

The Agency's programme of technical co-operation for 1983

by R. Helmke*

In 1983, the IAEA will provide development aid to more than 70 of its Member States. The Agency and the developing countries have jointly worked out a programme for 1983 based on the requests received from Member States during the first half of 1982. This programme, which was approved by the Agency's Board of Governors in February 1983, is surveyed below.

Developing Member States' needs for assistance in applying nuclear techniques have grown very rapidly over the last few years, as have the Agency's annual programmes for technical co-operation. With a value of about US \$20 million, the 1983 technical co-operation programme is the largest in the Agency's history; it is, in fact, now twice the size of the 1980 programme.

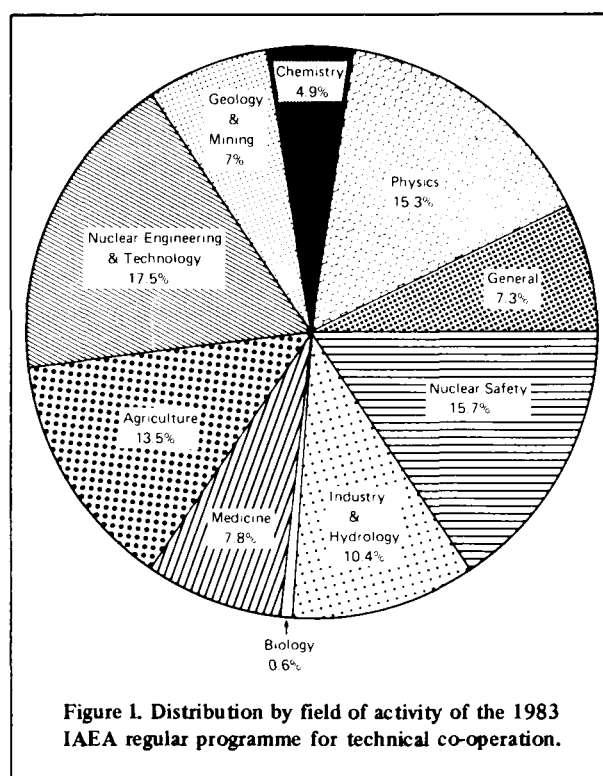
The rapid growth of the Agency's technical assistance denotes an unusually good performance at a time when funds for multi-lateral development aid have been drastically decreasing. There are many reasons for this, but the following are particularly significant. Firstly, the backbone of the Agency's technical assistance is a voluntary fund, whose resources can be programmed according to the priorities of the developing countries. Although voluntary, contributions by Member States are based on indicative shares of the total fund, determined collectively in advance. Secondly, each annual programme contains projects for which financing is not available from the voluntary fund.

The Agency undertakes, however, to obtain additional sources of finance in order to realize these projects. There are seventy such projects included in the 1983 programme, requiring about US \$5 million in addition to the US \$20 million already mentioned. The combination of these two modes of financing brings advantages to both recipient and donor countries. The voluntary fund allows for flexible programming to meet the medium- and long-term needs of developing countries; the project-by-project financing mode allows donor countries to support projects – usually devoted to shorter-term needs – with whose objectives they can identify themselves easily. This "tandem approach" accounts to a large extent for the Agency's ability to mobilize funds for development assistance. Another important factor is the close and continuous participation of recipient countries at all stages of programming, project formulation, and implementation.

Nuclear techniques are widely applicable

The composition of the programme by field of technical activity is shown in Figure 1. As can be seen, five fields account for approximately three quarters of the resources allocated in the 1983 programme: Nuclear Engineering and Technology; Safety in Nuclear Energy; Nuclear Physics; Agriculture; and Industry and Hydrology. A few of the projects approved in these fields are described below.

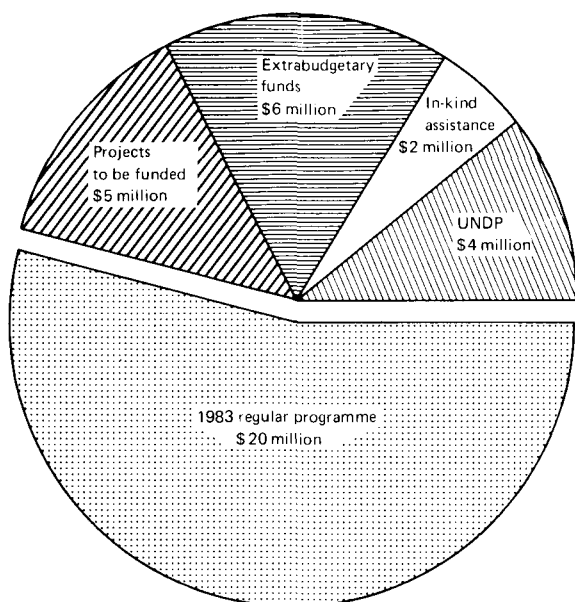
Radioisotope facility in Thailand: Radioisotopes have many applications in medicine. They can be employed to assess the condition and functioning of various body organs, such as the heart, lungs, brain, liver and kidneys; nuclear techniques can also be used to sterilize medical supplies. Developing countries have found that importing medical radioisotopes causes a severe drain on their limited reserves of foreign currency. In Thailand, when the Office of Atomic Energy for Peace decided to upgrade its Research Reactor to 2 MW, it decided at the same time to set up a laboratory to produce enough radioisotopes to meet the entire country's medical needs. The Government provided the money to buy most of the equipment



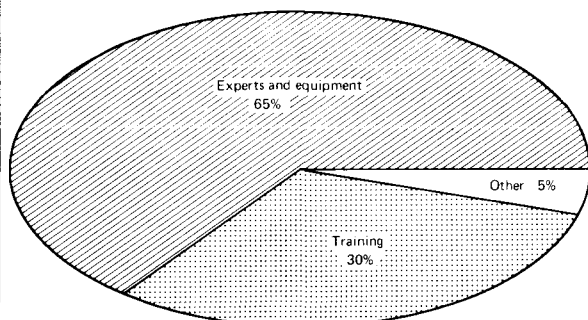
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Financing technical co-operation

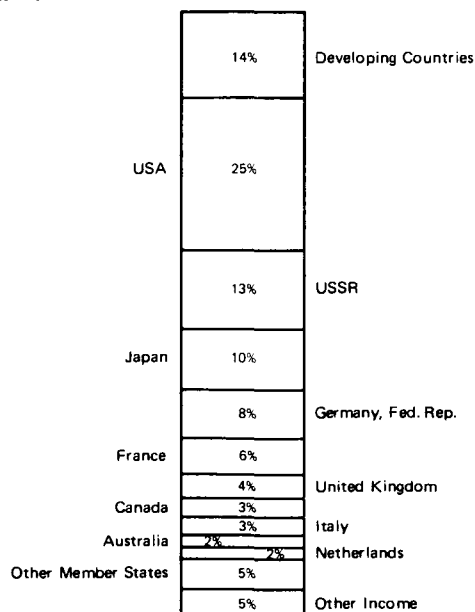
For 1983, the Agency has planned development aid amounting to US \$37 million.



The largest portion, approved by the Agency's Board of Governors, is the "Regular Programme" financed from a voluntary technical co-operation fund. The 1983 regular programme, which is described in the text of the article, is composed of:



Its resources come from:



needed to set up the production lines. In 1983 however, the Agency will provide lead bricks for hot cells (which are difficult to obtain locally) and the services of an expert in the production of radioisotopes. In 1984, it will provide quality control equipment and related experts' services. Over the two years, the Agency will donate US \$124 000 to the project. By the end of the project, Thailand should be able to produce by itself most of the radioisotopes its hospitals need.

Radiation protection in Syria: The Syrian Atomic Energy Commission, which is responsible for all radiation protection in the country, is in the process of setting up facilities for both routine radiation monitoring and research work, concurrently with the preparation of a national radiation protection law. At the same time, a training programme is being organized for personnel involved in radiation monitoring activities. The Agency first assisted this project from its regular programme of technical co-operation in 1982. This assistance will be continued in 1983 and 1984, bringing the Agency's total contribution up to US \$113 000. In the first year, a planning mission was undertaken and a thermoluminescent dosimetry system provided. The system measures the amount of radiation to which staff might have been exposed. The Agency is now providing calibration equipment, overseas training, and the services of experts who will demonstrate radiation measurement techniques to national staff. The project is intended to help Syria set up an effective and modern radiation monitoring system.

Agricultural research in Tanzania: This African country needs to grow more and better crops, but cannot afford to import thousands of tonnes of artificial fertilizer. Instead, the country's scientists are looking into different ways of applying fertilizer to the crops which grow in Tanzania to see if they can increase the fertility of their land without massive doses of foreign fertilizer. The Agency is helping the Faculty of Agriculture, Forestry, and Veterinary Science, Morogoro, use labelled fertilizers to investigate how local crops absorb phosphorus. Phosphates are among the most important ingredients of fertilizers and they do actually occur in Tanzania, in rocks in the northern part of the country. Scientists from Morogoro will also assess whether Tanzania could use this naturally occurring rock as a replacement for imported superphosphate. The Agency is providing expert services, a supply of labelled fertilizers, and equipment for the radioisotope laboratory.

Tanzania's farmers cannot raise as many cattle as they would like because tropical pests, disease-carrying insects, and mites, afflict their livestock. Some years ago, the solution to this problem seemed obvious: dip the cattle in chemicals which will kill the parasites. Unfortunately, scientists soon realized that the cattle themselves might ingest the chemicals and that poisonous residues might build up in their milk and meat. In a second technical co-operation project in Tanzania, the Agency is supporting investigations at the Tropical Pesticides Research Institute,

Arusha, aimed at assessing such residues in cattle, controlling pests that attack food crops, and testing the efficacy of tsetse fly control pesticides. Expert services and equipment needed for this work are being furnished by the Agency.

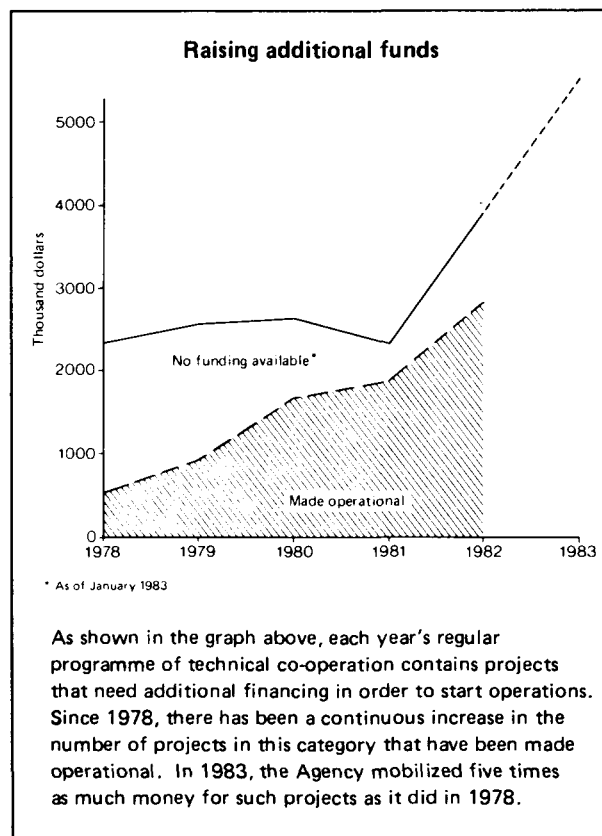
The Agency's help with these two projects will amount to approximately US \$250 000 over the next four years. It is expected that the projects will strengthen the institutes' capabilities for working with radioisotopes and, over a longer term, help improve the quality and increase the production of meat, milk, and grain in the country. Obviously, local breeds of cattle, local varieties of crop plants, and the agricultural practices native to Tanzania dictate that work like this has to be done there: results of research in other laboratories in other countries cannot be applied directly to the particular situation of Tanzania.

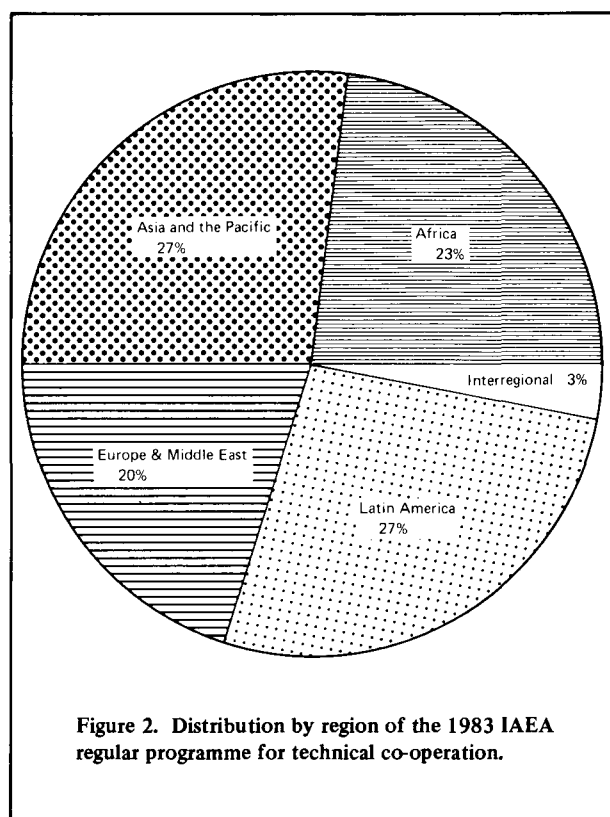
Insect toxicology in Cyprus: Another place where, because of local patterns of agriculture and varieties of crops, the country has to do its own agricultural research is Cyprus. The Agency has been assisting the Agricultural Research Institute at Nicosia for many years, most recently through the 1980-82 project "Nuclear techniques in agriculture". In this project, scientists are trying to check whether pesticides sprayed on crops will eventually find their way into people's diets, and build up in the human body. As part of the project, the Nicosia Institute set up a laboratory for pesticide residue analysis, and drew up a long-term programme. In a follow-up project the Institute's scientists will try to develop more effective and safer chemical pest control technologies by studying the fate of pesticides. They will also make comparative studies on the effects of new hormone insecticides on plants, insects, and animals, and on how the stability of an insecticide in the environment varies when different ways of applying it are tried. In its 1983 technical co-operation programme, the Agency has allocated US \$94 400 to support this project. The Agency will supply electrophoresis equipment, a photometer, a liquid scintillation counter, and the services of experts who will train Institute staff in insect toxicological methods. Once the project is completed, national officials responsible for agriculture should be able to recommend pesticides that are more effective and pose fewer environmental risks than the ones currently in use.

Non-destructive testing in Latin America: Countries in Latin America are investing in heavy industrial plant. Such industries use many heavy metal components; the quality of the materials, and the integrity of the welds and joins in such components are crucial for the safety, reliability, and durability of the industrial plants of which they are part. To ensure that there are no flaws in such welds, without destroying the components while examining them, radiography and other non-destructive techniques are widely used in industry. The materials and components tested can range from steel tubing and conventional turbine parts, to nuclear power plant



A cattle-dip in Tanzania. The Agency is helping Tanzanian scientists check that the chemicals in the cattle-dip, designed to kill parasites, are not finding their way into milk and meat destined for human consumption.





pressure vessels and fuel element cladding. Such techniques are well established in the industrialized countries, but as the developing world industrializes rapidly it needs to increase its expertise in this field. The Agency is supporting a project to organize a network of Latin American institutions and industries that are engaged in non-destructive testing (NDT). As there are several institutes already using NDT techniques in the region, the project is aimed at increasing their expertise and, at the same time, promoting the establishment of such techniques in countries where little has been done in this field. It is foreseen that the participating institutions will each specialize in a few specific aspects of NDT, that they will share out the work among themselves, and that they will pool their skills. The Agency, together with the UN Industrial Development Organization (UNIDO), and the United Nations Financing System for Science and Technology for Development (UNFSSTD) is sponsoring the joint venture. Under the 1983 programme, Agency funds amounting to US \$151 800 have been set aside for this project. It is expected that eventually a total of approximately US \$1 million will become available for this project in the period 1983–87.

Industrial radiography in Ecuador: Ecuador is one such Latin American country that is rapidly developing its petroleum, power, and metal industries. To encourage the country to develop non-destructive examination techniques, the Agency is providing under its 1983 pro-

gramme a high-voltage X-ray radiography system to the Higher Polytechnical School for the Coastal Region (ESPOL) and the services of an expert who will assist local staff with its installation and initial operation. This assistance is expected to enhance the school's expertise in non-destructive testing, enabling it to offer a variety of services to industry. The Agency's 1983 contribution of US \$65 600 complements the co-ordinated regional project to expand the use and application of non-destructive testing methods throughout Latin America.

These are only a few of the projects which the Agency's Board of Governors approved for the 1983 technical co-operation programme. There are 306 other projects in the 1983 programme, including eight designed to satisfy the needs of Member States on an inter-regional or regional basis like the project on non-destructive testing in Latin America described above. It will now be useful to consider some other characteristics and significant trends of the Agency's development aid as expressed in the 1983 programme.

Different regions — different needs

Figure 2 shows the distribution of the 1983 programme by geographical region. Asia and Latin America lead, each with 27% of the programmed resources, followed by Africa, and Europe and the Middle East. There is a considerable variation from region to region in the technical areas for which assistance had been requested under the 1983 programme. Most of the new projects in nuclear physics and nuclear chemistry are in Latin America. Almost half of the projects approved in nuclear engineering and technology were requested by countries in Asia and the Pacific region. Africa accounts for the largest proportion of projects in agriculture and medicine. Two thirds of the projects involving nuclear techniques in the field of biology are located in the Europe and Middle East region. Most of the industrial and hydrology projects are in Latin America. Finally, Africa has the largest share of projects in safety in nuclear energy — mainly relating to radiological protection.

Developing human resources

In addition to individual projects, the technical co-operation programme for 1983 also contains provision for fellowships and training courses. About half of all training provided by the Agency is funded from the regular programme; the other half is financed from extrabudgetary contributions or in-kind support made available by Member States. The amounts earmarked for fellowships in the regular programme have increased from US \$1.5 million in 1980 to US \$2.7 million in 1983. The 1983 training course programme also received an amount of US \$2.7 million. About one third of the 1983 training courses are in the fields of nuclear engineering, and safety in nuclear energy.

Three programme components

The Agency's technical assistance can be divided into expert and consultant services, equipment, and training. Over the last five years, the equipment component of the annual programmes has hovered around the 50% mark – currently it represents about 48%. During the same period, expert services have steadily increased, from about 15% to 24%; whereas the training component, which includes both fellowships and training courses, has decreased from about 35% to 28%. The increase in expert services is largely accounted for by increased requests from Latin America and, to a lesser extent, from Asia and the Pacific region. Most of the increase in equipment allocations under the regular programmes of the last five years is due to requests from Asia and Europe.

It has been a practice since 1980 to set resources aside for a reserve fund. The reserve fund is used to respond promptly to urgent needs by Member States that were not foreseen when the programme was formulated. In the 1983 programme, the level of the reserve fund was increased from US \$ 250 000 to US \$ 300 000.

Programming for the future

In approving the 1983 programme, the Board of Governors also approved a number of projects that will continue from year to year through the period 1984 to 1988. Over this period, a total of US \$12 million will have to be provided to finance these projects. Compared with 1981, this is a four-fold increase in the amount of money approved for future years; funds already approved for 1984, for example, account for about a third of what is expected to be available then. This reflects the desire of the Agency and Member States alike to extend the programming horizon further into the future. Projects planned for more than one year at the outset (multi-year projects) are still relatively new in the Agency, but their share has been increasing recently.


Improving the effectiveness of the Agency's aid

As the Agency's 1983 programme was being formulated, the Board of Governors initiated a technical co-operation policy review. The review has concentrated on policy issues which, to varying degrees, are already reflected in the 1983 programme. Five recommendations have emerged from the policy review:

- Multi-year programming should be increased further.
- Special assistance should be given in project identification and project planning to countries which have little experience in nuclear energy matters and which therefore are especially in need of the Agency's assistance.
- More projects should be supported in which all available inputs are fully integrated into a package of measures designed to solve a particular problem. This will mean systematic consideration of training needs and available resources from the host government or third parties at the time of project formulation.
- Increased consideration should be given to the possibility of including regional and interregional projects into the annual programmes in cases where these would be more effective than individual country projects.
- Finally, a dynamic programming approach is recommended that will enable the Agency to respond more quickly to changing needs and priorities in developing Member States.

These recommendations will be presented to the Board of Governors when it meets in June 1983 for consideration and possible approval. In the event that these recommendations are approved, they could be implemented in time for the 1985 programme. If this is done, this would contribute to an increase in the impact of the Agency's technical co-operation activities and permit the Agency to respond more effectively to the needs of its developing Member States.





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