

Chapter 4

Science Management and Organisation

(a) Information Technology and Dissemination

Information technology fundamentally represents the integration of microelectronics and communications technologies for data acquisition, storage and dissemination. Systems already exist for the exchange of scientific and technological information, such as that for agriculture by CAB. The hardware for information technology systems is commercially available. There are two gaps in existing information systems that need to be filled : one is the dissemination of information of local interest to complement highly developed systems for information of international interest like CAB; the second relates to information transfer *between* the less advanced nations, rather than—as at present—between the more advanced and the less advanced nations. Interlinkages between international information systems and local or national information interest, and between the more advanced and the less advanced nations, have been successful when patronised by institutions from the more advanced nations such as the CSIRO, Australia, for CRRERIS on energy, and the IDRC, Canada, for ECLA on science and technology.

The Council should consider (i) expanding the Asia-Pacific energy and the Caribbean science and technology information networks to include other areas of science and technology, in the short-term; (ii) establishing information networks on a subregional basis in Africa and Asia, using specific areas of science; (iii) securing the patronage of advanced national institutions; (iv) obtaining national commitment and mobilisation of specialist scientists and librarians as contact points for interfacing between global and local systems; (v) emphasising initially on agriculture and energy. Such information networks on science and technology would complement those socio-economic networks already well developed for national and international financing systems.

The Council should further consider developing a capacity to provide an advisory service in science and technology to member nations, especially the smaller nations, similar to the Technical Advisory Group (TAG) of CFTC. There is a need to develop a clearly-perceived capability for giving unbiased advice in specific areas of science and technology, in the short-term. The pre-consultancy services of Secretariat staff should be used as well as the consultancy services of experts with regional expertise, who can be contacted through national and international organisations. To provide such a service the Council would need to have access to data banks.

We recommend that the Council allocates for access to data banks for information dissemination and advice:

- £10,000 over five years (£2,000 per annum) initially;
- £20,000 over five years (£4,000 per annum) for a minimal capacity;
- £30,000 over five years (£6,000 per annum) for a desirable capacity.

(b) Popularisation of Science

Science and Technology have pervasive effects on the lives of all, and the extent of their impact depends on individual scientific education and awareness. The diffusion of science in society is generally concomitant with the process of technological acculturation but this has been marred by three factors: the lack of awareness among scientists of the impact of science on society and of the scientific components of social problems; the lack of an enhanced public understanding in the application of science to decision-making; and by a socio-cultural deprivation whereby the need for an understanding of objective scientific analysis, evidence and scientific methodology, is not appreciated.

Popularisation of science facilitates the evolution of a knowledge-based society. Science may be popularised through various techniques, media and education systems. Society is being stratified, especially in the less advanced nations, on a scientific and technological basis. Thus popularisation of science is necessary not only to enhance national allocations for science, but also to harness the talent of young people excited and motivated by science.

The Council should urge member nations to popularise science for the administrators and the public; to produce appropriate local and regional materials for making science both entertaining and educational while relating it to pressing economic issues; to commit funds and mobilise

their infrastructure, especially the Information Ministries, on a continuing basis for producing materials and generating an appropriate climate. Efforts are needed in the less advanced nations to complement the high level of science popularisation in the more advanced nations.

(c) Basic Science Education

Basic education in science has been marred especially in the less advanced nations by traditional socio-cultural pressures, the nature of training science teachers, and by the poor availability of equipment for experimental science. As a consequence, most nations have not been able to utilise the results of educational research over the past two decades in science curriculum development, in revision and innovation, or in teaching methods at all school levels, in attitude development, or skills development, or cognitive development. Attempts in curriculum development, to treat science as an empirical experience in investigation and discovery, have been marred by a variety of factors.

The Council should urge member nations to stimulate basic science education in schools and universities through better teacher training, incentives, equipment and curriculum development, so that science may contribute more effectively to technological and economic prosperity, in the short-term. There is a need to consult the HRDG Education Programme of the Commonwealth Secretariat, UNESCO, ICSU-CTS and CASTME when undertaking future activities in this area. Basic science education is important for enhancing indigenous scientific and technological capability. A re-orientation of science education systems particularly in the less advanced nations demands reformation of curricula at all education levels.

(d) Assessment of Research and Development

Nations wishing to develop and extend their own scientific and technological capability clearly need to select the most relevant R & D areas for their socio-economic and environmental needs. Successful management of scientific research and technological development (R & D) is a pre-requisite for sustainable social, economic and environmental development. The integration of R & D assessment into the processes of decision-making and management is important if assessment is to be useful. In many less advanced nations there is a gap in the application of R & D assessment to management. Selectivity in R & D is becoming essential for all nations, whether large or small, more advanced or less advanced, because of limited human and financial resources, and of the unpredictable nature of scientific and technological advances and their impacts. R & D assessment varies according to the science and technology priorities of the member nations, the kinds of activity being evaluated along the innovation spectrum, the emphasis

being placed on the quality of research, the effectiveness of programme management and organisation, the potential impact of specific research results, and to future orientations and strategies. Assessment methods must therefore reconcile with differing needs and perspectives, and must be flexible, pragmatic and relevant to objectives.

The Council should consider promoting training in R & D assessment methods. There are four approaches to R & D evaluation:

- (i) evaluation of scientific and technological priorities at a high level of generality, and dependent on national mechanisms for coordinating research funding;
- (ii) ex-ante evaluation of specific programmes and projects to specify design of objectives or indicators for measuring the realisation of objectives;
- (iii) monitoring to provide information on projects within programmes; and
- (iv) ex-post evaluation.

External assessment of R & D personnel, institutions and programmes is invaluable at 4–5 yearly intervals, provided assessors are expert in the areas to be evaluated. Council could assist member nations in locating assessors, where necessary.