Technical Co-operation and the Developing World

by Helio F.S. Bittencourt

There are many ways in which the International Atomic Energy Agency contributes to the transfer of nuclear technology to Member States. Very often the Agency acts as an intermediary between its Member States in the transfer of information, experience, materials and equipment. This function is chiefly carried out within the framework of the technical assistance programme, the main components of which are fellowships, experts' services, scientific visits and equipment. A closely related activity is the Agency's research contract programme under which applied research and development in selected areas is supported and co-ordinated. In certain fields these research contracts are grouped into co-ordinated research programmes under which, as a rule, the Agency brings together research establishments from both developing and developed countries. Research contracts are cost-sharing in nature, thus increasing the effectiveness of the Agency's contribution and ensuring the strong interest of the institutes concerned, and are awarded primarily to institutes in developing countries.

Under its regular programme of technical assistance the Agency supports activities in about 80 Member States intended to be of both economic and social benefit to these countries. In recent years numerous projects have been implemented, which are aimed, for example, at introducing radioimmunoassay procedures, increasing crop and animal production, determining pesticide fate in foods and the environment, introducing modern techniques of uranium exploration, aiding local research and educational institutions and training of national staff in relevant nuclear techniques.

In contrast to the Agency's other activities technical assistance provided under the regular programme is financed from the voluntary contributions of Member States and supplemented by offers of assistance in kind. On the basis of an assessment of the needs of the developing and the ability of the donor countries to make contributions, the Board of Governors establishes the amount of the target for voluntary contributions from which the Agency's next year's regular programme should be financed.

The Agency also administers funds made available from UNDP, SIDA (Swedish International Development Authority) and other sources in much the same way as it implements regular programme funds. In the past UNDP and SIDA have provided, and are currently providing, substantial amounts of large-scale assistance through the Agency to projects in individual countries; the period of time over which this assistance is given is considerably longer than has normally been the case under the Agency's regular programme.

The amount of assistance rendered has increased substantially over the last 15 years; a total of $14.5 million in assistance was provided during 1964–1968, while expenditures

Mr Bittencourt is Deputy Director General, Department of Technical Assistance and Publications, IAEA

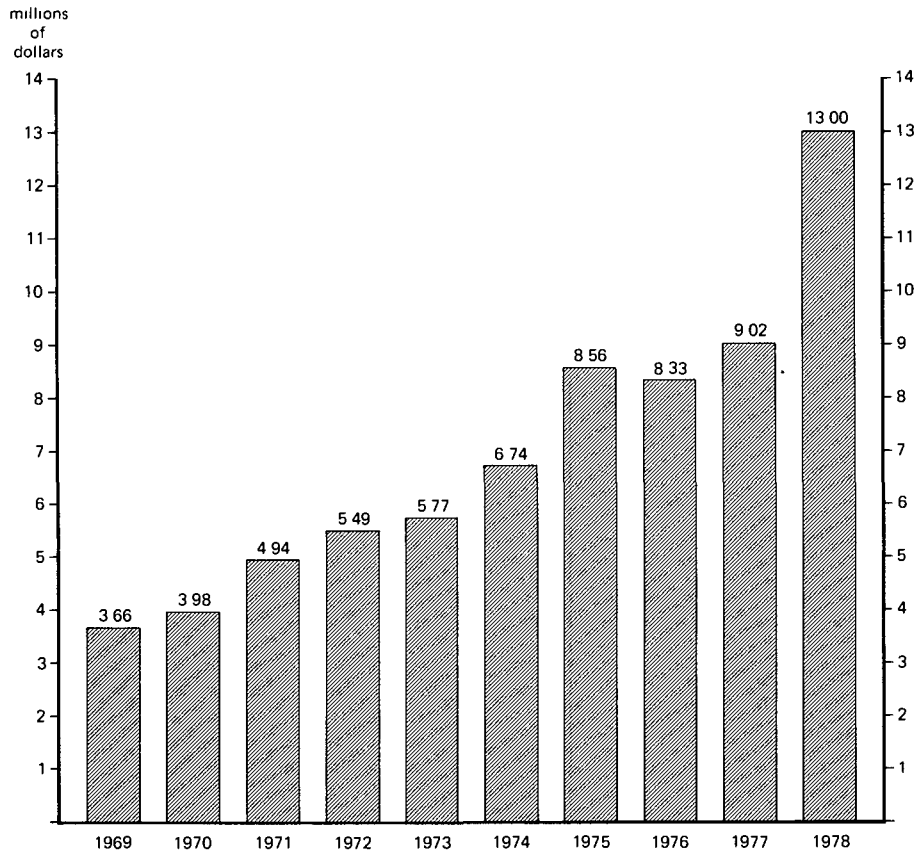

Figure 1. Technical assistance provided per year: 1969–1978 (from all sources of funds).

in the two succeeding five-year periods amounted to $23.8 million and $45.6 million, respectively. While inflation and exchange rate fluctuations have taken their toll, the increase in real terms remains nevertheless significant. During the last decade almost $70 million were spent by the Agency to support technical assistance activities. Figure 1 below shows annual expenditures in respect of technical assistance over this period.

The type of assistance requested and rendered thus depends a great deal upon existing scientific and technological infrastructures and the recipient countries' general level of economic and social development. As specialized nuclear technologies often require sophisticated equipment and facilities, as well as adequately trained and experienced staff, it is obviously easier to implement projects in the Agency's field of competence in the more advanced developing countries.

Most of the projects supported to date in Africa, for example, have focussed on the use of nuclear technology for improving agricultural production. This emphasis reflects the

importance of agriculture to national economies in the region and, at the same time, indicates the general extent to which nuclear technology can be effectively utilized. Recent projects in this very broad field have been aimed at optimizing fertilizer and water utilization, the study of soil-plant relationships, the introduction of techniques for the mutation breeding of plants, the development of radiotracer-aided methods to improve animal nutrition and the control of parasitic diseases in livestock. There has also been a number of requests for assistance in uranium exploration — in Chad, Egypt and Uganda, for instance — and, in a few of the more advanced countries, assistance has been sought for nuclear power development and reactor safety

Although agriculture is still the field in which most support is being provided to countries in the region of Asia and the Pacific, interest in nuclear power and its fuel cycle — nuclear engineering, reactor safety and exploration of nuclear raw materials — is on the increase. Significant support for projects designed to improve agricultural production and applied research capability has been forthcoming from SIDA in Bangladesh and India. Large-scale UNDP assistance was also provided to Pakistan for uranium exploration, and to India and the Republic of Korea for the establishment of cobalt-60 radiosterilization facilities.

In Europe, where infrastructures, even in the less industrialized countries, are considerably developed, assistance has been requested chiefly in nuclear engineering technology and uranium prospecting. Exemplary of large-scale technical assistance is the Romanian project "Development of Nuclear Technology", supported from 1973–1978 with funds from UNDP; the aim of this project was to introduce fuel processing and fuel element fabrication technology and to train national staff in relevant methods A total of $1.4 million was provided to the project, and further assistance, amounting to $653 000 was recently approved under a second phase. It is felt that this project has already made a significant contribution to the development of nuclear power technology in the country. Large-scale UNDP assistance was also provided to Greece and Turkey which enabled areas in these countries possibly having uranium mineralization to be identified. As part of this assistance local staff received valuable training not only in exploration strategy and methods, but also in the interpretation of results, and it is thought that national teams will now be able to carry out further prospecting on their own. Characteristic of assistance provided to countries of the Middle East are projects in nuclear medicine, the application of radioisotopes in agriculture and nuclear physics.

As a result of the wide differences in technological development between countries, the region of Latin America has been receiving assistance in all fields within the Agency's purview. In Argentina, Brazil and Mexico, where certain infrastructures are highly developed, heavy emphasis has been placed on nuclear power and its fuel cycle. The Agency, with financing from UNDP, is supporting the strengthening of a national centre for non-destructive testing and quality control in Argentina, and is providing assistance to Brazil, both under the UNDP and the regular programme, in manpower development for the nuclear power industry, safety analysis, isotope production and nuclear engineering. By contrast, Costa Rica has been receiving assistance for the improvement of the nuclear physics curriculum at its national university as well as for the application of nuclear techniques in medicine. Agricultural research is supported in many countries of the region, and large-scale UNDP assistance is being provided in this field to Brazil and Peru. The former project has already produced important results in respect of the Phaseolus-Rhizobium symbiosis and several mutant strains of wheat adapted to Brazilian conditions

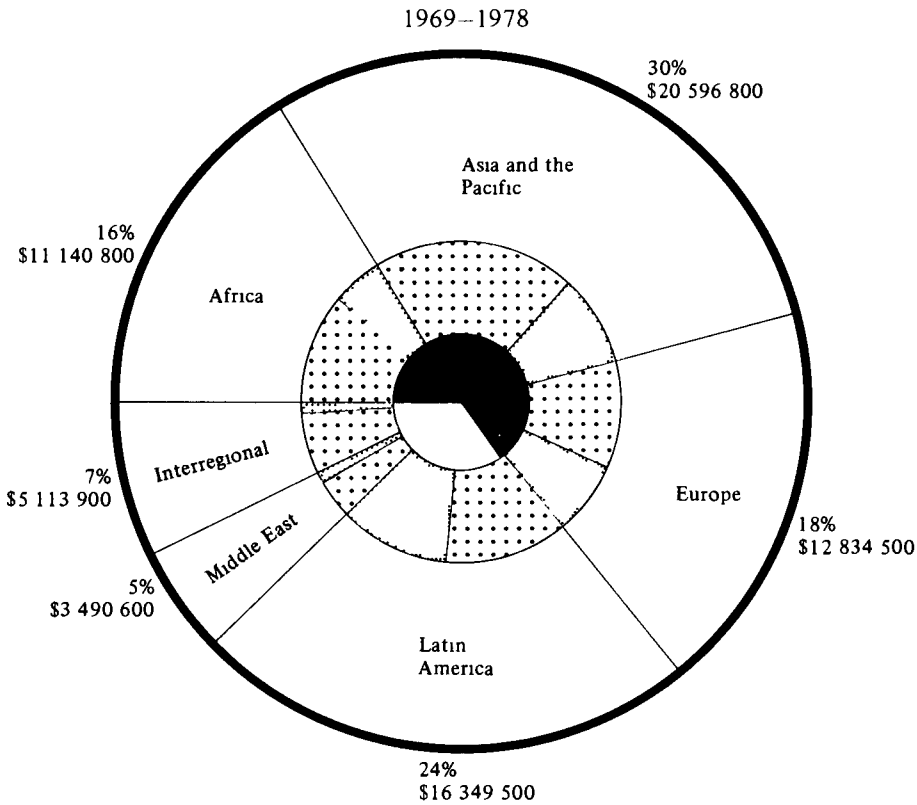

Figure 2. Distribution of Technical assistance by Region and Source: 1969–1978.

are now being propagated; investigations have also been initiated on other crops and the hydrological cycle in Amazonas is under study; as a result of the project, significant numbers of national staff are being trained in isotope and other modern techniques, and the counterpart institution is receiving ever greater international recognition.

The distribution of technical assistance resources among the regions over the period 1969–1978 is shown in Figure 2.

The Agency recognizes that a genuine transfer of technology involves more than the mere provision of equipment and foreign expertise. The aim of Agency technical assistance is therefore to ensure that imported technologies are assimilated, in order to become effective tools in the hands of **national personnel.** For this reason, approximately 30% of all technical assistance resources have been utilized for fellowships or on-the-job training to further the knowledge and expertise of persons from the developing Member States.

To assess the efficacy and socio-economic impact of the Agency's technical assistance over the last decade is difficult, as results are seldom immediate, and individual techniques are often applied in a much broader context, with their success dependent on the results of large-scale national programmes. Similarly, institution building is a long-term activity, the consequences of which may not become apparent for a decade or more.

Although industrial growth in certain developing countries has been significant in recent years, most of the developing countries still have predominantly agrarian economies, and the transition to industrialization, in which nuclear power technologies can play a significant role, cannot be made overnight. That such a transition is being made, however, is indicated by the increasing number of requests from many Member States for technical assistance related to nuclear power and its fuel cycle, reactor safety and exploration for nuclear raw materials, whereas in the first 15 years the majority of requests concerned the use of research and isotopes.