

THE PROVISION  
OF TECHNICAL ASSISTANCE  
BY THE AGENCY  
WITH SPECIAL REFERENCE  
TO 1974

Report by the Director General

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List of abbreviations

Agency	International Atomic Energy Agency
CERN	European Organization for Nuclear Research
IAEA	International Atomic Energy Agency
ILO	International Labour Organisation
MW(e)	Megawatt (electric)
SIDA	Swedish International Development Authority
Trieste Centre	International Centre for Theoretical Physics at Trieste
UNDP	United Nations Development Programme
U <sub>3</sub> O <sub>8</sub>	Uranium oxide
<hr/>	
Cameroon, U. R.	United Republic of Cameroon
German D. R.	German Democratic Republic
Germany, F. R.	Federal Republic of Germany
Korea, R.	Republic of Korea
Libyan A. R.	Libyan Arab Republic
Syrian A. R.	Syrian Arab Republic
Tanzania, U. R.	United Republic of Tanzania
USSR	Union of Soviet Socialist Republics
UK	United Kingdom of Great Britain and Northern Ireland
USA	United States of America

NOTES

1. All sums of money are expressed in United States dollars.
2. The technical assistance described in this report is classified under the following ten fields of activity:

<u>Code</u>	<u>Field of activity</u>
0	General atomic energy development
1	Nuclear physics
2	Nuclear chemistry
3	Prospecting, mining and processing of nuclear materials
4	Nuclear engineering and technology
5	Application of isotopes and radiation in agriculture
6	Application of isotopes and radiation in medicine
7	Application of isotopes and radiation in biology
8	Other fields of application of isotopes and radiation
9	Safety in nuclear energy

## Part 1. INTRODUCTION

1. Following its usual practice, the Board of Governors has requested the communication to the General Conference of the material it used in reviewing the provision of technical assistance by the Agency, with special reference to 1974; this material is accordingly reproduced in the present document. The review was carried out pursuant to paragraph 20 of the Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the Agency. [1]

2. The use of the resources placed at the Agency's disposal, in the form of voluntary contributions, gifts in kind, multi-bilateral funds, and UNDP funds for small- and large-scale projects, for the provision of technical assistance is reviewed in this document.

3. The three principal elements of the technical assistance provided are expert services, equipment and fellowships. The main objectives of the assistance are to promote the transfer of skills and knowledge relating to the peaceful uses of atomic energy, to support the efforts made by recipient countries to carry out their atomic energy activities more efficiently and safely, and to ensure that the knowledge acquired can continue to be applied after the provision of assistance by the Agency has been completed. The achievement of the latter objective, however, depends largely on the ability of Governments to make adequate facilities available and to recruit and retain the requisite number of qualified staff.

4. In 1974, 74 countries and one regional organization received technical assistance in one form or another from the Agency, as shown in Fig. 4B and Table 7 [2]. Almost 80% of all assistance provided related to nuclear engineering and technology, the application of isotopes and radiation in agriculture, to prospecting, mining and processing of nuclear materials, to the subjects covered by the classification heading "Other fields of application of isotopes and radiation" and to medicine.

5. The assistance, including assistance in kind, was provided through the services of 277 experts, lecturers and visiting professors, the supply of equipment to a value of about \$2 740 000, and 631 fellowship awards for individual study, scientific visits, a study tour and other short-term training projects.

6. The resources allocated for carrying out the Agency's 1974 technical assistance programme amounted to approximately \$7 810 000 (Table 1), whereas the total value of the technical assistance actually provided in 1974 was about \$6 737 000 (Tables 4 and 7), which includes payments against 1974 and prior years' obligations, as well as assistance in kind, and represents an increase of \$970 000 or about 12% over the sum of \$5 767 000 provided in 1973 (Table 4), but does not include the unliquidated obligations and assistance in kind outstanding at the end of the year.

7. As in earlier reports on the provision of technical assistance by the Agency [3], details are given below regarding activities in which developing countries have shown special interest in 1974, followed by information concerning, among other matters, revised UNDP procedures relating to the technical assistance financed under that programme.

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[1] GC(IV)/RES/65, Annex.

[2] The principal statistical tables are given in Annex I to this document.

[3] See, for example, document GC(XVIII)/INF/148, which provides information in paragraphs 8-23 on the use of nuclear techniques in agricultural research, another major area of interest to Governments.

A. TECHNICAL CO-OPERATION ACTIVITIES IN WHICH GOVERNMENTS  
HAVE SHOWN SPECIAL INTEREST

1. Nuclear power

8. As pointed out in last year's report, a large increase in the volume of requests for assistance directly related to the implementation of nuclear power programmes and projects can be expected in the future.[4] In spite of the normal time lag between the receipt of a request and the provision of assistance, the validity of this assumption was already evident in 1974 when the number of fellowship awards and experts provided for subjects related to nuclear power was more than double the corresponding figures for 1973.

9. At the same time there has been a marked increase in the number of requests for advisory services in respect of nuclear power programme planning. During 1974 the Agency concluded three nuclear power planning studies (for Bangladesh, Iran and Pakistan) and initiated a fourth one (for Indonesia). By the end of 1974 two additional studies had been requested (for Venezuela and Viet-Nam). These studies involve the use of sophisticated computer programs for analysis and for the optimization of electric power system expansion, developed from the methodology used in the Agency's Market Survey for Nuclear Power in Developing Countries (1973 and updated in 1974).

10. The study is usually made together with representatives of the requesting country, which is asked to send two engineers to the Agency's Headquarters to participate in the work and receive training in the methodology and the use of the computer programs. These programs can later be used in the home country for updating the study. Training in the methodology of carrying out nuclear power planning studies using the computer programs, or modified versions thereof, has also been given independently at the Agency's Headquarters to engineers from five developing countries.

11. Some UNDP offices in the field have indicated interest in supporting the acceptance of requests for UNDP financial assistance to carry out nuclear power planning studies and the pre-investment feasibility studies which would logically follow as the next step.

12. While these activities have been directly in support of the initiation of a nuclear power programme and the first nuclear power project in the developing countries, a broader-based programme of education in nuclear power management and engineering was drawn up in 1974 and will be initiated as a long-term project beginning in 1975. Recognizing the need for the training of key management staff in nuclear power engineering and licensing organizations, the first part of this programme, a major training course of 15 weeks' duration on nuclear power project planning and implementation, will be launched in autumn 1975 at the Karlsruhe Nuclear Centre in the Federal Republic of Germany, financed under the Agency's regular programme. Very thorough preparations for this course were made in 1974 with the help of consultants and an advisory group. It is intended that this course will be repeated in 1976 not only in the Federal Republic of Germany, but also in France and in the United States.

13. Another activity within the overall training programme aims at explaining the administrative, technical and economic problems likely to be encountered in connection with the introduction of nuclear power in a country, to senior Government officials who will participate in the making of early decisions on the nuclear power programme. To accomplish this a series of, possibly annual, two-week seminars will also be initiated in 1975, under UNDP auspices. In addition, to supplement the training programme for engineers in the reactor construction project organizations, regional training courses will be conducted which will have a more direct technical and economic content, for example, in regard to project management, plant reliability and quality assurance programming.

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[4] Ibid., paras 24-40.



14. One major obstacle to the early introduction of nuclear power in many developing countries is the difficulty of obtaining standardized and proven nuclear power stations in the electricity-generating range of 100-400 MW(e). Through a series of advisory group meetings, the latest of which was held in November 1974, the Agency is trying to identify the possible options to overcome this obstacle. Possibilities under consideration are the joint purchase by several countries of a series of identical nuclear power generating units in the 100-400 MW(e) range or the scaling down of larger capacity units which have been proven in industrialized countries.

15. Once decisions have been made in respect to the type of reactor to be built, its electricity generating capacity and the fuel cycle, the Agency is able to provide assistance relating to numerous additional aspects, for example, the design and quality control testing of reactor components and fuel elements manufactured locally, extending to dosimetry trials during the pre-commissioning and power generating phases of reactor operation.

16. Assistance is also available from the Agency at all stages of nuclear power planning, reactor construction and operation with regard to safety aspects, for example, in setting up the necessary body of legislative and regulatory codes governing nuclear power station construction and operation, the selection and evaluation of power station sites, and safety reviews in respect of reactor construction and operation. The Agency's assistance is usually provided in the form of training and the assignment of experts either singly or in teams. For example, one expert has been on duty in the Republic of Korea since mid-1973 to advise the Government on various safety aspects in connection with a nuclear power station scheduled to be commissioned in 1976, whereas the dispatching of Agency siting missions composed of several specialists usually involves visits of 2-3 weeks in duration.

17. Through advisory services and technical co-operation projects the Agency is intensifying its efforts to assist the developing countries embarking on nuclear power programmes. The Agency's aim is to promote countries' self-sufficiency in reactor safety matters, through well designed individual and group training programmes and the provision of expert guidance on the creation and administration of adequate regulatory codes. In addition to on-going technical assistance activities related to routine health and safety procedures in individual countries and organized on a regional basis, an interregional training course on nuclear energy regulation will be conducted in 1975 and a course on regulatory requirements and nuclear plant safety is being planned for 1976 for countries in the Asia and Far East region. Furthermore, study tours and additional training courses are being planned to meet the needs of developing countries in all regions in the years ahead.

## 2. Uranium exploration

18. The reassessment of electricity generating costs has recently led some developing countries earnestly to consider the early introduction of nuclear power, while others are expanding their nuclear power programmes. The dynamics of these rapid changes in energy supply plans is exerting an irreversible pressure on uranium exploration and development activities throughout the world, but especially in the developing countries. It is also more evident than ever before that the discovery and exploitation of nuclear raw materials - primarily uranium - can have a significant impact on a country's economy, seen in the light of the requirements for uranium in the world during the next few decades. In regard to the world situation, the overriding factor in determining the future demand for uranium is the rate of installation of nuclear power plants for the generation of electricity. Nuclear power production began on a commercial scale approximately 14 years ago and, by the end of 1974, 65 000 MW(e) of nuclear power generating capacity had been installed. This represents only 4-5% of the world's total electricity generating capacity, but it is estimated that there will be an installed nuclear power generating capacity of over 1 000 000 MW(e) by 1990 and that 55% of all electric energy in the world will be produced by nuclear power stations by the year 2000. Converting this production into terms of uranium ore needs it is estimated that there will be a cumulative requirement by 1990 of about 1 800 000 short tons of  $U_3O_8$  and of approximately 4 000 000 short tons ten years later. To meet this demand the annual rate of new uranium ore discoveries will have to

rise from the present yearly average of 80 000 short tons of  $U_3O_8$  to 300 000 short tons in 1990 and to nearly double the 1990 rate by the year 2000. This presents a huge challenge to the geological, exploration and mining professions, and a sum of the order of 17 000 million dollars may be required for uranium exploration up to the end of this century.

19. At the present time only 18 countries are known to have reserves exceeding 1000 short tons of  $U_3O_8$  which can be exploited at relatively low cost, and about 95% of these "low-cost" uranium reserves is located in seven, mainly advanced countries. This situation almost certainly reflects the amount invested by countries in uranium exploration, and it is known that the amount of funds invested for this purpose in developing countries over the last 25 years has been relatively small in comparison with the total investment. Future requirements for uranium are certain to change this situation, especially as many geologically favourable areas remain to be explored in developing countries. These countries could benefit in two ways if economically exploitable uranium deposits were found within their territories, first by utilizing their own uranium resources to fuel nuclear power stations, and secondly through commercial export of uranium to countries in need of nuclear power and whose indigenous uranium resources appear to be deficient. Until the end of 1973 uranium supply contract costs were generally low (US \$6-8/pound of  $U_3O_8$ ). The current energy supply problem and the substantial rises in petroleum prices have also affected uranium prices; forward supply contracts were agreed during 1974 frequently at more than double the cost prevailing in 1973. The expectation is that considerable new exploration activity will be stimulated and that commercial organizations will take an increasing interest in obtaining uranium exploration and exploitation concessions in the developing countries.

20. In all of these activities the Agency is able to provide advisory services and technical support (expert services, equipment and supplies, and fellowship training) for technical assistance programmes on uranium exploration and development on request. The subjects covered by this assistance and these services range from initial geological assessments of an area or a country in regard to its potential for uranium occurrence to uranium ore processing techniques. Frequently initial advisory missions are concerned with the discussion of the basic requirements for carrying out exploration programmes and with defining technical assistance requests.

21. During 1973-74 the Agency arranged for the provision of services by experts with a wide variety of skills, such as geologists skilled in the exploration for sedimentary-type uranium deposits, geochemists for regional uranium geochemical surveys, geophysicists with expertise in installing aerial radiometric survey equipment in fixed-wing aircraft and helicopters and in operating it over what is frequently very difficult terrain, mining engineers to estimate uranium ore reserves and the cost of exploitation of deposits, laboratory managers to organize and operate analytical facilities for uranium ore samples, ore processing chemical engineers to assess difficult or unusual ore bodies, and specialists with skills such as the know-how needed for the bacterial leaching of uranium ores. The range in the type of equipment supplied for technical assistance projects has also been great, including radiometric detection instruments for ground and aerial surveys, radon-soil-gas-detection instruments for the location of hidden uranium ore bodies, laboratory instruments, vehicles, truck-mounted drills, bulldozers to make roads to exploration sites as well as water tankers and camping equipment to support the work at remote uranium exploration sites. In 1973-74 the Agency assisted 15 small- and three large-scale projects in uranium exploration and development; it is likely that two new large-scale projects will soon be added to this list.

22. Two new types of activity were initiated in 1974, the first being a pre-production feasibility study for the Argentine Government on the Sierra Pintada deposits in Mendoza Province. The work is being done under a subcontract by a recognized mining engineering consultancy firm and involves an integrated study by a mining engineer, a mining economist and an ore processing expert of all the development work done by the Argentine Atomic Energy Commission preparatory to the financing of the mine and mill production facilities. The second new activity calls for the provision of a consultant to assist a developing

country in the preparation of documentary material to attract exploration and exploitation bids from commercial mining companies for concession rights to work a known uranium-bearing area. The consultant will also assist the Government in selecting a suitable concessionaire.

23. In addition to providing technical assistance at the country level, the Agency continued its programme of regional training by holding a course in 1974 on uranium prospecting and ore evaluation, in co-operation with the Atomic Minerals Division of the Department of Atomic Energy of India, for 15 geologists and mining engineers from the region. An inter-regional training course on the more specialized subject of geochemical surveying for uranium is planned for 1975, as is a uranium prospecting and ore evaluation training course for participants from countries in Europe, the Middle East and countries bordering on the Mediterranean Sea, for 1976.

### 3. Industrial applications of nuclear technology

24. The adaptation of the use of nuclear technology in industry to meet local requirements can greatly increase the production potential of the developing countries that have a strong scientific infrastructure and go to great lengths to sustain domestic light and medium-scale industries. The use of much of this technology is relatively inexpensive; on the other hand, doing without it may prove to be costly in terms of the financial loss represented by wasted labour and raw materials because of, for example, goods which cannot be sold or machines that break down due to defects. The introduction of nuclear technology for exploitation by local industry and civil works administrations can also contribute towards making more effective use of the existing scientific infrastructure in a country. It is possible that some research institutes are already staffed by personnel qualified to provide services for which various branches of industry are not equipped. For example, some individuals may already have received training in radiography and merely lack the equipment with which the reliability of welded joints and connections on bridges and pipelines can be inspected during the pre-commissioning stage. In addition, countries with research reactors can draw on the staff of these facilities for advice on and valuable assistance in respect of hundreds of worth-while applications of nuclear technology in industry and other sectors.

25. In paragraphs 68, 72, 74, 76 and 78 below a brief description is given of the five projects in the industrial application of nuclear technology which are receiving UNDP large-scale assistance through the Agency: two for the radiosterilization of medical supplies, one for the radiation curing of the surface coating on plywood, one for the radiation curing of textiles and plastic materials and one for work in non-destructive testing and quality control techniques. In addition, over the past ten years, small-scale assistance has been provided by the Agency for 55 projects in 25 countries and to ten intercountry projects (a regional adviser to 15 countries in Asia and the Far East region, a regional adviser to ten countries in the Latin America region, two interregional study tours, three interregional and four regional training courses), as can be seen from the chart below. Small-scale assistance for 11 more projects has already been approved, but has not yet been provided. The assistance which the Agency has been called upon to provide, has been in six main areas: in the use of nucleonic gauges, radiography, the use of tracer techniques, the use of nuclear analytical techniques, radiation processing, and the production of radiation sources.

#### (a) Nucleonic gauges

26. These gauges are fitted with a radiation source which, together with a detector, makes it possible to measure and weigh products, and control the flow of materials. Some typical applications are: to control the volume of food, beverages and other products filled into containers; to monitor for and maintain a pre-determined thickness of paper, plastic film or sheets of metal; to carry out moisture and density measurements of concrete and soils during the construction of highways and dams; to control the level of raw materials in

EXPERTS AND EQUIPMENT PROVIDED BY THE AGENCY  
FOR THE INDUSTRIAL APPLICATION OF NUCLEAR TECHNOLOGY  
(1965-1974)

LOCATION	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	NUMBER OF EXPERTS	EQUIPMENT (US \$)	LEGEND
ARGENTINA	GA			GA		HRP		RP 2 NT		IP	7	54 536	<p>— = ONE-EXPERT MISSION</p> <p>2 — = TWO-EXPERT MISSION</p> <p>▨ = UNDP LARGE-SCALE PROJECT</p> <p>■ = INTERCOUNTRY PROJECT</p> <p>* = EQUIPMENT PROVIDED; EXPERT NOT NEEDED OR NOT YET SENT</p> <p>••• = PREPARATORY ASSISTANCE (1-3 CONSULTANTS) TO A UNDP LARGE-SCALE PROJECT</p> <p>GA = GENERAL APPLICATIONS</p> <p>IP = RADIOISOTOPE PRODUCTION</p> <p>NA = NUCLEAR ANALYTICAL TECHNIQUES</p> <p>NG = NUCLEONIC GAUGING</p> <p>NT = NON-DESTRUCTIVE TESTING</p> <p>PS = POLLUTION STUDIES</p> <p>RP = RADIATION PROCESSING</p> <p>SM = RADIOSTERILIZATION OF MEDICAL SUPPLIES</p> <p>TT = TRACER TECHNIQUES</p>
BOLIVIA										NA 2	2	27 801	
BRAZIL						TT		PS RP	PS		4	10 279	
BULGARIA									GA	GA * RP *	1	53 423	
CHILE				NG							1	9 700	
COLOMBIA				NGH		TT	NG	NT			4	70 450	
CUBA								RP *	*	*	—	31 168	
EGYPT				HGA							1	—	
GUATEMALA		NT			TT				GA		3	16 096	
HUNGARY								SM *	NT *	SM *	2	159 691	
INDIA					SM	•••••	••	NG			8	582 445	
INDONESIA					NT			HRP RP *	NT *	*	2	26 109	
IRAQ						TT					1	—	
ISRAEL				TT						SM RP *	2	17 538	
KOREA, R.						RP				RP ••	3	132 117	
MEXICO	GA									RP	2	—	
MOROCCO										NA	1	—	
PHILIPPINES								RPH	PS RP		3	17 967	
SINGAPORE				GA	NG	TT	NTH	PS	RP NG		7	51 351	
THAILAND				NT				NA			3	14 000	
TUNISIA									NG *	*	—	13 335	
TURKEY					NG	NG 2		NG			4	25 559	
URUGUAY								RPH			1	21 031	
VENEZUELA								RP		RP	2	33 702	
YUGOSLAVIA					RP						1	7 117	
REGIONAL ADVISERS				GA	GA						2	—	
STUDY TOURS		GA				GA					8	—	
TRAINING COURSES		GA		GA		RP	TT NT		TT	NA	34	19 244	
EXPERTS ON DUTY EACH YEAR	2	13	—	10	7	21	25	15	20	19	109	1394 659	
	TOTAL												

coke ovens and in blast furnaces; and to control the moisture content in products, such as paper, during the manufacturing process. Assistance of this kind has been provided to Chile, India, Singapore, Tunisia and Turkey.

(b) Radiography

27. In addition to the radiography applications mentioned above, this technology can also be used to inspect the welding done in connection with shipbuilding, the construction of power plants and refineries, as well as for the fabrication and repair of pressure vessels. This technology is also used for quality control and safety inspections of aircraft engines and turbines, including those used in hydroelectricity generating stations, and of internal combustion engines and other equipment. Assistance of this kind has been provided to Brazil, Indonesia, Singapore and Thailand.

(c) Tracer techniques

28. This technology constitutes a much-used tool in industry because its use makes it possible to detect the movement of materials instantaneously. Much of this work is done on a customer-service basis by the staff of nuclear research reactors, who also produce the short-lived radioisotopes needed therefor. In industry this technology is used primarily to check the flow of materials and to undertake "trouble-shooting" in manufacturing processes. In chemical factories and refineries for petroleum products these techniques are used to detect leaks and to monitor the flow path of products. Processes calling for the blending of raw materials, on the other hand - for example, in rubber formulation and in the manufacturing of chemicals, petroleum products and feeds for livestock - can be investigated to ensure consistent quality, resulting in significant time and labour savings. Other routine uses to improve the efficiency of plant operations include the monitoring of the transit time of raw materials in, for example, cement kilns, glass furnaces and wood-pulp digesters. Assistance of this kind has been provided to Brazil, Bulgaria, Guatemala, Iraq and Singapore.

(d) Nuclear analytical techniques

29. Much of the work done under this heading is referred to as "activation analysis", but X-ray fluorescence is also an important technique. These techniques are useful in the quantitative analysis of the composition of alloys, cement, glass and various other products and are also used in mineral exploitation work to assay ore samples. Furthermore, Governments wishing to protect the environment can obtain factual data on the purity of the air and water and on the quantities of pollutants that are discharged into the biosphere through the use of these techniques. Nuclear analytical techniques are also used in other industrial processes, including the analysis of the sulphur content in petroleum, of halogenated hydrocarbons and of organic phosphates in various commercial products. Assistance of this kind has been provided to Bolivia, Colombia, Morocco and Thailand.

(e) Radiation processing

30. Most of the assistance provided by the Agency for radiation processing projects in developing countries has been for the irradiation sterilization of medical supplies involving the use of a cobalt-60 source. A demonstration plant in India was commissioned at the end of 1973 to sterilize locally-made products such as absorbent cotton and gauze, disposable syringes, blood donor and infusion sets, and surgical sutures; all of these products and many more are currently being processed, and the volume of sterilized goods continues to expand. Similar plants are being constructed in Hungary and the Republic of Korea with the Agency's assistance, and it is likely that another country will soon request the Agency's help in this area. The use of this technique makes it possible to process goods which are sensitive to heat or chemicals and, therefore, cannot be sterilized by using conventional methods. As these products can be packaged before being irradiated they retain their sterile status for a long time, and this fact has been instrumental in promoting the wide acceptance of single-use, disposable medical products because of their proven superior hygienic quality. Assistance of this kind has also been provided to Argentina, Israel and the Philippines.

31. Other industrial processes in which this technology can make a decisive contribution is in the production of wood-plastics and similar composite materials that take on new properties; one example of these is the manufacture of abrasion-resistant parquet flooring. Electron beam accelerators are also used extensively to cure surface coatings on wood panelling, to make crease-proof fabrics, and to cross-link plastic materials; the last of these constitutes an important step in the production of, for example, heat-resistant cable insulation and shrinkable plastic films for food packaging. As the processing energy required for this work is only a fraction of that needed for doing the same work by conventional means, electron beam processing can be expected to play a more prominent role in the chemical industry in the future. Assistance of this kind has been provided to Cuba, Indonesia, the Republic of Korea, the Philippines, Singapore, Venezuela and Yugoslavia.

(f) Production of radiation sources

32. The Agency has provided technical assistance, for example, to Argentina to help in the production of cobalt-60 in a research reactor for use as radiation sources in radiography equipment, for medical therapy, and for radiosterilization plants. Of course, these sources can be used for many other applications in industry (see the preceding paragraph) and in agriculture (for example, in the disinfestation of grains and fish, in the production of radiation-attenuated vaccines, and in plant mutation breeding studies).

33. It was originally assumed that the growth in the use of nuclear technology in the developing countries would be in direct proportion to their progress in the establishment of new industries. Although this assumption is certain to retain its validity in most cases, the early introduction of nuclear power in numerous countries that are deficient in fossil fuels and hydroelectric energy sources will greatly accelerate the rate at which nuclear techniques will be adopted for routine use, especially in industry. In this regard, radiation processing, non-destructive testing and process control techniques involving the use of nuclear technology can be expected to figure prominently in the advances made in the industrial sector. The Agency is willing and able to provide advice, training and equipment for all of these applications, should it be called upon to do so.

#### 4. The use of nuclear techniques in hydrology

34. Despite the tremendous strides in science and technology during the last century, man is still engaged in a quest for water to meet his daily needs. An expanding world population spurred by the desire for a higher standard of living and the resulting requirement for more fresh water for domestic, industrial and agricultural uses indicate that the need to increase the available supply of water on a global basis will continue to be urgent in the years ahead. In many parts of the world and particularly in areas that are largely dependent on precipitation to meet the basic domestic and agricultural water requirements, hardships of devastating proportions are endured during periods of drought such as occurred in Africa in recent years. The need for the development of additional supplies of water is not confined to arid regions but exists in temperate regions as well, especially when little is known about the possibility of the replenishment of the water used and the time it takes for this to occur. With the increasing demand and competition for water it has become progressively more difficult to cope with water supply problems.

35. A vast array of highly sophisticated techniques has been developed in recent years, including the use of environmental and artificial isotopes for tracing and dating water, to help solve vital hydrologic problems. The value of the use of nuclear techniques in hydrologic investigations has received widespread acceptance in the developing countries as a result of the Agency's technical co-operation activities. Most of the Agency's assistance has been provided in the form of experts sent individually or in teams to review hydrologic programmes and the adequacy of the laboratory facilities of countries wishing to establish or increase their capability in water resource investigations. The

primary objective of this assistance is to help develop a local capability, through training, in the application of nuclear techniques. Designed to complement on-going water resource investigations, the demonstration of these techniques usually includes studies to determine the origin of ground water, its age, flow velocity and direction, interconnections between surface water and ground water or the mixing of water in different aquifers and studies on related problems. Support to institutions in developing countries engaged in evaluating water resources has been and will continue to be a fundamental activity of the Agency.

36. One area of investigation in ground water hydrology in which environmental isotopes have been employed with much success has been in defining ground water flow dynamics in karst regions. Most drainage from these regions is through subterranean channels that are often not linked up with drainage basins defined by topography, and therefore quantitative evaluation is not readily possible by using conventional hydrologic methods. Consequently, large areas of the globe dependent on ground water recharge from karst aquifers frequently experience water shortages, because of the difficulty in defining and effectively exploiting available water resources.

37. Isotopes have been used to define the parameters of many of these aquifers by establishing the source and area of recharge, the age and transit time of water in the aquifer and the volume of water in storage. In Lebanon, for example, isotopes were used to determine the source of fresh water supplying submarine springs discharging into the Mediterranean Sea. In Jamaica, Mexico and most countries bordering on the Mediterranean Sea, isotopes have been used to determine the origin of ground water in, and its transit time through, carbonate aquifers and to define the source and extent of recharge areas. The success obtained in using isotopes as tracers to determine flow dynamics has increased the use of nuclear techniques in such studies, and in many countries the application of these techniques is fast becoming a routine procedure.

38. The application of nuclear techniques as a supplemental tool in studies of sediment transport is another area that has received increased attention in recent years. Since 1970, nuclear techniques have been used in the study of sediment movement in streams and in the littoral drift along coasts and in dealing with a wide variety of problems related to the siltation of harbours, navigation channels, lakes and reservoirs. The determination of sediment movement is a major problem in hydrology and hydraulic engineering and is of fundamental importance in such diverse activities as dredging, site location, construction and maintenance of dams, reservoirs, harbours, channels, canals and other costly engineering works. Millions of dollars are spent annually to maintain navigable waterways and harbours, for the removal of sedimentary deposits from docks, water intakes of hydroelectric and nuclear power stations, the protection of river banks and sea shores, and for studies of the movement of silt and pollutants from dump sites and spoil grounds. The increased number of technical assistance requests for experts, equipment and training in this highly specialized area not only indicates the ever growing awareness of the potential value of the application of nuclear techniques in solving these problems but also reflects the shortage of the required equipment and skilled personnel. During the last few years the Agency provided experts, training and equipment for tracer measurements of sediment movement and hydrodynamic studies in estuaries and harbours in Brazil, Indonesia, Israel and the Philippines. It is likely that a larger share of the Agency's aid resources will be needed in the future to meet the growing demand for technical assistance in conducting sediment transport studies.

## B. OTHER DEVELOPMENTS

39. The role of the UNDP resident representative in the overall management of the assistance provided under that programme is becoming increasingly important, and there is a tendency to transfer additional functions from UNDP Headquarters to its offices in the field. In respect of project approvals the UNDP resident representative has been given the authorization to approve small-scale assistance requests (up to \$150 000 as

from January 1975). Furthermore, the concept of "approval in principle" of requests for large-scale assistance has been put into practice to speed up the project formulation-approval procedure; this means that advance information is sent from a UNDP resident representative's office to UNDP Headquarters, giving an outline of a proposed project and a tentative budget. Where UNDP Headquarters finds no need to modify the proposal from the substantive point of view, it may give its approval of the project in principle. If this approval is given, the UNDP resident representative can continue the formulation of the project with the Government and the executing agency without any further involvement of UNDP Headquarters.

40. The Agency was represented in the meetings of the UNDP-organized Working Group on Administrative and Financial Matters at which further changes in UNDP policies and procedures were discussed. Some new procedures went into effect on 1 January 1975; for example, the office of the UNDP resident representative is now the focal point for project programming and the monitoring of field operations of all projects assisted by UNDP. Furthermore, the UNDP resident representative now signs all project documents on behalf of UNDP and issues all project budgets, irrespective of whether the projects are approved by him or at UNDP Headquarters. Thus he alone will be responsible for authorizing executing agencies to commit funds for project implementation. Also, the office of the UNDP resident representative is now the official source of information for the executing agencies on project approvals and revisions. The only exception is in respect of intercountry (regional, inter-regional and global) projects, where responsibility for approving such projects and issuing authorizations to commit funds remains with UNDP Headquarters.

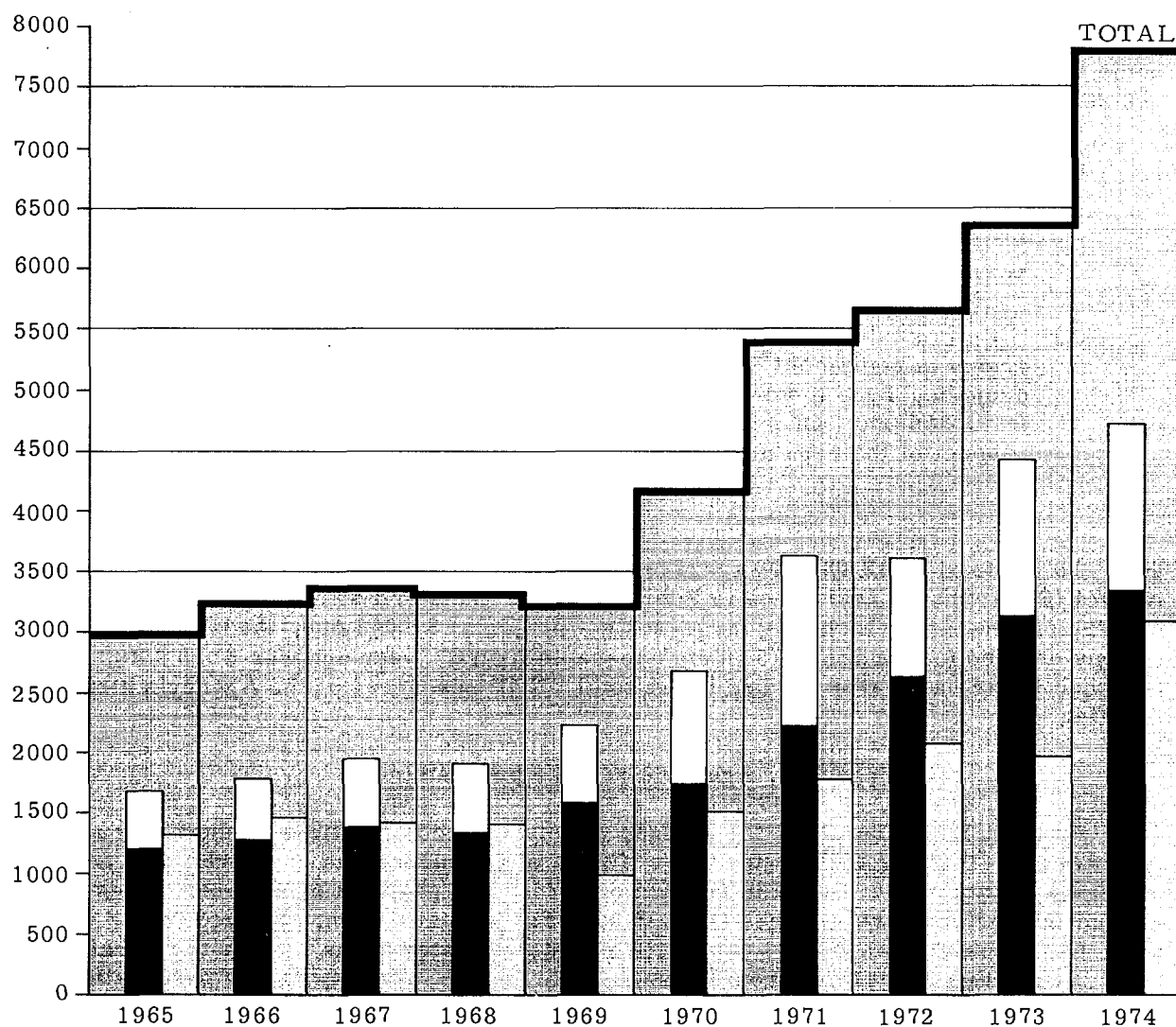
41. A recent development in connection with the Agency's provision of UNDP-financed assistance is the introduction of the concept of cost sharing, whereby the recipient country agrees to make a cash contribution in United States dollars - in addition to its counterpart contribution - thus reducing the amount needed from UNDP resources. A special contribution of this kind has been made by the Government of Greece in connection with a nuclear raw materials exploration project.

42. For many years UNDP projects executed by most United Nations organizations - excluding the Agency - have been assisted by "associate" experts, persons whose services are made available cost-free by donor Governments, in association with a senior expert. Usually under thirty years of age, associate experts are qualified graduates in their particular area of specialization and may have had some years of post-graduate experience. The purpose of a team assignment of this kind is to provide field experience for the associate expert and to release the senior expert from routine tasks such as conducting low-level in-service training and carrying out basic laboratory tests. The first associate expert attached full-time to an Agency-executed programme was assigned to a project in West Africa where he assisted in radiochemistry research work and training to the satisfaction of all parties concerned. It is expected that a second associate expert will be made available in 1975 in connection with an Agency-assisted project at a university in North Africa and that the number of associate experts will increase in future.

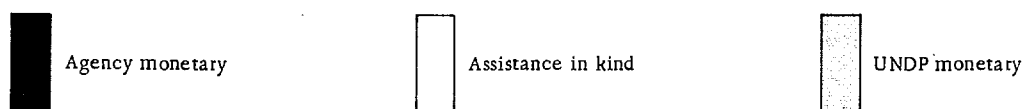


FIGURE 1

RESOURCES AVAILABLE FOR  
AGENCY TECHNICAL ASSISTANCE PROGRAMMES: 1965-1974  
(in thousands of dollars)



Agency monetary	1200	1263	1380	1348	1586	1749	2224	2636	3123	3344
Assistance in kind	497	528	570	565	658	932	1410	968	1297	1389
UNDP monetary	1317	1462	1431	1422	981	1513	1775	2072	1964	3082
<b>TOTAL</b>	<b>3014</b>	<b>3253</b>	<b>3381</b>	<b>3334</b>	<b>3225</b>	<b>4194</b>	<b>5409</b>	<b>5676</b>	<b>6384</b>	<b>7815</b>



## Part II. ANALYSIS OF THE ASSISTANCE PROVIDED

### A. AVAILABLE RESOURCES

#### 1. General

43. The resources available to the Agency in 1974 for the provision of technical assistance came to \$7 815 000 (see Fig. 1 and Table 1), which is 22.4% higher than the figure for 1973 (\$6 384 000) and is made up as follows:

- (a) UNDP, \$3 081 600 in cash: \$845 300 for small-scale projects and \$2 236 300 for large-scale projects;
- (b) Income to Operating Fund II, including voluntary contributions of Member States transferred from the General Fund, \$3 344 000; and
- (c) Gifts in kind (services of cost-free and partly cost-free experts, grants of equipment in support of approved technical assistance projects, Type II fellowships and training course stipends) valued at \$1 389 000. Of this total, \$1 358 000 was made available in respect of the regular programme and \$31 000 for UNDP projects.

#### 2. UNDP

44. To the total of \$3 081 600 spent by the Agency to carry out the UNDP field programme in 1974 (\$304 000 for assistance to intercountry projects and \$2 777 600 for assistance to country programme - including large-scale - projects) \$1 043 600, the unliquidated obligations carried forward to 1975 (the comparable figure a year ago was \$928 200), should be added to give a clearer picture of the total UNDP resources at the Agency's disposal in 1974.

#### 3. Agency's regular programme

45. As at 31 December 1974 the pledges of voluntary contributions to the General Fund for 1974 had exceeded 102% of the target figure of \$3 million, as compared with about 95% of the \$3 million target figure in respect of 1973. The payment by Member States of current and prior years' pledges (\$3 093 000, the largest amount received in any year to date, as compared with \$2 826 000 in 1973), was reflected in the income to Operating Fund II (totalling \$3 344 000 from all sources in respect of 1974, as compared with \$3 123 000 for 1973), from which the regular programme is financed.

#### 4. Gifts in kind

46. The estimated value of the assistance in kind made available for 1974 programmes was \$1 389 500, which is 7% higher than the figure of \$1 297 100 for 1973. This rise is attributable to a large increase in the value of equipment grants (from \$253 400 to \$395 700), whereas the value of cost- and partly cost-free expert services decreased somewhat (from \$90 700 to \$76 900) as did fellowships (from \$953 000 to \$916 900 consisting of Type II fellowship and training course stipends). Equipment grants were provided as assistance in kind by two Member States in 1974 (see Annex II. A), by Sweden and the United States of America.

#### 5. Funds-in-trust

47. No assistance was provided by the Agency under funds-in-trust arrangements in 1974. The funds from which the costs of an associate expert made available by the Netherlands were met, as well as the assistance provided from SIDA funds, have been included in the "gifts in kind" data given above.

## 6. Use of resources

48. The total value of the technical assistance being provided by the Agency exceeded the \$11.1 million mark for the first time in 1974 (the figure for 1973 was \$9.2 million), and consisted of \$6 737 300 in assistance provided and \$4 385 400 in unliquidated obligations and assistance in kind in the process of being provided but still outstanding at the end of the year. More assistance was provided by the Agency in 1974 than in any previous year, that is, \$970 600 or about 17% more than in 1973, the year in which the largest amount of assistance up to then had been furnished. The breakdown of the total of unliquidated obligations and assistance in kind outstanding at 31 December 1974 is as follows: \$503 200 for expert services, \$1 998 000 for equipment and supplies and \$1 884 200 for fellowships.

49. As in earlier years, regular programme expenditures and unliquidated obligations at the end of 1974 exceeded the cash resources in respect of that year's regular programme, due to the fact that the former totals also include expenditures and obligations met from funds carried over in respect of assistance being provided under the regular programme for 1973 and prior years. The type and estimated value of the assistance in kind made available to the Agency in 1974 is given - by donor - in Annex II, which also includes information on possible assistance to projects not included in the 1974 regular programme owing to lack of funds.

### B. DISTRIBUTION OF ASSISTANCE

#### 1. By field of activity

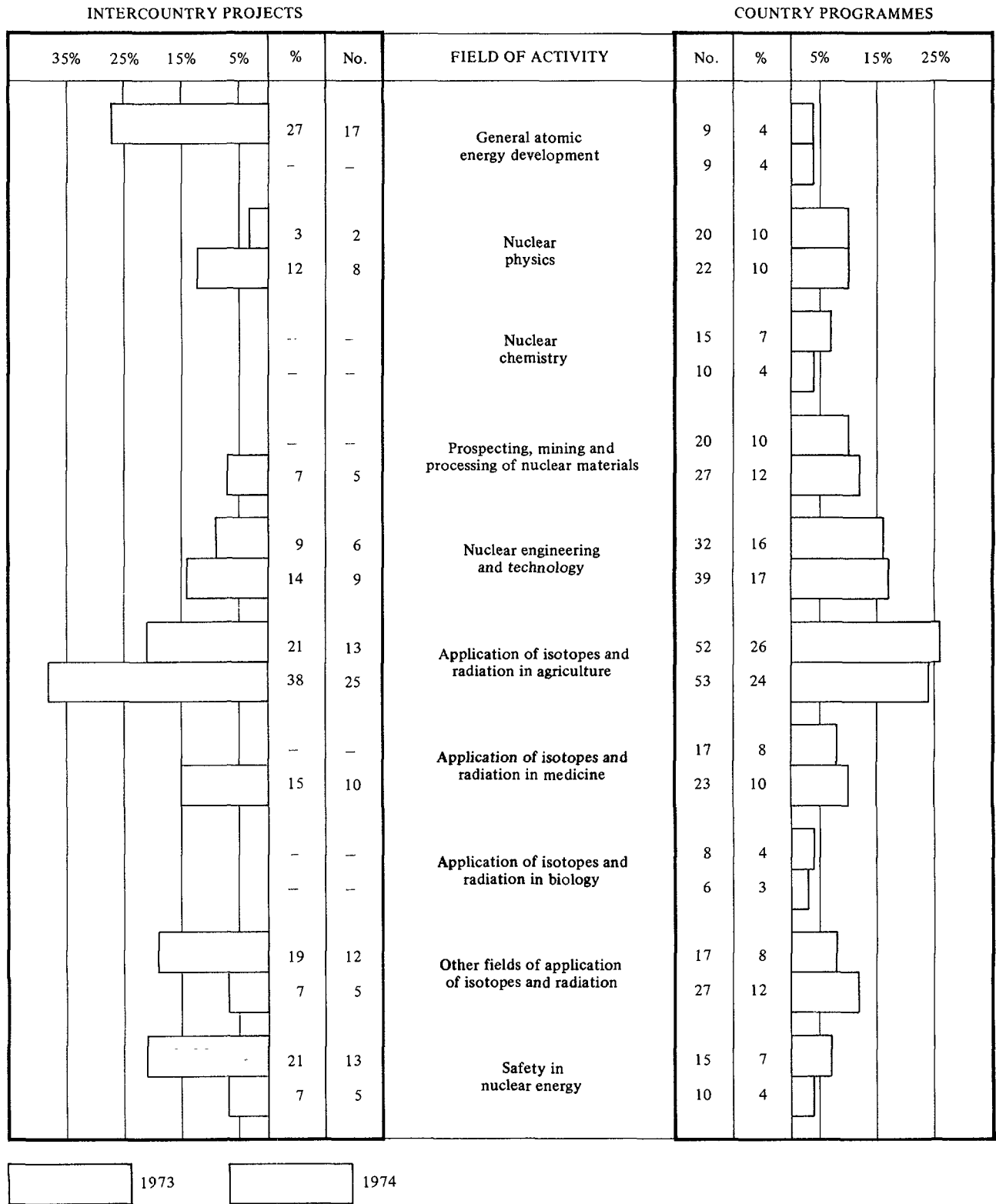
50. A 1973:1974 comparison is given below of the amount of assistance provided in what were the top five fields of activity in 1974. Numerical data for all ten fields of activity are given in Figs 2A, 3A and 4A (which also include comparable data for 1973), in Fig. 5A and Table 5.

Assistance by field of activity and type: 1973 and 1974  
(in thousands of dollars)

Field of activity	Year	Experts	Equip-	Fellow-	Share of total	
		\$	ment	ships	\$	%
Nuclear engineering and technology	1973	208.3	350.0	359.6	917.9	15.9
	1974	305.6	566.5	471.9	1344.0	20.0
Application of isotopes and radiation in agriculture	1973	496.7	508.0	433.4	1438.1	24.9
	1974	453.6	534.5	348.2	1336.3	19.8
Prospecting, mining and processing of nuclear materials	1973	335.6	129.6	67.9	533.1	9.3
	1974	498.6	440.2	84.3	1023.1	15.2
Other fields of application of isotopes and radiation	1973	213.6	448.7	169.7	832.0	14.4
	1974	219.3	501.5	166.5	887.3	13.2
Application of isotopes and radiation in medicine	1973	152.3	217.4	167.1	536.8	9.3
	1974	161.5	337.3	195.5	694.3	10.3
Total	1973	1406.5	1653.7	1197.7	4257.9	73.8
	1974	1638.6	2380.0	1266.4	5285.0	78.5
Total assistance	1973	1926.5	2055.3	1784.9	5766.7	100.0
	1974	2103.6	2742.9	1890.8	6737.3	100.0

FIGURE 2A

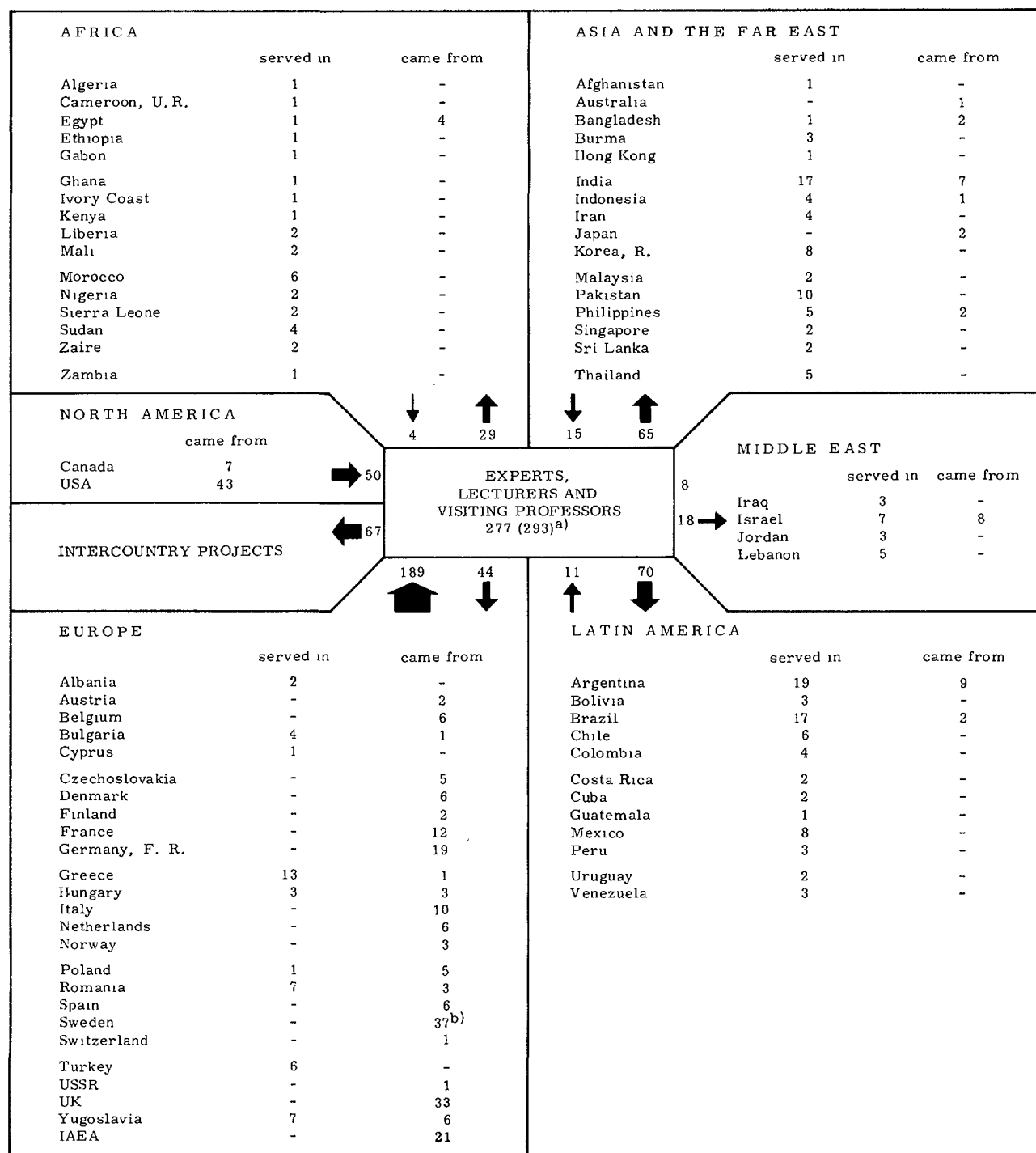
DISTRIBUTION OF EXPERT SERVICES BY FIELD OF ACTIVITY: 1973 and 1974



Note: The figures in the columns above indicate the number of expert assignments and the corresponding percentage share, by field of activity, of the total expert services provided.

FIGURE 2B

DISTRIBUTION OF EXPERT SERVICES BY REGION: 1974

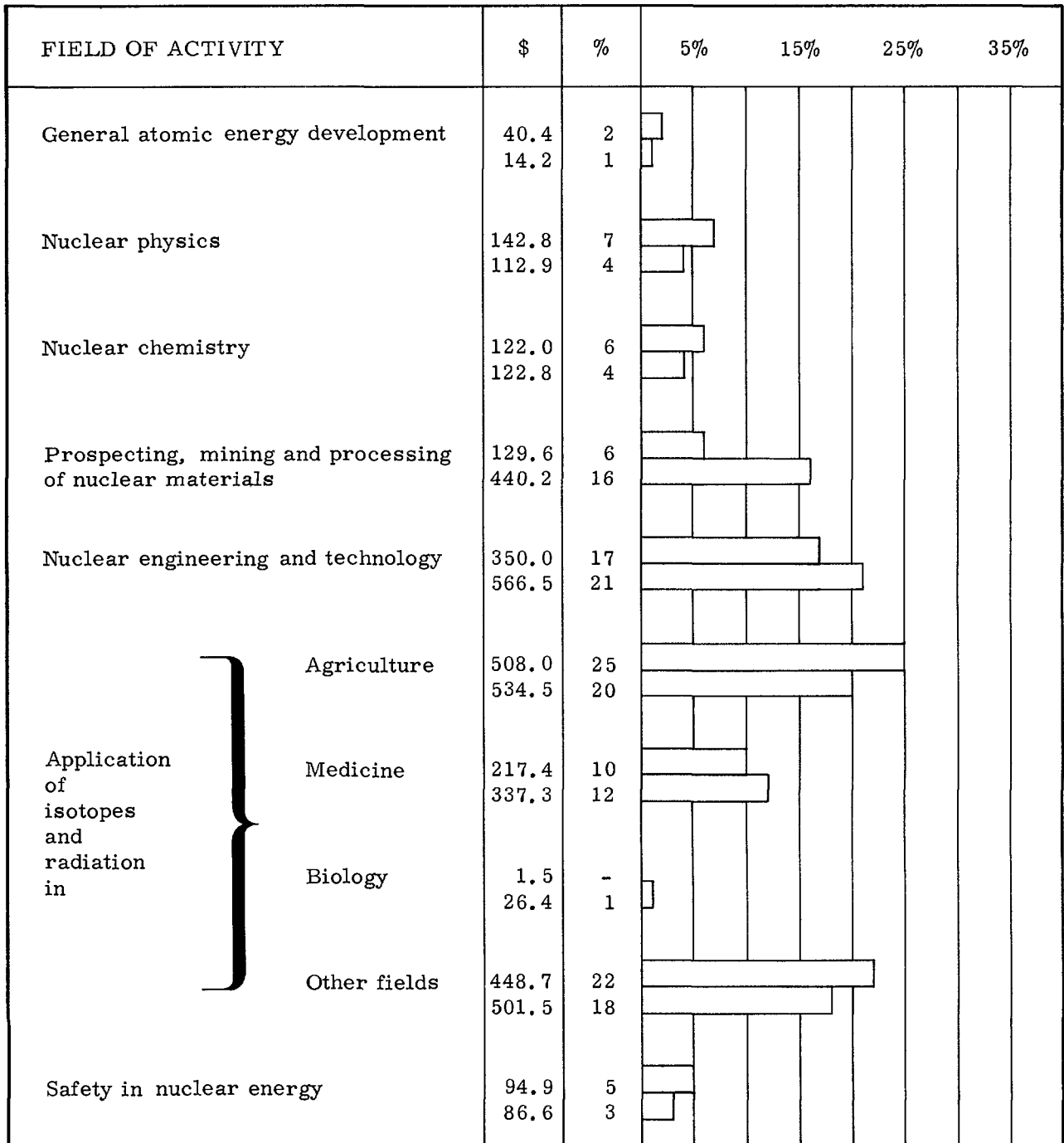


a) The difference between the number of assignments (293) and the actual number of experts (277) is due to the fact that each of 12 experts served in two and two in three different countries.

b) Includes 25 lecturers for three SIDA-financed training courses, as follows: from Austria, one; Canada, two; Denmark, one; Germany, F. R., two; Hungary, two; Korea, R., one; Netherlands, one; Sri Lanka, one; Sweden, four; Switzerland, one; United Kingdom, one; United States, two; Yugoslavia, one; IAEA, five.

FIGURE 3A

DISTRIBUTION OF EQUIPMENT BY FIELD OF ACTIVITY: 1973 and 1974  
(in thousands of dollars)

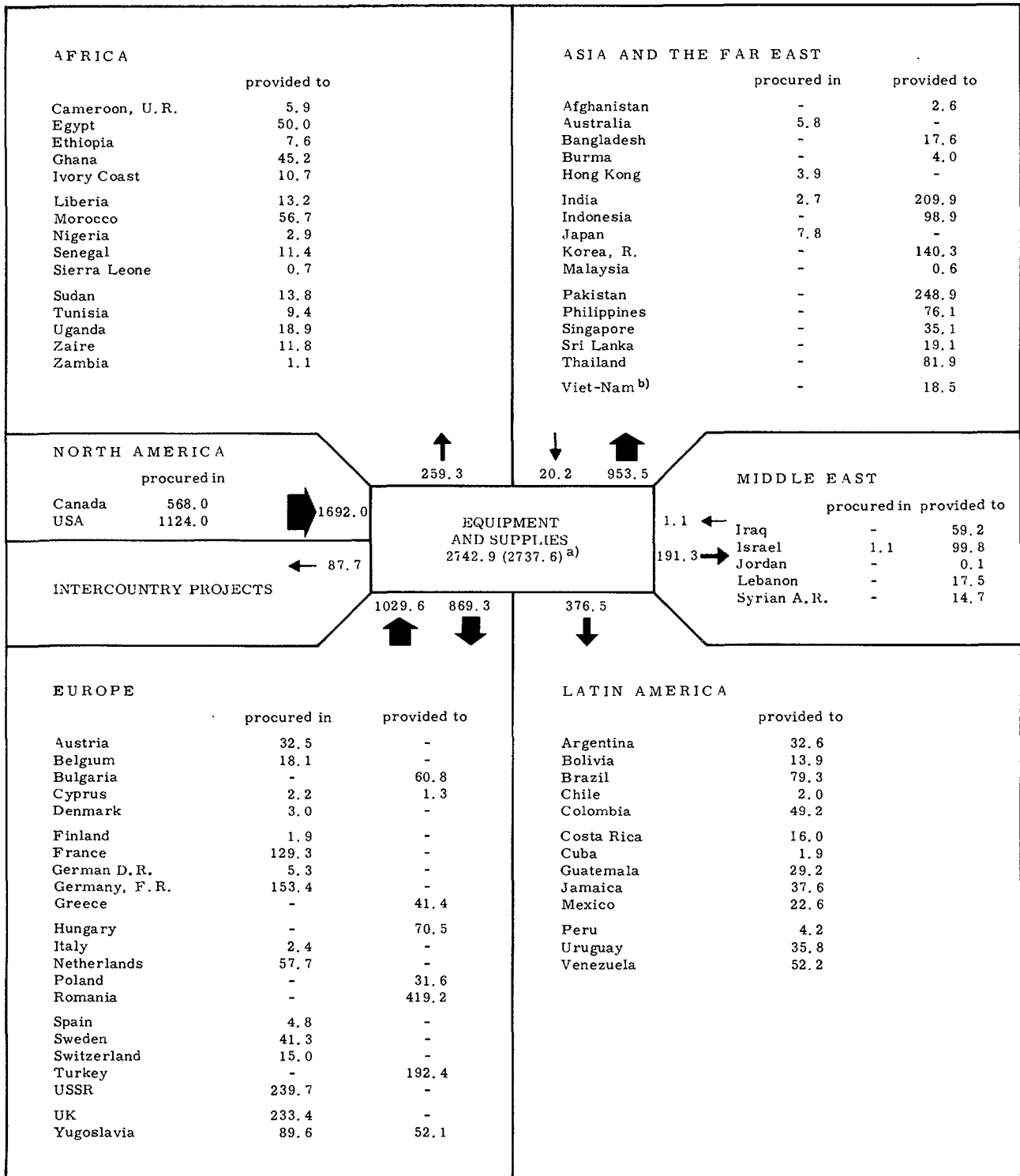


1973  
 1974

Note: The figures in the second and third columns of the chart indicate the value (in thousands of dollars) of equipment and the corresponding percentage share, by field of activity, of the total equipment provided.

FIGURE 3B

DISTRIBUTION OF EQUIPMENT BY REGION: 1974  
(in thousands of dollars)

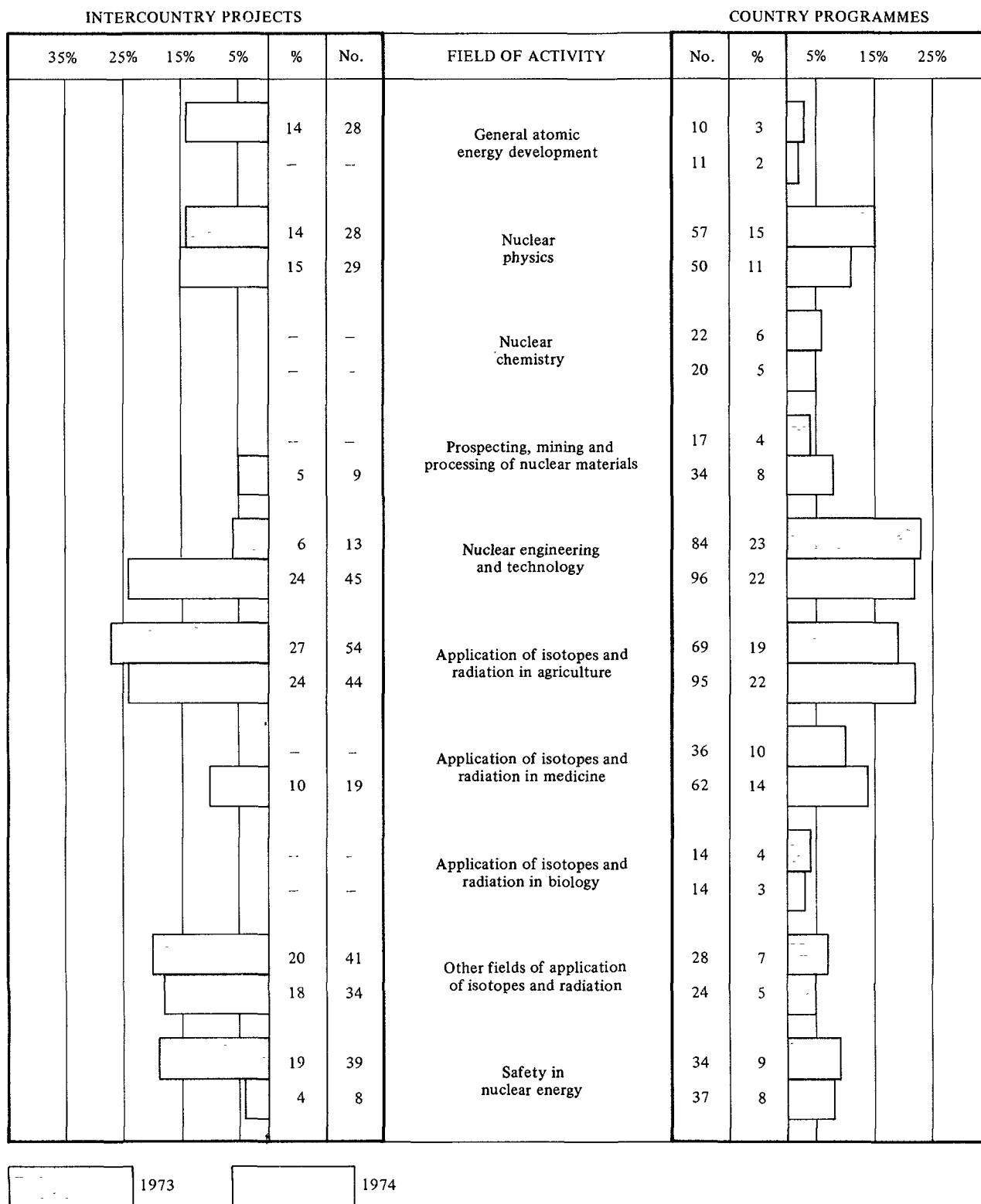


a) Does not include miscellaneous charges amounting to \$5300.

b) The official designation of Viet-Nam is now the Republic of South Viet-Nam.

FIGURE 4A

DISTRIBUTION OF FELLOWSHIP AWARDS BY FIELD OF ACTIVITY: 1973 and 1974

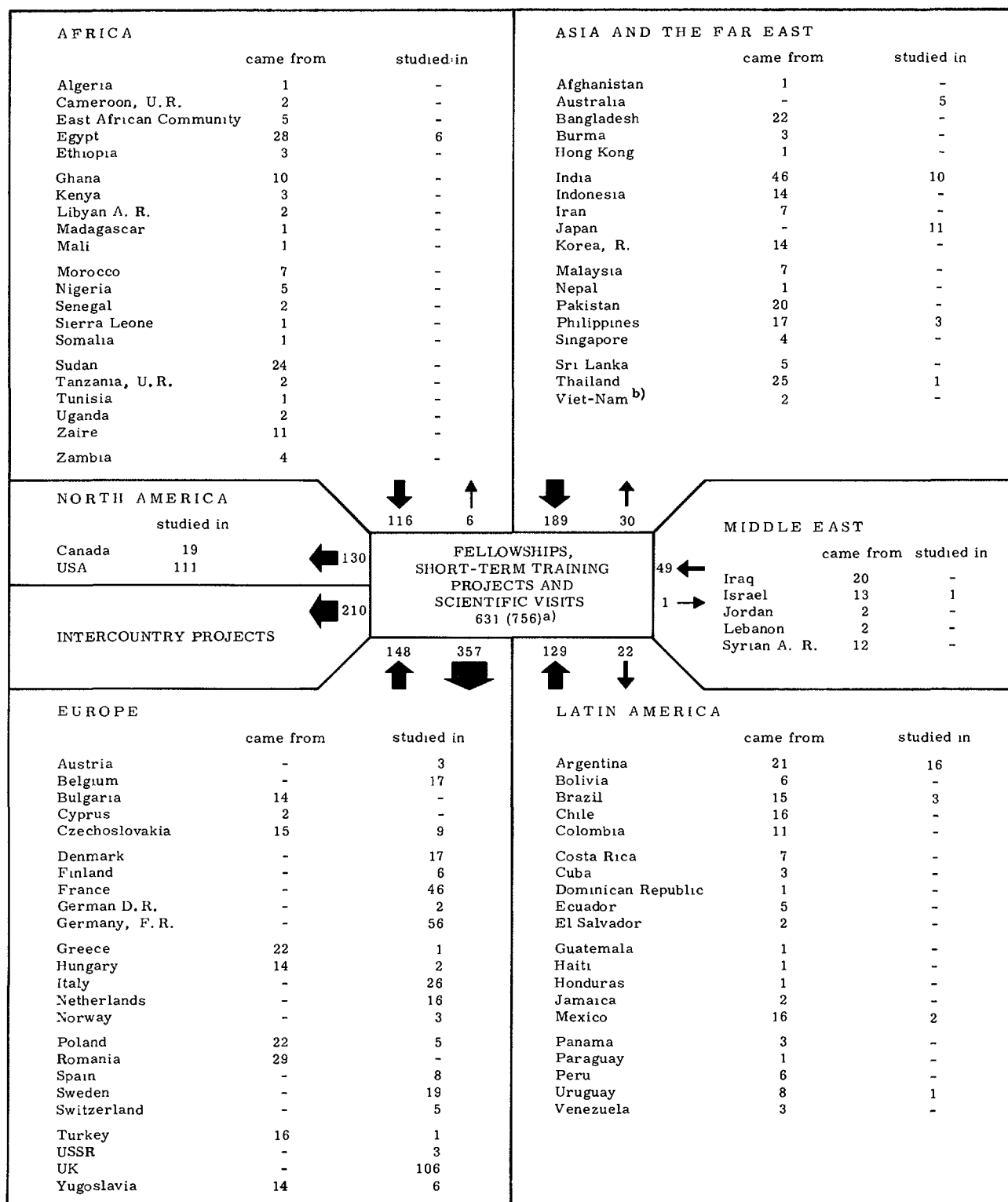


Note: The figures in the columns above indicate the number of fellowship awards and the corresponding percentage share, by field of activity, of the total number of fellowships awarded.



FIGURE 4B

DISTRIBUTION OF FELLOWSHIP AWARDS BY REGION: 1974

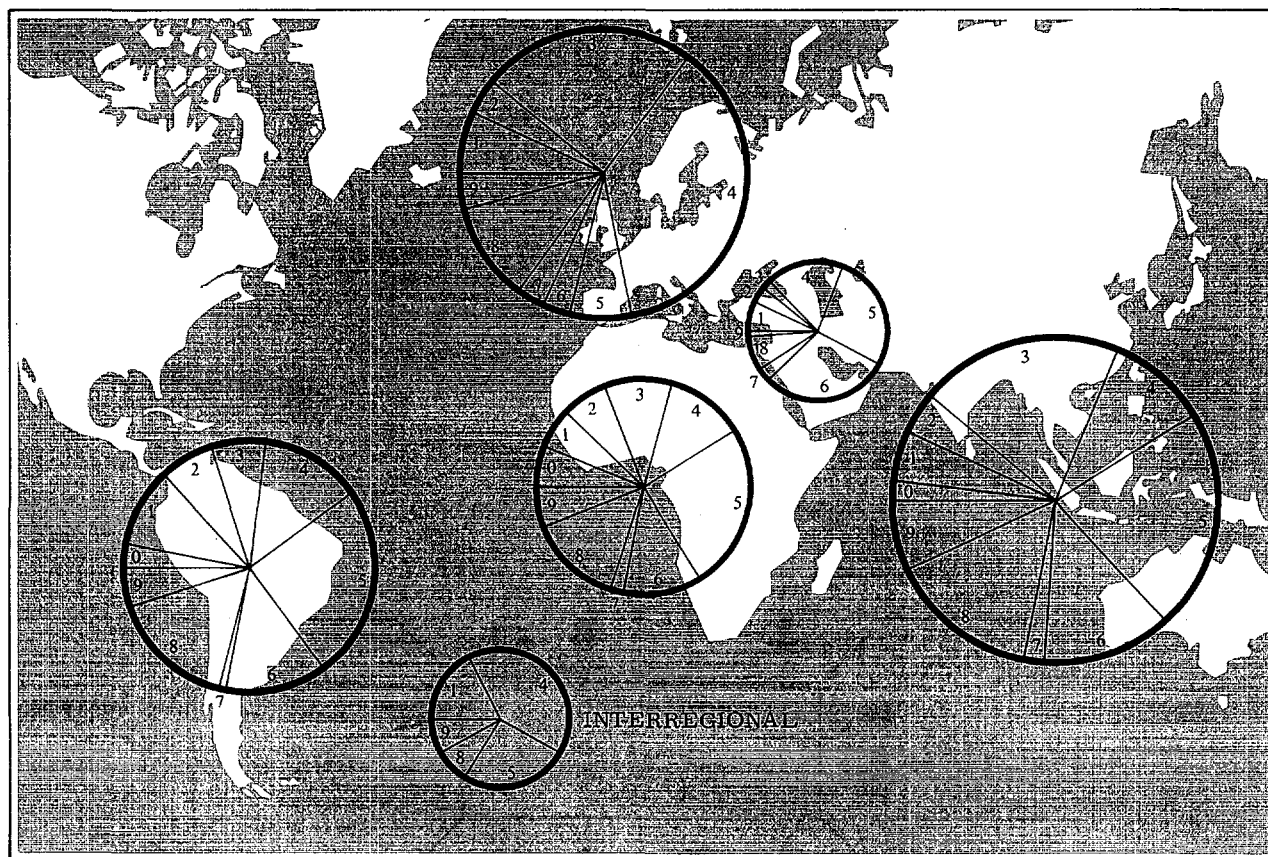


a) The difference between the number of awards (631) and the number of places of study (756) is due to the fact that 17 fellows studied in two, eight in three, four in four, two in five, and one in six different countries, whereas six holders of awards for scientific visits went to two, nine to three, seven to four, three to five and two to six different countries.

b) The official designation of Viet-Nam is now the Republic of South Viet-Nam.

FIGURE 5A

DISTRIBUTION OF TECHNICAL ASSISTANCE BY FIELD OF ACTIVITY AND REGION: 1974<sup>a)</sup>



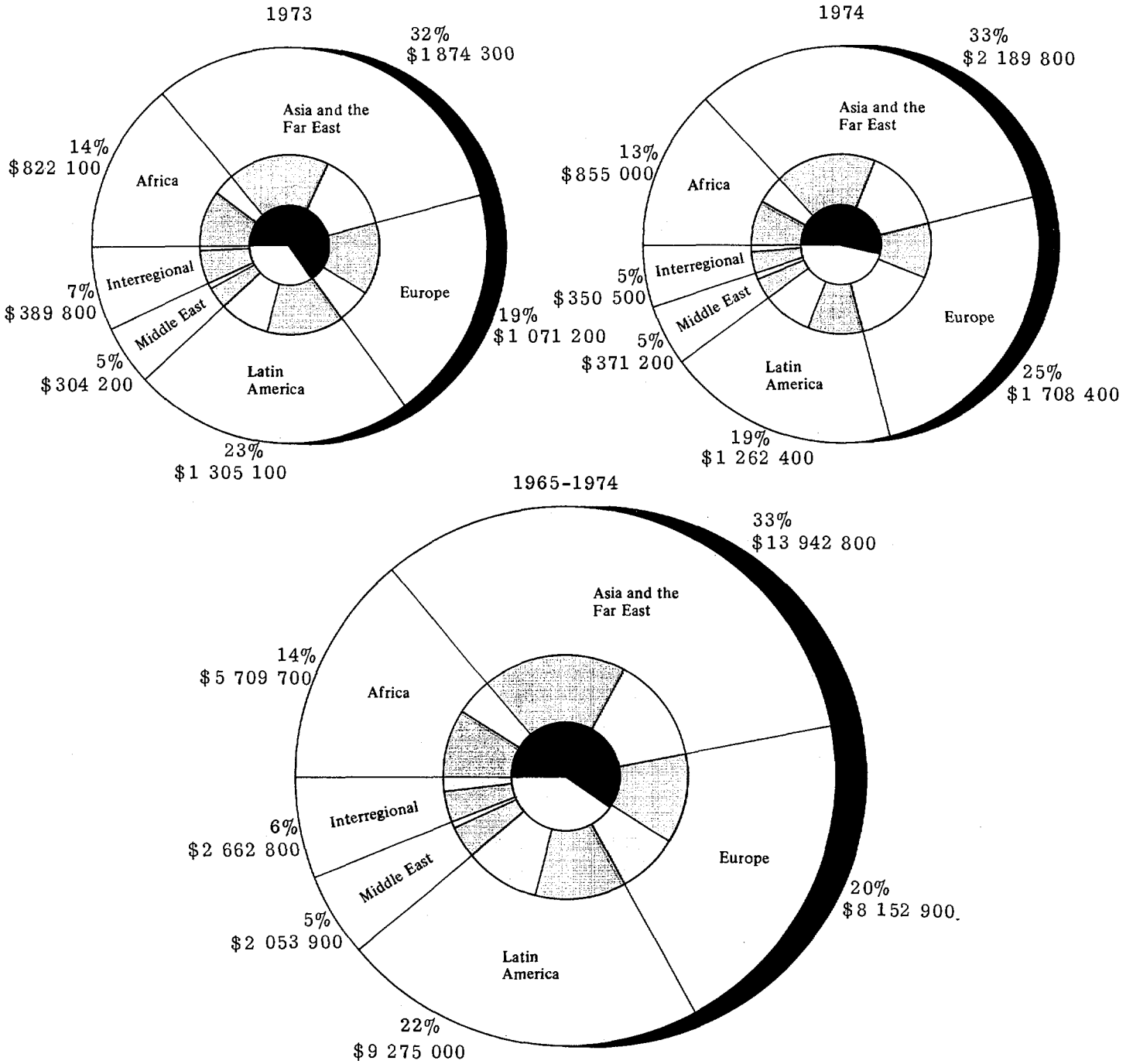
SUMMARY

Field of activity	Africa %	Asia and the Far East %	Europe %	Latin America %	Middle East %	Inter- regional %	All regions %
0 - General atomic energy development	6	2	—	3	—	—	2
1 - Nuclear physics	6	5	7	10	7	18	8
2 - Nuclear chemistry	7	4	4	7	4	—	5
3 - Prospecting, mining and processing of nuclear materials	10	20	24	7	2	—	15
4 - Nuclear engineering and technology	12	10	37	13	18	40	20
Application of isotopes and radiation in	5 - Agriculture	25	22	7	25	27	20
	6 - Medicine	12	13	3	13	30	10
	7 - Biology	2	2	3	1	3	2
	8 - Other fields	14	15	11	16	8	13
9 - Safety in nuclear energy	6	7	4	5	1	8	5
	100%	100%	100%	100%	100%	100%	100%

<sup>a)</sup> For each region, the relative monetary value of the technical assistance provided by the Agency is denoted by the size of the circle superimposed over the region on the map. The size of the segments in each circle indicates the share of total assistance given in the various fields of activity.

FIGURE 5B

DISTRIBUTION OF TECHNICAL ASSISTANCE BY REGION AND SOURCE  
(1973, 1974 and 1965-1974)

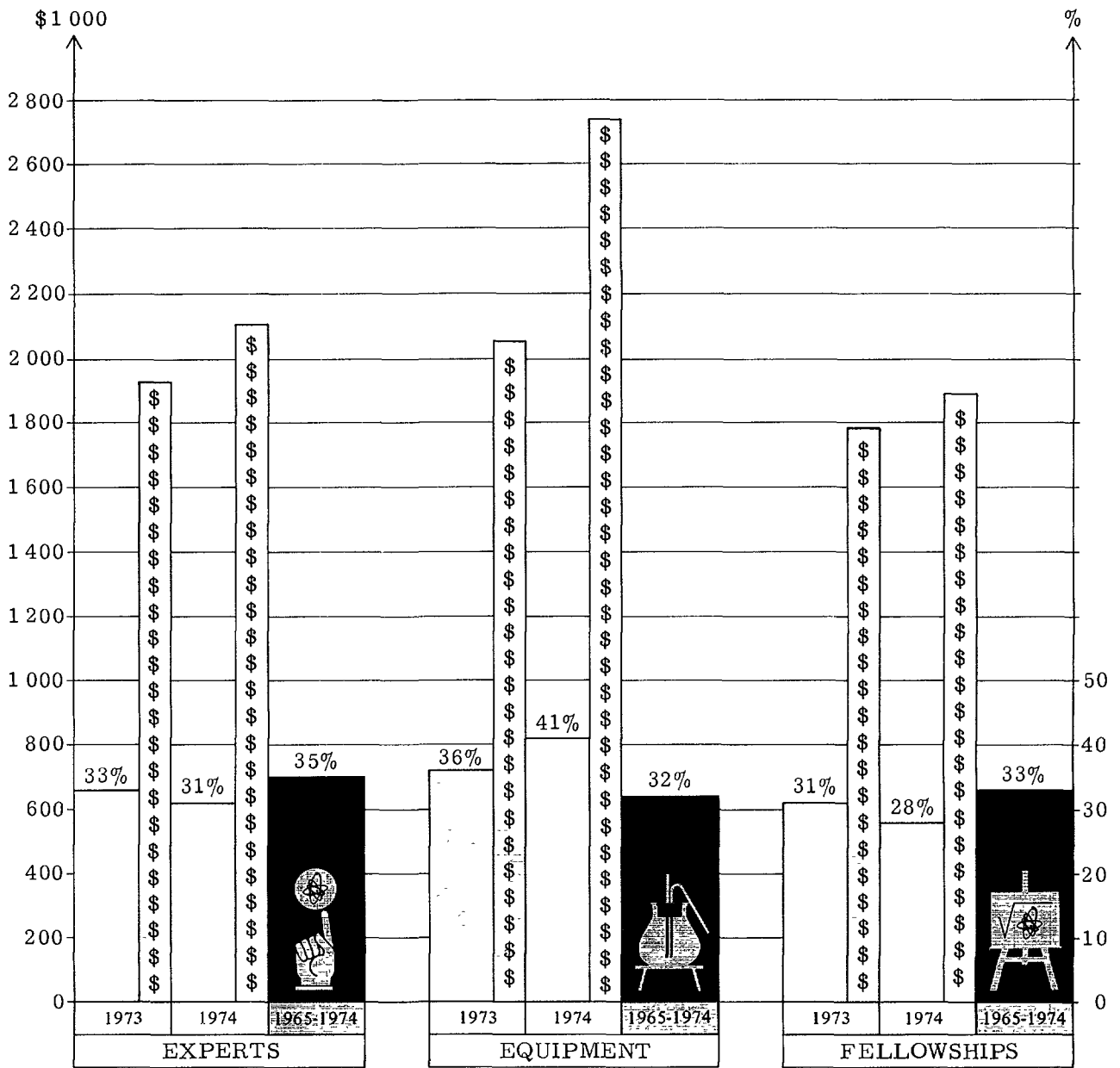


LEGEND (distribution of technical assistance by source):

INNER RING (regional distribution)	INNER CIRCLE (overall distribution)	1973	1974	1965-1974
Regular programme	Regular programme	65.3%	53.8%	59.7%
UNDP	UNDP	34.7%	46.2%	40.3%

FIGURE 6

DISTRIBUTION OF TECHNICAL ASSISTANCE BY TYPE OF ASSISTANCE  
(1973, 1974 and 1965-1974)



TYPE	1973		1974		1965-1974	
	%	\$1 000	%	\$1 000	%	\$1 000
EXPERTS	33	1 926.5	31	2 103.6	35	14 451.4
EQUIPMENT	36	2 055.3	41	2 742.9	32	13 380.9
FELLOWSHIPS	31	1 784.9	28	1 890.8	33	13 874.8
TOTAL	100	5 766.7	100	6 737.3	100	41 797.1

Note: Fellowships include participants in short-term training projects.

## 2. By region and country

51. Information on the distribution of technical assistance by region is summarized in Figs 5A and 5B. As in 1973, more countries in Africa - namely, 20 - received Agency assistance than in any other region; 15 States in Asia and the Far East received country programme assistance from the Agency in 1974, followed by the regions of Latin America, Europe and the Middle East with 13, 10 and 5 country programme recipients respectively. Eleven additional countries - three in Africa, one in Asia and the Far East, and seven in Latin America - participated in the Agency's programme of intercountry short-term training projects.

52. In 1974, 74 countries and one regional organization received technical assistance from the Agency, as compared with 75 countries and one regional organization in 1973. Including those which acted as hosts for short-term training projects and scientific visits, 23 countries both received and provided assistance in 1974 (26 in 1973). Nineteen countries provided but did not receive technical assistance in 1974 (18 in 1973), and 51 countries were recipients only (49 in 1973). Thus, as in 1973, 93 countries participated in the Agency's technical assistance programme in 1974. Figs 2B, 3B and 4B and Table 3 show the extent to which skills and knowledge were exchanged between countries.

## 3. By type of assistance

53. As shown in Fig. 6, the distribution of technical assistance in 1973, 1974 and over the period 1965-1974 by type, was as follows:

<u>Period</u>	<u>Experts</u>	<u>Equipment</u>	<u>Fellowships</u>
1973	33%	36%	31%
1974	31%	41%	28%
1965-1974	35%	32%	33%

The growing number of Agency-executed UNDP large-scale projects, which frequently have substantial equipment components, has accelerated the trend of allocating a gradually increasing share of funds for the provision of equipment. The average share of the total assistance provided that was devoted to equipment was 25% over the ten-year period 1961-1970, 29% over the period 1963-1972 and has now reached the 32% mark.

### (a) Experts, lecturers and visiting professors

54. In 1974, 277 experts, lecturers and visiting professors from 36 countries served a total of 786 man-months at a cost of \$2 103 600; the comparable data for 1973 are: 256 experts, lecturers and visiting professors from 37 countries provided 790 man-months of assistance at a cost of \$1 926 500. In addition, unliquidated obligations and assistance in kind outstanding at 31 December 1974 totalled \$503 200 for expert services. Twelve experts each served in two countries, two experts each served in three countries, and 196 experts were assigned to one country only. A total of 55 countries (51 in 1973) were provided with country programme experts and visiting professors, and an additional 67 experts and lecturers (63 in 1973) assisted 11 intercountry projects (24 partly cost-free and 30 cost-free experts and lecturers were provided, as compared with 31 partly cost-free

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[5] GC(XVII)/INF/142, paras 42 and 43, and GC(XVIII)/INF/148, paras 58-60.

and 15 cost-free experts and lecturers in 1973). Experts' final reports which became available in 1974 are listed in Annex IV.

55. The difficulties encountered in the recruitment of scientists for expert assignments have been described in prior years' reports. [5] In an effort to cope somewhat better with some of these difficulties the Agency has contacted a number of national nuclear energy centres and research institutions to make arrangements to associate them more closely with the Agency's technical co-operation programme. Some of these centres and research institutions have entered into an ad hoc agreement with the Agency, by signing a "memorandum of understanding", governing the conditions under which members of their staff are made available as experts to assist specific projects. According to the terms of the memorandum the centre or institution concerned agrees to make one or more scientists available for specific expert assignments, as requested, or to accept full responsibility for the provision of expert services for an entire project or part of a project on a "package" basis, within budgetary and time limits agreed upon in advance.

56. This arrangement has the advantage of promoting co-operating between advanced and less-advanced institutes and is seldom more costly than contracting directly with individual scientists. Mindful of the Agency's limited resources the advanced centres and institutions tend to bear most of the overhead costs in respect of their seconded staff and bill the Agency at a lower rate than that charged to private enterprises. With regard to the scientists themselves, who continue to be paid by their employers, such technical assistance assignments do not represent a break in their employment, with accompanying advantages from a career and social security viewpoint. It is hoped that this recruitment procedure - which constitutes a valuable contribution to the Agency's technical co-operation programme - will continue to be effective and find wider application in the future; its efficacy will depend on the willingness of Member States to make well-qualified experts available to the Agency at reasonable cost.

(b) Equipment and supplies

57. Including the value of grants of equipment delivered during 1974, 54 countries and eight intercountry projects (56 and six respectively, in 1973) were provided with equipment and supplies to a value of \$2 742 900, which represents an increase of one third over the amount of \$2 055 300 provided in 1973, and is the largest amount of equipment provided by the Agency in any one year. An additional amount of equipment and supplies valued at \$1 998 000 was still outstanding at the end of the year; this amount is included in the figures given in columns (9) and (10) of Tables 4, 7 and 8. In Fig. 7B, illustrating trends over the period 1965-1974, it can be seen that the value of the equipment provided in 1974 was three times greater than ten years earlier.

58. As in previous years, efforts were made to spread the purchase of technical assistance equipment and supplies over a large number of Member States. In 1974, those items were procured in 23 countries (in 1973, in 22 countries), as shown in Fig. 3B, which also includes financial data in respect of equipment grants.

59. The problems associated with equipment procurement and maintenance have been touched upon in this part of the report often in recent years. As can be seen above, the volume of equipment and supplies provided by the Agency has increased in spite of recurring problems. There are several reasons for this favourable result, but it is primarily due to the growing number of projects in developing countries that receive large-scale assistance through the Agency, much of which is equipment. Another reason is the modification of Agency procedures, where practicable, to speed up procurement. For example, a new procedure is now being introduced whereby Agency Project Managers assigned to large-scale assistance projects can order urgently required spare parts and equipment replacements directly from the field. It is hoped that this procedure will improve the efficiency of field operations.

(c) Fellowships

60. A total of 631 candidates from 71 countries and a regional organization received awards under the training programme in 1974 (see Fig. 4B and Tables 3 and 6) as against 574 candidates from 66 countries and a regional organization in 1973. The number of man-months of training awarded was 3977 in 1974 as against 3252 in 1973. The higher number of fellowship award holders in 1974 was due mainly to increases in the number of awards for individual study financed from Agency fellowship funds (163 awards in 1974 and 100 in 1973).

61. Due to the large number of award holders under prior years' programmes who studied in 1974, the value of the training provided by the Agency in 1974 is the highest on record for any one year, namely, \$1 890 800, as compared with \$1 784 900 in 1973. The 1974 total does not include the unliquidated obligations and assistance in kind outstanding (Type II training not yet completed, or not yet begun) as at 31 December 1974, amounting to \$1 884 200. This amount is more than \$400 000 higher than the combined total of these two items at the end of 1973 and holds promise of a training programme amounting to more than \$2 300 000 in 1975.

62. A comparison of the nominations and awards for country programme fellowships in 1973 and 1974 and of all technical assistance awards made during these two years is given below. The number of country programme awards rose by one fourth, whereas the number of scientific visit awards and those for short-term training projects decreased by 25% and 7% respectively.

<u>Country programme awards</u>	<u>1973</u>	<u>1974</u>
Nominations received	526	548
Effective awards[6]	331	413
Percentage of nominations which led to effective awards	62.9%	75.4%
<u>Inter-country programme awards</u>		
Scientific visits	40	30
Short-term training projects	203	188
Total awards	574	631

63. The increase from 62.9% in 1973 to 75.4% in 1974 in the percentage of nominations which led to effective awards is due primarily to the fact that the qualifications of candidates in 1974 were better than in 1973. From the comparison given below, however, it can be seen that numerous candidates were not selected because they were under- or over-qualified for the training requested, their knowledge of the foreign language in which the training abroad would have been given was not satisfactory, the training requested was not related to the peaceful application of nuclear energy, or because their candidature was withdrawn and, thus, they were not available to take up fellowship awards.

[6] Total number of awards less withdrawals after award as at 31 December 1973 and 31 December 1974, respectively.

Nominations not resulting in effective awards in 1973 and 1974

	Number		Share of total nominations received	
	1973	1974	1973	1974
Not selected because the candidate lacked suitable qualifications or experience, or because the requested field of training was not in the Agency's area of competence	96	43	18.2%	7.8%
Withdrawn on the initiative of the nominating Government (before or after award)	64	53	12.2%	9.7%
Not resulting in an award owing to lack of funds or appropriate training openings	35	39	6.7%	7.1%
Total	195	135	37.1%	24.6%

(d) Regional and interregional activities

64. In 1974, the Agency conducted 11 intercountry training projects in ten different countries, in which there were 237 participants from 61 different countries and a regional organization. The cost of attendance of 188 participants from 60 countries and the regional organization was paid out of project funds (cash and in kind resources under the Agency's regular programme and under UNDP); the cost of attendance of 49 participants, including 44 nationals of host countries, was borne by another organization or programme or by the participant's Government. The statistical figures and financial tables in this report include short-term training project data only in respect of the 188 awards financed from Agency resources.

65. Six of the 11 intercountry training projects related to the application of isotopes and radiation (three in agriculture, one on various applications for laboratory technicians, one in industry and one in medicine); in addition there was one project in the use and maintenance of nuclear and related electronic equipment, one in radiological protection, one in reactor burn-up physics, one in uranium prospecting and ore evaluation, and one in the utilization of nuclear research reactors. Further details on the location, attendance, financing, etc. of these projects are given in Annex III.

(e) Follow-up missions

66. In 1974 five one-man missions were sent to the regions to determine needs and discuss development plans with requesting countries. The cost of sending staff members on these missions averaged \$247 for each of the 30 countries visited.

### C. UNDP LARGE-SCALE ASSISTANCE ACTIVITIES

#### 1. General

67. The modest "seed money" technical assistance of the regular programme type provided in small instalments over the years, to satisfy needs which Governments could not meet for lack of funds, has strengthened institutions in the recipient countries and enabled them to make a larger contribution towards economic and social development in their respective countries. In a growing number of cases these institutions are being selected to



become the Government's counterpart organization to the Agency for the purpose of implementing UNDP large-scale assistance to projects in the developing countries. Designed to make an early impact in the recipient country, this large-scale assistance provided through the Agency is primarily of the pre-investment type or is for the demonstration of nuclear techniques and modern technology, or involves a combination of both of these. Projects for which pre-investment assistance is provided through the Agency include power surveys as well as projects such as those involving the radiosterilization of medical supplies or the prospection for and evaluation of national nuclear raw materials resources. The latter projects also involve the demonstration of nuclear techniques and technology; examples of projects of this type for which the Agency has provided large-scale assistance are the nuclear research projects in agriculture in Brazil, India (completed in 1974), Indonesia, Morocco and in Yugoslavia (completed at the end of 1966), and the non-destructive testing centre in Argentina. The increasing importance of large-scale assistance in the overall technical co-operation activities of the Agency can be seen from the following comparison: ten years ago the large-scale assistance provided by the Agency totalled \$417 400 or less than 15% of the total assistance provided in 1965, as against \$2 236 700 or 33% of the total assistance provided in 1974. Details are given below of the large-scale assistance currently being provided through the Agency with a view to bringing up to date the information provided in last year's report[7].

## 2. National centre for non-destructive testing and quality control in Argentina

68. The objectives of this project are manifold: to strengthen the capability of the National Atomic Energy Commission's non-destructive testing (NDT) group in a new centre to be established to provide a better and broader-based NDT service to Argentine industry, to provide specialized training for engineers and technicians, and to help in the standardization of existing and the development of new NDT methods for industrial use. The centre will also serve as a focal point for work on the use of NDT techniques in the construction and operation of nuclear power stations.

## 3. Application of nuclear technology in agriculture in Brazil

69. Until recently most of the activities being carried out under this project at the Centre of Nuclear Energy in Agriculture in Piracicaba have been concentrated on devising ways and means of increasing the production of beans (Phaseolus vulgaris), which constitute an important source of protein for human consumption. To this end, work has been started in plant breeding, including the production of improved varieties resistant to pests and diseases, and in plant nutrition as well as in developing efficient practices for the application of fertilizer. Research is also being conducted in entomology to develop improved methods for combating insect pests that damage beans, citrus fruit and sugar cane. Pesticide tracer studies, water utilization investigations and work in the animal sciences round out the Centre's programme. More emphasis will be placed on work in the animal sciences when the new building and associated laboratory facilities, at present under construction and scheduled to be ready for use by the end of 1975, are available.

## 4. Technological applications of nuclear energy in Chile

70. At the site of the research reactor at La Reina, Santiago, the Agency is assisting the Government of Chile in establishing a nuclear centre, with staff qualified in the following subjects: nuclear engineering, to operate and design nuclear reactors; isotope hydrology techniques; non-destructive testing methodology; the production of isotopes for use in agriculture, industry and other research areas; the production of radiopharmaceuticals required in therapy and medical research; radiochemistry, for work in activation analysis and in the monitoring of background radiation in the environment; food and agriculture, for

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[7] GC(XVIII)/INF/148, paras 72-84.

work with labelled fertilizers and food preservation studies; radiological protection, for the protection of the Centre's staff and the environment; and, assisting in the country's programme to train health physicists and radiotherapists.

#### 5. Radiation dosimetry after accidents in Egypt

71. The main purpose of this project is to carry out laboratory investigations of the most reliable techniques for the assessment of the intensity of radiation (neutron and gamma rays) released into the environment and of the concentration of radioactivity in the air, in the event of a radiation accident. The analytical instruments needed for this work have been provided and counterpart staff are receiving specialized training abroad as preparation for the assignment of an Agency-provided consultant and to enable them to work independently thereafter. Expert services will be provided in 1975, as planned.

#### 6. National Centre for Radiation Technology in Egypt

72. The Centre will house a radiation facility which will be used to determine the economic feasibility of radiation processing on an industrial scale. Two areas in which studies of this kind could produce an early impact are cited as examples of the likely activities of the Centre in future: first, the radiation sterilization of prepackaged medical supplies (such as sutures, cotton wool, single-use syringes, needles and infusion sets) and pharmaceuticals which would be of importance to meet local needs and for export; and second, the improvement or modification of the characteristics of cotton and cotton/synthetic-fibre fabrics by means of radiation processing, plus the use of wood-plastics for bobbins and shuttles, which should make it possible to expand the output and lower the production costs of the country's textile industry. The obvious advantage to the economy in making changes in the structure of the textile industry would be the creation of new jobs for the manufacture of finished products from cotton, which is now exported primarily as a raw material, and a more efficient utilization of the country's capacity in the production of synthetic fibres.

#### 7. Exploration for uranium in Central and Eastern Macedonia and Thrace (Phase II) in Greece

73. This project is designed to explore for and find significant uranium occurrences which can be developed and utilized in connection with the Government's long-term power generation programme. The work is now being concentrated on examining in more detail promising uranium occurrences which were located during the reconnaissance phase of the project. The training of counterpart staff continues to be an important activity, and test drilling has already commenced.

#### 8. Irradiation sterilization of medical products in Hungary

74. This project provides for the establishment of a cobalt-60 irradiation facility at Debrecen for the sterilization of medical supplies totalling 6000 cubic metres in volume annually. Equipment has been ordered and will be installed in 1976. Construction of the building to house the facility has commenced and is scheduled to be completed in 1975. The training of counterpart staff is continuing, as planned.

#### 9. Nuclear research in agriculture in India

75. Large-scale assistance to this project was completed in 1974, as planned. The work involved activities at four different research institutes, which increased the need for close co-ordination but contributed to a fruitful co-operation between the participating institutes and to the establishment of interdisciplinary and interinstitutional research teams. At the Indian Agriculture Research Institute extensive programmes will be continued in improving crops - especially oil seeds, cereals and pulses - and in studying, for example, soil productivity, fertilizer utilization and ground-water recharge problems. Agricultural research work at the Bhabha Atomic Research Centre is likely to be concentrated on mutation breeding trials to improve the quality of oil seeds and rice and, in entomology, to

develop methods for the control of a number of insect pests. The work programmes initiated under the project at the Indian Veterinary Research Institute, especially the animal parasitology work on the production and use of a radiation-attenuated vaccine against lung-worm in sheep, will be maintained or expanded; other programmes include studies in animal nutrition, physiology and endocrinology. At the National Dairy Research Institute similar work is being carried out in the animal nutrition area, but here the emphasis is on the development of feedstuffs (containing ingredients not needed for human consumption) for use in feeding trials with dairy stock crossbred with local varieties, to determine which breed produces the most per unit of feed under local conditions. Follow-up assistance to this very successful project is being considered under UNDP and also from SIDA.

#### 10. Demonstration plant for the irradiation sterilization of medical products in India

76. The irradiation sterilization plant, ISOMED, was commissioned in January 1974, two years after the project was started. The facility has operated continuously since then, serving some 25 customers in the Bombay area. In December 1974 ISOMED was irradiating 35 medical/pharmaceutical items on a regular basis and conducting feasibility (trial irradiation) studies of 25 other products. Of particular significance are the efforts to utilize the facility to sterilize locally-produced contraceptive devices in support of the Government's family planning programme. The project has satisfactorily met its objective of establishing a practical demonstration facility for sterilizing medical products totalling 100 000 cubic feet (about 3000 m<sup>3</sup>) in volume annually.

#### 11. Mutation breeding in Indonesia

77. The purpose of the project is to carry out plant breeding work in Indonesia, using induced mutation techniques, to improve crop varieties in respect of yield, disease resistance, earliness, response to fertilizers and nutritional aspects. Six of the numerous rice mutants developed so far have been accepted for official variety testing, and the mutation breeding work is being expanded to include experiments on legumes and sugar cane.

#### 12. Radiation processing demonstration facility in the Republic of Korea

78. The radiation processing demonstration facility is mainly intended to introduce radiation technology into Korean industry - for example, for the sterilization of medical products, the fabrication of wood-plastic combinations, and the surface coating of plywood and other panel boards. Two major facilities are being set up at the Korean Atomic Energy Research Institute under this project: a gamma irradiator with an initial radiation source consisting of 100 000 curies of cobalt-60 and a 300-keV electron beam accelerator. Associated laboratories will complement these facilities.

#### 13. Use of radioisotopes in agriculture in Morocco

79. The aim of the project is to develop methods for increasing the yield of oil-producing crops, mainly sunflower, as well as of sugar beets, wheat, cotton, berseem and maize. The Agency's contribution consists mainly of providing advice on research programmes such as fertilizer utilization studies, as well as providing in-service training and opportunity for study abroad, to improve the qualifications of Moroccan scientists and laboratory technicians in the use of nuclear and other modern techniques in agricultural research. Considerable progress has been made and Agency assistance in the form of expert services, consultant visits and the provision of equipment and supplies is continuing.

#### 14. Training and research in applied nuclear physics at the Faculty of Sciences (Rabat) in Morocco

80. The aim of the project is to expand and intensify the teaching of nuclear physics and its applications in the curriculum of the Faculty of Sciences. This will be done through the addition of lecture and laboratory courses on applied nuclear physics topics to meet the

needs of the country, for example, in agriculture, geology, medicine and mining, and the establishment of an appropriate post-graduate training programme. Project activities have just commenced, and satisfactory progress has been made.

#### 15. Insecticidal investigation for tsetse fly eradication in Nigeria

81. A major constraint in regard to the large-scale expansion of the livestock industry in Nigeria is the tsetse fly, which infests vast areas. New insecticides and techniques for using them now hold promise of solving the problem in some locations. The aim of the project is to develop a laboratory and carry out laboratory and field experiments involving the use of insecticides.

#### 16. Exploration for uranium in the Siwalik Sandstones, Dera Ghazi Khan District (Phase II) in Pakistan

82. As anticipated in last year's report [8], the results of the work done during the initial field seasons were sufficiently encouraging to prompt the Government to request the continuation of UNDP assistance through the Agency over a period of two more years. The purpose of the project is to determine the extent and economic potential of uranium occurrences in the Siwalik sandstones and to train local geologists, analytical laboratory staff, drilling and field maintenance personnel in all relevant aspects of uranium exploration and evaluation. The work is progressing as planned.

#### 17. Development of nuclear technology in Romania

83. The Institute of Nuclear Technology in Romania is being expanded to provide the basis on which national industry can play a significant role in the Romanian nuclear power programme, in particular in the design and manufacture of fuel elements and reactor components for nuclear power plants as well as for subcritical and critical assemblies for use in training and research. Expert services and fellowship training are being provided under subcontract arrangements by Belgium, Canada, France, the Federal Republic of Germany and Sweden. The construction of buildings for the new Institute of Nuclear Technology is progressing satisfactorily. In addition, subcontracts have been placed for the irradiation testing of components and fuel elements fabricated at the Institute and for post-irradiation quality control studies.

#### 18. Exploration for uranium in South-West Anatolia in Turkey

84. The staff of the Mineral Research and Exploration Institute is receiving training in the use of modern methods for uranium exploration, development and processing on the project site and abroad. This training activity is an integral part of the UNDP assistance, which includes the reconnaissance of the entire project area (3000 km<sup>2</sup>) and the intensive search for new ore bodies as well as the evaluation of known ore bodies and new discoveries in two smaller, well-defined sub-areas. Test drilling and geochemical surveying are under way, and good progress has been made.

#### 19. Radioisotope applications in Zambia

85. This project is an extension of assistance provided under the Agency's regular programme (1969-1970) and UNDP (1970-1972) to the Radioisotope Unit of the National Council for Scientific Research. The main objective is the establishment of a radioisotope advisory service capable of assisting local research organizations in carrying out scientific investigations in a number of fields related to Zambia's development and of training local staff in the use of radioisotope equipment. The project has been a success and the Radioisotope Unit is now able to provide the services for which it was established.

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[8] Ibid., para. 74.

## D. SIDA LARGE-SCALE ASSISTANCE ACTIVITIES

### 1. General

86. On 19 December 1969 the Agency signed an agreement with the Government of Sweden governing the manner in which the two parties would co-operate in the provision of technical assistance to developing countries. Furthermore, the Government of Sweden agreed to make funds available to the Agency - through the Swedish International Development Authority (SIDA) - for the implementation of mutually agreed programmes and projects. [9] In the interim the Agency has conducted seven training courses and arranged study programmes for the holders of 45 Type II fellowship awards which were financed by SIDA. In addition to providing group and individual training abroad, SIDA also finances development assistance in certain countries and allocates the resources therefor on the basis of an "indicative planning figure", along the lines adopted by UNDP for the provision of country programme assistance. Thus, ministries in the countries eligible to receive aid from SIDA submit requests for assistance through the national co-ordinating authority to SIDA, which arranges for a United Nations organization to serve as the executing agency for the assistance which has been approved. In 1974 the first case of SIDA large-scale assistance - to be provided through the Agency - was approved.

### 2. Development of the Institute of Nuclear Agriculture in Bangladesh

87. The long-range objective of this Institute is - in close collaboration with other national agricultural research organizations - to help improve the country's agricultural production through studies leading to improved and intensified plant breeding methods, the optimum use of fertilizer, the control of plant diseases and pests, and the judicious use of water resources for crop irrigation. SIDA assistance involves the provision of expert services, equipment and fellowships with an aggregate value equivalent to \$1.3 million over a five-year period. Some preparatory assistance was provided to the project in 1974 in the form of a visit of an Agency expert.

## E. EVALUATION OF TECHNICAL ASSISTANCE PROGRAMMES

### 1. General

88. The process of assessing the effectiveness of the technical assistance provided by the Agency was described in last year's report. [10] The same methodology and procedures were applied during 1974, with continuing emphasis on evaluation in depth since more projects involving UNDP large-scale assistance were implemented with the Agency's help last year than ever before (details of these are given in paras 68-85 above) and these projects call for an annual tripartite review and a separate terminal review on completion. As has been stated in earlier reports, the Agency's evaluation effort is commensurate with the needs expressed by Governments and the resources available for such work; these resources include the funds allocated for Agency participation in evaluation missions in the UNDP budget for large-scale assistance to recipient country projects. In countries where the Agency is not involved in the provision of UNDP-financed large-scale assistance, the processes used are those described in last year's report. It is also evident that, in reviewing the assistance provided to projects involving the use of nuclear techniques, attention is often focused on other aspects of a country's atomic energy programme, irrespective of the source of funding, and this leads to an evaluation of the assistance provided to other projects, which usually consisted of the provision of the services of an expert and of some equipment.

[9] The text of the agreement is reproduced in document INF/CIRC/138.

[10] GC(XVIII)/INF/148, paras 85-95.

89. Evaluations carried out during 1974 have confirmed that a project which is not integrated into the overall development efforts of a country cannot be effective in promoting development. It is essential that the long-range objective of a project be clearly identified with the country's overall development goals and that logical linkage exists between the project's immediate objective and its long-range objective. Although recipient Governments are asked to specify these objectives at the time of the submission of a request for assistance, this information is not always provided, in some cases because the planning of the work programmes of the requesting authority is not co-ordinated beforehand with the Government's development machinery. Improvements in the internal co-ordination of activities have been noted in several countries but the effective integration of atomic energy programmes and projects within the development process at the national level is often still lacking.

90. During 1974 recipient Governments, with a few exceptions, continued to comment favourably upon the performance of Agency experts and, in particular, their adaptability to local conditions. As before, the main problem noted by the experts concerning their counterparts was that they were able and competent but that many left the project for financial reasons during the course of the expert's assignment, because salary scales were too low and higher paid employment was available in the private sector, or they were required to transfer to Government service of a representational nature. The equipment which was provided has been favourably commented upon by recipient Governments but some have noted that packaging standards and the quality of transport facilities seem to have deteriorated and that the number of items discovered to be faulty on arrival has markedly increased. There still remains the problem of Governments not making budgetary provision of sufficient foreign exchange for the purchase of spare parts, and, on occasion, repair and maintenance facilities and staff continue to be lacking. This sometimes leads to the under-utilization of facilities, particularly of items of expensive equipment in some laboratories. In assessing the importance of new requests for equipment, care has to be taken to ensure that existing items are not unnecessarily duplicated.

91. It has been noted that requests for assistance to projects involving highly sophisticated or advanced technology, or both require particularly careful appraisal to ensure effective project implementation. Where large-scale multilateral assistance is involved, preparatory missions are necessary, and this procedure is in fact being utilized on an increasing scale. It is a feature of UNDP-assisted programmes, irrespective of the subject matter, as well as of Agency-supported programmes, that counterpart personnel are tending to play a more prominent part in the execution of projects; as a result, internationally recruited experts are being used more often as consultants in the sense that they are being assigned for relatively short periods to provide advice at predetermined stages over the entire span of the project rather than being assigned in situ for, say, a two-year period. In advanced and highly specialized technical areas suitably qualified expert candidates are often difficult to find and, when found, are frequently not readily available for immediate or long-term assignments. This situation has made it necessary to use even more experts for short-term visits to projects; this system has yielded good results in most cases, as evidenced by the satisfactory progress made by the counterpart staff during and subsequent to the visits of the expert.

## 2. Fellowship training survey

92. In continuation of its routine evaluation procedure the Agency undertook another survey of the fellowship programme in 1974, the fourth in a series that covers the period from the inception of the programme in 1958 to the end of 1971. This latest survey includes information in respect of the fellows who completed their training in 1970 and 1971. During these two years 509 fellows from 58 countries finished their training abroad; of these, 406 (or 80%) completed and returned the evaluation questionnaire sent to them by the Agency's Training Section. Analysis of the information received indicates, as in previous surveys, that a very high percentage of fellows returned to their home countries (95.3% of those who returned the questionnaire) upon the completion of their Agency fellowship; among those who remained abroad (4.7%), many did so in order to continue their studies without Agency

support (2.7%), while 2.0% remained abroad because of employment opportunities. The corresponding data from all four surveys (2632 returned questionnaires) are 94.8% and 5.2%, and 3.6% and 1.6% respectively.

93. Of the fellows who returned to their home countries upon completion of their Agency fellowship, 81.0% indicated that their current activities were closely related to their training, 14.1% stated that their present work was partially related and 4.9% stated that it was unrelated to their training; the corresponding data from all four surveys are: 85.0%, 11.1% and 3.9%. The fellows were also asked to rate the quality of the training received. Of the total, 396 fellows indicated a rating ranging from "good" to "excellent", six considered their training as having been "adequate", whereas four fellows (or 1%) felt that their training had been "inadequate".

94. During 1970 and 1971, approximately 15% of Agency fellows received a post-graduate degree; among these, four out of ten obtained the Ph.D. degree and the balance the M.Sc. degree. It is interesting to note that among the fellows included in the latest survey who stated that their training was "partially related" or "unrelated" to their present work, an above-average share, namely, 25% received a post-graduate degree. Of the fellows included in the latest survey, nearly 40% had published one or more technical papers during their training or soon after returning home. In the light of these results it may be concluded that the Agency's fellowship programme - thanks to the excellent facilities and study opportunities made available by Member States - continued to provide good training. In 1975 the Agency will conduct a survey of the fellows who completed their training during 1972-1974.

### Part III. CONCLUSIONS

95. The statistical data in this report reflect a trend which has been commented on previously [11], and three major growth areas have now emerged: nuclear power; the application of isotopes and radiation in industry and hydrology; and the exploration for, and development of, nuclear raw materials. The volume of assistance provided to projects in the life sciences - primarily in agriculture, medicine and biology - is tending to stabilize but there has been a slight decline recently in the quantity of assistance provided to agricultural projects, though not for the application of nuclear techniques in fertilizer utilization studies. This latter aspect reflects the importance attached by recipient Governments to the fact that the shortage and high cost of fertilizer are hindering the growth of agricultural production; accordingly, any technically sound project that holds promise of developing ways of making more economical use of fertilizer and of producing at lower cost the electricity needed for fertilizer production will receive high priority.

96. As the volume of assistance expands for the introduction of nuclear power and for the application of nuclear technology in industrial development, these programmes move out of the jurisdiction of atomic energy commissions: responsibility for the generation of electricity is in the hands of the public utilities; industry, as soon as techniques have been demonstrated to be economically sound, is usually handed to the private sector; and raw materials development is a matter supervised by other governmental departments, such as the national geological survey. In those developing countries with an atomic energy commission or its equivalent, it is therefore essential for the Agency to establish effective relations with the authority to which the atomic energy commission reports, to determine what its role and responsibilities are in these three areas.

97. These trends are also reflected in the assistance being provided by UNDP, which has noted that increased resources are being programmed for assistance to new projects in the industrial sector and in the areas of science and technology, especially in the more advanced developing countries. As economic and social development proceeds, the capacity of the recipient Governments to make effective use of programmes involving the application of nuclear techniques, is likely to increase; on the other hand, the least developed countries, with lower levels of per capita income, still tend to direct a significantly larger share of their internal resources and the assistance available from abroad to programmes in agriculture and education. The Agency's assistance activities are, therefore, growing at a faster rate in the more developed of the developing countries. Accordingly, there is a growing need for advanced training facilities and, whilst training was given in all subject areas in the early years, a major share of the Agency's training assistance is now concentrated in areas concerned with the introduction of nuclear power and the application of nuclear technology in the tertiary sector of development.

98. The climate of economic and social development in the developing countries has changed in the last decade, and Government priorities and needs have correspondingly altered. Furthermore, to ensure that the most effective use is made of the limited resources available for the provision of multilateral aid, it is necessary to emphasize the importance of thorough programme and project formulation - an area in which the Agency, on request, can assist Governments. With the increase in the aid resources put at the Agency's disposal under multi-bilateral and funds-in-trust arrangements, as well as in the form of gifts in kind and cash contributions in support of the Agency's regular programme, and the movement towards more extensive co-operation with governmental departments other than those directly concerned with atomic energy matters, it is more important than ever before for the Agency to ensure that there is no duplication of assistance to a country, whether from a multilateral or other source.

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[11] GC(XVII)/INF/142, paras 105-107, and GC(XVIII)/INF/148, paras 114-118.

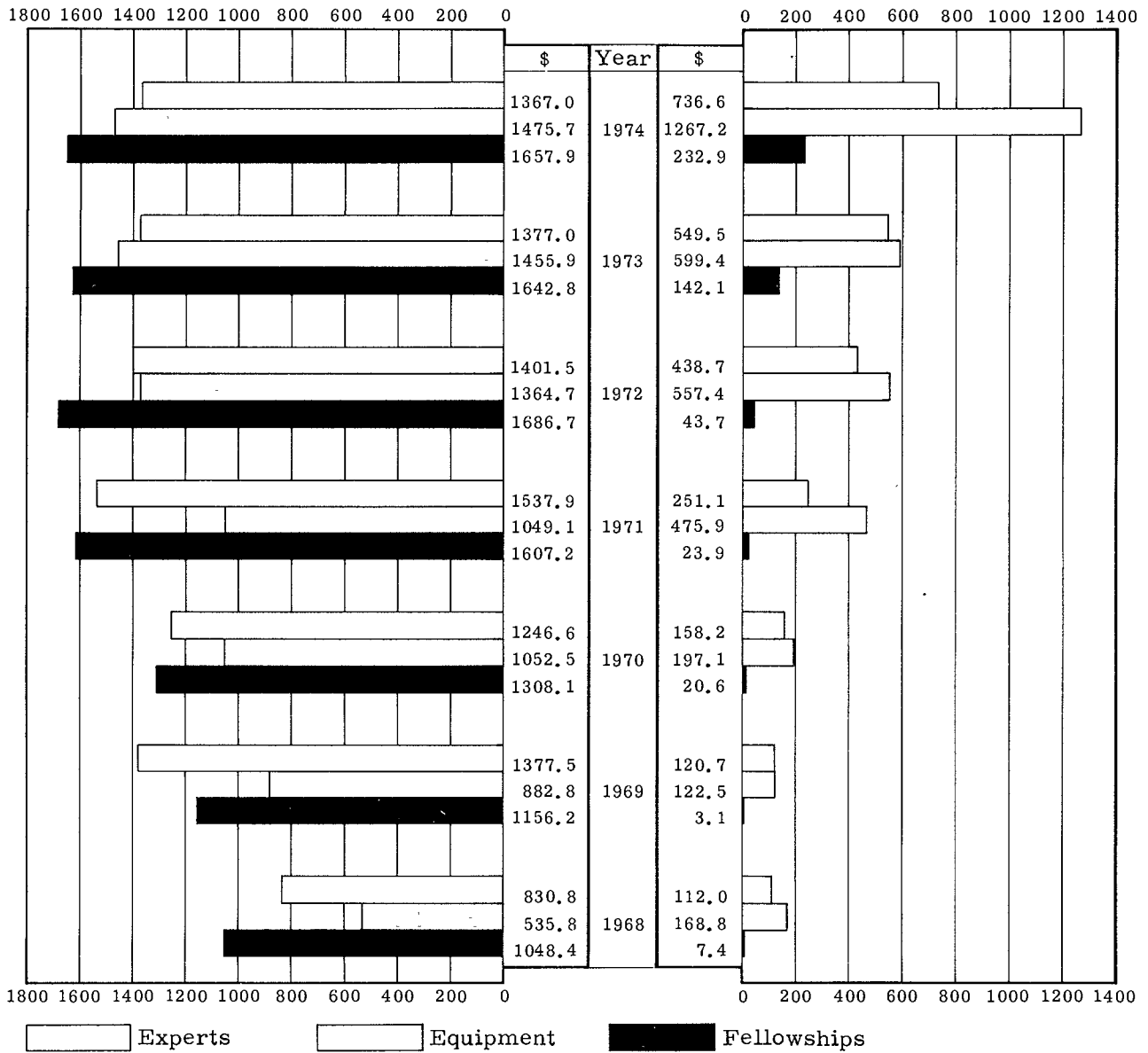


FIGURE 7A

TRENDS IN THE TECHNICAL CO-OPERATION ACTIVITIES OF THE AGENCY  
(in thousands of dollars)

Regular programme and  
UNDP small-scale projects

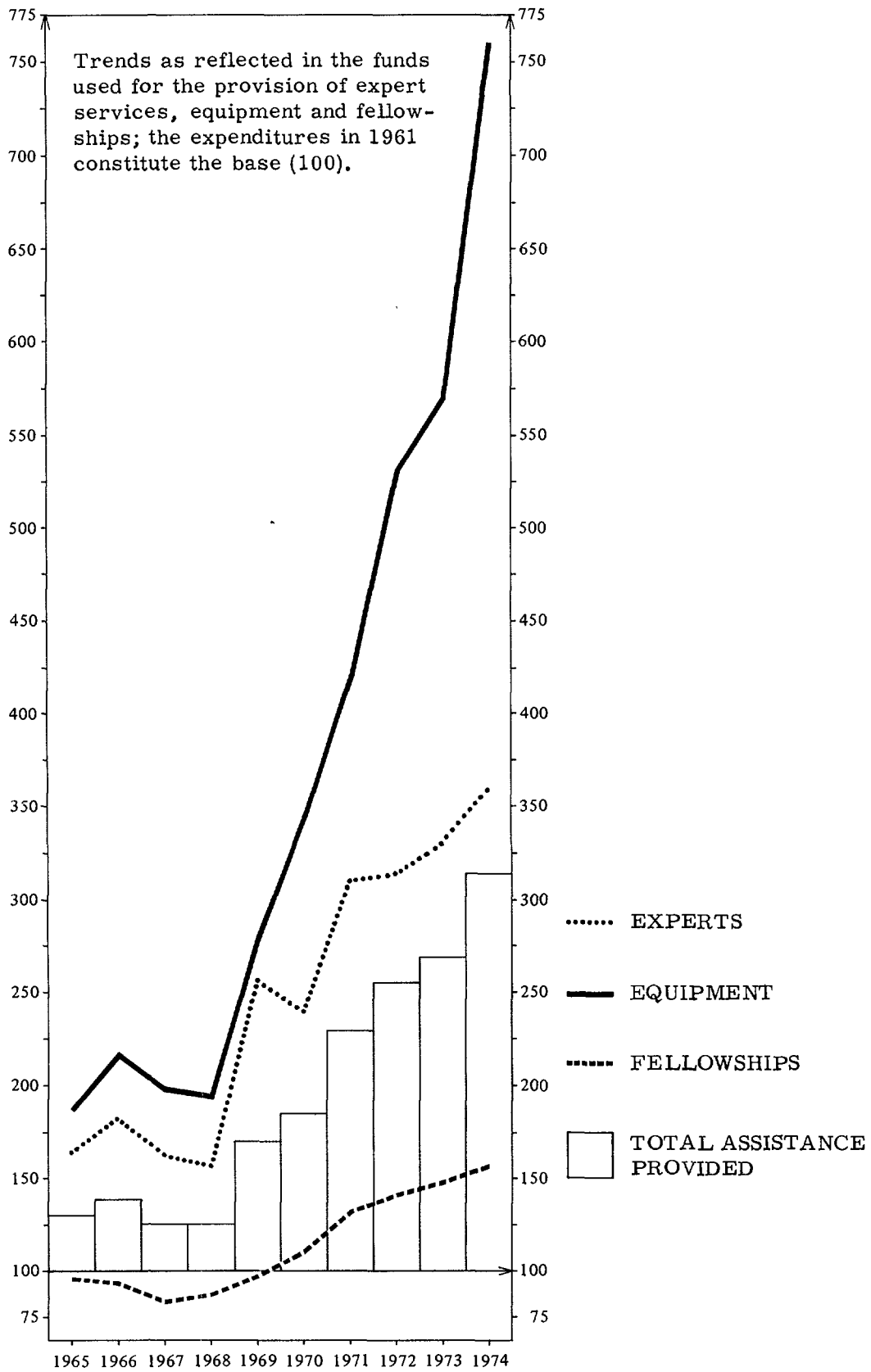
UNDP large-scale projects <sup>a)</sup>



a) The UNDP large-scale project figures given above in respect of experts and equipment include expenditures on subcontracts and miscellaneous project costs; these amounted to \$76 200 in 1968, \$70 500 in 1969, \$1 100 in 1970, \$35 100 in 1971, \$203 800 in 1972, \$196 800 in 1973 and \$227 800 in 1974.

FIGURE 7B

TRENDS IN THE TECHNICAL CO-OPERATION ACTIVITIES OF THE AGENCY



## ANNEX I

### STATISTICAL TABLES

#### Introductory Notes

#### Resources

1. Fig. 1 and Table 1 show the resources made available for approved field programmes of technical assistance and thus do not include UNDP overhead cost allocations. In addition, data in respect of offers of assistance in kind have been up-dated to 31 December 1974; for example, the value of Type II fellowship offers has been adjusted, where necessary, to reflect the resources that were actually available when fellows took up their studies under Type II arrangements. The estimated value of all offers of assistance in kind in support of a given year's technical assistance programme is shown in columns (1b) and (2b) of Table 1.

2. All monetary values appearing under the heading "in kind" are estimated in accordance with the following guidelines:

- (a) Experts. The value of the services of each cost-free expert is estimated on the basis of the average salary of an equivalent expert engaged by the Agency and the applicable daily subsistence allowance as established by UNDP, plus the cost of a round-trip air ticket;
- (b) Equipment. The value of equipment is estimated according to the offer made by the donor Government (at the later, "assistance provided" stage, however, the value to the relevant project is based on the actual costs incurred by the donor Government); and
- (c) Fellowships. The value of Type II fellowships is estimated on the basis of the monthly stipend rate either as proposed by the host country or as established currently by UNDP, multiplied by the duration of the award in months. The estimated travel costs have been added if they were paid by the host country. (Training course stipends paid under this heading, however, are based on actual payments.)

These values and the totals in which they are included must therefore be considered as approximations.

#### Assistance provided

3. The financial statistics given in Tables 4, 7 and 8 relate, in the first instance, to actual cash payments against 1974 and prior years' obligations (shown according to the year(s) in which the cash payments were made) plus the total value of the assistance made available in kind (shown according to the year(s) in which it was provided). Thus, the balance of funds - for example, obligated but not spent in 1974 - is not included in the financial data relating to the assistance provided, but is shown separately in column 9 (see, for example, the 1974 entries in Table 4); the total cumulative balance of funds obligated in 1974 and prior years, but not yet spent as at 31 December 1974, is given at the bottom of this column in Tables 4, 7 and 8.

4. Assistance in kind has been separated into two parts. The first part consists of assistance which has been provided - for example, fellowship training already provided - expressed in terms of estimated cash expenditures. The second part is made up of assistance which is in the process of being provided - for example, fellowship training not yet completed - which is equivalent to unliquidated obligations (see column (10) in Tables 4, 7 and 8). The provision of expert services and equipment in kind has been shown in the same way.

5. Some minor corrections have also been made in the financial statistics relating to assistance provided in kind during prior years which take into account, inter alia, candidates who were withdrawn subsequent to the award of Type II fellowships, that is, after 31 December of a given year. Further, as the Agency exercises no financial control over assistance provided in kind, delay is occasionally experienced in receiving information on equipment deliveries, interruption in fellowship training, etc.

#### Types of assistance

6. (a) Experts. When not shown separately, the assignments of lecturers and visiting professors are included under the heading "Experts". With regard to Table 6, it should be noted that under "Inter-country programmes" the assignments of a number of experts are not sub-divided by region but included, with associated training awards, under the heading "Short-term training projects";
- (b) Equipment. As can best be seen in Table 7, the total assistance provided under this heading is the sum of the amounts disbursed for equipment and supplies in respect of country and inter-country programmes; and
- (c) Fellowships. In Table 3, where awards are classified by place of study, columns relating to short-term regional training projects and scientific visits have been introduced in order to reflect more accurately the valuable contribution made by host countries. The UNDP country, Agency Type I and Type II awards shown in Tables 3 and 6 constitute the total effective awards as of 31 December 1974 (all notifications of non-acceptances by the proposed host countries and of withdrawals by the nominating countries communicated to the Agency by the close of the year have been taken into account). In Table 6 the number of fellowships classified by nationality does not include awards for short-term training projects and scientific visits, since their inclusion would significantly distort the statistics relating primarily to holders of one-year fellowships. Although awards for short-term training projects and scientific visits are included in Table 6 under "UNDP" and "Agency Type I" (in Table 5 under "Number of fellowships") and are financed under "in kind" and "multi-bilateral" arrangements, the regular programme or UNDP, they are not in the same category as Type I, Type II or UNDP country awards. Furthermore, in the financial summaries (Tables 7 and 8) the expenditure on, for example, short-term training projects is not shown as assistance to individual countries but to "Inter-country programmes". None of the tables includes any reference to local participants in short-term training projects (see Annex III).

#### Inter-country programmes

7. In the broadest sense, this heading covers expenditure on regional projects for which experts' services only were provided (for example, by regional advisers), regional and inter-regional projects for which experts, equipment and fellowships were provided (for example, short-term training courses), and regional and inter-regional projects for which fellowships only were provided (for example, scientific visits).

Subcontract activities and funds-in-trust arrangements

8. The statistical tables do not include data relating to services provided by the Agency under subcontracts to other organizations, or in respect of projects carried out at the expense of developing countries under funds-in-trust arrangements.

Figures and percentages

9. Due to the rounding-off of monetary amounts to the nearest hundred or thousand dollars, the totals indicated in various places may differ slightly. In preparing figures and tables, percentages have also been rounded off.

## A. TECHNICAL ASSISTANCE RESOURCES

Table 1

Available resources: 1965-1974  
(in thousands of dollars)

Year	Agency		UNDP		Sub-totals		TOTAL (3) + (4) (5)
	Monetary (1a)	In kind <sup>a/</sup> (1b)	Monetary (2a)	In kind <sup>a/</sup> (2b)	Monetary (3)	In kind <sup>a/</sup> (4)	
1965	1 200	488	1 317	9	2 517	497	3 014
1966	1 263	526	1 462	2	2 725	528	3 253
1967	1 380	565	1 431	5	2 811	570	3 381
1968	1 348	560	1 422	5	2 770	565	3 335
1969	1 586	654	981	4	2 567	658	3 225
1970	1 749	915	1 513	17	3 262	932	4 194
1971	2 224	1 368	1 775	42	3 999	1 410	5 409
1972	2 636	962	2 072	6	4 708	968	5 676
1973	3 123	1 262	1 964	35	5 087	1 297	6 384
1974	3 344	1 358	3 082	31	6 426	1 389	7 815
1965- 1974	19 853	8 658	17 019	156	36 872	8 814	45 686

<sup>a/</sup> Estimated; see Introductory Notes, paras 1 and 2, to this Annex.

Table 2

Funds for the Agency's regular programme of technical assistance: 1965-1974  
(in thousands of dollars)

Item	1965-1970	1971	1972	1973	1974	1965-1974
Target for voluntary contributions to the General Fund <sup>a/</sup>	12 000	2 500	3 000	3 000	3 000	23 500
Share of target budgeted for technical assistance	10 711	2 437	3 000	3 000	3 000	22 148
Amount pledged	8 625	2 143	2 485	2 846	3 081	19 180
Actually made available for technical assistance <sup>b/</sup>	8 526	2 224	2 636	3 123	3 344	19 853

<sup>a/</sup> Until 1972 a share of the funds from voluntary contributions was used to support other operational programme activities of the Agency; up to 1967 most of this share was used for research contracts, and over the period 1964-1969 \$210 000 was used for fellowships at the Trieste Centre.

<sup>b/</sup> The funds from voluntary contributions are supplemented by miscellaneous income accruing to the General Fund and to Operating Fund II, which explains why the amount actually made available for technical assistance in each of the years 1969-1974 exceeded the amount pledged.

Table 3

Experts (classified by place of origin) and fellowship awards (classified by place of study): 1974

Place of origin of experts or place of study for holders of fellowship awards	Experts					Fellowship awards						
	UNDP		Agency		TOTAL	UNDP		Agency			TOTAL	
	Paid	Free	Paid	Free		Country	Regional	Type I	Type II	Regional		Scientific visits
Argentina	7 <sup>a)</sup>	-	2	-	9	6 <sup>b)</sup>	-	-	9	-	1	16
Australia	-	-	1	-	1	2 <sup>b)</sup>	-	1	2	-	-	5
Austria	1 <sup>a)</sup>	-	1	-	2	-	-	1	2	-	-	3
Bangladesh	-	-	2	-	2	-	-	-	-	-	-	-
Belgium	3	-	2	1	6	2	-	7	3	29	5	46
Brazil	2	-	-	-	2	1 <sup>b)</sup>	-	-	2	15 <sup>c)</sup>	-	18
Bulgaria	1	-	-	-	1	-	-	-	-	-	-	-
Canada	5 <sup>a)</sup>	-	2	-	7	8 <sup>b)</sup>	-	9	1 <sup>c)</sup>	-	1	19
Czechoslovakia	1	-	4	-	5	5 <sup>b)</sup>	-	-	3	-	1	9
Denmark	5 <sup>a)</sup>	-	1	-	6	9 <sup>b)</sup>	-	1	4	-	3	17
Egypt	2	-	2	-	4	-	-	5	1	-	-	6
Finland	-	-	2	-	2	-	-	2	2	-	2	6
France	2 <sup>a)</sup>	-	10	-	12	7 <sup>b)</sup>	-	18	10	-	11	46
German D.R.	-	-	-	-	-	-	-	1	-	28	1	30
Germany, F.R.	4 <sup>a)</sup>	-	14	1	19	17 <sup>b)</sup>	-	9	16	14	14	70
Ghana	-	-	-	-	-	-	20	-	-	-	-	20
Greece	-	-	1	-	1	1 <sup>b)</sup>	-	-	-	-	-	1
Hungary	1 <sup>a)</sup>	-	2	-	3	-	-	-	2	-	-	2
India	1 <sup>a)</sup>	-	6	-	7	-	9	1	4	14 <sup>c)</sup>	5	33
Indonesia	1 <sup>a)</sup>	-	-	-	1	-	-	-	-	-	-	-
Israel	2 <sup>a)</sup>	-	6	-	8	-	-	-	-	-	1	1
Italy	8 <sup>a)</sup>	-	2	-	10	6 <sup>b)</sup>	17	1	12	15 <sup>c)</sup>	7	58
Japan	-	-	2	-	2	1 <sup>b)</sup>	-	-	8	-	2	11
Mexico	-	-	-	-	-	-	8	2	-	-	-	10
Netherlands	1 <sup>a)</sup>	1	4	-	6	7 <sup>b)</sup>	-	1	4	-	4	16
Norway	3 <sup>a)</sup>	-	-	-	3	2 <sup>b)</sup>	-	-	-	-	1	3
Peru	-	-	-	-	-	-	19	-	-	-	-	19
Philippines	-	-	2	-	2	-	-	-	2	-	1	3
Poland	3 <sup>a)</sup>	-	2	-	5	-	-	-	4	-	1	5
Romania	2 <sup>a)</sup>	-	1	-	3	-	-	-	-	-	-	-
Spain	3 <sup>a)</sup>	-	3	-	6	3 <sup>b)</sup>	-	1	4	-	-	8
Sweden	7 <sup>a)</sup>	-	5	25	37	8 <sup>b)</sup>	-	2	2 <sup>c)</sup>	-	7	19
Switzerland	-	-	1	-	1	-	-	2	1 <sup>c)</sup>	-	2	5
Thailand	-	-	-	-	-	-	-	-	-	-	1	1
Turkey	-	-	-	-	-	1 <sup>b)</sup>	-	-	-	-	-	1
USSR	-	-	1	-	1	-	-	-	3	28	-	31
UK	19 <sup>a)</sup>	-	14	-	33	12 <sup>b)</sup>	-	76	5 <sup>c)</sup>	-	13	106
USA	19 <sup>a)</sup>	1	23	-	43	14 <sup>b)</sup>	-	26	67 <sup>c)</sup>	-	4	111
Uruguay	-	-	-	-	-	-	-	-	-	-	1	1
Yugoslavia	1	-	5	-	6	3 <sup>b)</sup>	-	-	2	-	1	6
IAEA	9 <sup>a)</sup>	-	12	-	21	2 <sup>b)</sup>	-	10	1 <sup>c)</sup>	-	7	20
Sub-total	113	2	135	27	277	117	73	176	176	143	97	782
CERN, Switzerland	-	-	-	-	-	-	-	1	-	-	-	1
Joint Institute for Nuclear Research, Dubna, USSR	-	-	-	-	-	-	-	-	1	-	-	1
Sub-total	-	-	-	-	-	-	-	1	1	-	-	2
GRAND TOTAL	113	2	135	27	277	117	73	177	177	143	97	784 <sup>d)</sup>

- a) Includes the following large-scale project experts, from: Argentina, two; Austria, one; Canada, five; Denmark, four; France, two; Germany, F.R., one; Hungary, one; India, one; Indonesia, one; Israel, one; Italy, three; Netherlands, one; Norway, two; Poland, one; Romania, one; Spain, three; Sweden, six; United Kingdom, ten; United States, eight; IAEA staff, one.
- b) Includes the following large-scale project awards, in: Argentina, six; Australia, two; Brazil, one; Canada, eight; Czechoslovakia, five; Denmark, seven; France, six; Germany, F.R., 11; Greece, one; Italy, six; Japan, one; Netherlands, six; Norway, one; Spain, three; Sweden, seven; Turkey, one; United Kingdom, seven; United States, nine; Yugoslavia, two; IAEA, one.
- c) Includes the following SIDA-financed awards, in: Canada, one; Sweden, two; Switzerland, one; United Kingdom, five; United States, three; IAEA, one; as well as 15, 14 and 15 awards for participants in training courses held in Brazil, India and Italy, respectively.
- d) The difference between the number of awards (631) and the number of places of study (784) is due to the fact that 17 fellows studied in two, eight in three, four in four, two in five and one in six different countries; 28 participants in a study tour went to two countries; 30 participants in the scientific visit programme went to 97 places of study.

B. DISTRIBUTION OF TECHNICAL ASSISTANCE

Table 4

Types of technical assistance: 1965-1974  
(in thousands of dollars)

TYPE	Experts		Visiting professors		Equipment		Fellowships		Scientific visits		Intercountry projects		Subcontracts		TOTAL		Assistance outstanding at 31 December 1974		TOTAL (8) + (9) + (10) \$
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	(10)	
	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	\$	
<b>1965-1970</b>																			
UNDP monetary	3 144.4	40.7	-	-	2 080.7	26.9	795.2	10.3	-	-	1 142.2	14.8	564.9	7.3	7 727.4	100.0	-	-	7 727.4
Agency monetary	2 506.7	34.1	545.9	7.4	1 635.8	22.3	1 957.5	26.7	126.7	1.7	574.5	7.8	-	-	7 347.1	100.0	17.0	-	7 364.1
Assistance in kind <sup>a/</sup>	60.4	1.6	-	-	614.9	16.3	3 005.6	79.5	-	-	99.9	2.6	-	-	3 780.8	100.0	-	-	3 780.8
TOTAL	5 711.5	30.3	545.9	2.9	4 331.4	23.0	5 758.3	30.5	126.7	0.7	1 816.6	9.6	564.9	3.0	18 855.3	100.0	17.0	-	18 872.3
<b>1971</b>																			
UNDP monetary	746.7	40.6	-	-	666.0	36.2	127.7	6.9	-	-	275.1	15.0	23.3	1.3	1 838.8	100.0	-	-	1 838.8
Agency monetary	760.1	35.8	60.7	2.9	495.1	23.3	509.3	24.0	26.7	1.2	272.7	12.8	-	-	2 124.6	100.0	33.5	-	2 158.1
Assistance in kind <sup>a/</sup>	27.0	2.7	-	-	240.4	24.5	630.8	64.3	-	-	83.5	8.5	-	-	981.7	100.0	-	2.7	984.4
TOTAL	1 533.8	31.0	60.7	1.2	1 401.5	28.4	1 267.8	25.8	26.7	0.5	631.3	12.8	23.3	0.5	4 945.1	100.0	33.5	2.7	4 981.3
<b>1972</b>																			
UNDP monetary	818.3	39.5	-	-	768.2	37.1	162.8	7.9	-	-	127.5	6.1	195.2	9.4	2 072.0	100.0	-	-	2 072.0
Agency monetary	822.2	32.2	49.6	1.9	801.4	31.4	594.6	23.3	28.9	1.1	259.3	10.1	-	-	2 556.0	100.0	143.4	-	2 699.4
Assistance in kind <sup>a/</sup>	8.1	0.9	-	-	92.0	10.6	681.1	78.8	-	-	83.5	9.7	-	-	864.7	100.0	-	33.3	898.0
TOTAL	1 648.6	30.0	49.6	1.9	1 661.6	30.2	1 438.5	26.2	28.9	0.5	470.3	8.6	195.2	3.6	5 492.7	100.0	143.4	33.3	5 669.4
<b>1973</b>																			
UNDP monetary	921.4	46.9	-	-	501.5	25.5	257.7	13.1	-	-	103.3	5.3	180.4	9.2	1 964.3	100.0	-	-	1 964.3
Agency monetary	881.6	32.9	21.0	0.8	998.1	37.7	453.3	16.9	82.2	3.1	239.7	9.0	-	-	2 675.9	100.0	516.3	-	3 192.2
Assistance in kind <sup>a/</sup>	25.6	2.3	-	-	351.2	31.2	642.7	57.0	-	-	107.0	9.5	-	-	1 126.5	100.0	-	148.0	1 274.5
TOTAL	1 828.6	31.7	21.0	0.4	1 850.8	32.1	1 353.7	23.5	82.2	1.4	450.0	7.8	180.4	3.1	5 766.7	100.0	516.3	148.0	6 431.0
<b>1974</b>																			
UNDP monetary	906.3	29.4	-	-	1 323.2	42.9	305.3	9.9	-	-	304.0	9.9	242.8	7.9	3 081.6	100.0	1 043.6	-	4 125.2
Agency monetary	986.0	40.8	16.3	0.7	767.5	31.8	462.4	19.2	60.9	2.5	120.1	5.0	-	-	2 413.2	100.0	1 593.5	-	4 006.7
Assistance in kind <sup>a/</sup>	34.1	2.7	-	-	361.9	29.1	709.0	57.1	-	-	137.5	11.1	-	-	1 242.5	100.0	-	854.1	2 096.6
TOTAL	1 926.4	28.6	16.3	0.3	2 452.6	36.4	1 476.7	21.9	60.9	0.9	561.6	8.3	242.8	3.6	6 737.3	100.0	2 637.1	854.1	10 228.5
<b>1965-1974</b>																			
UNDP monetary	6 537.1	39.2	-	-	5 339.6	32.0	1 648.7	9.9	-	-	1 952.1	11.7	1 206.6	7.2	16 684.1	100.0	1 043.6	-	17 727.7
Agency monetary	5 956.6	34.8	693.5	4.1	4 697.9	27.4	3 977.1	23.2	325.4	1.9	1 466.3	8.6	-	-	17 116.8	100.0	2 303.7	-	19 420.5
Assistance in kind <sup>a/</sup>	155.2	1.9	-	-	1 660.4	20.8	5 669.2	70.9	-	-	511.4	6.4	-	-	7 996.2	100.0	-	1 038.1	9 034.3
GRAND TOTAL	12 648.9	30.3	693.5	1.6	11 697.9	28.0	11 295.0	27.0	325.4	0.8	3 929.8	9.4	1 206.6	2.9	41 797.1	100.0	3 347.3	1 038.1	46 182.5

a/ Estimated; see Introductory Notes, paras 4 and 5, to this Annex.

b/ The 1974 Agency monetary figures include miscellaneous and bank charges amounting to \$7000 under "Experts", \$5300 under "Equipment" and \$600 under "Fellowships".



Table 5

Fields of technical assistance: 1974

Field	Number of expert assignments	Cost of equipment (in thousands of dollars)	Number of fellowship awards a)
General atomic energy development	9	14.2	11
Nuclear physics	30	112.9	79
Nuclear chemistry	10	122.8	20
Prospecting, mining and processing of nuclear materials	32	440.2	43
Nuclear engineering and technology	48	566.5	141
Application of isotopes and radiation in agriculture	78	534.5	139
in medicine	33	337.3	81
in biology	6	26.4	14
Other fields of application of isotopes and radiation	32	501.5	58
Safety in nuclear energy	15	86.6	45
<b>TOTAL</b>	<b>293</b>	<b>2 742.9</b>	<b>631</b>

a) These figures include 188 participants in 11 regional and interregional short-term training projects and 30 holders of awards for scientific visits.

Table 6

## Recipients of expert services and fellowship awards: 1974

RECIPIENT	Number of expert assignments, classified by location of duty station										Number of fellowship awards, classified by nationality of award holder							
	UNDP				Agency				TOTAL		UNDP		Agency				TOTAL	
	Paid		Free		Paid		Free		(1)	(2)	(1)	(2)	Type I		Type II		(1)	(2)
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)					(1)	(2)	(1)	(2)		
<u>Country programmes:</u>																		
Afghanistan	1	2	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-
Albania	1	1	-	-	1	1	-	-	2	2	-	-	-	-	-	-	-	-
Algeria	-	-	-	-	1	1	-	-	1	1	-	-	1	12	-	-	1	12
Argentina	8 <sup>a)</sup>	19	-	-	11	24	-	-	19	43	2 <sup>b)</sup>	11	6	54	7	78	15	143
Bangladesh	-	-	-	-	-	-	1	1	1	1	-	-	2	11	13	150	15	161
Bolivia	-	-	-	-	3	5	-	-	3	5	-	-	-	-	2	18	2	18
Brazil	9 <sup>a)</sup>	37	-	-	7	19	1	1	17	57	5 <sup>b)</sup>	46	5	35	4	43	14	124
Bulgaria	-	-	-	-	4	3	-	-	4	3	1	1	4	33	7	70	12	104
Burma	-	-	-	-	3	22	-	-	3	22	-	-	-	-	1	6	1	6
Cameroon, U. R.	1	12	-	-	-	-	-	-	1	12	-	-	2	21	-	-	2	21
Chile	5 <sup>a)</sup>	13	-	-	1	3	-	-	6	16	8 <sup>b)</sup>	45	2	7	1	10	11	62
Colombia	-	-	-	-	4	21	-	-	4	21	-	-	2	13	5	46	7	59
Costa Rica	-	-	-	-	2	11	-	-	2	11	-	-	-	-	4	35	4	35
Cuba	1	1	-	-	1	6	-	-	2	7	-	-	1	12	-	-	1	12
Cyprus	-	-	-	-	1	1	-	-	1	1	-	-	2	15	-	-	2	15
Czechoslovakia	-	-	-	-	-	-	-	-	-	-	-	-	6	66	6	55	12	121
Dominican Republic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	12	1	12
Egypt	-	-	-	-	1	12	-	-	1	12	2 <sup>b)</sup>	21	4	40	13	139	19	200
Ethiopia	1	3	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-
Gabon	-	-	-	-	1	1	-	-	1	1	-	-	-	-	-	-	-	-
Ghana	-	-	-	-	1	1	-	-	1	1	1 <sup>b)</sup>	12	2	9	2	18	5	39
Greece	6 <sup>a)</sup>	46	-	-	7	15	-	-	13	61	6 <sup>b)</sup>	34	8	63	4	35	18	132
Guatemala	-	-	-	-	1	4	-	-	1	4	-	-	-	-	-	-	-	-
Hong Kong	-	-	-	-	1	6	-	-	1	6	-	-	1	6	-	-	1	6
Hungary	-	-	-	-	3	6	-	-	3	6	5 <sup>b)</sup>	4	5	60	2	20	12	84
India	14 <sup>a)</sup>	36	-	-	3	6	-	-	17	42	12 <sup>b)</sup>	65	9	71	17	162	38	298
Indonesia	1 <sup>a)</sup>	1	-	-	3	15	-	-	4	16	1 <sup>b)</sup>	12	3	24	4	39	8	75
Iran	1	2	-	-	3	7	-	-	4	9	-	-	1	10	1	6	2	16
Iraq	-	-	-	-	3	1	-	-	3	1	-	-	7	63	5	60	12	123
Israel	3	1	-	-	4	6	-	-	7	7	-	-	5	30	3	36	8	66
Ivory Coast	-	-	-	-	1	2	-	-	1	2	-	-	-	-	-	-	-	-
Jordan	1	4	-	-	2	8	-	-	3	12	1	18	1	6	-	-	2	24
Kenya	-	-	-	-	1	5	-	-	1	5	-	-	-	-	-	-	-	-
Korea, R.	1 <sup>a)</sup>	1	-	-	7	20	-	-	8	21	-	-	3	36	7	62	10	98
Lebanon	1	1	-	-	4	17	-	-	5	18	-	-	1	12	-	-	1	12
Liberia	1	7	1	7	-	-	-	-	2	14	-	-	-	-	-	-	-	-
Malaysia	-	-	-	-	2	2	-	-	2	2	-	-	4	30	-	-	4	30
Mali	1	5	-	-	1	7	-	-	2	12	-	-	-	-	-	-	-	-
Mexico	3 <sup>a)</sup>	4	-	-	5	18	-	-	8	22	-	-	3	24	3	21	6	45
Morocco	3 <sup>a)</sup>	10	-	-	3	22	-	-	6	32	1	12	4	39	1	9	6	60
Nigeria	1 <sup>a)</sup>	1	-	-	1	12	-	-	2	13	-	-	2	21	1	3	3	24
Pakistan	8 <sup>a)</sup>	49	-	-	2	3	-	-	10	52	2 <sup>b)</sup>	11	6	39	5	56	13	106
Peru	-	-	-	-	3	5	-	-	3	5	-	-	-	-	5	51	5	51
Philippines	-	-	-	-	5	11	-	-	5	11	1	7	3	38	6	43	10	88
Poland	-	-	-	-	1	1	-	-	1	1	3	6	9	91	6	60	18	157
Romania	6 <sup>a)</sup>	17	-	-	1	3	-	-	7	20	20 <sup>b)</sup>	135	5	52	1	5	26	192
Senegal	-	-	-	-	-	-	-	-	-	-	-	-	2	12	-	-	2	12
Sierra Leone	1	5	1	5	-	-	-	-	2	10	-	-	-	-	-	-	-	-
Singapore	-	-	-	-	2	9	-	-	2	9	-	-	1	12	1	12	2	24
Sri Lanka	-	-	-	-	2	6	-	-	2	6	-	-	2	18	-	-	2	18
Sudan	1	1	-	-	3	3	-	-	4	4	2	24	10	101	2	24	14	149
Syrian A. R.	-	-	-	-	-	-	-	-	-	-	-	-	7	72	4	36	11	108
Thailand	1	2	-	-	4	13	-	-	5	15	-	-	6	56	12	130	18	186
Turkey	5 <sup>a)</sup>	32	-	-	1	1	-	-	6	33	1 <sup>b)</sup>	4	5	54	5	60	11	118
Uruguay	-	-	-	-	2	6	-	-	2	6	-	-	-	-	6	46	6	46

RECIPIENT	Number of expert assignments, classified by location of duty station										Number of fellowship awards, classified by nationality of award holder								
	UNDP				Agency				TOTAL		UNDP		Agency				TOTAL		
	Paid		Free		Paid		Free		(1)	(2)	(1)	(2)	Type I		Type II		(1)	(2)	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)					(1)	(2)	(1)	(2)			(1)
Venezuela	2	12	-	-	1	4	-	-	3	16	-	-	-	-	-	-	-	-	-
Viet-Nam (3)	-	-	-	-	-	-	-	-	-	-	-	-	1	12	1	12	2	24	-
Yugoslavia	3	3	-	-	4	8	-	-	7	11	1	5	4	24	1	12	6	41	-
Zaire	-	-	-	-	1	10	1	1	2	11	-	-	6	61	4	42	10	103	-
Zambia	1 <sup>a)</sup>	12	-	-	-	-	-	-	1	12	-	-	-	-	2	18	2	18	-
Sub-total	92	340	2	12	129	393	3	3	226	748	75	473	163	1465	175	1740	413	3678	-
<u>Intercountry programmes:</u>																			
Short-term training projects	29	19	1	1	12	5	25	13	67	38	73	156	71	46	44	60	188	262	-
Scientific visits	-	-	-	-	-	-	-	-	-	-	-	-	30	37	-	-	30	37	-
Sub-total	29	19	1	1	12	5	25	13	67	38	73	156	101	83	44	60	218	299	-
GRAND TOTAL	121	359	3	13	141	398	28	16	293 <sup>c)</sup>	786	148	629	264	1548	219	1800	631	3977	-

(1) Number

(2) Number of man-months.

(3) The official designation of Viet-Nam is now the Republic of South Viet-Nam.

a) Includes the following large-scale project experts: one/12 man-months, Argentina; eight/31 man-months, Brazil; five/13 man-months, Chile; six/46 man-months, Greece; 13/34 man-months, India; one/1 man-month, Indonesia; one/1 man-month, Korea, R.; three/10 man-months, Morocco; one/1 man-month, Nigeria; eight/49 man-months, Pakistan; six/17 man-months, Romania; five/32 man-months, Turkey; one/12 man-months, Zambia.

b) Includes the following large-scale project awards: one/1 man-month, Argentina; five/46 man-months, Brazil; eight/45 man-months, Chile; two/21 man-months, Egypt, three/28 man-months, Greece; five/4 man-months, Hungary; seven/42 man-months, India; one/12 man-months, Indonesia; two/11 man-months, Pakistan; 20/135 man-months, Romania; one/4 man-months, Turkey.

c) The difference between the number of assignments (293) and the actual number of experts (277) is due to the fact that each of 12 experts served in two and two in three different countries.

Table 7

Financial summary: 1974  
(in thousands of dollars)

RECIPIENT	Assistance provided, by type				Assistance provided, by source				Assistance outstanding at 31 December 1974		TOTAL (8) + (9) + (10)	
	Experts	Equip- ment	Fellow- ships	TOTAL	UNDP		Agency		TOTAL	Unliquidated obligations		In kind balance <sup>a)</sup>
					Monetary	In kind <sup>a)</sup>	Monetary	In kind <sup>a)</sup>				
					(1)	(2)	(3)	(4)				
<u>Country programmes:</u>												
Afghanistan	5.5	2.6	0.8	8.9	8.1	-	0.8	-	8.9	-	-	8.9
Albania	1.6	-	5.2	6.8	0.5	-	5.5	0.8	6.8	-	-	6.8
Algeria	0.1	-	9.1	9.2	2.3	-	6.9	-	9.2	3.4	-	12.6
Argentina	89.7	27.5	41.6	158.8	50.7	-	92.7	15.4	158.8	45.3	42.4	246.5
Bangladesh	1.4	17.6	52.2	71.2	-	-	21.4	49.8	71.2	35.7	147.5	254.4
Bolivia	10.2	13.9	7.8	31.9	12.1	-	12.0	7.8	31.9	13.1	7.8	52.8
Brazil	63.1	2.2	37.5	102.8	22.0	-	64.8	16.0	102.8	24.3	17.1	144.2
Bulgaria	3.9	60.8	54.3	119.0	6.8	-	78.5	33.7	119.0	49.4	36.4	204.8
Burma	53.3	4.0	-	57.3	-	-	57.3	-	57.3	29.5	3.7	90.5
Cameroon, U. R.	30.0	5.9	3.6	39.5	34.7	-	1.2	3.6	39.5	23.3	-	62.8
Chile	6.6	2.0	9.9	18.5	-	-	12.7	5.8	18.5	4.4	-	22.9
Colombia	55.2	49.2	13.3	117.7	-	-	105.7	12.0	117.7	27.3	24.7	169.7
Costa Rica	27.5	16.0	7.5	51.0	-	-	33.5	17.5	51.0	9.3	27.9	88.2
Cuba	17.2	1.9	6.7	25.8	1.5	-	18.2	6.1	25.8	148.0	0.5	174.3
Cyprus	3.9	1.3	5.6	10.8	-	-	10.8	-	10.8	7.1	12.0	29.9
Czechoslovakia	-	-	39.0	39.0	-	-	11.1	27.9	39.0	35.2	39.6	113.8
Dominican Republic	-	-	-	-	-	-	-	-	-	-	6.2	6.2
Egypt	20.5	25.5	63.0	109.0	1.8	-	57.2	50.0	109.0	128.3	70.8	308.1
El Salvador	-	-	(0.8)	(0.8)	-	-	(0.8)	-	(0.8)	-	-	(0.8)
Ethiopia	8.1	7.6	-	15.7	8.1	-	2.4	5.2	15.7	-	-	15.7
Gabon	3.7	-	-	3.7	-	-	3.7	-	3.7	-	-	3.7
Ghana	0.1	45.2	26.0	71.3	8.4	-	28.9	34.0	71.3	1.6	35.6	108.5
Greece	38.3	12.5	54.0	104.8	4.6	-	66.8	33.4	104.8	81.7	25.3	211.8
Guatemala	10.0	29.2	-	39.2	-	-	12.9	26.3	39.2	7.2	-	46.4
Hong Kong	15.1	-	-	15.1	-	-	15.1	-	15.1	4.7	-	19.8
Hungary	14.7	5.7	50.7	71.1	-	-	44.5	26.6	71.1	56.8	9.7	137.6
Iceland	-	-	-	-	-	-	-	-	-	1.7	-	1.7
India	16.0	20.2	107.6	143.8	14.2	-	69.7	59.9	143.8	138.1	87.4	369.3
Indonesia	53.5	90.8	18.7	163.0	60.3	-	95.5	7.2	163.0	69.7	17.6	250.3
Iran	24.7	-	24.0	48.7	5.0	-	20.3	23.4	48.7	4.0	6.8	59.5
Iraq	3.5	59.2	22.3	85.0	-	-	72.7	12.3	85.0	219.4	35.1	339.5
Israel	19.8	99.8	18.8	138.4	37.6	-	60.2	40.6	138.4	26.0	18.7	183.1
Ivory Coast	4.6	10.7	-	15.3	-	-	15.3	-	15.3	-	-	15.3
Jamaica	-	37.6	3.8	41.4	-	-	3.8	37.6	41.4	-	-	41.4
Jordan	27.8	0.1	10.4	38.3	13.0	-	20.6	4.7	38.3	6.7	-	45.0
Kenya	16.9	-	-	16.9	-	-	16.9	-	16.9	16.6	-	33.5
Korea, R.	63.3	17.9	51.5	132.7	-	-	102.3	30.4	132.7	62.4	19.7	214.8
Lebanon	41.1	17.5	5.0	63.6	5.8	-	52.8	5.0	63.6	20.5	-	84.1
Liberia	27.5	13.2	-	40.7	17.5	10.0	0.1	13.1	40.7	-	-	40.7
Madagascar	3.8	-	1.2	5.0	-	-	5.0	-	5.0	26.2	-	31.2
Malaysia	2.8	0.6	25.1	28.5	-	-	23.5	5.0	28.5	17.0	-	45.5
Mali	29.8	-	-	29.8	11.3	-	18.5	-	29.8	-	-	29.8
Mexico	57.9	22.6	14.3	94.8	31.8	-	54.1	8.9	94.8	36.8	10.8	142.4
Morocco	49.2	31.7	6.1	87.0	-	-	60.7	26.3	87.0	43.7	2.1	132.8
Nigeria	25.9	2.4	4.3	32.6	-	-	29.7	2.9	32.6	10.0	-	42.6
Pakistan	10.5	70.6	69.5	150.6	1.1	-	79.2	70.3	150.6	89.3	37.9	277.8
Peru	14.9	4.2	19.2	38.3	-	-	19.1	19.2	38.3	2.0	23.0	63.3
Philippines	28.9	76.1	56.6	161.6	5.7	-	97.6	58.3	161.6	45.4	17.3	224.3
Poland	0.3	31.6	71.4	103.3	5.6	-	60.8	36.9	103.3	120.0	21.0	244.3
Romania	7.3	35.0	38.1	80.4	-	-	64.2	16.2	80.4	147.4	16.9	244.7
Senegal	0.3	11.4	-	11.7	-	-	11.7	-	11.7	5.4	-	17.1
Sierra Leone	22.4	0.7	-	23.1	13.2	9.9	-	-	23.1	2.0	2.9	28.0
Singapore	18.9	35.1	8.5	62.5	-	-	46.2	16.3	62.5	27.5	3.8	93.8
Sri Lanka	12.2	19.1	9.0	40.3	2.1	-	20.4	17.8	40.3	29.5	-	69.8
Sudan	15.5	13.8	28.1	57.4	8.6	-	35.0	13.8	57.4	121.2	15.0	193.6
Syrian A. R.	5.8	14.7	24.1	44.6	-	-	29.4	15.2	44.6	50.0	10.5	105.1
Thailand	42.6	81.9	59.8	184.3	23.0	-	103.5	57.8	184.3	56.6	66.8	307.7
Tunisia	-	9.4	-	9.4	-	-	5.3	4.1	9.4	-	-	9.4
Turkey	2.7	34.8	38.3	75.8	4.8	-	29.4	41.6	75.8	56.5	32.1	164.4
Uganda	-	18.9	-	18.9	-	-	18.9	-	18.9	-	-	18.9

RECIPIENT	Assistance provided, by type				Assistance provided, by source				Assistance outstanding at 31 December 1974		TOTAL (8) + (9) + (10)	
	Experts	Equip- ment	Fellow- ships	TOTAL	UNDP		Agency		TOTAL	Unliquidated obligations		In kind balance <sup>a)</sup>
					Monetary	In kind <sup>a)</sup>	Monetary	In kind <sup>a)</sup>				
					(1)	(2)	(3)	(4)				
Uruguay	11.3	35.8	13.0	60.1	16.6	-	22.8	20.7	60.1	35.0	9.6	104.7
Venezuela	40.1	52.2	-	92.3	62.7	-	29.6	-	92.3	2.2	-	94.5
Viet-Nam <sup>b)</sup>	-	18.5	27.0	45.5	-	-	27.3	18.2	45.5	8.1	-	53.6
Yugoslavia	29.6	52.1	23.4	105.1	39.8	-	58.0	7.3	105.1	103.7	8.8	217.6
Zaire	28.2	11.8	8.6	48.6	-	-	36.2	12.4	48.6	37.1	26.7	112.4
Zambia	-	0.1	9.4	9.5	-	-	0.1	9.4	9.5	1.5	5.3	16.3
Sub-total	1239.3	1382.7	1304.1	3926.1	541.3	19.9	2280.2	1084.7	3926.1	2374.8	1003.0	7303.9
<u>Intercountry programmes</u>												
Africa	4.5	17.1	52.3	73.9	73.9	-	-	-	73.9	-	-	73.9
Asia and the Far East	13.3	11.4	32.2	56.9	54.0	2.9	-	-	56.9	-	-	56.9
Latin America	28.4	18.0	34.1	80.5	72.4	8.1	-	-	80.5	-	-	80.5
Interregional projects	74.5	41.2	234.6	350.3	103.7	-	120.1	126.5	350.3	47.4	35.1	432.8
Sub-total	120.7	87.7	353.2	561.6	304.0	11.0	120.1	126.5	561.6	47.4	35.1	644.1
Miscellaneous	7.0	5.3	0.6	12.9	-	-	12.9	-	12.9	-	-	12.9
<u>UNDP large-scale projects</u>												
Argentina	43.8	5.1	1.6	50.5	50.5	-	-	-	50.5	5.6	-	56.1
Brazil	101.6	77.1	26.0	204.7	204.7	-	-	-	204.7	23.6	-	228.3
Chile	34.0	-	18.1	52.1	52.1	-	-	-	52.1	9.6	-	61.7
Egypt	-	24.5	16.2	40.7	40.7	-	-	-	40.7	1.0	-	41.7
Greece	119.7	28.9	11.9	160.5	160.5	-	-	-	160.5	19.3	-	179.8
Hungary	-	64.8	8.7	73.5	73.5	-	-	-	73.5	287.0	-	360.5
India	93.6	189.7	50.4	333.7	333.7	-	-	-	333.7	76.2	-	409.9
Indonesia	3.0	8.1	5.0	16.1	16.1	-	-	-	16.1	-	-	16.1
Korea, R	2.5	122.4	9.3	134.2	134.2	-	-	-	134.2	226.5	-	360.7
Morocco	24.3	25.0	0.7	50.0	50.0	-	-	-	50.0	23.4	-	73.4
Nigeria	2.5	0.5	-	3.0	3.0	-	-	-	3.0	6.8	-	9.8
Pakistan	131.8	178.3	20.4	330.5	330.1	0.4	-	-	330.5	51.8	-	382.3
Romania	66.7	384.2	60.7	511.6	511.6	-	-	-	511.6	189.7	-	701.3
Turkey	83.1	157.6	3.9	244.6	244.6	-	-	-	244.6	4.6	-	249.2
Zambia	30.0	1.0	-	31.0	31.0	-	-	-	31.0	-	-	31.0
Sub-total	736.6	1267.2	232.9	2236.7	2236.3	0.4	-	-	2236.7	925.1	-	3161.8
GRAND TOTAL	2103.6	2742.9	1890.8	6737.3	3081.6	31.3	2413.2	1211.2	6737.3	3347.3	1038.1	11122.7

- a) Assistance in kind can only be estimated; see Introductory Notes, paras 4 and 5, to this Annex.  
b) The official designation of Viet-Nam is now the Republic of South Viet-Nam.

Table 8

Financial summary: 1958-1974  
(in thousands of dollars)

RECIPIENT	Assistance provided, by type				Assistance provided, by source					Assistance outstanding at 31 December 1974		TOTAL (8) + (9) + (10)
	Experts (1)	Equip- ment (2)	Fellow- ships (3)	TOTAL (4)	UNDP		Agency		TOTAL (8)	Unliquidated obligations (9)	In kind balance <sup>a/</sup> (10)	
					Monetary	In kind <sup>a/</sup>	Monetary	In kind <sup>a/</sup>				
					(5a)	(5b)	(6)	(7)				
<u>Country programmes</u>												
Afghanistan	80.4	78.7	58.8	217.9	78.2	-	86.6	53.1	217.9	-	-	217.9
Albania	14.0	52.1	20.7	86.8	0.5	-	71.8	14.5	86.8	-	-	86.8
Algeria	13.3	-	71.2	84.5	21.7	-	55.8	7.0	84.5	3.4	-	87.9
Argentina	706.5	401.0	566.6	1674.1	565.3	0.6	761.1	347.1	1674.1	45.3	42.4	1761.8
Austria	62.0	13.8	120.7	196.5	-	-	132.6	63.9	196.5	-	-	196.5
Bangladesh	1.4	43.2	63.1	107.7	-	-	50.5	57.2	107.7	35.7	147.6	290.9
Bolivia	135.6	162.7	126.4	424.7	128.8	-	216.0	79.9	424.7	13.1	7.8	445.6
Brazil	879.6	414.9	584.3	1878.8	810.9	-	747.5	320.4	1878.8	24.3	17.1	1920.2
Bulgaria	23.0	205.2	434.2	662.4	74.1	-	407.1	181.2	662.4	49.4	36.4	748.2
Burma	488.8	264.4	119.7	872.9	445.2	-	359.9	67.8	872.9	29.5	3.7	906.1
Cameroon, U.R.	239.0	80.0	20.3	339.3	237.1	-	95.4	6.8	339.3	23.3	-	362.6
Chile	322.8	182.8	229.5	735.1	179.6	-	396.1	159.4	735.1	4.4	-	739.5
China, Republic of	229.7	166.2	554.9	950.8	281.5	-	307.7	361.6	950.8	-	-	950.8
Colombia	271.5	237.4	160.1	669.0	132.0	-	285.6	251.4	669.0	27.3	24.7	721.0
Costa Rica	54.9	36.2	24.1	115.2	-	-	78.4	36.8	115.2	9.3	27.9	152.4
Cuba	109.7	117.9	27.1	254.7	17.5	-	203.3	33.9	254.7	148.0	0.5	403.2
Cyprus	68.4	98.5	26.8	193.7	24.1	-	151.0	18.6	193.7	7.1	12.0	212.8
Czechoslovakia	-	-	392.0	392.0	4.8	-	233.3	153.9	392.0	35.2	39.6	466.8
Dominican Republic	-	-	-	-	-	-	-	-	-	6.2	-	6.2
Ecuador	47.0	46.6	68.2	161.8	35.5	-	71.2	55.1	161.8	-	-	161.8
Egypt	329.5	414.3	781.0	1524.8	303.6	0.8	683.9	536.5	1524.8	128.3	70.8	1723.9
El Salvador	41.1	36.1	19.9	97.1	14.1	-	30.1	52.9	97.1	-	-	97.1
Ethiopia	67.4	53.4	24.3	145.1	52.9	-	63.4	28.8	145.1	-	-	145.1
Gabon	3.7	-	-	3.7	-	-	3.7	-	3.7	-	-	3.7
Ghana	257.1	226.1	141.6	624.8	161.1	-	370.5	93.2	624.8	1.6	35.6	662.0
Greece	609.4	137.2	493.9	1240.5	384.3	-	546.6	309.6	1240.5	81.7	25.3	1347.5
Guatemala	64.7	83.4	35.8	183.9	56.2	-	70.5	57.2	183.9	7.2	-	191.1
Haiti	0.9	-	-	0.9	-	-	0.9	-	0.9	-	-	0.9
Hong Kong	35.1	51.1	-	86.2	-	-	86.2	-	86.2	4.7	-	90.9
Hungary	70.9	338.7	535.3	944.9	130.0	-	623.9	191.0	944.9	56.8	9.7	1011.4
Iceland	29.0	72.1	25.9	127.0	-	-	74.6	52.4	127.0	1.7	-	128.7
India	126.7	295.7	1023.6	1446.0	269.7	3.6	542.4	630.3	1446.0	138.1	87.4	1671.5
Indonesia	462.7	294.0	635.1	1391.8	281.1	-	623.8	486.9	1391.8	69.7	17.6	1479.1
Iran	583.4	72.0	403.6	1059.0	455.4	0.5	358.4	244.7	1059.0	4.0	6.8	1069.8
Iraq	346.3	169.9	457.4	973.6	242.5	-	464.2	266.9	973.6	219.4	35.1	1228.1
Israel	202.2	376.6	198.0	776.8	156.9	-	401.0	218.9	776.8	26.0	18.7	821.5
Italy	9.0	-	160.1	169.1	-	-	95.6	73.5	169.1	-	-	169.1
Ivory Coast	50.2	27.7	2.9	80.8	62.3	-	18.5	-	80.8	-	-	80.8
Jamaica	41.1	59.1	20.4	120.6	10.4	-	52.9	57.3	120.6	-	-	120.6
Japan	50.1	-	322.3	372.4	49.8	-	129.4	193.2	372.4	-	-	372.4
Jordan	62.2	20.3	48.8	131.3	67.9	-	48.2	15.2	131.3	6.7	-	138.0
Kenya	48.8	92.4	14.8	156.0	27.4	-	85.8	42.8	156.0	16.6	-	172.6
Khmer Republic <sup>b/</sup>	85.0	29.3	1.7	116.0	39.1	-	69.6	7.3	116.0	-	-	116.0
Korea, R.	375.0	170.9	791.0	1336.9	117.2	-	663.5	556.2	1336.9	62.4	19.7	1419.0
Kuwait	5.5	-	3.9	9.4	-	-	9.4	-	9.4	-	-	9.4
Lebanon	184.3	125.4	53.4	363.1	81.8	-	258.1	23.2	363.1	20.5	-	383.6
Liberia	115.2	29.0	-	144.2	60.2	27.8	27.7	28.5	144.2	-	-	144.2
Libyan A.R.	0.4	7.7	-	8.1	-	-	8.1	-	8.1	-	-	8.1
Madagascar	20.5	24.3	21.5	66.3	-	-	66.3	-	66.3	26.2	-	92.5
Malaysia	40.0	31.2	54.6	125.8	1.6	-	95.8	28.4	125.8	17.0	-	142.8
Mali	45.8	16.1	-	61.9	13.4	-	48.5	-	61.9	-	-	61.9
Mexico	601.5	280.8	253.3	1135.6	415.8	-	565.7	154.1	1135.6	36.8	10.8	1183.2
Morocco	325.3	168.1	100.6	594.0	115.9	-	411.8	66.3	594.0	43.7	2.1	639.8
Netherlands	-	-	17.8	17.8	-	-	10.8	7.0	17.8	-	-	17.8
New Zealand	-	-	37.2	37.2	-	-	26.2	11.0	37.2	-	-	37.2
Nicaragua	13.9	7.4	20.1	41.4	-	-	41.4	-	41.4	-	-	41.4
Nigeria	204.5	124.9	88.4	417.8	110.7	-	242.8	64.3	417.8	10.0	-	427.8
Norway	-	-	9.6	9.6	-	-	5.3	4.3	9.6	-	-	9.6
Pakistan	439.5	370.2	591.1	1400.8	265.0	-	716.0	419.8	1400.8	89.3	37.9	1528.0
Panama	17.1	10.6	29.0	56.7	4.1	-	23.6	29.0	56.7	-	-	56.7
Paraguay	10.3	4.6	32.1	47.0	-	-	31.3	15.7	47.0	-	-	47.0
Peru	219.2	203.9	78.7	501.8	116.4	-	226.4	159.0	501.8	2.0	23.0	526.8
Philippines	359.6	510.7	880.7	1751.0	421.9	8.9	687.8	632.4	1751.0	45.4	17.3	1813.7
Poland	19.9	240.9	751.5	1012.3	199.7	-	536.1	276.5	1012.3	120.0	21.0	1153.3
Portugal	57.5	45.9	37.7	141.1	-	-	88.9	52.2	141.1	-	-	141.1
Rhodesia	-2.2	17.8	7.6	27.6	25.4	-	2.2	-	27.6	-	-	27.6

RECIPIENT	Assistance provided, by type				Assistance provided, by source					Assistance outstanding at 31 December 1974		TOTAL (8) + (9) + (10) (11)
	Experts	Equip- ment	Fellow- ships	TOTAL	UNDP		Agency		TOTAL	Unliquidated obligations	In kind balance <sup>a/</sup>	
					Monetary	In kind <sup>a/</sup>	Monetary	In kind <sup>a/</sup>				
					(1)	(2)	(3)	(4)				
Romania	58.8	236.2	409.1	704.1	57.8	-	459.1	187.2	704.1	147.4	16.9	868.4
Saudi Arabia	18.8	2.9	10.5	32.2	-	-	25.2	7.0	32.2	-	-	32.2
Senegal	113.3	108.3	15.3	236.9	86.5	0.8	148.7	0.9	236.9	5.4	-	242.3
Sierra Leone	98.8	17.1	18.9	134.8	53.1	9.9	57.8	14.0	134.8	2.0	2.9	139.7
Singapore	100.3	103.9	25.0	229.2	-	-	187.1	42.1	229.2	27.5	3.8	260.5
South Africa	-	-	107.8	107.8	-	-	42.1	65.7	107.8	-	-	107.8
Spain	-	-	61.1	61.1	-	-	38.0	23.1	61.1	-	-	61.1
Sri Lanka	269.1	216.1	77.5	562.7	108.0	-	354.1	100.6	562.7	29.5	-	592.2
Sudan	187.4	90.7	86.7	364.8	36.3	-	305.5	23.0	364.8	121.2	15.0	501.0
Syrian A. R.	67.5	61.4	90.5	219.4	23.6	-	148.9	46.9	219.4	50.0	10.5	279.9
Tanzania, U. R.	6.8	-	2.8	9.6	9.6	-	-	-	9.6	-	-	9.6
Thailand	740.8	300.4	884.4	1925.6	535.0	-	827.2	563.4	1925.6	56.6	66.8	2049.0
Tunisia	192.7	109.3	149.3	451.3	141.2	-	269.9	40.2	451.3	-	-	451.3
Turkey	605.0	300.5	633.4	1538.9	442.9	-	657.9	438.1	1538.9	56.5	32.1	1627.5
Uganda	177.2	99.2	14.1	290.5	131.0	-	152.4	7.1	290.5	-	-	290.5
Uruguay	120.7	321.1	82.6	524.4	168.8	-	264.0	91.6	524.4	35.0	9.6	569.0
Venezuela	249.6	94.8	197.5	541.9	126.9	-	246.5	168.5	541.9	2.2	-	544.1
Viet-Nam <sup>c/</sup>	74.4	140.7	141.3	356.4	31.4	-	169.8	155.2	356.4	8.1	-	364.5
Yugoslavia	202.3	353.8	759.2	1315.3	502.9	-	553.1	259.3	1315.3	103.7	8.8	1427.8
Zaire	234.0	76.7	80.0	390.7	9.6	-	343.9	37.2	390.7	37.1	26.7	454.5
Zambia	66.6	42.3	20.2	129.1	-	-	113.5	15.6	129.1	1.5	5.3	135.9
Other countries <sup>d/</sup>	13.4	1.6	116.2	131.2	1.8	-	65.0	64.4	131.2	-	-	131.2
Sub-total	13978.8	10518.4	16858.3	41355.5	10217.0	52.9	20378.4	10707.2	41355.5	2374.8	1003.0	44733.3
<u>Intercountry programmes</u>												
Africa	71.7	72.9	91.6	236.2	228.0	2.5	5.7	-	236.2	-	-	236.2
Asia and the Far East	355.3	116.6	203.1	675.0	537.1	44.3	79.1	14.5	675.0	-	-	675.0
Europe	21.0	18.6	17.3	56.9	56.9	-	-	-	56.9	-	-	56.9
Latin America	266.2	113.3	156.4	535.9	472.9	24.8	36.6	1.6	535.9	-	-	535.9
Middle East	5.8	1.2	5.3	12.3	12.3	-	-	-	12.3	-	-	12.3
Interregional projects	655.0	346.0	2209.8	3210.8	1163.0	21.5	1631.3	395.0	3210.8	47.4	35.1	3293.3
Sub-total	1375.0	668.6	2683.5	4727.1	2470.2	93.1	1752.7	411.1	4727.1	47.4	35.1	4809.6
Miscellaneous	102.4	17.5	1.5	121.4	23.2	-	98.2	-	121.4	-	-	121.4
<u>UNDP large-scale projects</u>												
Argentina	93.0	9.7	5.6	108.3	108.3	-	-	-	108.3	5.6	-	113.9
Brazil	194.4	196.4	62.8	453.6	449.9	3.7	-	-	453.6	23.6	-	477.2
Chile	74.5	-	24.2	98.7	98.7	-	-	-	98.7	9.6	-	108.3
Egypt	-	47.9	23.5	71.4	71.4	-	-	-	71.4	1.0	-	72.4
Greece	378.3	91.6	21.0	490.9	490.9	-	-	-	490.9	19.3	-	510.2
Hungary	0.3	64.8	8.7	73.8	73.8	-	-	-	73.8	287.0	-	360.8
India	655.2	1326.2	161.6	2143.0	2143.0	-	-	-	2143.0	76.2	-	2219.2
Indonesia	18.3	29.8	8.9	57.0	57.0	-	-	-	57.0	-	-	57.0
Korea, R.	2.5	122.4	11.3	136.2	136.2	-	-	-	136.2	226.5	-	362.7
Morocco	31.1	25.0	0.7	56.8	56.8	-	-	-	56.8	23.4	-	80.2
Nigeria	2.5	0.5	-	3.0	3.0	-	-	-	3.0	6.8	-	9.8
Pakistan	335.1	421.1	34.0	790.2	789.8	0.4	-	-	790.2	51.8	-	842.0
Philippines	133.4	260.9	83.1	477.4	475.0	2.4	-	-	477.4	-	-	477.4
Romania	109.3	490.1	90.7	690.1	689.9	0.2	-	-	690.1	189.7	-	879.8
Turkey	110.6	441.7	3.9	556.2	556.2	-	-	-	556.2	4.6	-	560.8
Yugoslavia	199.3	318.0	70.6	587.9	587.9	-	-	-	587.9	-	-	587.9
Zambia	116.6	4.1	-	120.7	120.7	-	-	-	120.7	-	-	120.7
Central America	409.3	575.9	9.4	994.6	985.3	9.3	-	-	994.6	-	-	994.6
Sub-total	2863.7	4426.1	620.0	7909.8	7893.8	16.0	-	-	7909.8	925.1	-	8834.9
GRAND TOTAL	18319.9	15630.6	20163.3	54113.8	20604.2	162.0	22229.3	11118.3	54113.8	3347.3	1038.1	58499.2

<sup>a/</sup> Assistance in kind can only be estimated; see Introductory Notes, paras 4 and 5, to this Annex.

<sup>b/</sup> The Khmer Republic has now reverted to the use of the name Cambodia.

<sup>c/</sup> The official designation of Viet-Nam is now the Republic of South Viet-Nam.

<sup>d/</sup> Includes the following countries which have not received technical assistance during the last ten or more years: Denmark, Finland, France, Germany, F. R., Monaco, Sweden, Switzerland and the United States.

## ANNEX II

## ASSISTANCE IN KIND FOR AGENCY TECHNICAL CO-OPERATION PROGRAMMES

A. Estimated value of the assistance in kind made available to the Agency in 1974

Donor	Assistance made available	Value \$
Argentina	Three lecturers and training for nine Type II fellowship award holders (38 man-months)	15 400
Austria	Training for five Type II fellows (19½ man-months)	8 600
Belgium	One expert, training for eight Type II fellows (59½ man-months) and stipends for training course participants	46 100
Brazil	Two lecturers and training for two Type II fellows (14 man-months)	6 300
Czechoslovakia	One lecturer	700
Denmark	One lecturer and training for five Type II fellows (31 man-months)	11 300
Egypt	Training for one Type II fellow (9 man-months)	2 600
Finland	Training for two Type II fellows (12 man-months)	7 000
France	One lecturer and training for 18 Type II fellows (105½ man-months)	38 600
Germany, F.R.	One expert, two lecturers, training for 37 Type II fellows (227 man-months) and stipends for training course participants	136 100
Hungary	Training for four Type II fellows (31 man-months)	8 000
India	Training for six Type II fellows (25 man-months)	5 300
Israel	Training for one Type II fellow (5 man-months)	800
Italy	One lecturer and training for 18 Type II fellows (89 man-months)	26 200
Japan	Training for 14 Type II fellows (72½ man-months)	33 800
Mexico	Training for one Type II fellow (3½ man-months)	1 500
Netherlands	One expert, one lecturer and training for 13 Type II fellows (52 man-months)	38 800
Philippines	Training for two Type II fellows (6½ man-months)	800
Poland	Training for five Type II fellows (25 man-months)	8 100
Romania	Training for two Type II fellows (11 man-months)	3 900
Spain	Training for five Type II fellows (37½ man-months)	10 100
Sweden	One expert, 25 lecturers, equipment for three training courses, training for 15 Type II fellows (80 man-months) and stipends for training course participants	142 400
USSR	Training for four Type II fellows (24 man-months)	13 500
UK	One expert and five lecturers	3 600
USA	One expert, five lecturers, equipment for projects in 23 countries and training for 78 Type II fellows (463 man-months)	668 400
Yugoslavia	One lecturer and training for three Type II fellows (24 man-months)	4 600
TOTAL	Six experts, 48 lecturers, equipment for projects in 23 countries and for three training courses, training for 258 Type II fellows (1464½ man-months) and participant stipends for five training courses	1 242 500



B. Possible assistance to projects not included in the 1974 regular programme owing to lack of funds

Requesting country	Title of the project	Possible supplier	Nature of offer	Value of the assistance provided
Greece	Radiostimulation of plant growth	South Africa	An expert and equipment	Not known
	Radiation damage	South Africa	An expert and equipment	Not known
Indonesia	Neutron spectrometry	Germany, F.R.	Some equipment	Not known
	Radiochemistry	Germany, F.R.	Some equipment	Not known
Iran	Radiation protection	South Africa	An expert and equipment	Not known
	Use of radioisotopes in agriculture	South Africa	An expert and equipment	Not known
Mexico	Neutron spectrometry	Germany, F.R.	An expert	Not known
	Nuclear medicine	South Africa	An expert	Not known
	Radioimmunoassay	South Africa	An expert	Not known
	Physical aspects of irradiation sources	South Africa	An expert	Not known
Pakistan	Use of radioisotopes in agriculture	Germany, F.R.	Some equipment	Not known
	Food preservation	Germany, F.R.	Some equipment	Not known
Turkey	Nuclear physics	South Africa	Some equipment	Not known
	Use of radioisotopes in industry	South Africa	An expert and equipment	Not known
	Production of Ge/Li detectors	South Africa	Some equipment	Not known

Note: Following the procedure suggested by the Technical Assistance Committee (TAC) of the Board of Governors, the Director General, in a circular letter of 11 July 1974, brought to the attention of the technically advanced Member States the 45 requests for expert services and equipment which could not be submitted for approval to TAC - as a part of the 1974 regular programme of technical assistance - for lack of funds, requesting those Member States to consider the possibility of meeting such requests through the Agency or on a bilateral basis by gift, loan or otherwise and informed them that details of the assistance needed would be provided on request. The Agency provided more detailed information on the 15 projects mentioned above.

## ANNEX III

## INTERCOUNTRY PROJECTS: 1974

Title	Place and dates	Source of funds	Participation <sup>a/</sup>		
			(1)	(2)	(3)
Interregional training course on the use of isotopes and radiation techniques in research on soil-plant relationships	New Delhi, India 4 March to 26 April	SIDA	14	-	6
Study tour on the utilization of nuclear research reactors	German Democratic Republic and USSR 13 May to 11 June	Regular programme	28	-	-
Regional training course for radioisotope laboratory technicians	Kwabanya, Ghana 8 July to 25 October	UNDP	20	-	5
Interregional training course on the use, design and maintenance of nuclear and related electronic equipment	ILO Centre, Turin, Italy 2 September to 29 November	UNDP	17	2	-
Interregional training course on plant breeding for disease resistance including the utilization of induced mutation techniques	Casaccia, Italy 23 September to 31 October	SIDA	15	1	5
Regional training course on radio-immunoassay procedures	Lima, Peru 7-31 October	UNDP	19	5	6
Interregional review course on reactor burn-up physics	Mol, Belgium 7-18 October	Regular programme and Belgium	29	-	-
Interregional training course on the use of isotope techniques for studying the fate of pesticides and other foreign chemicals in food and agriculture	São Paulo, Brazil 14 October to 15 November	SIDA	15	-	5
Regional training course on uranium prospecting and ore evaluation	Hyderabad and numerous other locations in India 4 November to 28 December	UNDP	9	-	3
Advanced regional training course on radiological health and safety measures	Mexico City, Mexico 18 November to 6 December	UNDP	8	-	11
Interregional training course on activation analysis in industry and research	Berlin (West) 25 November to 6 December	Regular programme, the Federal Republic of Germany and the Senat	14	-	-

<sup>a/</sup> The figures under (1) denote the number of award holders whose cost of participation was met out of project funds; those under (2) denote the number of participants who attended at the expense of the Government, another organization or programme; and those under (3) denote the number of local participants - no stipends or international travel costs are payable out of project funds in respect of participants shown under (2) and (3).

## ANNEX IV

EXPERTS' FINAL REPORTS<sup>a/</sup>

Reference number	Name of expert	Subject	Country of assignment
895	B. Vavrejn	Medical applications of radioisotopes	Cuba
896	U. Dahlborg	Liquid structure by neutron spectroscopy	Mexico
898	B. Ma	Design of fuel elements	Argentina
899	K. Boddy	Radiation protection	Bulgaria
900	G. W. Smith	Activation analysis	Burma
901	R. Gonfiantini	Isotopes in hydrology	Turkey
902	M. Tubis	Radiopharmacy	Greece
903	Ch. Sonntag	Radioisotopes in hydrology	Iran
904	J. W. Balock	Radioisotopes in entomology	Cyprus
905	G. Guiraud	Use of radioisotopes in agriculture <sup>b/</sup>	Lebanon
906	J. Dobo	Radiation chemistry	Yugoslavia
908	M. Osredkar	Nuclear physics	Costa Rica
909	M. Vidmar	Health physics	Chile
910	P. Wattson	Hospital physics	Syrian Arab Republic
911	D. F. Regulla	Thermoluminescence dosimetry	Turkey
912	M. Majteles	Environmental radiation laboratory	Yugoslavia
914	G. Paic	Nuclear physics <sup>b/</sup>	Morocco
915	D. Enkerlin	Development of agricultural production through the application of nuclear techniques in entomology	Brazil
916	E. T. Chulik	Reactor physics	Brazil
917	L. Kertesz	Use of radioisotopes in medicine	Sudan
918	G. Sauzay	Use of radioisotopes in hydrology	Philippines

Reference number	Name of expert	Subject	Country of assignment
920	J.C. Webb	Atomic energy planning	Sudan
921	A. Cowan	Reactor engineering	Argentina
922	A.L. Bement, Jr.	Nuclear materials metallurgy	Mexico
923	V. Middelboe	Isotopes in agriculture	Cuba
924	Y. Henis	Nuclear techniques in soil microbiology	Brazil
925	L. Carneiro	Cochabamba Nuclear Medical Centre <sup>c/</sup>	Bolivia
926	R. Skjoeldebrand R. Krymm	Nuclear power	Iran
928	I.D. Clarke	Food irradiation biochemistry	Thailand
930	S. Hashish	Radioisotope applications in biology <sup>b/</sup>	Zaire
931	J.R. Gat A. Issar	Radioisotopes in hydrology	Iran
932	M. Quintiliani	Radiochemistry and radiobiology	India
933	M. Radwan	Radioisotopes in industry	Turkey
934	V.P. Guinn	Neutron activation analysis	Mexico
935	K. Baechmann	Neutron activation analysis	Lebanon
936	B.R. Payne	Isotopes in hydrology	Greece
937	C. Giuntini	Use of radioisotopes in clinical medicine cardiovascular dynamics	Argentina
938	J.K. Haywood	Nuclear instrumentation	India
939	M. Gotoda	Use of radioisotopes in industry	Philippines
940	P. Petroff	Nuclear physics	India
941	D.V. Rebollo	Preparation of labelled molecules	Bolivia
943	R.K. Iyer	Environmental contamination	Hungary
944	L.G. Pickens	Radioisotopes in entomology	Korea, R.
945	R. Boulenger	Radiation protection <sup>b/</sup>	Zaire

Reference number	Name of expert	Subject	Country of assignment
946	Y. Barrada	Use of radioisotopes in agriculture	Bulgaria
947	T. C. McGuire	Fuel element transport, storage and reprocessing; heat extraction	Argentina
948	Z. M. Bartolome	Reactor measurements	Korea, R.
949	M. Jembicki	Use of radioisotopes in medicine	Sri Lanka
950	S. P. Tsialas	Health physics	Philippines
951	M. Davison	Radiation dosimetry	Israel
952	R. C. Greenwood	Neutron capture gamma-ray spectroscopy	Greece
953	L. Sztanyik T. L. Servian	Biological control laboratories	Iraq
955	A. Burmester	Plastification of wood by irradiation	Venezuela
956	I. Draganic	Radiation dosimetry	Thailand
957	A. Stonehill	Radiosterilization of medical supplies	Israel
958	R. H. Smith	Radiobiology	Greece
959	M. A. Geyh	Radioisotopes in hydrology	Yugoslavia
960	S. Bonotto	Plant physiology	Bulgaria
961	E. Kunz	Radiation protection <sup>b/</sup>	Gabon
963	I. P. Prince	Use of radioisotopes in medicine	Philippines
964	H. Guenther	Testing of nuclear fuel element canning	Argentina
965	E. Karttunen	Nuclear physics	Hong Kong
966	I. G. Valencia	Plant breeding	Korea, R.
967	T. Todorov	Hemopathies in domestic animals	Yugoslavia
968	O. Gimstedt	Nuclear power plant	Yugoslavia
969	A. R. P. Caillot	Sedimentology	Albania
970	W. Mulligan	Radioisotopes in agriculture	Yugoslavia

Reference number	Name of expert	Subject	Country of assignment
971	U. Dahlborg	Neutron physics	Yugoslavia
972	L. Kokta	Nuclear electronics	Cuba
973	M. E. Wacks	Nuclear engineering	Thailand
974	S. Rolandson	Solid state physics	Pakistan
975	H. Goresline	Food preservation	Thailand
976	M. Oberhofer	Health physics	Indonesia
977	F. Walther	Plant breeding	Korea, R.
978	E. Rolstad	Reactor components metallurgy	Argentina
979	P. de Meester	Non-destructive testing of nuclear fuel elements in hot cells	Argentina
980	G. Ahstroem	Radioisotopes in agriculture	Hungary
981	E. Lubin	Radioisotope applications in medicine <sup>c/</sup>	Colombia
982	H. Harbst	Radioisotope applications in medicine <sup>c/</sup>	Colombia
983	M. A. Soenen	Instrumentation of irradiation devices	Romania
984	A. Oppelt	Radioisotopes in medicine	Romania
985	B. J. Csik C. A. Rennie	Power reactor survey <sup>c/</sup>	Mexico
986	G. Paic	Use of accelerators at the Institute of Nuclear Studies, Algiers <sup>b/</sup>	Algeria
987	M. Branica	Analytical radiochemistry	Peru

<sup>a/</sup> The reports are available in English unless otherwise indicated. No data have been included in respect of reports whose distribution is restricted to the recipient Government.

<sup>b/</sup> Available in French only.

<sup>c/</sup> Available in Spanish only.



