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- \* Those references marked with an asterisk\* represent publications of the Joint IAEA/IIASA Research Project or the International Institute for Applied Systems Analysis. Copies may be obtained by writing to: H. Otway, Project Leader, Joint IAEA/IIASA Research Project, IAEA, P.O. Box 590, A-1011 Vienna.
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## IAEA Technical Co-operation Activities

This is the first of a series of articles outlining the different kinds of technical assistance requested by and given to Member States in specific regional areas. These divisions are principally delineated by geographic boundaries, and each is supervised by an "area officer." The first covers the particular requirements of the IAEA Technical Assistance Programme dealing with

### Europe and the Middle East

by Arturo E. Cairo

In the United Nations system a "developing country" is one which is entitled to receive technical assistance under the United Nations Development Programme (UNDP). In Europe the following Member States of the IAEA are entitled, at the present time, to receive such assistance: Albania, Bulgaria, Cyprus, Czechoslovakia, Greece, Hungary, Iceland, Poland, Romania, Spain, Turkey and Yugoslavia. The Member States in the Middle East region which receive assistance from or through the Agency are: Afghanistan, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Saudi Arabia and the Syrian Arab Republic. Other developing countries in these two areas which are not Member States and have not yet requested country programme assistance from the IAEA, are: Bahrain, Democratic Yemen, Malta, Oman, Qatar, the United Arab Emirates and Yemen Arab Republic.

The assistance provided to the above Member States has been of a very distinctive nature in terms of the subjects covered and the volume of aid extended. This is partly due to the varying stages of progress in the introduction and use of nuclear technology in the developing countries in the two areas.

In Europe, for example, most Agency assistance has been provided in the form of fellowships. Many of the developing countries in the area, particularly in East Europe, were already running well-thought-out and established nuclear programmes by the time the Agency was founded. Thus the progress of these programmes created a need for a specialization of skills and, consequently, the need to find appropriate training abroad when it was not available at home. Furthermore, the fellowship requests from many of these countries almost invariably involved highly qualified persons, and the training has usually been requested in advanced areas of nuclear research, for the application of isotopes and radiation or for reactor technology work; during the last few years the emphasis has been on nuclear power programmes and on exploration for nuclear raw materials.

The experts requested by the East European countries have consistently been for relatively brief assignments, almost always associated with the commissioning and demonstration of sophisticated items of equipment in very specialized areas, which points up the fairly advanced state of their nuclear energy programmes. The trend in other developing countries in Europe has been to request the services of experts for longer periods of time and usually in technical areas of a more general nature.

In the region delineated by the IAEA as the Middle East, however, the situation has been quite different. Activities in the nuclear energy field were initiated by the countries in this area at quite different times, in some as late as 1964 and in others not at all so far. Only three countries have installed research reactors (Iran, Iraq and Israel) and this is reflected in the complexity of their requests for technical assistance, which in general have been for highly specialized experts and sophisticated equipment. In the rest of the area, the application of isotopes and radiation in agriculture and medicine has been of primary concern.

The capacity of the developing countries in both Europe and the Middle East to absorb Agency technical assistance and the distribution of this assistance by type and technical field can be seen in the graphs below.

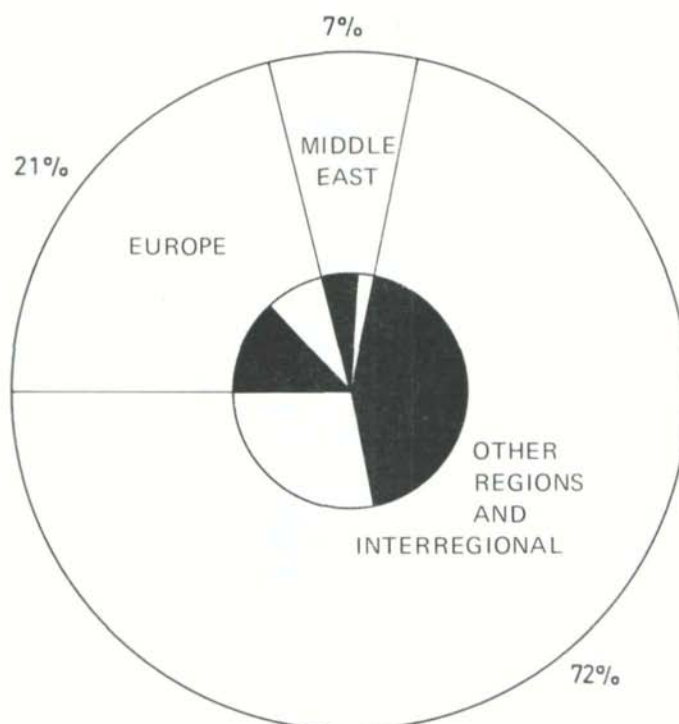
## EUROPE

The financial data given above also include the small volume of assistance — usually in the form of awards for fellowships, scientific visits and attendance at training courses — provided in the early years of the Agency to Member States in Europe which are not considered developing countries, namely, to Austria, Denmark, Finland, France, the Federal Republic of Germany, Italy, Monaco, the Netherlands, Norway, Portugal, Sweden and Switzerland.



Between 1958 and 1974 the Agency awarded 5053 fellowships for individual study, of which 1830 went to European nationals. As for experts, 496 have served in Europe, while the European developing countries themselves have provided 427 experts — out of a total of 1888 experts from all European countries — in support of the Agency's technical assistance programme.

The constantly increasing need for energy and the resultant larger demand for nuclear raw materials to fuel nuclear power stations has prompted many countries to request assistance to develop sophisticated technology and to help in the exploration of uranium, as can be seen from the graph showing the distribution of assistance by field of activity.

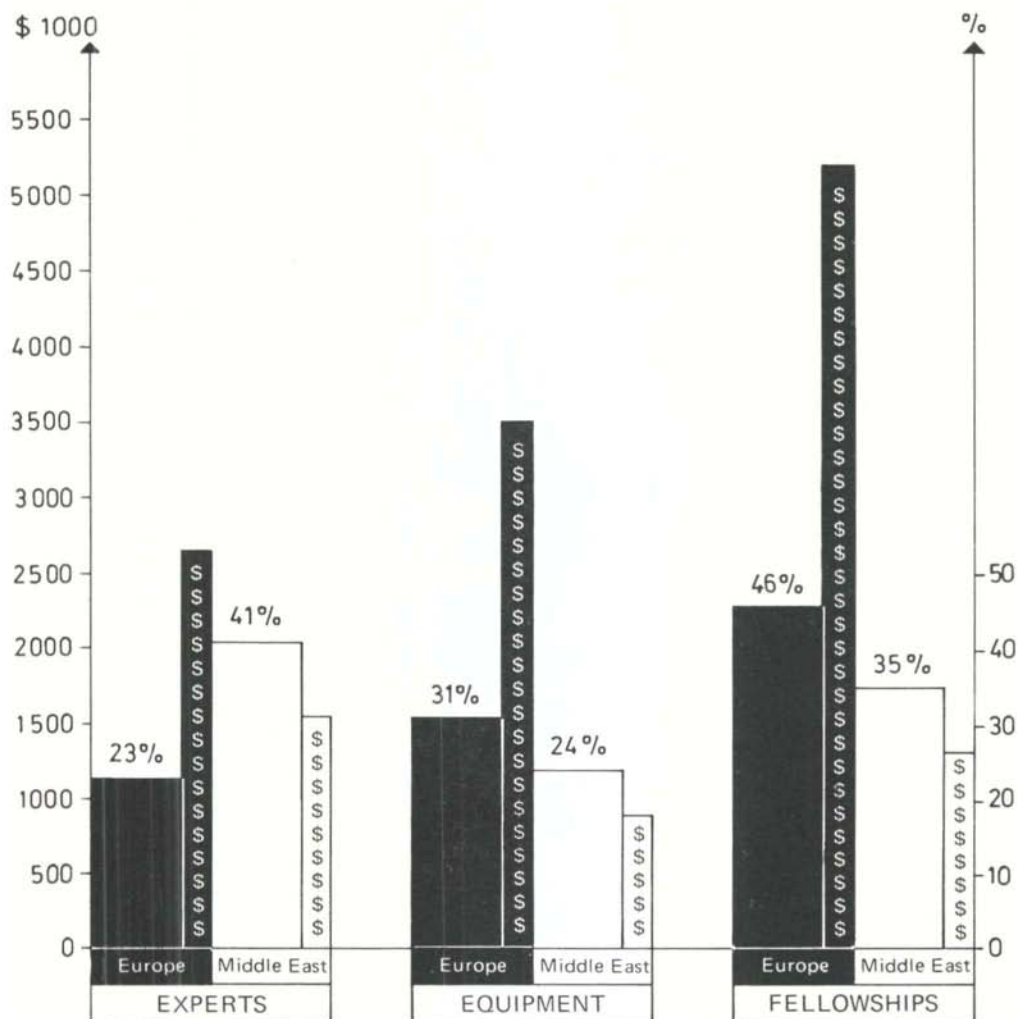
**DISTRIBUTION OF  
TECHNICAL ASSISTANCE BY REGION AND SOURCE:  
1958-1974**



Distribution of technical assistance by source (in thousands of dollars):

INNER CIRCLE	Europe	Middle East	Other regions	Total
 Regular Programme	7136.2	2686.7	23686.7	33509.6
 UNDP	4283.6	1120.0	15200.6	20604.2
TOTAL	11419.8	3806.7	38887.3	54113.8

**DISTRIBUTION OF  
TECHNICAL ASSISTANCE BY TYPE OF ASSISTANCE:  
1958-1974**



	Europe		Middle East	
	%	\$1000	%	\$1000
EXPERTS	23	2679.5	41	1567.0
EQUIPMENT	31	3525.2	24	909.4
FELLOWSHIPS	46	5215.1	35	1330.3
TOTAL	100	11419.8	100	3806.7

## DISTRIBUTION OF TECHNICAL ASSISTANCE BY FIELD OF ACTIVITY: 1973 AND 1974

FIELD OF ACTIVITY e	EUROPE				MIDDLE EAST					
	1973		1974		1973		1974			
	%	\$1000	%	\$1000	%	\$1000	%	\$1000		
General atomic energy development	0.3	3.6	—	—	2.8	8.6	—	0.2		
Nuclear physics	10.1	107.7	7.2	123.3	10.7	32.5	7.3	27.0		
Nuclear chemistry	7.4	79.5	3.7	62.6	8.6	26.2	3.7	13.9		
Prospecting, mining and processing of nuclear materials	12.7	136.4	24.1	411.0	5.4	16.3	2.0	7.5		
Nuclear engineering and technology	25.8	276.6	37.5	640.5	10.0	30.4	18.6	69.0		
Application of isotopes and radiation in	{	agriculture	13.2	141.2	7.2	123.3	38.7	117.8	27.1	100.7
		medicine	7.1	76.1	2.7	46.9	19.5	59.4	29.9	110.9
		biology	3.7	39.0	3.0	51.4	2.3	7.1	2.8	10.2
		other fields	14.7	157.3	10.6	180.9	2.1	6.2	7.9	29.4
Safety in nuclear energy		5.0	53.8	4.0	68.5	(0.1)	(0.3)	0.7	2.4	
TOTAL		100.0	1071.2	100.0	1708.4	100.0	304.2	100.0	371.2	

Typical examples of this trend are the following UNDP-assisted large-scale projects executed by the Agency:

- Establishment of an Institute for Nuclear Technology in Romania;
- Exploration for uranium in Central and East Macedonia and Thrace in Greece; and
- Exploration for uranium in South West Anatolia in Turkey.

The project in Romania has a total UNDP budget of \$1 434 500. The complexity of this project can be better shown with some figures. The plan of operation called for 36 foreign experts and 95 fellowships by May 1975; equipment purchases amounting to \$600 000 and special technical services costing \$352 000 had to be contracted by this time. A unique project in several respects and the largest of its kind ever executed by the Agency, the project aims at providing the Government of Romania with the capability of solving the technological problems associated with the construction of a nuclear power station. The importance given to this plan by the Government can be appreciated by taking into account the size of the Institute of Nuclear Technology which is being built at Pitesti, approximately 100 km from Bucarest, which will also have a materials' testing reactor. The project is an excellent example of European co-operation; in fact, most of the expertise, training and contracted technical services are being provided by European Member States of the Agency. UNDP large-scale assistance is scheduled to be completed by the middle of 1977; however, there are already indications that the Government will request a continuation of the assistance from UNDP during a second phase.

The project in Greece, "Exploration for uranium in Central and Eastern Macedonia and Thrace", was initiated in 1971 and UNDP assistance during a second phase has been approved until the end of 1975. The objectives of the project are to assist the Government to locate and define areas of significant uranium potential in Central and Eastern Macedonia and Thrace, which now require more detailed work before they can be further developed. The total UNDP expenditures by the end of 1974 amounted to \$490 900 as follows: experts, \$378 300; equipment, \$91 600, and training \$21 000. The work has been running smoothly, and although its pace has slowed down recently, it is expected that the project will achieve an important part of its objectives by the end of 1975.

The UNDP large-scale assistance to the project in Turkey is the follow-up of technical assistance provided by the Agency in 1962 under the regular programme. The main purpose of the project is to establish a viable national basis for Government plans to use nuclear power station-generated electricity for the future economic development of Turkey. Assistance valued at \$568 500 was approved by UNDP for the execution of this scheme, which has progressed so far without any problems.

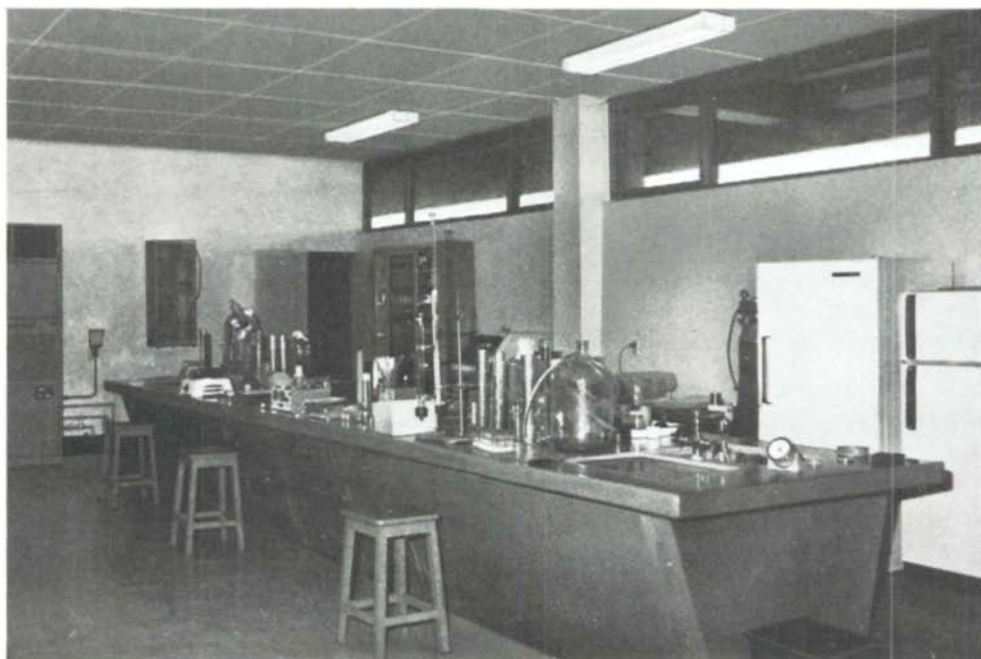
In respect of Agency assistance involving the application of isotopes and radiation two important projects in receipt of UNDP large-scale assistance should be mentioned, one in Yugoslavia: "Nuclear research and training in agriculture" formally completed in December 1966 and scheduled to receive a modest amount of UNDP assistance until the end of 1976, and one in Hungary: "Use of ionizing radiation for the sterilization of medical supplies" which has just started.

Yugoslavia has —as a result of the project— a model institution for agricultural research using nuclear techniques which is now internationally known and co-operates with similar leading organizations in and outside of Europe. Started in 1974, the project in Hungary is



(ABOVE): Equipment to be used at the Institute of Nuclear Technology in Romania is part of the large-scale assistance programme being carried out by IAEA/UNDP. An IAEA expert is helping to install the pellet press (left) and a machine for the contréless grinding of pellets.

(BELOW): A Romanian expert has been working in Bamako, Mali, setting up and assisting in the operation of a radioisotope laboratory in the Central Animal Husbandry Laboratory. The photograph shows equipment in the laboratory supplied by the IAEA.



intended to determine the economics of a modern facility for the radiosterilization of medical products, and the demonstration plant is expected to be operational by 1977. The total UNDP contribution to this project is \$594 000.

## MIDDLE EAST

Almost all the projects assisted by the Agency in the Middle East have been successful, but a few deserve special mention because of their particular importance to the country concerned: For example, in Iran the establishment of an important facility for the study of environmental isotopes and their application in hydrology was assisted in particular by the Federal Republic of Germany, and this aid is still continuing under bilateral arrangements; in Iraq the modification and upgrading of their research reactors was made possible with special assistance from the Soviet Union; in Israel sedimentation studies along the coast were conducted in co-operation with and received valuable support from the Commissariat à l'Energie Atomique de France.

This outline appears to be rather modest in terms of activities assisted and money spent, as so far it has involved the provision of only 199 experts to the Middle East countries and the granting of 366 fellowships. The recipient countries themselves, however, have provided 57 experts in support of the Agency's technical assistance programme and accepted 39 Agency fellows for training. Moreover, the situation as regards the nuclear energy field can soon be expected to change considerably in the Middle East. Iran, for example, has decided to construct several power reactors within the next few years and has established the Atomic Energy Organization of Iran to deal with the problem of investing in a very limited period of time several billion dollars for the establishment of nuclear power stations. Although a small project in terms of money, the Agency has assisted Iran by providing an expert to advise the Government on its planning to build power reactors —this is probably the most challenging expert post that the Agency has ever filled. At the end of his IAEA six-month contract, the expert was requested by the Government to remain in their employ.

There are indications that Kuwait and Saudi Arabia are studying the possibility of "going nuclear". The foremost need in all these cases will be for massive technological staff training and experts' advice, and the IAEA can play a very important role in assisting these countries in furthering their plans. However, due to the limited resources available to the Agency for technical assistance, it is hoped that they will provide the necessary funds for organizing that part of their programmes.