

IAEA Technical Co-operation Activities:

Asia and the Pacific

This second article in the series is written by Cezar P. Nuguid, Area Officer for the Technical Assistance Programme in this region until 31 August 1975.

During the period 1970–1974 the IAEA provided country programme assistance (expert services, equipment and supplies, and fellowship training) to 17 countries in the geographic region designated as "Asia and the Pacific" by the United Nations Development Programme (UNDP), namely, to Afghanistan; Bangladesh; Burma; Cambodia; China, Republic of; Hong Kong; India; Indonesia; Iran; Korea, Republic of; Malaysia; Pakistan; the Philippines; Republic of South Viet-Nam; Singapore and Thailand*. In addition, representatives of Laos and Nepal have attended Agency-organized short-term training projects, such as seminars and training courses.

One third of all technical assistance provided by the Agency during the past five years has gone to the countries in this region; this assistance was divided as follows: expert services 30%, equipment and supplies 41% and fellowship training 29%. It was not always like this, however.** The Agency's largest single contribution towards the development of competence in the use of nuclear techniques and technology in these countries has been in the area of training. Since the inception of the fellowship programme in 1958 more than 1600 awards for individual study have been made to Fellows from the region. These awards, plus the in-service training provided in the recipient countries by Agency experts, have made a sizable contribution towards the establishment of the research reactor centres located in India, Indonesia, Iran, the Republic of Korea, Pakistan, the Philippines, the Republic of South Viet-Nam and Thailand. In addition, Malaysia is in the process of setting up a similar nuclear research centre, with IAEA assistance.

Nevertheless, the stage of technological advancement in the nuclear area varies greatly among the developing countries in the region and this, to some extent, reflects the capacity of these countries to absorb technical assistance. During the past five years, for example, only

* In the Agency the technical assistance provided to Afghanistan and Iran is co-ordinated and programmed by the Area Office serving countries in Europe and the Middle East. The statistics in this article, however, include the value of the technical assistance provided to these two countries.

** The corresponding proportions over the period 1958–1974 were: expert services 31%, equipment and supplies 30% and fellowship training 39%.

six of these countries were able to absorb IAEA regular programme assistance in excess of \$300 000, while the eleven others used smaller amounts:

<u>Number of countries</u>	<u>Value of the technical assistance received under the regular programme 1970–1974</u>
3	Less than \$50 000
2	\$50 000 to \$149 900
6	\$150 000 to \$299 900
1	\$300 000 to \$449 900
3	\$450 000 to \$599 900
2	\$600 000 to \$749 900

It is interesting to see how the injection of small amounts of aid under the Agency's regular programme of technical assistance (the amount received by countries in the region under the regular programme increased by more than 60% from 1970 to 1974) led to an expansion of the assistance financed under UNDP. From the chart given below it can be seen that whereas the amount of UNDP large- and small-scale assistance was about the same in 1970, this pattern changed abruptly. UNDP large-scale assistance accounted for 23% of total Agency aid to countries in the region in 1970, but by 1974 this share rose to 37%. During the same period UNDP-financed assistance made up 46% of all of the aid provided by the Agency to countries in the region. By coincidence, it works out that 46% of all of the UNDP large-scale assistance provided through the Agency has been in respect of projects in countries located in this region. It is therefore not surprising that the IAEA has carried out more UNDP large-scale assistance projects for countries in this region than in any other, namely, two each in agriculture, nuclear power and industrial applications, and one in uranium exploration. In addition, the first case of Agency-executed large-scale assistance to be financed by the Swedish International Development Authority (SIDA) was approved in 1974, for the development of a nuclear institute for agricultural research in Bangladesh.

AGRICULTURE

An important problem common to all developing countries is the production of food. The first goal is to increase the quantity of food supplies through improved methods of production; the next goal is to improve the nutritional balance of the diet of the population. Experience has shown that simple improvements in agricultural methods, for example, the use of some fertilizer at the right time and the introduction of better seeds and breeds of livestock can result in an immediate and significant increase in productivity. In order to achieve further increases in agricultural productivity, however, a more sophisticated technology is required which involves the use of more accurate and efficient research methods and tools.

Atomic energy technology — the use of ionizing radiation and isotopic tracers — puts some of the most accurate and efficient tools available into the hands of agricultural scientists. Nuclear methods have been used on a routine basis for years in the laboratories and on experimental farms in the developed countries and have contributed significantly

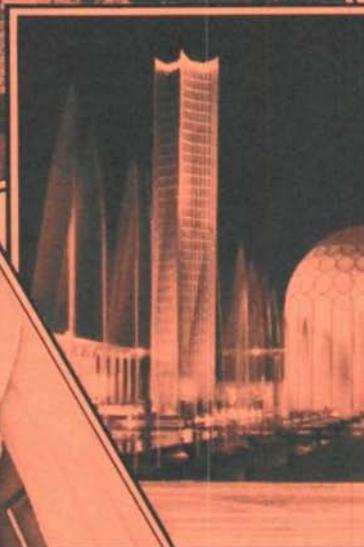


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- 1 Improved rice strains yielding more protein and larger harvests are continually being developed by means of Research Contracts. This crop is harvested by workers in Indonesia. Photo: UN
- 2 Aerial view of the PAEC facilities at Quezon City. The egg-shaped building houses the one megawatt research reactor; the semi-circular structure has administrative offices and the others are supporting laboratories. Photo: PAEC
- 3 The Pakistan Institute of Technology (PINSTECH) in Islamabad, is a major nuclear research centre for the country. Photo: PAEC
- 4 Scientists and technologists from the government and the private sector are trained in radioisotope techniques and reactor technology by the Philippine Atomic Energy Commission. Photo: PAEC
- 5 Radioisotope techniques to measure thyroid activity are demonstrated at the Indian Veterinary Research Institute, Izatnagar.
- 6 A shepherd's family in Kashmir set up their hut during field trials to test radiated attenuated vaccine against lungworm in sheep, which has been produced under a T.A. programme in India.
- 7 Members of an IAEA survey panel on nuclear power plant siting, with officials of the PAEC and the National Power Corporation, at the proposed site at Bagac, Bataan, Philippines. Photo: PAEC
- 8 A sampling point on the steep cliffs of volcanic Cheju Island, Rep. of Korea, during a hydrology project in 1965 using environmental isotopes to trace scarce water supplies.



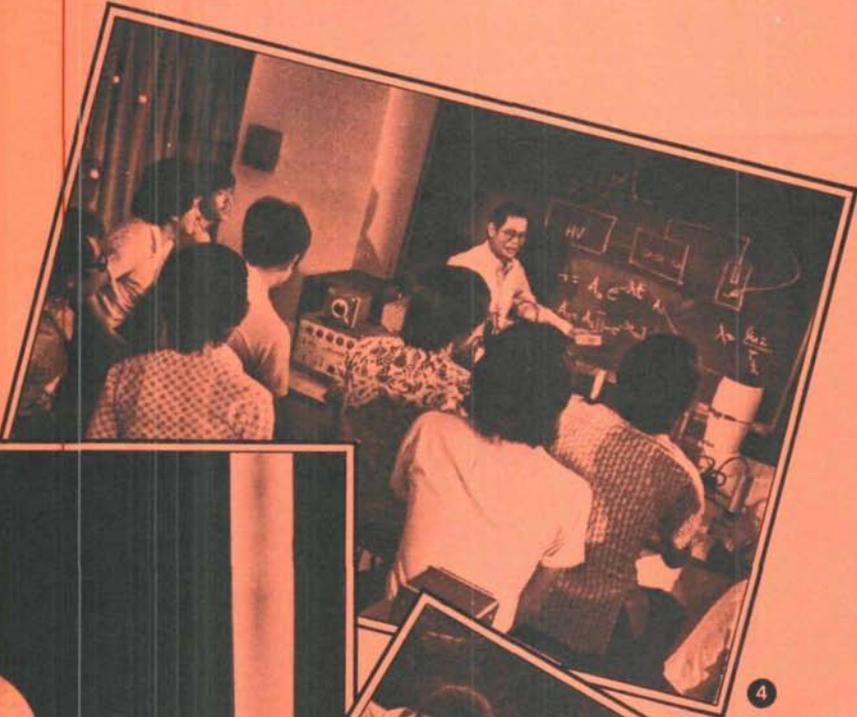
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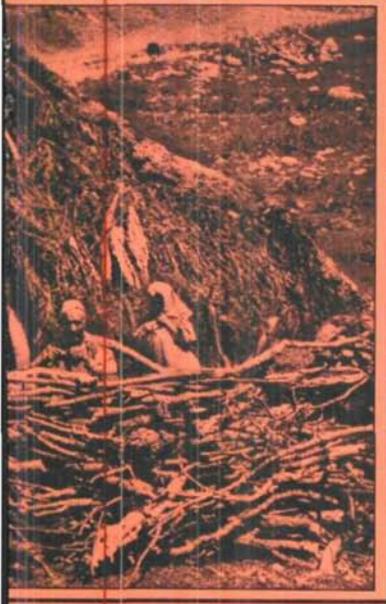
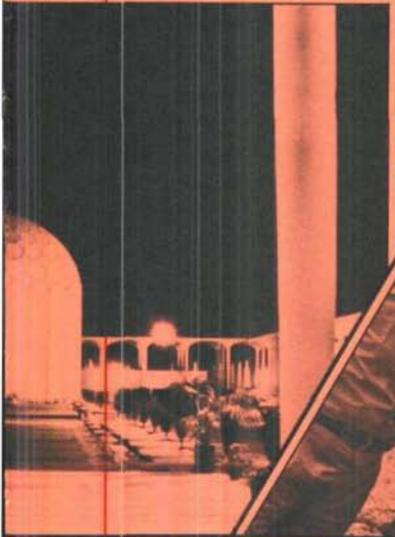
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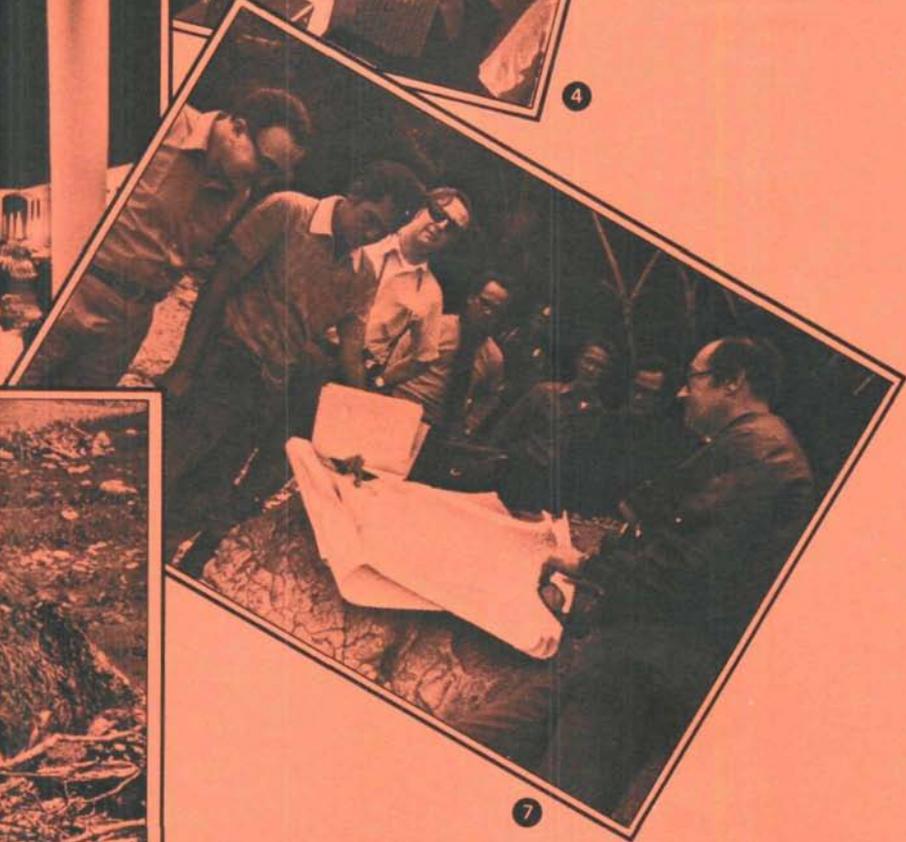
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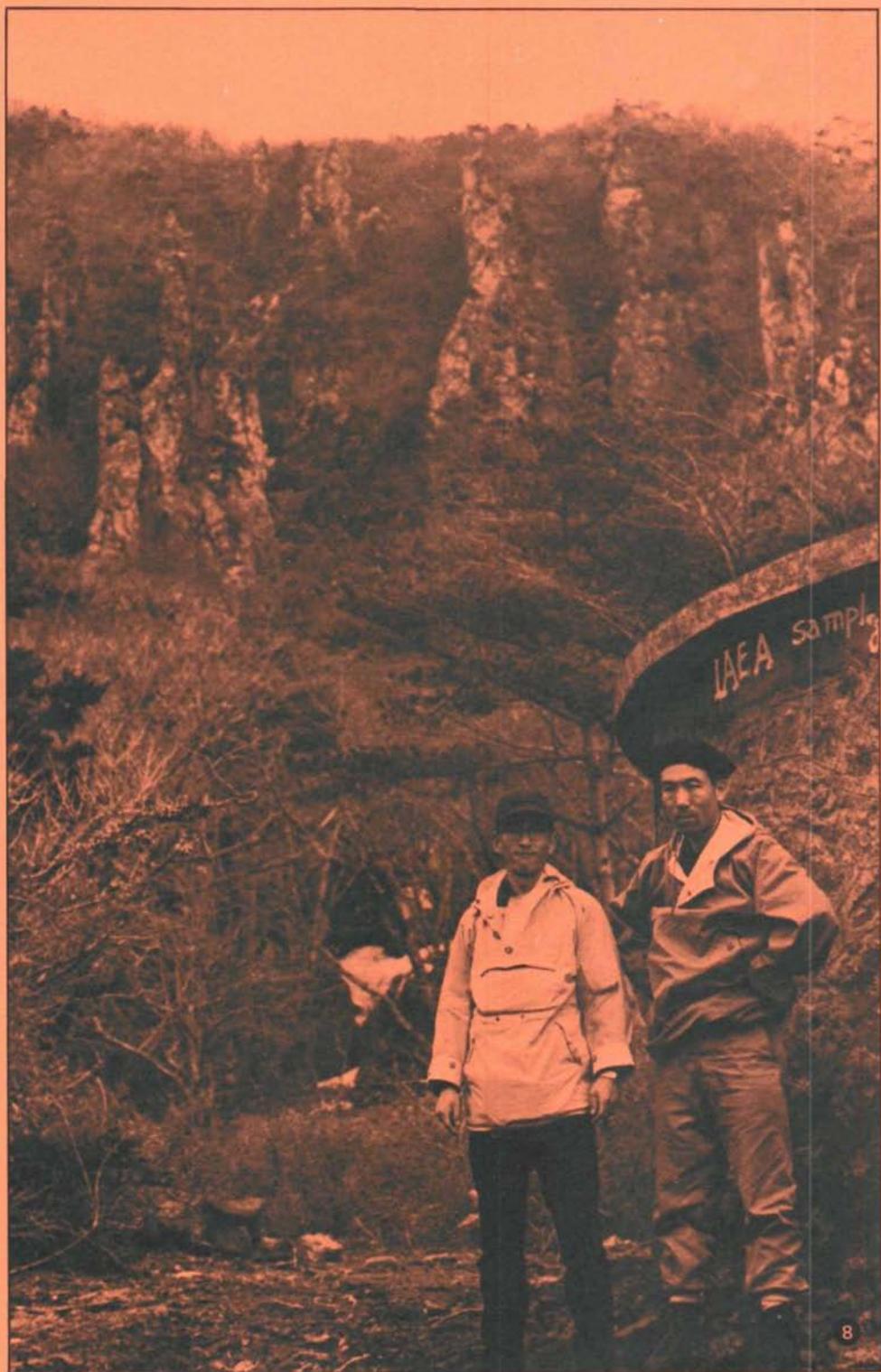
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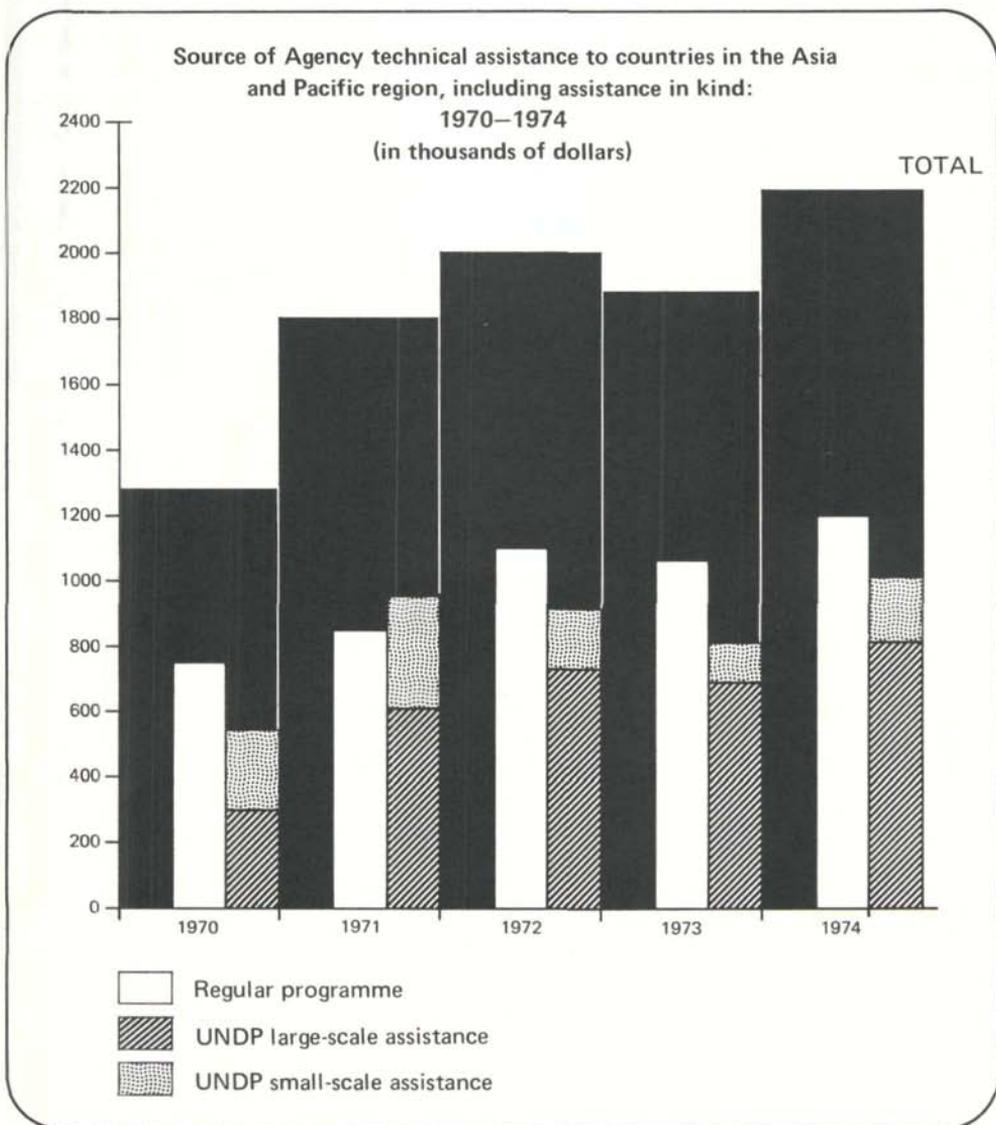


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to advances in the soil, plant, animal and food sciences. Many of the developing countries in the region have already begun to make good use of this technology (India, the prime example, has established modern nuclear research facilities with UNDP help which can easily compete with agricultural research centres in the more advanced countries), but numerous developing countries in the region still lack sufficient trained manpower, equipment and the pre-requisite scientific base to be able to derive maximum benefit from this advanced technology.

Distribution of technical assistance by field of activity: 1970-1974

Field	1970		1971		1972		1973		1974		1970-1974	
	\$1000	%	\$1000	%	\$1000	%	\$1000	%	\$1000	%	\$1000	%
General atomic energy development	21.8	1.7	61.2	3.4	39.7	2.0	39.7	2.1	42.9	2.0	205.3	2.2
Nuclear physics	107.3	8.4	149.3	8.3	99.0	4.9	180.3	9.6	116.4	5.3	652.3	7.1
Nuclear chemistry	123.8	9.6	84.5	4.7	165.5	8.2	112.5	6.0	80.7	3.7	567.0	6.2
Prospecting, mining and processing of nuclear materials	8.6	0.7	211.9	11.7	137.5	6.9	175.2	9.4	430.7	19.7	963.9	10.5
Nuclear engineering and technology	241.9	18.8	200.0	11.1	344.3	17.1	202.7	10.8	226.5	10.3	1215.4	13.3
Application of isotopes and radiation in agriculture	513.3	40.0	696.5	38.6	619.9	30.8	469.6	25.1	485.7	22.2	2785.0	30.4
Application of isotopes and radiation in medicine	63.1	4.9	117.3	6.5	230.0	11.5	158.3	8.4	276.6	12.6	845.3	9.2
Application of isotopes and radiation in biology	20.1	1.6	32.3	1.8	82.1	4.1	32.4	1.7	56.5	2.6	223.4	2.4
Other fields of application of isotopes and radiation	132.2	10.3	146.4	8.1	235.9	11.7	380.0	20.3	328.6	15.0	1223.1	13.4
Safety in nuclear energy	51.4	4.0	104.3	5.8	56.2	2.8	123.6	6.6	145.2	6.6	480.7	5.3
Total	1283.5	100.0	1803.7	100.0	2010.1	100.0	1874.3	100.0	2189.8	100.0	9161.4	100.0

Depending on the infrastructure and the needs of the requesting countries, the Agency has provided either small- or large-scale assistance to agricultural projects; as can be seen from the foregoing table, more assistance has been provided during the past five years to agricultural projects in countries of the region than in any other field of activity.

Distribution of technical assistance by field of activity: 1970–1974

From the table it is apparent that the next most important fields of activity are “Other fields of application of isotopes and radiation” (mainly industrial applications) and “Nuclear engineering and technology”. Numerous requests for short- and intermediate-term assignments of consultants on industrial applications were received by the Agency following the six-month tour in 1968 of a regional adviser on the use of nuclear techniques in industry. This has led to large-scale assistance to two projects (radiosterilization of medical supplies in India and radiation processing in the Republic of Korea) and others are likely to follow in the near future (for example, a radiation processing demonstration project in the Philippines).

NUCLEAR POWER

On the other hand, the share of IAEA assistance provided to activities classified under “Nuclear engineering and technology” (primarily nuclear power project planning and implementation) can be expected to increase considerably in the future as a result of the sharp increase in the cost of fuel oil. The IAEA Market Survey for Nuclear Power in Developing Countries (updated in 1974, using sophisticated computer programmes that can be adapted to individual countries’ analysis needs) has revealed that nuclear power is not only competitive but that many countries in the region will have to rely heavily on this energy source in the 1980’s and 1990’s. The Agency has already conducted detailed nuclear power feasibility studies for the Philippines, following which it has been decided to construct two 600 MWe nuclear power stations on the island of Luzon, the first of which is scheduled to be commissioned by 1982. A similar study will soon be carried out for Indonesia, and in Thailand it is expected that large-scale assistance valued at \$1 million will be provided in the near future in connection with a project to train nuclear scientists, engineers and technologists. The Agency has also been called upon to advise on optimal sites for the location of nuclear power stations and to make safety evaluations during the construction of power reactors.

A regional survey and briefing course on the technical and economic aspects of nuclear power development was held in Bangkok in 1973, attended by 37 participants from 14 countries, to present a detailed overview to the top management of nuclear power programmes. Other specialized courses are being offered to meet the need for the training of key management staff in nuclear power engineering and licensing organizations (for example, the training course of 15 weeks’ duration on nuclear power project planning and implementation which commenced in September 1975 and is due to be repeated in 1976). A survey and briefing course similar to that held in Bangkok but emphasizing power reactor management, contractual arrangements and quality assurance programming is scheduled to be held in Manila in February 1976 for interested countries in the region. On request, the Agency can also assist in the formulation of the specifications to be included in the invitations to tender sent to likely reactor suppliers, in the evaluation of bids, and is prepared to assist the developing countries at all stages of their nuclear power programmes.

The Agency has also provided a considerable amount of assistance for the "Prospecting, mining and processing of nuclear materials", principally in Pakistan in respect of a large-scale project on uranium exploration, as well as for a regional training course on uranium prospection and ore evaluation which was held in 1974. The mountainous regions contain many areas that are geologically favourable for the discovery of deposits of nuclear materials that can be exploited at reasonably low cost and can be potentially of great advantage to the countries, both for their own nuclear power programmes and as a source of export income. Agency assistance to projects in this field of activity can be expected to vary somewhat from year to year, depending on how rapidly the work in this technical area accelerates during the next 5-10 years.

CO-OPERATION

No article on IAEA technical co-operation activities in the Asia and Pacific region would be complete if no mention were made of the exemplary co-operation between the countries in the region. Joint training and research programmes involving the exchange of scientists and sophisticated equipment among developing countries in the region were initiated, for the first time in the Agency's history, in this region 10 years ago. Three similar programmes have received Agency assistance during the past five years, in addition to 10 short-term training projects organized for the developing countries in the region, in which more than 1100 persons participated: one on nuclear physics, one on uranium prospection, three relating to nuclear power and technology, two concerning agricultural subjects, one on microbiology, one on isotope hydrology, two on industrial applications and two relating to nuclear safety. Furthermore, representatives of countries in the region participated in about 40 inter-regional study tours and training courses, some of which were hosted by countries in the Asia and Pacific region.

The latest major step taken to co-ordinate research activities on a regional basis and make the findings available to other interested countries, was an agreement which came into force in June 1972, the Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology, which is referred to as the "RCA" agreement; the 10 countries party to it (Bangladesh, India, Indonesia, Republic of Korea, Malaysia, Pakistan, the Philippines, Singapore, the Republic of South Viet-Nam and Thailand) are called "RCA" countries.

The role of the Agency under the RCA agreement is to co-ordinate research programmes of interest and importance to the participating countries, provide support in the form of research contracts, training under the fellowship programme and, where needed, assistance in obtaining funds from UNDP to carry out major programmes. The first major RCA programme to become operational is the Asian Regional Project on the Radiation Preservation of Fish and Fishery Products in which seven countries are currently participating. Examples of other major RCA research programmes that are being developed pertain to increasing the production of protein from animals and plants, as well as of oil seeds, in order to improve nutritional standards in the region. The fact that close co-operation on subjects relating to the introduction of nuclear power is already a reality, makes it possible to predict further good progress in the future.