council, they may consider as appropriate specific project requests that fit their objectives, from scientists participating in the Council's programmes. The Council needs to spend much effort in matching these organisations with suitable scientists. The Council should explore a variety of approaches for seeking funds from external agencies for research, training and information dissemination. In particular, it should develop a special relationship with the various financing institutions within the Commonwealth family, like the Commonwealth Fund for Technical Cooperation (CFTC), the Commonwealth Foundation, the aid agencies in Commonwealth countries such as the Canadian International Development Agency (CIDA), the Overseas Development Administration (ODA), UK, and with non-governmental and private organisations in Commonwealth countries, such as the International Development Research Centre (IDRC) and the Royal Society.

(d) Secretariat Organisation

An expanded programme of scientific cooperation in the Commonwealth implies a shift in the functions of the Council's Secretariat. From being predominantly a source of liaison and support it will become a source of advice, on the promotion of research and development, and on diversification of science and technology. Council must therefore give special attention not only to the staffing and organisation of the Secretariat but particularly the level of specialised professional staff with expertise that can meet the new challenge of its expanded programme of scientific cooperation. The staff strength of the Council's Secretariat is presently very modest. We are convinced that the staffing of the Secretariat must be expanded, if only to some small extent, because of the scope of the expanded programme and the substantial work required.

Because of the current economic climate, at this stage we recommend only that the Council budget for one more project officer to help initiate this expanded programme, over and above the six project officers presently supported. In view of the balance of this expanded programme, and the scientific specialisations of existing professional staff in the Secretariat, this professional staff member should be a biologist. The Council and its Secretary should deploy the existing professional staff to initiate this expanded programme, and when economic conditions permit, should aim for a further growth in the Secretariat, corresponding to the size and nature of the expanded programme.

Table 4: Summary of High Priority and Action Plan for an Expanded Programme of Scientific Cooperation in the Commonwealth

(All values for programme costs at 1984 prices: £)

STRATEGIC FOCUS: AN INTERDISCIPLINARY APPROACH TO THE USE OF
SCIENCE FOR TECHNOLOGY FOR DEVELOPMENT INVOLVING NATURAL
RESOURCES, TECHNOLOGICAL AIDS & SCIENCE MANAGEMENT
(e.g. INTEGRATED RESOURCES MANAGEMENT)

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
Scientific Advisory Committee			
1. Establish a Scientific Advisory Committee to review advances and programmes, and advise on emerging areas	100,000	100,000	100,000
Five-year sub-totals: (Sum per annum)	100,000 (20,000)	100,000 (20,000)	100,000 (20,000)

Natural Resources:

(a) *Energy Resources*

2. Develop anaerobic microbiology for enhancing biogas systems with indigenous feedstock; research training and information dissemination
3. Assess and use energy resources in wind and solar regimes; survey and training
4. Develop a modest, low-cost, 5 MW solar thermal electric conversion (STEC) modular unit; research, training and information dissemination
5. Strengthen the energy information network in the Asia-Pacific region

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
Natural Resources—continued			
(a) <i>Energy Resources—continued</i>			
6. Establish energy information networks in the Caribbean and African regions			
7. Establish task force of experts to determine relative priorities	500,000	1,000,000	2,250,000
Five-year sub-totals: (Sum per annum)	500,000 (100,000)	1,000,000 (200,000)	2,250,000 (450,000)
(b) <i>Mineral and Water Resources</i>			
8. Control pollution of ground-water by faecal wastes and agrochemicals; research, training, information dissemination			
9. Develop remedial measures for using polluted groundwater; research, training, information dissemination			
10. Develop conjunctive use of ground and surface waters especially in the coastal zone; research, training, information dissemination	400,000	900,000	1,500,000
11. Develop methods for optimising rural water supply and small-scale irrigation; research, training, information dissemination			
12. Develop desalination of brackish and saline waters; research, training, information dissemination			
13. Develop methods for the use of limited water resources; research, training, information dissemination			
14. Control and use freshwater-seawater relationships in small islands; research, training, information dissemination			
15. Develop regional geochemistry; research, training, information dissemination			
16. Develop the application of geophysical techniques especially deep crustal seismic reflection profiling; research, training, information dissemination			
17. Train technicians in geochemical and geophysical techniques especially in small states; training, information dissemination			

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
Natural Resources—continued			
<i>(b) Mineral and Water Resources—continued</i>			
18. Continue the production and distribution of the <i>Earth Sciences Newsletter</i> ; information dissemination	25,000	25,000	25,000
19. Economic minerals: phosphate rock (Agricultural Research)	60,000	97,000	60,000
Five-year sub-totals (Sum per annum)	485,000 (97,000)	985,000 (197,000)	1,585,000 (317,000)
<i>(c) Materials Technology</i>			
20. Disseminate information on engineering materials in the short-term especially to less advanced nations; information dissemination			
21. Promote downstream uses of construction materials including timber, fibre, paper and ceramics in the short-term; research, training, information dissemination	250,000	500,000	750,000
Five-year sub-totals (Sum per annum)	250,000 (50,000)	500,000 (100,000)	750,000 (150,000)
<i>(d) Biological Diversity and Genetic Resources</i>			
22. Survey and authenticate biological diversity of perennial plants, especially in the tropics, and of potential value for the production of food, fibre, oils and pharmaceuticals; surveys, training, information dissemination			
23. Study of animal species; surveys, training, information dissemination	500,000	1,000,000	1,850,000
24. Promote involvement of agricultural scientists to enhance food production and primary industry; training, information dissemination			
25. Train taxonomists especially on tropical food, economic and medicinal plants; training, information dissemination			

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
Natural Resources—continued			
(d) <i>Biological Diversity and Genetic Resources—continued</i>			
26. Promote development of inexpensive techniques for upgrading agricultural and industrial plants, such as conventional plant breeding, and micropropagation and meristem cultivation techniques			
Five-year sub-total (Sum per annum)	500,000 (100,000)	100,000 (20,000)	1,850,000 (350,000)
(e) <i>Agricultural Resources</i>			
27. Survey local sources of phosphate rocks in the tropics, and develop simple methods for their processing and use as fertilisers; survey, research, training, information dissemination	60,000	60,000	60,000
28. Selection of nitrogen-fixing organisms, their use particularly in seed inoculation, and the development of cheaper processes for nitrogen fixation including direct oxidation processes, especially in the tropics; research training, information dissemination	501,000	500,000	750,000
29. Development of the relationships of water resources, soil water and agro-meteorology to plant growth and reproduction especially in the tropics, research, training, information dissemination	250,000	500,000	990,000
30. Improvement of plant genotype through micropropagation, plant breeding and selection techniques for adaption to various physical and socio-cultural conditions, especially in the tropics; research, training, information dissemination			
31. Disseminate information on ova-transplantation techniques for improving animals husbanded especially in the tropics, information dissemination	50,000	100,000	150,000
32. Develop post-harvest treatment of agricultural commodities especially in relation to climatic conditions, and to the processing and storage of roots, tubers and fruits in the tropics; research, training, information dissemination	50,000	500,000	750,000

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
Natural Resources—continued			
<i>(e) Agricultural Resources—continued</i>			
33. Upgrade animal feeds in their protein content by microbiological treatment; research, training, information dissemination	250,000	500,000	750,000
Five-year sub-totals (Sum per annum)	650,000 (130,000)	2,100,000 (420,000)	3,390,000 (678,000)
<i>(f) Tropical Forest Ecology</i>			
34. Commission study on tropical forest degradation	50,000	50,000	50,000
35. Include concerns in tropical forest ecology and other programmes			
Five-year sub-totals (Sum per annum)	50,000 (10,000)	50,000 (10,000)	50,000 (10,000)
<i>(g) Environmental Planning</i>			
36. Develop adaptive environmental assessment and management, environmental impact assessment, and national conservation strategies; research, training, information dissemination	200,000	300,000	500,000
Five-year sub-totals (Sum per annum)	200,000 (40,000)	300,000 (60,000)	500,000 (100,000)
<i>(h) Coastal Zone Management</i>			
37. Develop oceanography, especially biological oceanography, because of its relevance to fisheries	100,000	200,000	300,000
38. Develop indigenous capability on the dynamics and management of the coastal zone on a pilot-project basis, and on two island systems or states, one in the South Pacific and the other in the Caribbean regions; research, training information dissemination	200,000	400,000	500,000
39. Disseminate information on coastal pollution in consultation with international organisations such as UNEP, IOC and IMCO; information dissemination			

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
Natural Resources—continued			
(h) <i>Coastal Zone Management—continued</i>			
40. Offer advice to member nations on EEZ maritime issues in conjunction with international organisations such as ICOD; Advisory Committee, information dissemination.			
Five-year sub-totals (Sum per annum)	300,000 (60,000)	600,000 (100,000)	800,000 (160,000)
New Technological Aids			
(a) <i>Remote Sensing</i>			
41. Establish a Task Force to review present and future Commonwealth activities with the view to:	60,000	60,000	60,000
(a) available techniques, capabilities and infrastructure for obtaining and analysing remotely-sensed data;			
(b) formulating a plan of action for an integrated Commonwealth approach beneficial to all nations particularly the small states, for remote sensing and data transmission and analysis, using both aircraft and satellite carriers; and			
(c) examining within the plan of action existing arrangements and new mechanisms for the training of technicians and scientists in remote sensing, especially on a regional basis.			
42. Commission a study in the short-term on the use of available remote sensing data, potentially based on the expert papers submitted, for sensitising politicians and scientists on its potentials and advantages; study, information dissemination			
43. Establish in the short- and long-term regional networks for information dissemination on new developments in remote sensing analysis and applications; information dissemination	250,000	500,000	1,000,000

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
New Technological Aids—continued			
<i>(a) Remote Sensing—continued</i>			
44. Promote development of aircraft-borne remote sensing capability, with palletised equipment, for development and use by Commonwealth nations; research, training, information dissemination			
Five-year sub-totals (Sum per annum)	310,000 (62,000)	560,000 (112,000)	1,060,000 (212,000)
<i>(b) Biotechnology (including Genetic Engineering)</i>			
45. Establish a Biotechnology Advisory Committee comprising expert practising scientists:	50,000	100,000	100,000
(a) to review annually advances made in potential substrates for microbiological processes, food and animal feeds, soil microbes for plant nutrition and health, nitrogen fixation, microbial insecticides, fuel and energy, waste treatment and utilisation, cellulose conversion, antibiotics and vaccines, and in pure culture production techniques; survey, information dissemination			
(b) to promote and establish contact between scientists in Commonwealth and non-Commonwealth organisations; information dissemination			
(c) to screen the application of all aspects of biotechnology in view of the exponential and unpredictable nature of new advances; survey, information dissemination			
(d) to advise Council on the need for training in specific techniques at appropriate regional institutions; training			
(e) to identify important areas for the promotion of collaborative research, as appropriate; research, training, information dissemination			

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
New Technological Aids—continued			
<i>(b) Biotechnology (including Genetic Engineering)—continued</i>			
46. Implementation of recommendations	250,000	500,000	500,000
Five-year sub-totals (Sum per annum)	300,000 (60,000)	600,000 (120,000)	600,000 (120,000)
<i>(c) Microelectronics</i>			
47. Establish a Computer Advisory Committee to advise member nations especially the small states, in the short-term, on specifications for a versatile, cheap, portable and standard computer; Advisory Committee, survey, information dissemination	50,000	100,000	100,000
48. Establish special training courses in software development where its application for local uses appears important			
49. Conduct periodic or occasional training courses of 1-2 weeks duration in computer-aided design, for scientists at the university and research levels; training, information dissemination			
Five-year sub-totals (Sum per annum)	50,000 (10,000)	100,000 (20,000)	100,000 (20,000)

Science Management and Organisation*(a) Information Technology and Dissemination*

50. Expand the Asia-Pacific energy and the Caribbean science and technology information networks to include other areas of science and technology
51. Establish information networks on a subregional basis in Africa and Asia, using specific areas of science, securing the patronage of advanced nation institutions, obtaining national commitment and mobilisation of specialist scientists and librarians as contact points, and emphasising initially on agriculture and energy

Table 4—continued

<i>Levels of Programme Development: Scientific Area/Goals and Objectives</i>	<i>Initial (Priority A1)</i>	<i>Minimal (Priority A2)</i>	<i>Desirable (Priority A3)</i>
Science Management and Organisation—continued			
(a) Information Technology and Dissemination—continued			
52. Develop an advisory capacity; access to data banks	10,000	20,000	30,000
Five-year sub-totals (Sum per annum)	10,000 (2,000)	20,000 (4,000)	30,000 (6,000)
(b) Popularisation of Science			
(c) Basic Science Education			
(d) Assessment of Research and Development			
53. Promote training in R & D assessment methods for managing science; survey, training, information dissemination	50,000	100,000	200,000
Five-year sub-totals (Sum per annum)	50,000 (10,000)	100,000 (20,000)	200,000 (40,000)
Total Programme Costs (5 year basis)	3,755,000	7,965,000	13,115,000
Overhead costs (5 year basis)	475,000	475,000	475,000
TOTAL (Sum per annum)	4,230,000 (846,000)	8,490,000 (1,698,000)	13,740,000 (2,748,000)

Table 5: Composition of the Costing of the Expanded Programme of Scientific Cooperation

(£ at 1984 prices)

<i>Financing Levels:</i>	<i>Initial</i>	<i>Minimal</i>	<i>Desirable</i>
Five year Total Costs:	4,230,000	8,490,000	13,740,000
(Cost per annum)	(846,000)	(1,698,000)	(2,748,000)
Components:			
1. Existing:			
(a) CFTC contribution:			
Five year totals:	1,115,000	1,115,000	1,115,000
(Allocation per annum)	(223,000)	(223,000)	(223,000)
(b) CSC Regular Budget:			
Five year totals	1,745,000	1,745,000	1,745,000
(Sum per annum)	(349,000)	(349,000)	(349,000)
2. Additional:			
(d) CSC Project Budget: (including modest contribution from external sources)			
Five year totals	1,370,000	5,650,000	10,880,000
(Sum per annum)	(274,000)	(1,126,000)	(2,175,000)

Table 6: International Funds Supporting Various Types of Scientific and Technological Activities

<i>Types of Activities</i>	<i>Requirements and Characteristics</i>	<i>Range of Funding (US\$ per year)</i>	<i>Funding Agencies Providing Support</i>
Individual Research Efforts	— Scientific capability and creativity — Interaction with peers — Access to literature and (possibly) travel — Access to scientific equipment and materials in a limited scale — One scientist with (possibly) technical assistants — Minimum of managerial skills — 1-4 years of support	Less than \$10,000	I F S
Research Projects	— Scientific and technical capability and creativity — Interaction with peers and with users of research results — Access to literature and travel — Access to specialised scientific equipment and materials in a continuous fashion — Multidisciplinary teams (e.g. 3-5 Researchers plus assistants) — Access to (possibly) pilot plants and small scale field trials — Intermediate level of managerial skills — 2-5 years of support	\$10,000-\$150,000	Private Foundations (Ford, Rockefeller, etc) — SAREC — BOSTID (AID/NAS) — UNESCO — UN Agencies — UNDP — NUFFIC — IDRC — CIDA

Table 6:—continued

<i>Types of Activities</i>	<i>Requirements and Characteristics</i>	<i>Range of Funding (US\$ per year)</i>	<i>Funding Agencies Providing Support</i>
Large-scale Research and Implementation Programmes and Projects (possibly including extension work, industrial implementation and training)	— Technical and scientific capability — Interaction with other research groups, farmers, industry, government agencies, international agencies etc — Access to specialised laboratories and materials exclusively for the programme or project — Large multidisciplinary teams (e.g. 5-20 researchers plus assistants) — Access to pilot plants and industrial facilities, large scale field trials — High level of managerial skills and control — 4 or more years of support	More than \$150,000 reaching in some cases several million dollars	— AID — ORSTOM — SIDA — GTZ — Other bilateral agencies (Dutch, British, Belgian, etc) — WHO (tropical diseases) — CGIAR — World Bank — IFAD — ADB — IDB

SOURCES: F. Sagasti, G. Oldham, P. Voraui and P. Thiongane 1984
 Evaluation of the International Foundation for Science (1974-1981)
 Final Report. IFS, Stockholm.

Table 7: Intergovernmental Sources of External Funds for Research

European Economic Community (EEC) Science and Technology for Development Programme 1983–1986

Islamic Foundation for Science Technology and Development (IFSTD)

Colombo Plan Bureau

United Nations Development Programme (UNDP)

UN Financing System for Science and Technology (UNFSST)

United Nations Educational, Scientific and Cultural Organisation (UNESCO)

United Nations University (UNU)

Commonwealth Fund for Technical Cooperation (CFTC)

North Atlantic Treaty Organisation (NATO)—Scientific Affairs Division

Table 8: National and Multilateral Sources of External Funds for Research

The Swedish Agency for Research Cooperation with Developing Countries (SAREC)

Overseas Development Administration (ODA)

Swedish Commission for Technical Cooperation (SCTC)

Swedish Fund for Industrial Cooperation with Developing Countries (Swedfund)

Austrian Foundation for Development Research

Netherlands Organisatie Voor Internationale Ontwikkelingss Arrenweking (NOVIB)

Australian Development Bureau (ADAB)

Canadian International Development Agency (CIDA)

International Development Research Centre (IDRC)

Swedish International Development Authority (SIDA)

Table 9: Non-governmental Sources of External Funds for Research

International Foundation for Science (IFS)

Royal Society of London

Commonwealth Foundation

International Council of Scientific Unions (ICSU) including its member Unions, its Committee on Science and Technology in Developing Countries (COSTED) and the International Biosciences Networks (IBN)

Table 10: Private Sources of External Funds for Research

Volkswagen Foundation

1% for Development

Leverhulme Trust

Battelle Memorial Institute

Ford Foundation

Rockefeller Foundation

Carnegie Corporation

Toyota Foundation

Alexander Von Humboldt-Stiftung