

These industries will require considerable increases in energy supplies, particularly in rural areas, and hence the development of new sources of energy and new means for energy conservation. The energy problem is also related to the need to increase and diversify agricultural production, to develop forest resources and to improve transportation.

Natural and social scientists must also work together to bring about the social and economic improvements in health that will help to slow down population growth and ultimately stabilise the size of populations.

Throughout the symposium, special emphasis was given to the role of women in the development process, in particular the need for greatly expanding women's opportunities for employ-

ment and education, and for relieving the unallayed drudgery that characterises traditional 'women's work' in rural societies. The unfavourable socio-economic environment for women would be improved if they could participate more fully in development—the less-developed countries cannot reap the full benefits of technology until this vital human resource has been mobilised. Conversely, the multiple impacts of technology on the welfare of women in changing societies must be evaluated.

Industrialists in both developed and less-developed countries will inevitably have a central role in the application of science and technology to development. To serve their own long-range interests, industries operating in each developing country should be en-

couraged to choose technologies and a scale of operations that are most appropriate for the local factors of production and lead to greater equity within the country, as well as improving the human and natural-resource base.

The participants were unanimous in agreeing that the Singapore symposium should not be an isolated event. A continuing steering committee was established which has begun to explore those problem areas that could be most effectively approached by cooperation among scientists and technologists from the rich and the poor countries. □

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UNCSTD: gloom over growing gulf between politicians and scientists

"THE gap between the 'experts' and the policy-makers, between those who study and work with science and technology, and those who make development decisions—that gap seems to be growing ever larger as UNCSTD draws near", laments the latest issue of the *Lund Letter*, a Swedish commentary on preparations for the conference.

And a recent Swedish Royal Academy of Sciences meeting has emphasised the point. Called to inform and stir up interest among scientists who may not have been involved in the official preparations for the conference, the day-long discussions left a pessimistic impression of what the official UNCSTD session can hope to achieve.

The non-governmental organisations, however, offer more hope. They came up with some good ideas at their meeting in Singapore in January (see above), and the academy meeting pointed to several areas where Swedish research could be useful to the Third World. The non-governmental organisations seem certain to make a hefty intellectual and psychological contribution.

One suggestion for a new form of cooperation came from Dr Stephan Schwartz, the head librarian at the Royal Institute of Technology, who wanted to improve the flow of scientific and technical information to developing countries. From his own survey of the age distribution of references in scientific journals, it is apparent that in a good journal (*Nature* was his example), half of the references are less than two years old. In a journal used in even a relatively advanced developing country like Portugal, half the references are seven to 10 years old.

This means that the Third World is not getting the most up-to-date information, and is therefore not able to tackle its problems in the most up-to-

date ways. This situation could be improved by establishing link-ups between libraries in developing countries and Western institutes which could do computer searches of the specialised literature needed to cope with the countries' particular problems. Photocopies of most important material could then be supplied to the developing countries.

Dr Schwartz pointed out, however, that the information such a system could supply would be useless unless it could be assimilated by the local science and technology system. He thus echoed one of the meeting's recurrent themes: that development of one sector in a country is only possible if it is backed up by development in all the other sectors. It is these gaps that are hardest to close, because they are the result of development and depend on all other gaps closing first.

The gaps in the politicians' outlooks are so wide as to make them incompatible. In agriculture alone, Asian and African demands are totally different from what the Europeans want to offer.

As Mr Thomas Rosswall from SCOPE (the Scientific Committee on the Problems of the Environment, set up by the International Council of Scientific Unions) pointed out, the European Community (EC) paper presented to UNCSTD's Third Preparatory Committee in January maintains that it is possible, with adequate water and fertiliser supplies, to triple and quadruple yields from traditional varieties of seeds. This is irrelevant to the Third World, where neither adequate water supplies nor fertilisers are available.

In talking about the advantages of fertilisers, the EC paper takes no heed of the fact that widespread use of fertilisers is only possible where their cost, relative to the costs of other agricultural inputs, is low, which is certainly not the case in developing

countries. Again, the EC paper, recounting the European experience, sees mechanisation as a good way of achieving economies of labour. But the Asian and African papers specifically say that they want labour-intensive agricultural systems.

On a more practical note, Dr Bo Hall, of the Department of Agriculture's Commission on Natural Resources, pointed to research on the production of pig iron on a small scale but at prices competitive with the iron produced from big blast furnaces. Small-scale methods are needed for the exploitation of small domestic markets, in contrast to the large-scale technologies developed by the multinationals for developing large ore bodies.

Dr Malin Falkenmark, of the Natural Sciences Research Council's Committee for Hydrology, said that research on groundwater in hard rock is a Swedish speciality and could be useful in India and West Africa especially, where rock groundwater is an important source of water. Groundwater replenishment techniques—techniques for artificially recharging groundwater supplies—were originally developed in Sweden and could probably be used widely in arid and semi-arid areas.

There are vast regions where Swedish work on erosion and sedimentation could also be applied. These processes are not always thought of in relation to river basin development, although many reservoirs rapidly fill up with sand if erosion is not stopped on lands further upstream. Finally, the Nordic countries could pool their work on water assessment—determining the available water resources in an area to avoid over-exploitation—and help developing countries to make water assessments of their own.

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