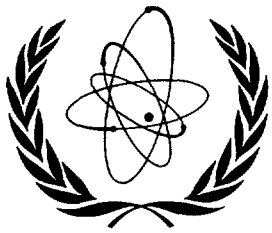

International Atomic Energy Agency

THE PROVISION OF TECHNICAL ASSISTANCE BY THE AGENCY WITH SPECIAL REFERENCE TO 1969

Report by the Director General

GC(XIV)/INF/122

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CONTENTS

List of abbreviations

Agency	International Atomic Energy Agency
CERN	European Organization for Nuclear Research
ECOSOC	Economic and Social Council of the United Nations
EPTA	United Nations Expanded Programme of Technical Assistance (now the Technical Assistance component of the United Nations Development Programme)
FAO	Food and Agriculture Organization of the United Nations
IAEA	International Atomic Energy Agency
IBRD	International Bank for Reconstruction and Development
IPA	Regional Joint Training and Research Programme using a Neutron Crystal Spectrometer between the Governments of India and the Philippines and the Agency
Monaco Laboratory	International Laboratory of Marine Radioactivity at Monaco
NORA	Joint Agency-Norwegian Programme of Research with the Zero Power Reactor "NORA"
NPY	Co-operative Programme for Research in Reactor Physics between the Government of Norway, Poland and Yugoslavia
Trieste Centre	International Centre for Theoretical Physics at Trieste
UNDP	United Nations Development Programme
UNDP(SF)	United Nations Development Programme (Special Fund component)
UNDP(TA)	United Nations Development Programme (Technical Assistance component)
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHO	World Health Organization

Congo, D.R.	Democratic Republic of the Congo
CSSR	Czechoslovak Socialist Republic
Germany, F.R.	Federal Republic of Germany
Korea, R.	Republic of Korea
UAR	United Arab Republic
UK	United Kingdom of Great Britain and Northern Ireland
USA	United States of America
USSR	Union of Soviet Socialist Republics

NOTES

All sums of money are expressed in United States dollars.

The technical assistance described in this report is classified under the following ten fields of activity:

Code	Field of activity
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 I. 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 1969; 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 and UNDP(TA) funds, for the provision of technical assistance is reviewed in this document and, in Part II, section C, information is given with regard to the UNDP(SF) projects for which the Agency served either as executing agency or as subcontractor in 1969 (see also Annex III).

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 to ensure that the knowledge acquired can continue to be applied after Agency projects have 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 1969, 65 countries received technical assistance in one form or another from the Agency, as shown in Table 7[2]. Approximately 64% of all assistance provided related to the application of isotopes and radiation in agriculture, nuclear engineering and technology, nuclear physics and nuclear chemistry.

5. The assistance, including grants of equipment and assistance in kind, was provided through the services of 230 experts, lecturers and visiting professors, the supply of equipment to a value of about $883 000, and 484 fellowship awards for individual studies, scientific visits, a study tour and other short-term training projects.

6. The resources allocated for carrying out the Agency's 1969 technical assistance programme amounted to $2 961 000 (Table 1), whereas the total value of the technical assistance actually provided in 1969 was about $3 410 000 (Table 7). This includes payments against 1969 and prior years' obligations, as well as assistance in kind, and represents an increase of approximately $1 000 000 or 41% over the sum of $2 415 000 provided in 1968 (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 some activities in which Member States have shown special interest in 1969, followed by information concerning other developments relating to technical assistance.

A. Technical co-operation activities in which Governments have shown special interest

8. In 1969 more assistance was provided in the application of isotopes and radiation in agriculture than in any other field of activity. With regard to agricultural activities, the largest share of expenditure on experts and equipment was devoted to food preservation

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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(XIII)/INF/111.

projects, followed by soil fertility, irrigation and crop production projects, entomology projects, and plant breeding and genetics projects, in that order. Since 1965-66, when assistance was provided for three food preservation projects, there has been a steady increase in such assistance. In 1969 the interest shown in this activity was reflected in the large attendance at a visiting seminar on the use of ionizing radiation in the processing and preservation of food held in nine countries in Asia and the Far East. It is expected that food preservation projects will continue to figure prominently in the assistance to be provided in 1970 and that some might even evolve into larger programmes involving substantial capital investment. Subsequent developments will depend largely on the results of research at present being conducted in developed countries and the extent of public health clearance in various countries of foodstuffs that have been irradiated.

9. In terms of the amount of assistance provided, agricultural projects were followed in 1969 by projects carried out in nuclear engineering and technology; for the second consecutive year, the projects which received most assistance related to nuclear instrumentation and electronics, and these projects are expected to be given high priority for years to come because of the importance attached to the construction and maintenance of nuclear equipment. Next in order of importance in 1969 was the production of isotopes, and special and growing interest is being shown in this activity because of the contribution it can make to modern industrial development, while freeing foreign currency for other priority requirements. Interest was also shown in a related activity, the production of labelled compounds.

10. With regard to nuclear physics activities, most assistance was provided in 1969 for experimental nuclear physics and nuclear spectroscopy projects, followed by those in neutron physics. In nuclear chemistry most of the projects assisted related to radiochemistry (which includes work on the chemical and nuclear properties of radionuclides, hot atom chemistry, and the use of tracers), followed by analytical chemistry projects, which can be expected to increase in importance in the future, not merely because the activation analysis technique is so effective, but because of the low-cost and quick methods which can be used, for example, for the analysis of nuclear ores.

11. Great interest continues to be shown in medical and industrial applications of isotopes and radiation, isotope hydrology and prospection of nuclear raw materials, even though those activities do not usually receive as large a share of the resources available for assistance as the activities mentioned above. Another very important activity for which requests for assistance are regularly received is radiation protection.

B. Other developments

12. During 1969 two reports were published on the subject of assistance to developing countries, each of which - although looking at the problem from a somewhat different viewpoint - can be expected to have a considerable effect on both the volume and form of such assistance in the future.

13. The first of these reports, entitled "Partners in Development", was prepared by the Commission on International Development formed by the Right Honourable Lester B. Pearson, of Canada, at the request of IBRD, and published in October 1969. A memorandum on this report, bringing out those points of particular interest to the Agency, has already been presented to the Board by the Director General. The greater part of the report deals with general questions of finance, trade and investment which are, of course, primarily the concern of IBRD, but a number of recommendations are made for the improvement of the machinery for the provision of multilateral and bilateral technical assistance which will doubtless be examined at a conference of heads of international and national agencies and of representatives of developed and developing countries which the report recommends should be called by the President of IBRD in 1970. One of the most interesting recommendations, as far as United Nations organizations are concerned, is that the amount of assistance provided from multilateral rather than bilateral services should be increased from 10% to 20%; well-informed observers, however, seem to consider that this shift may be difficult to achieve.

14. The second report, entitled "A Study of the Capacity of the United Nations Development System" [4], is perhaps of more immediate interest to United Nations organizations which act as executing agencies for projects requested by Governments under UNDP. In June 1968, the UNDP Governing Council endorsed the draft terms of reference proposed by the Administrator of UNDP for preparing the study, and Sir Robert Jackson was appointed as the Commissioner, under whose direction the study was to be made. It is of interest to note that the main purpose of the study was to determine whether the United Nations organizations could carry out a programme of twice the current size by 1975 and - to the extent that the study revealed any deficiencies in the existing system - to recommend administrative and other measures to remedy the situation. The study was published in December 1969 and was given preliminary consideration in January 1970 by the Governing Council which considered it in detail in March 1970. It is expected that the Governing Council will continue its review of the study at its tenth regular session, in June 1970 and that it will then adopt whatever resolutions it considers appropriate for transmission to ECOSOC and the General Assembly of the United Nations. The Board will be informed by the Director General of the action taken by the Governing Council and ECOSOC when the various intergovernmental discussions have been completed. It seems unlikely that the recommendations in the study which the Governing Council decides to endorse can take effect before January 1971.

15. The new "continuous programming" procedures approved for UNDP(TA) by the Governing Council came into effect on 1 January 1969. Perhaps the most important factor in the new procedures is the arrangement which permits Governments continuously to adjust their programmes to reflect changing priorities in the development process. Recipient Governments may request assistance from any United Nations organization at any time, up to the ceiling of a country target figure approved by the Governing Council; the target figure designated for the current year is also the provisional target figure for the following three years, subject to such annual revisions as the Governing Council may decide to make. Governments may request assistance extending over a four-year period; projects not implemented in the year in which they were approved are carried over, with the associated financial provision, into the succeeding year unless the Government concerned decides to cancel or amend the request as originally submitted. Up to 50% of the unused portion of a country's annual target figure may be carried over into the succeeding year and used for programming purposes, in addition to the target established for that year.

16. It had been expected that re-adjustment of Government priorities to take full advantage of the new procedures would result in some reduction - even if only temporary - in the volume of assistance requested from the Agency. In fact, however, the new procedures have produced the opposite result. Using the slightly artificial figure of half the approved country programme for the preceding two-year period (1967-68) i.e. $879 000 as a basis for comparison, the projects approved by UNDP as at 31 December 1969 were valued at $864 000 and further requests valued at $125 000 were awaiting approval by UNDP, so that the size of the Agency's UNDP(TA) programme had significantly increased.

17. For the year 1970, new country projects to the value of $538 590 had already been approved as at 1 January 1970. Taking into account projects approved for 1969 which had not been implemented and had been carried over from that year, the value of the total country programme to be carried out in 1970 already amounted at the beginning of the year to $839 540. It does not seem unreasonable to expect that further requests valued at $300 000 will be approved during the course of the year, so that for the first time, the Agency will have an annual UNDP(TA) country programme valued at well over $1 million.

18. In addition, country projects valued at $279 000 had already been approved or were awaiting approval for 1971, and those for 1972 were valued at $58 000. This encouraging result suggests that Governments are now willing and able to pay increasing attention to the part that atomic energy can play in economic and social development.

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[4] United Nations document DP/5.

Part II. ANALYSIS OF THE ASSISTANCE PROVIDED

A. Available resources

1. General

19. The resources available to the Agency in 1969 for the provision of technical assistance came to $2 961 000 (see Fig. 1 and Table 1), which is slightly less than the figure for 1968 ($3 058 000) and is made up as follows:

(a) UNDP(TA), $748 000 in cash;

(b) Income to Operating Fund II, including voluntary contributions of Member States transferred from the General Fund, $1 586 000 in cash; and

(c) Gifts in kind (services of cost-free and partly cost-free experts, Type II fellowships and grants of equipment in support of approved technical assistance projects) valued at $627 000. Of this total, $623 000 was made available in respect of the regular programme and $4 000 for UNDP(TA) projects.

2. UNDP(TA)

20. The funds allocated for carrying out the 1969 UNDP(TA) field programme included $179 000 for regional and inter-regional projects and $459 000 for country programme projects. In addition, under new UNDP(TA) accounting procedures, allocations amounting to $375 300 (of which $75 800 is for regional and inter-regional projects) have been transferred as of 31 December 1969 and added to the funds approved for 1970; this explains what at first glance would appear to be a sharp reduction in UNDP(TA) funds in comparison with prior years.

3. Agency's regular programme

21. As at 31 December 1969, the pledges of voluntary contributions to the General Fund for 1969 had almost reached 75% of the target figures of $2 million, as compared with 71% for 1968. Of the target figure, 94% was budgeted for technical assistance. The payment by Member States of current and prior years' pledges was reflected in the income to Operating Fund II ($1 586 000, as compared with $1 348 000 in 1968), from which the regular programme is financed.

4. Gifts in kind

22. The estimated value of assistance in kind made available in 1969 was about $627 000, which is 9% higher than the figure of about $576 000 for 1968. This rise is attributable to increases in the value of cost-free experts' services (from $11 400 to $14 400), equipment grants (from $73 900 to $80 200) and Type II fellowships (from $491 200 to $532 500).

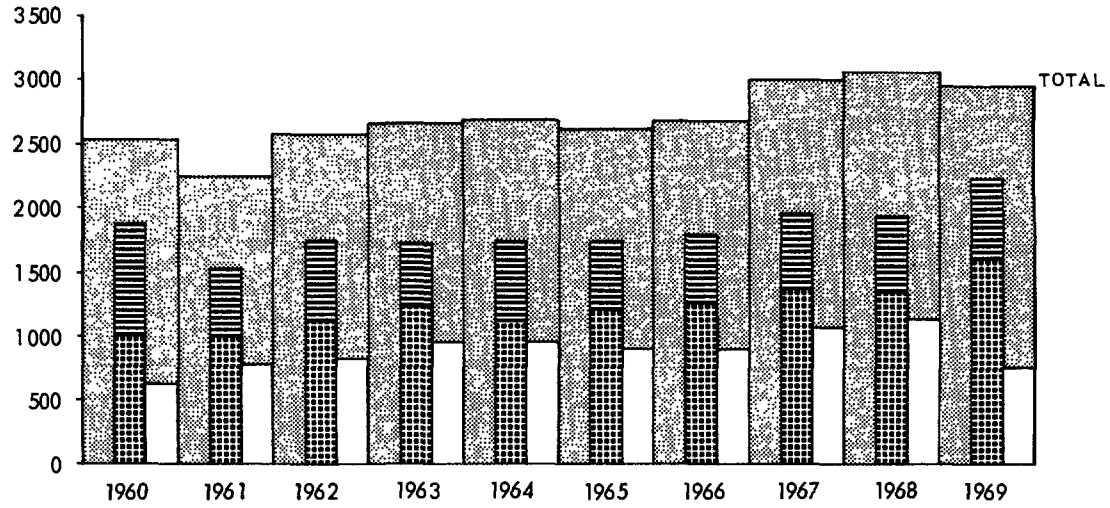
5. Other available resources

23. In 1969 the Agency received allocations of $792 400 for field projects financed by UNDP(SF).

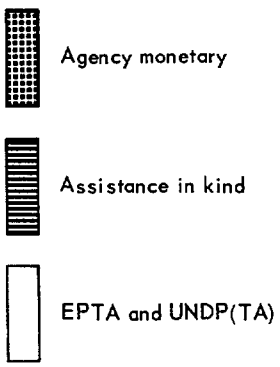
24. Under funds-in-trust arrangements with developing countries the Agency carried out three projects in 1969, which involved cash expenditures of $16 700, $3200 and $400 respectively.

FIGURE 1

RESOURCES AVAILABLE FOR THE AGENCY'S TECHNICAL ASSISTANCE PROGRAMME (1960 - 1969)
(In thousands of dollars)



	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Agency monetary	1008	981	1146	1230	1115	1200	1263	1380	1348	1586
Assistance in kind	885	519	588	480	618	511	518	567	576	627
EPTA and UNDP(TA)	633	786	828	954	946	901	893	1076	1134	748
TOTAL	2526	2286	2562	2664	2679	2612	2674	3023	3058	2961



6. Use of resources

25. The Agency provided more technical assistance in 1969 than in any previous year. The total value of the assistance, $3 409 500, represents an increase of nearly $1 000 000 over 1968 and about $500 000 over 1964, the year in which the value had been highest up to 1969. The individual sums making up the 1969 total, that is, $1 577 700 under the regular programme, $1 237 900 under UNDP(TA) and $593 900 in assistance in kind, are all the highest on record for a single year. In addition, unliquidated obligations and assistance in kind outstanding at 31 December 1969 amounted to $1 867 600, consisting of $418 300 for expert services, $459 400 for equipment and supplies and $989 900 for fellowships. (The corresponding figures, broken down by source, are as follows: regular programme, $838 800: $289 400, $219 500 and $329 900; UNDP(TA), $402 500: $128 400, $146 200 and $127 900; assistance in kind, $626 300: $500, $93 700 and $532 100.)

26. As in 1968, regular programme and UNDP(TA) cash expenditures and unliquidated obligations at year's end exceeded the cash resources in respect of 1969 projects financed under those two programmes. The explanation is that the 1969 figures include expenditures and obligations met from funds carried over from 1968 and prior years.

B. Distribution of assistance

1. By field of activity

27. A comparison is given below of the amount of assistance provided in the top five fields of activity in 1968 and 1969. Numerical data for all ten fields of activity are given in Figs 2A, 3A and 4A (which also include comparable data for 1968), in Fig. 5A and in Table 5

Assistance by field of activity and type: 1968 and 1969
(in thousands of dollars)

Field	Year	Experts	Equipment	Fellowships	Share of total programme	
		$	$	$	$	%
Application of isotopes and radiation in agriculture	1968	146.4	99.6	163.3	409.3	16.9
	1969	370.3	280.5	188.5	839.3	24.6
Nuclear engineering and technology	1968	153.8	50.3	272.2	476.3	19.7
	1969	230.6	39.3	246.1	516.0	15.1
Nuclear physics	1968	90.3	60.1	158.2	308.6	12.8
	1969	181.9	95.7	180.3	457.9	13.4
Nuclear chemistry	1968	66.9	46.7	96.2	209.8	8.7
	1969	148.5	110.1	109.0	367.6	10.8
Application of isotopes and radiation in medicine	1968	132.1	60.0	121.1	313.2	13.0
	1969	144.3	66.6	125.9	336.8	9.9
Total	1968	589.5	316.7	811.0	1717.2	71.1
	1969	1075.6	592.2	849.8	2517.6	73.8
Total assistance	1968	830.8	535.8	1048.4	2415.0	100.0
	1969	1376.8	882.8	1149.9	3409.5	100.0

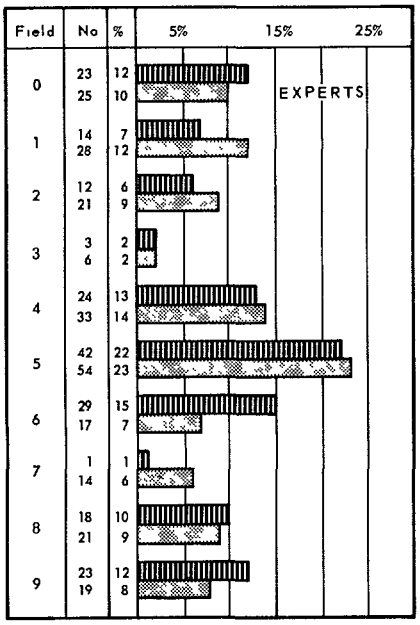
FIGURE 2A

DISTRIBUTION OF EXPERT SERVICES BY FIELD OF ACTIVITY AND REGION (1968 and 1969)

Field	Year	Africa		Americas		Asia and the Far East		Europe		Middle East		Inter-regional		Total		Percentage of total	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
0 - General atomic energy development	1968	-	-	7	11	-	-	1	5	2	9	13	3	23	28	12.2	6.1
	1969	2	2	-	-	1	1	1	1	1	1	20	2	25	7	10.5	0.9
1 - Nuclear physics	1968	2	6	3	8	6	31	2	2	1	2	-	-	14	49	7.4	10.6
	1969	6	31	6	26	6	19	7	18	3	15	-	-	28	109	11.8	13.9
2 - Nuclear chemistry	1968	1	2	4	12	5	17	-	-	2	5	-	-	12	36	6.4	7.8
	1969	1	4	5	25	6	28	6	17	3	16	-	-	21	90	8.8	11.5
3 - Prospecting, mining and processing of nuclear materials	1968	1	12	1	1	-	-	1	2	-	-	-	-	3	15	1.6	3.2
	1969	1	12	4	13	-	-	1	2	-	-	-	-	6	27	2.5	3.5
4 - Nuclear engineering and technology	1968	1	2	5	15	6	31	3	24	1	11	8	7	24	90	12.7	19.4
	1969	1	11	10	22	11	63	3	24	1	7	7	3	33	130	13.9	16.6
5 - Application of isotopes and radiation in agriculture	1968	4	16	4	18	10	31	12	17	1	1	11	4	42	87	22.2	18.8
	1969	10	63	7	37	15	69	10	19	2	12	10	7	54	207	22.7	26.4
6 - Application of isotopes and radiation in medicine	1968	4	33	6	20	4	18	2	2	-	-	13	3	29	76	15.3	16.4
	1969	5	21	3	16	3	23	4	7	2	13	-	-	17	80	7.1	10.2
7 - Application of isotopes and radiation in biology	1968	-	-	1	3	-	-	-	-	-	-	-	-	1	3	0.5	0.7
	1969	-	-	4	22	-	-	5	11	-	-	5	3	14	36	5.9	4.6
8 - Other fields of application of isotopes and radiation	1968	3	8	6	18	2	8	-	-	1	2	6	4	18	40	9.5	8.6
	1969	3	7	11	17	6	27	1	5	-	-	-	-	21	56	8.8	7.2
9 - Safety in nuclear energy	1968	2	7	16	16	2	7	1	6	-	-	2	3	23	39	12.2	8.4
	1969	1	3	5	28	1	2	1	1	1	1	10	6	19	41	8.0	5.2
TOTAL	1968	18	86	53	122	35	143	22	58	8	30	53	24	189	463	100.0	100.0
	1969	30	154	55	206	49	232	39	105	13	65	52	21	238[a]	783	100.0	100.0

(1) Number of expert assignments. (2) Man-months.

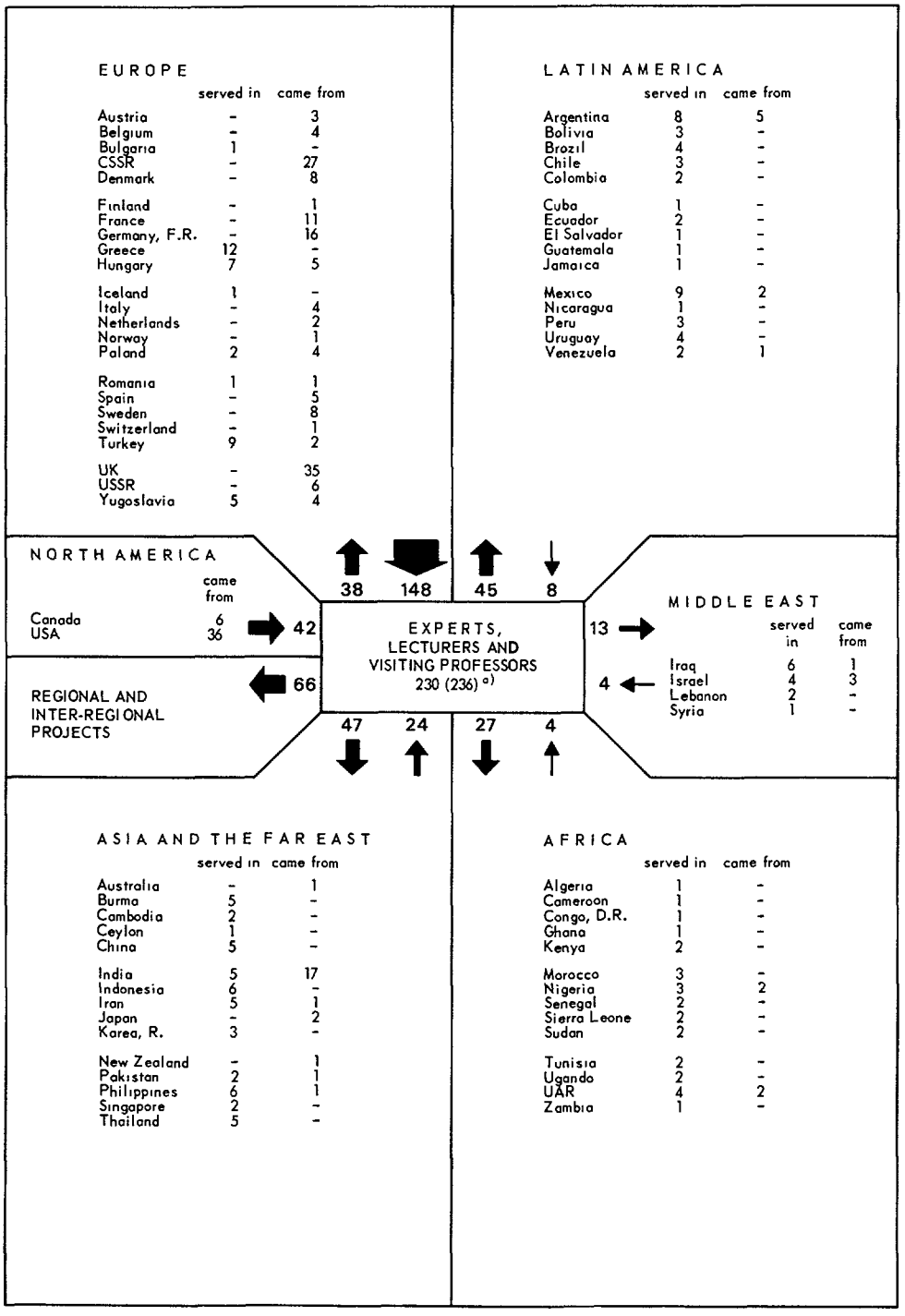
a/ The difference between the number of assignments by field of activity (238) and by region (236) is due to the fact that each of two experts served in two different fields of activity in the same country.



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

FIGURE 2B

DISTRIBUTION OF TECHNICAL ASSISTANCE EXPERTS BY REGION: 1969

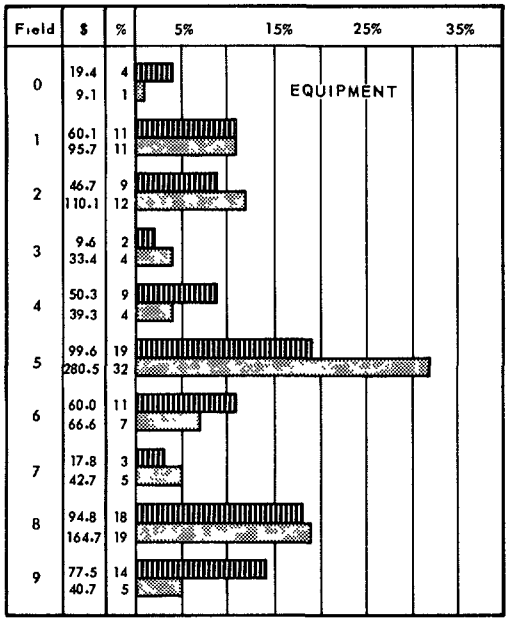


a) The difference the number of assignments (236) and the actual number of experts (230) is due to the fact that each of six experts served in two countries.

FIGURE 3A

DISTRIBUTION OF EQUIPMENT BY FIELD OF ACTIVITY AND REGION (1968 and 1969)
(in thousands of dollars)

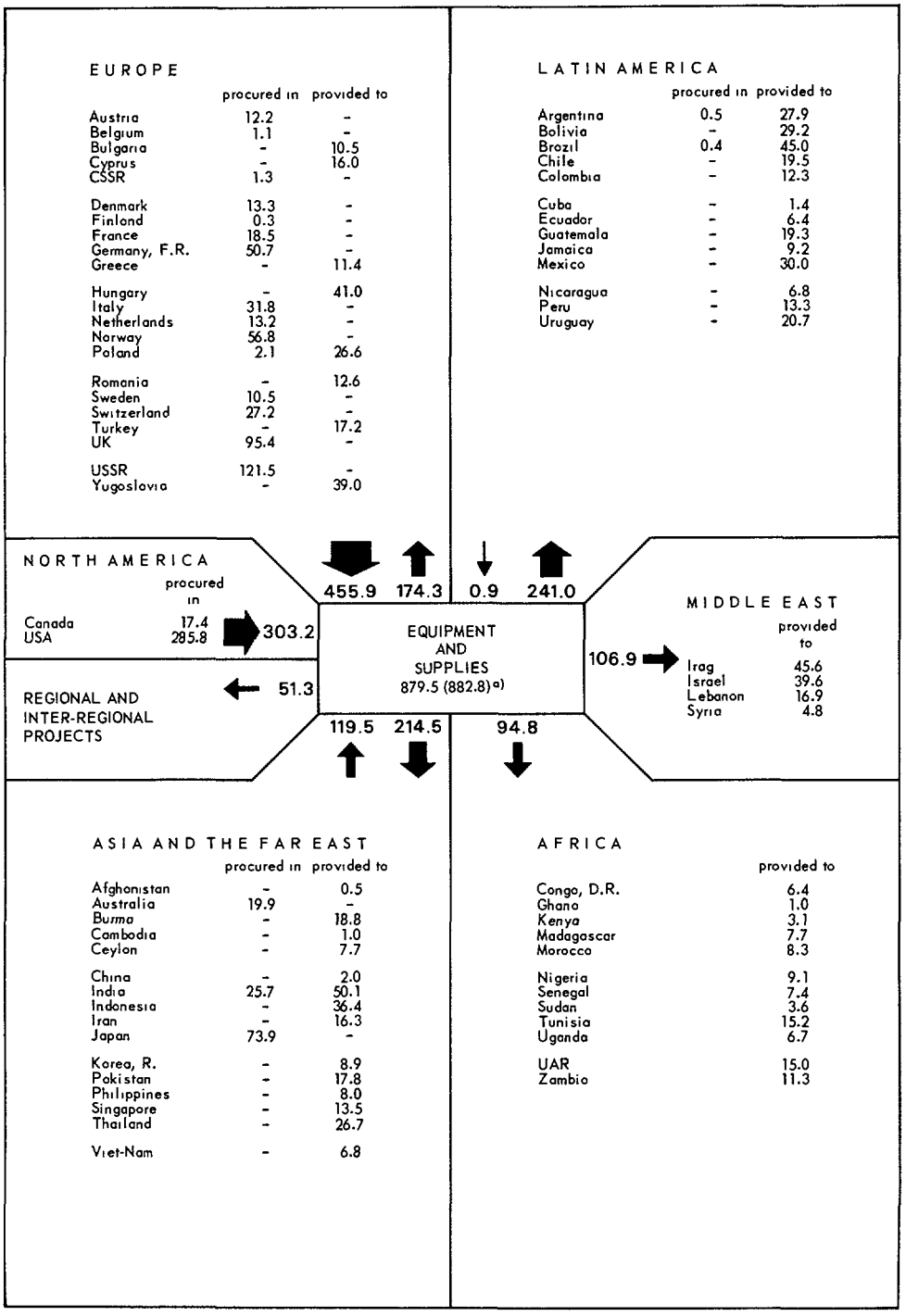
Field	Year	Africa	Americas	Asia and the Far East	Europe	Middle East	Inter-regional	Total	Percentage of total
0 - General atomic energy development	1968	-	1.5	10.5	7.4	-	-	19.4	3.6
	1969	0.7	-	0.5	2.3	4.8	0.8	9.1	1.0
1 - Nuclear physics	1968	-	32.9	27.2	-	-	-	60.1	11.2
	1969	19.1	31.8	30.4	6.3	8.1	-	95.7	10.8
2 - Nuclear chemistry	1968	4.4	14.4	16.7	10.7	0.5	-	46.7	8.7
	1969	0.5	41.4	9.1	21.0	38.1	-	110.1	12.5
3 - Prospecting, mining and processing of nuclear materials	1968	2.4	4.9	-	2.3	-	-	9.6	1.8
	1969	2.5	30.4	-	0.5	-	-	33.4	3.8
4 - Nuclear engineering and technology	1968	6.5	18.8	17.8	-	1.1	6.1	50.3	9.4
	1969	6.0	17.7	13.1	-	2.4	0.1	39.3	4.5
5 - Application of isotopes and radiation in agriculture	1968	21.9	18.8	44.7	13.8	-	0.4	99.6	18.6
	1969	51.0	48.1	83.2	69.1	27.3	1.8	280.5	31.8
6 - Application of isotopes and radiation in medicine	1968	2.0	13.7	28.6	11.5	3.6	0.6	60.0	11.2
	1969	6.3	21.4	20.1	18.8	-	-	66.6	7.5
7 - Application of isotopes and radiation in biology	1968	-	7.4	-	10.4	-	-	17.8	3.3
	1969	-	3.8	-	37.1	-	1.8	42.7	4.8
8 - Other fields of application of isotopes and radiation	1968	0.5	62.9	20.8	1.7	-	8.9	94.8	17.7
	1969	14.4	32.7	62.1	18.1	13.0	24.4	164.7	18.7
9 - Safety in nuclear energy	1968	12.0	13.5	1.0	49.9	1.0	0.1	77.5	14.5
	1969	3.1	19.8	1.9	1.1	13.2	1.6	40.7	4.6
TOTAL	1968	49.7	188.8	167.3	107.7	6.2	16.1	535.8	100.0
	1969	103.6	247.1	220.4	174.3	106.9	30.5	882.8	100.0



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 TECHNICAL ASSISTANCE EQUIPMENT BY REGION: 1969
(in thousands of dollars)



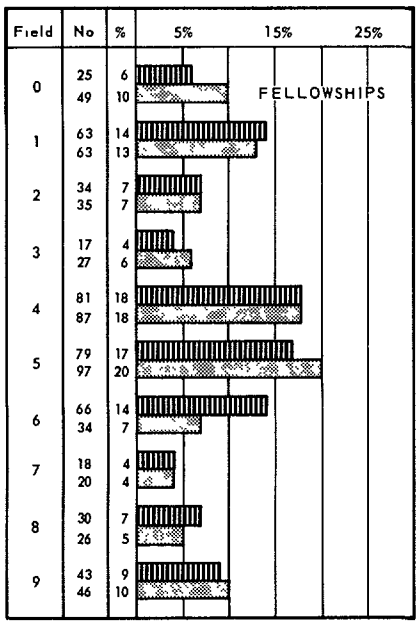
a) The difference between the value of the equipment procured ($879 500) and the value of the equipment provided ($882 800), namely $3 300, was expended to meet freight and other incidental charges in recipient countries (in some cases in respect of equipment and supplies provided in 1968).

FIGURE 4A

DISTRIBUTION OF FELLOWSHIPS BY FIELD OF ACTIVITY AND REGION (1968 and 1969)

	Field	Year	Africa		Americas		Asia and the Far East		Europe		Middle East		Inter-regional		Total		Percentage of total	
			(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
0 -	General atomic energy development	1968	-	-	1	3	1	2	1	4	1	3	21	6	25	18	5.5	0.6
		1969	-	-	1	8	16	12	-	-	-	-	32	13	49	33	10.1	1.1
1 -	Nuclear physics	1968	10	84	8	77	15	150	24	231	6	68	-	-	63	610	13.8	18.9
		1969	6	67	8	81	10	109	34	315	5	36	-	-	63	608	13.0	21.1
2 -	Nuclear chemistry	1968	4	36	3	34	13	134	12	111	2	22	-	-	34	337	7.5	10.5
		1969	5	57	9	88	5	49	16	126	-	-	-	-	35	320	7.2	11.1
3 -	Prospecting, mining and processing of nuclear materials	1968	3	24	5	30	4	40	4	44	1	12	-	-	17	150	3.7	4.7
		1969	1	10	15	37	1	9	7	30	3	36	-	-	27	122	5.6	4.2
4 -	Nuclear engineering and technology	1968	5	50	10	103	31	298	16	145	3	34	16	48	81	678	17.8	21.0
		1969	9	85	10	93	30	267	18	136	7	80	13	17	87	678	18.0	23.5
5 -	Application of isotopes and radiation in agriculture	1968	8	67	4	22	23	227	23	165	2	5	19	15	79	501	17.3	15.5
		1969	4	26	9	89	19	180	10	68	5	10	50	76	97	449	20.1	15.6
6 -	Application of isotopes and radiation in medicine	1968	2	24	9	91	6	47	9	78	3	25	37	106	66	371	14.5	11.5
		1969	6	53	9	67	6	58	12	84	1	10	-	-	34	272	7.0	9.4
7 -	Application of isotopes and radiation in biology	1968	-	-	5	54	8	83	4	36	1	8	-	-	18	181	3.9	5.6
		1969	1	6	1	8	1	12	4	33	1	1	12	16	20	76	4.1	2.6
8 -	Other fields of application of isotopes and radiation	1968	1	5	3	18	4	26	5	35	-	-	17	55	30	139	6.6	4.3
		1969	3	13	15	36	5	42	2	16	1	12	-	-	26	119	5.4	4.1
9 -	Safety in nuclear energy	1968	3	30	11	29	8	88	5	52	2	20	14	21	43	240	9.4	7.4
		1969	-	-	2	24	9	98	6	50	1	12	28	26	46	210	9.5	7.3
	TOTAL	1968	36	320	59	461	113	1095	103	901	21	197	124	251	456	3225	100.0	100.0
		1969	35	317	79	531	102	836	109	858	24	197	135	148	484	2887	100.0	100.0

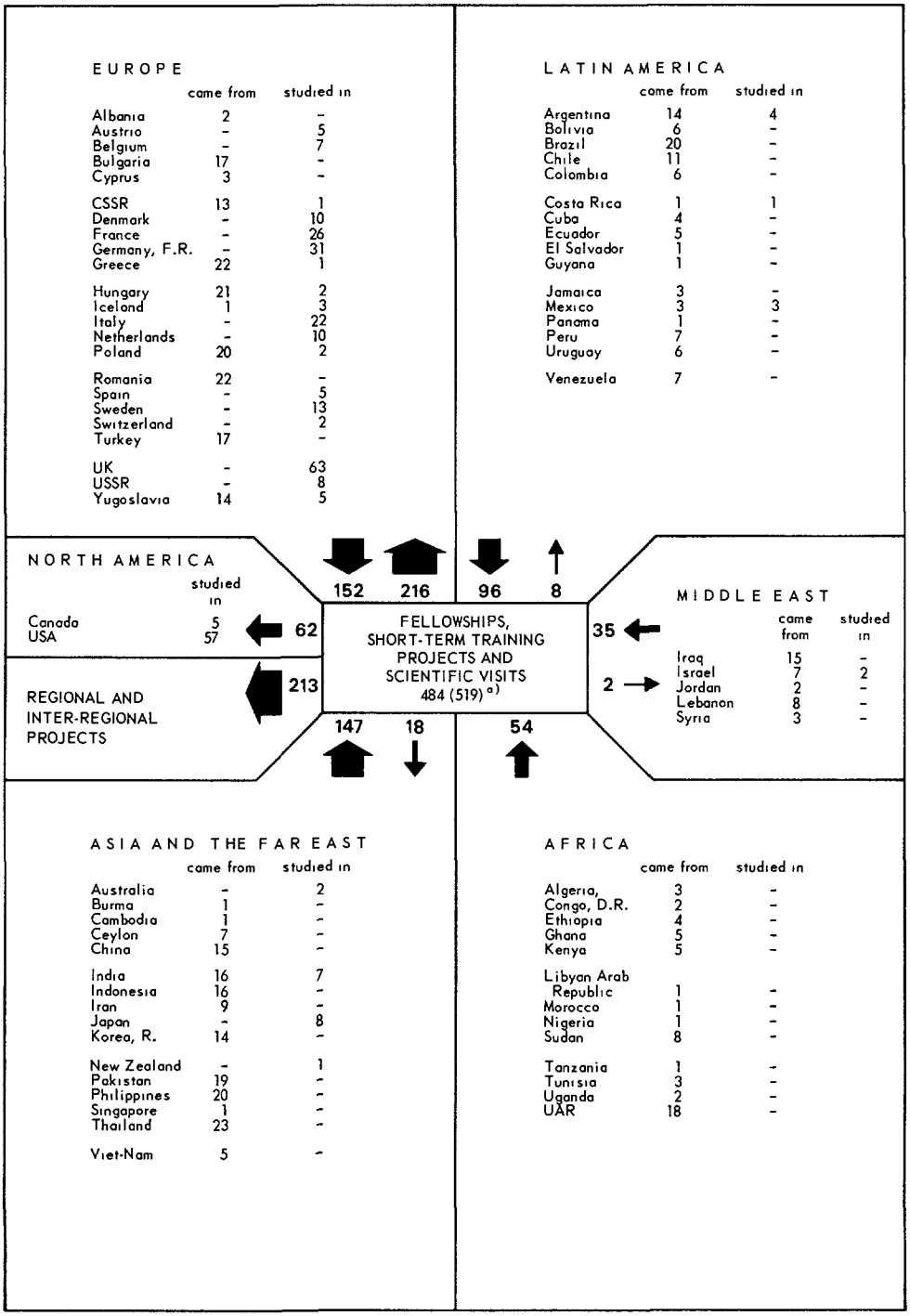
(1) Number of fellowship awards. (2) Man-months.



Note:
The figures in the second and third columns of the chart indicate the number of fellowships and the carresponding percentage share, by field of activity, of the total number of fellowships awarded.

FIGURE 4B

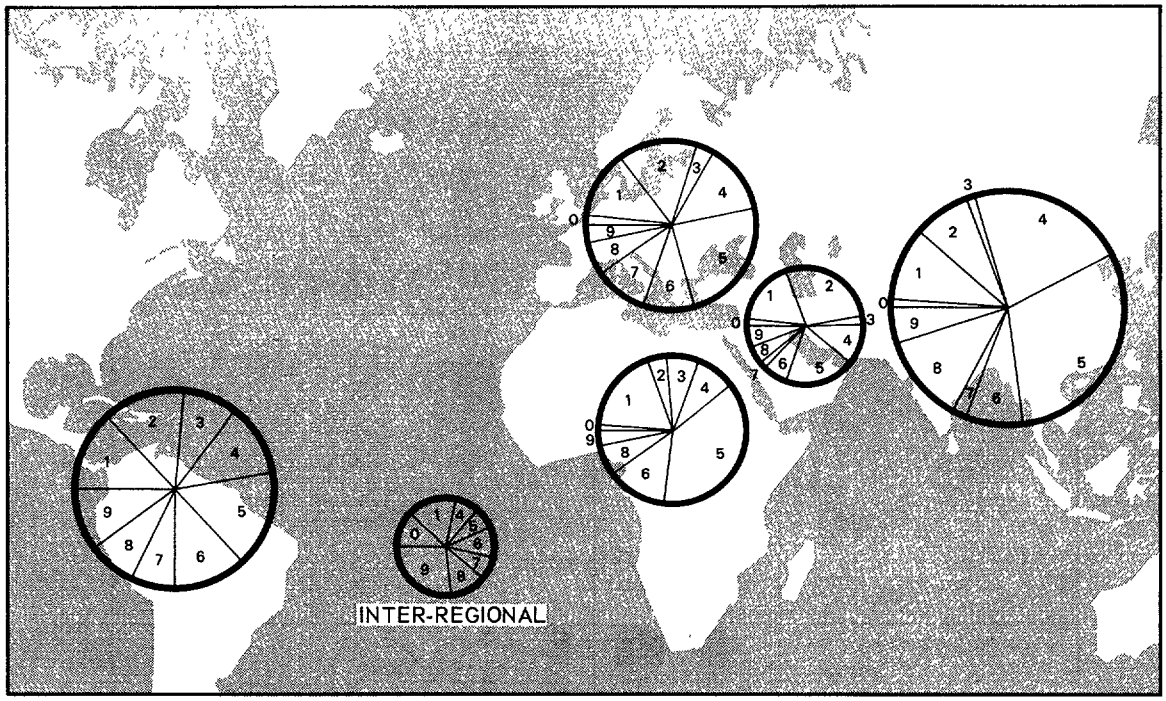
DISTRIBUTION OF TECHNICAL ASSISTANCE FELLOWSHIPS BY REGION: 1969



a) The difference between the number of fellows (484) and the number of places of study (519) is due to the fact that six fellows studied in two different countries, whereas three holders of an award for scientific visits went to two, three to three, two to four, and four to five different countries.

FIGURE 5A

DISTRIBUTION OF TECHNICAL ASSISTANCE BY FIELD OF ACTIVITY AND REGION: 1969[a)]



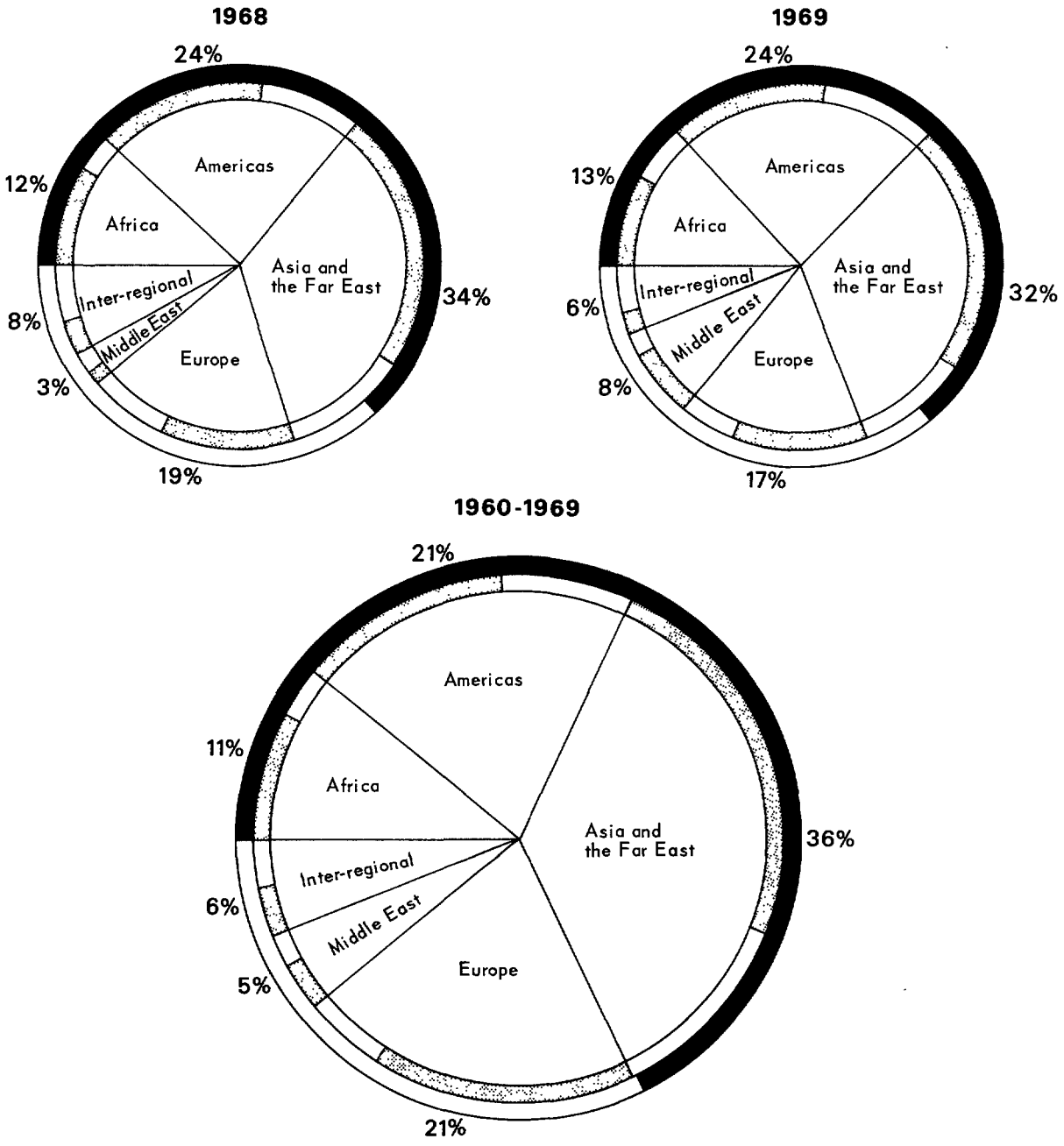
SUMMARY

Field	Africa %	Americas %	Asia and the Far East %	Europe %	Middle East %	Inter-regional %
0 - General atomic energy development	1	-	1	2	2	12
1 - Nuclear physics	18	13	10	13	17	16
2 - Nuclear chemistry	4	13	8	15	28	-
3 - Prospecting, mining and processing of nuclear materials	7	9	1	3	2	-
4 - Nuclear engineering and technology	9	12	22	14	12	8
5 - Application of isotopes and radiation in agriculture	38	16	31	24	20	7
6 - Application of isotopes and radiation in medicine	13	12	8	10	7	10
7 - Application of isotopes and radiation in biology	-	7	2	10	1	8
8 - Other fields of application of isotopes and radiation	7	8	12	6	5	12
9 - Safety in nuclear energy	3	10	5	3	6	27
	100%	100%	100%	100%	100%	100%

[a)] 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
(1968, 1969 and 1960-1969)

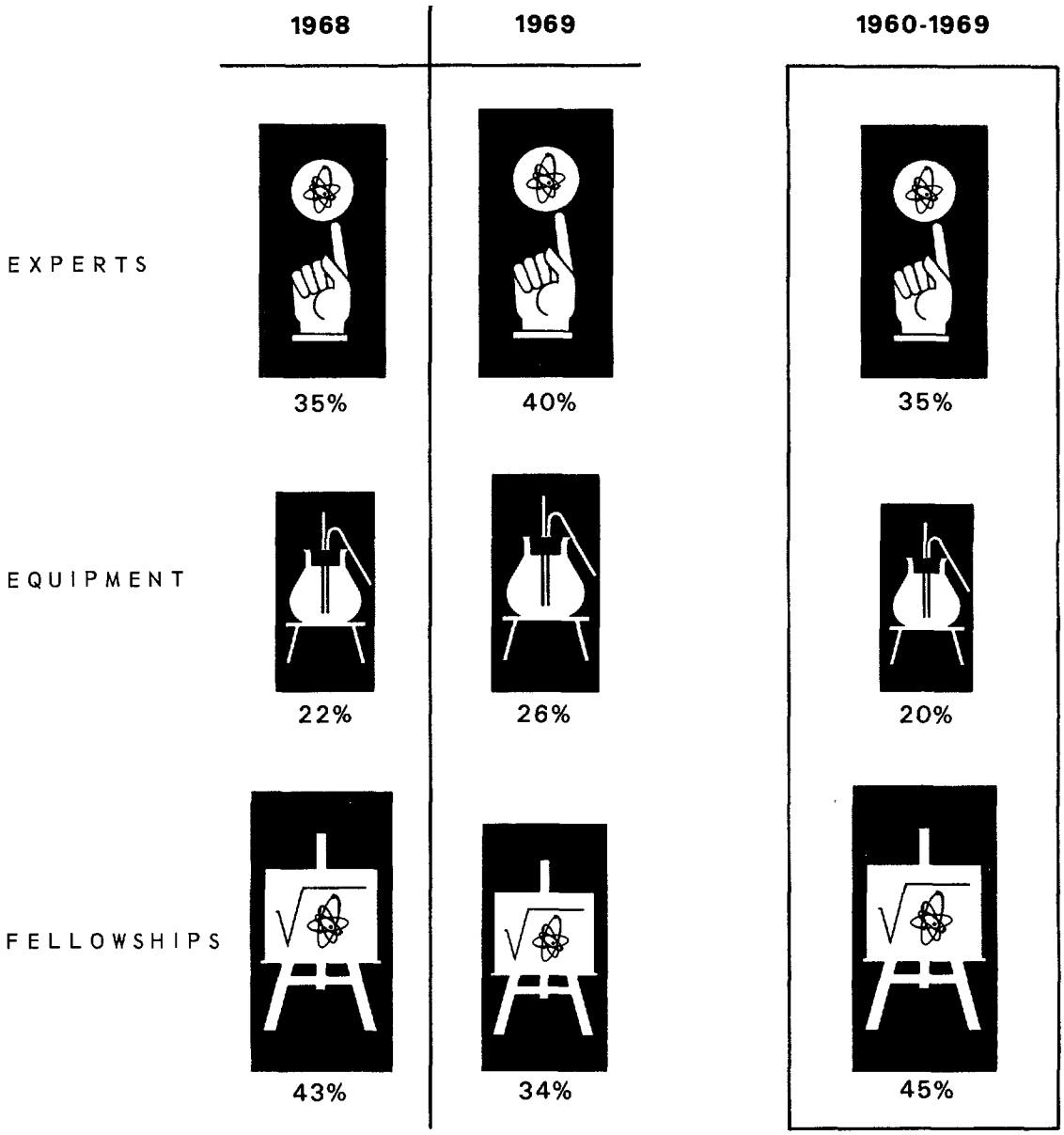


LEGEND (distribution of technical assistance by source):

INNER RING (regional distribution)	OUTER RING (overall distribution)	1968	1969	1960-1969
Regular programme	Regular programme	63.1%	63.6%	67.7%
EPTA-UNDP(TA)	EPTA-UNDP(TA)	36.9%	36.4%	32.3%

FIGURE 6

DISTRIBUTION OF TECHNICAL ASSISTANCE BY TYPE OF ASSISTANCE
(1968, 1969 and 1960-1969)



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

2. By region and country

28. Detailed information on the distribution of technical assistance by region is given in tabular form in Figs 2A, 3A and 4A and summarized in Figs 5A and 5B. It will be noted that the largest variation shown in Fig. 5B is the sizable increase in the assistance provided to countries in the Middle East from 3% of the total assistance in 1968 to 8% in 1969; the other percentage variations did not change by more than 2%.

29. In 1969, 65 countries received technical assistance from the Agency, as compared with 67 countries in 1968. Including those which acted as hosts for short-term training projects and scientific visits, 24 countries both received and provided assistance in 1969 (23 in 1968). Compared with 17 in 1968, 18 countries provided but did not receive technical assistance in 1969, and 41 countries were recipients only (44 in 1968). Thus, 83 countries participated in the Agency's technical assistance programme in 1969 (84 in 1968, 75 in 1967). Figs 2B and 4B and Table 3 show the extent to which skills and knowledge were exchanged between countries.

3. By type of assistance

30. As shown in Fig. 6, the distribution of technical assistance in 1968, 1969 and over the period 1960-1969, by type, was as follows:

Period	Experts	Equipment	Fellowships
1968	35%	22%	43%
1969	40%	26%	34%
1960-1969	35%	20%	45%

(a) Experts, lecturers and visiting professors

31. In 1969, 230 experts, lecturers and visiting professors from 36 countries served a total of 783 man-months at a cost of $1 376 800; this represents a significant increase over 1968, when a total of 185 experts, lecturers and visiting professors from 35 countries provided 463 man-months of assistance at a cost of $830 800. In addition, unliquidated obligations and assistance in kind outstanding at 31 December 1969 totalled $418 300 for expert services. Six experts each served in two countries and 158 experts were assigned to only one country; a total of 53 countries (44 in 1967 and 1968) were provided with country programme experts and visiting professors, and an additional 66 experts and lecturers assisted 16 regional and inter-regional projects (18 partly cost-free and 13 cost-free experts and lecturers were provided, as compared with 19 partly cost-free and seven cost-free experts and lecturers in 1968). In spite of salary increases, the cost of providing expert services was 2% lower per man-month in 1969 than in 1968 because the experts in the field during 1969 (some of whom started their assignment in 1968) served, on average, over a longer period than in 1968.

(b) Equipment and supplies

32. Including the value of grants of equipment delivered during 1969, 51 countries and nine regional projects (42 and seven, respectively, in 1968) were provided with equipment and supplies to a value of $882 800, which represents an increase of about 65% over the amount of $535 800 provided in 1968. An additional amount of equipment and supplies valued at $459 400 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.

33. As in previous years, efforts were made to spread the purchases of technical assistance equipment and supplies over a large number of Member States. In 1969, these items were procured in 22 countries (see Fig. 3B, which also includes financial data in respect of equipment grants), as compared with 23 countries in 1968.

34. The special requirements of requesting countries were taken into account, to the extent possible, while bearing in mind the need to procure items at a reasonable price and utilize all the available currencies. Where possible, requested spare parts were supplied, either as a part of the equipment element of approved projects, or, where no provision of equipment was foreseen, in connection with the expert's assignment when the provision of spare parts was essential to ensure the success of the project. In an attempt to help countries solve their equipment maintenance problems, the Agency, in selecting suppliers, has given preference to suppliers who have service facilities in or near the requesting country and whose equipment has already been used to the satisfaction of the recipient institute. The vital need to ensure adequate servicing for equipment deserves more attention than it has received in the past. This important consideration should be uppermost in mind when equipment lists are drawn up, especially when items are requested which require regular maintenance (or a readily available source of expendable supplies not manufactured in the country), without which the equipment is either unreliable or inoperable.

(c) Fellowships

35. A total of 484 candidates from 58 countries received fellowship awards under the training programme in 1969 (see Fig. 4B and Tables 3 and 6) as against 456 candidates from 59 countries in 1968. The number of man-months of training awarded was 3225 in 1968 as against 2887 in 1969; the increase from $1 048 400 to $1 149 900, or nearly 10%, in the cost of the training provided in 1969 is explained by the fact that many candidates take up their studies either late in the year of award, or during the following year. This situation is reflected in the unliquidated obligations and assistance in kind outstanding (Type II training not yet completed, or not yet begun) at the end of the financial year; the combined sum was $1 077 200 on 31 December 1968 and $989 900 one year later. The total as at 31 December 1969 is a cumulative sum, and therefore includes monetary balances and outstanding assistance in kind carried over from 1968.

36. The number of country programme awards fell from 315 in 1968 to 294 in 1969. Except for UNDP(TA) awards, which dropped from 46 in 1968 to 30 in 1969, there was little change: Type I awards numbered 121 in 1968 and 118 in 1969, and Type II awards, 148 in 1968 and 146 in 1969. The sharp decrease in UNDP(TA) awards need not give rise to concern: 1968 was the closing year of the 1967-1968 biennial period, and the nature of the programming procedure was such that there was usually an above-average number of UNDP(TA) awards at the end of each biennial period. In 1967 there were 18 UNDP(TA) country programme awards, resulting in an average of 32 awards per year in 1967 and 1968, which compares favourably with the total of 1969 UNDP(TA) awards, since 1969 was the first operational year under the new system of "continuous programming".

37. A comparison of the nominations and awards for country programme fellowships in 1968 and 1969 and of all awards made during those two years is given below.

Country programme awards	1968		1969	
Nominations received		458		448
Effective awards [5]				
Individual projects	299		283	
International projects	16	315	11	294
Percentage of nominations which led to effective awards		68.8%		65.6%
Other international training awards				
Scientific visits	9		13	
Short-term training projects	132		177	
Total number of awards	456		484	

[5] Total number of awards less withdrawals after award as at 31 December.

(d) Regional and inter-regional activities [6]

(i) Regional advisers

38. Two experts on the use of isotopes in animal parasitology served as advisers for a regional demonstration project in Africa, and two other experts completed their assignments as regional advisers in Latin America (one on hospital physics and one on the industrial applications of radioisotopes). The assignments of all four were financed under UNDP(TA).

(ii) Short-term training projects

39. In 1969, the Agency conducted 13 regional and inter-regional training projects in 21 different countries, in which there were more than 900 participants from 59 different countries. The cost of attendance of 192 participants was paid out of project funds (Agency and UNDP(TA) resources covering the cost for 177 participants from 47 countries, and the FAO regular programme the cost for 15 participants from 15 countries), and the cost of attendance of 724 participants, including 685 nationals of host countries, was borne by another organization or programme or by the participant's Government. The statistical figures and tables in this report include short-term training project data only in respect of awards financed from Agency and UNDP(TA) resources.

40. The following nine projects were financed under UNDP(TA): a visiting seminar in Burma, China, India, Indonesia, the Republic of Korea, Pakistan, the Philippines, Singapore and Thailand; a study tour in Czechoslovakia, Poland and the Soviet Union; six training courses, two of which were held in Iran and one each in Argentina, Brazil, India and Poland; and a demonstration project involving studies in Australia, China, India, Iran, Japan, New Zealand, the Philippines and Thailand. The three projects carried out under the Agency's regular programme were: two training courses in the United States (one was partially subsidized by the host country and both were partially financed from FAO funds) and a survey course held at Headquarters. One additional training course carried out by the Agency in 1969 was held in Italy and financed under the FAO regular programme. In addition to the lecturers made available by host countries, 61 were provided by the Agency, including 20 from its own staff, not including 11 staff members who served as host lecturers in connection with the survey course held at Headquarters. A further 11 lecturers (six outside lecturers and five Agency staff members) were provided for the training course financed under the FAO regular programme.

41. Six training courses were on the application of isotopes and radiation (four in agriculture, one in biology and one in hydrology), one course was on uranium prospection, one was on radioisotope production and one on safety in nuclear energy. The demonstration project in Asia and the Far East was concerned with advanced atomic energy technology; the survey course was on economic and technical aspects of nuclear power; the study tour dealt with waste management; and the visiting seminar was devoted to food preservation.

(iii) Follow-up missions

42. No follow-up missions were sent out in 1969. Information on missions to be dispatched in 1970 will be included in the report for that year.

C. UNDP(SF) activities

43. Work on the two current projects under UNDP(SF) for which the IAEA is executing agency continued satisfactorily. The project in Central America to study the feasibility of eradicating the Mediterranean fruit fly by use of the sterile insect release method is now approaching the end of its first phase, which ends on 30 June 1970. By that time, it is

[6] Regional and inter-regional projects are listed in Annex II.

expected that techniques for the large-scale production of sterile insects will have been refined, and - equally important - that methods for their aerial release will have been perfected. An effective field demonstration of medfly suppression was carried out in an area of 42 km^2 in 1968-69. A large body of experimental data on all aspects of the use of the sterile male technique in this region has been collected to provide the necessary parameters on which a major medfly eradication experiment in Nicaragua could be based.

44. The second project, in India, on the application of nuclear research techniques in agriculture, which began in October 1968, is administratively somewhat complex, in that the research programme involves co-operation between four separate research institutions in different locations co-ordinated through a steering committee established by the Government. The Indian Agricultural Research Institute (New Delhi) is concerned with soil fertility, mutation breeding and the control of insect pests; the Bhabha Atomic Research Centre (Trombay) with induction of mutations and a study of the sterile male technique; the Indian Veterinary Research Institute (Izatnagar) with studies of trace elements in animal nutrition and development of radiation-attenuated vaccines for use against parasites; and the National Dairy Research Institute (Karnal) with studies of nutrient metabolism and synthesis of milk protein. The consequences of an unexpected delay in the construction of the main laboratory building have been offset by changes in the equipment delivery schedule, the temporary adaptation of other facilities for use in carrying out essential research in the interim, a re-phasing of the assignment of experts and the re-timing of fellowships.

45. In addition, as a sub-contractor providing isotope hydrological advisory services and carrying out water analyses, the Agency assisted nine UNDP(SF) projects in 1969 at a reimbursable cost of about $17 300 (see Annex III).

D. Evaluation of the technical assistance programme

1. General

46. In 1969 ECOSOC again considered the evaluation of technical assistance programmes of United Nations organizations. It recognized the continuing importance of the subject and the need to clarify the complex issues involved. It therefore decided to defer for a further year consideration of a draft resolution which recommended, inter alia, an intensification by the organizations, within the limits of available resources, of their efforts to evaluate the technical soundness of their programmes, urged Governments to keep under constant review aid received from such organizations, stressed the important role of the evaluation to be carried out by the Secretariat of UNDP in conjunction with the organizations, and requested a report containing recommendations on how existing evaluation activities could be rationalized and integrated into a common system.

47. As mentioned in last year's report, the Secretary-General of the United Nations dispatched five missions to various countries to evaluate the overall impact on the development of those countries of the assistance provided by the United Nations organizations.[7] ECOSOC decided that, as no significant new benefits could be expected from further missions of this kind for the time being, no action would be taken within the next 18 months to dispatch such missions.

48. There was a consensus that the Inter-Agency Study Group on Evaluation, on which the Agency is represented, should continue to meet annually. While it is recognized that each organization and programme develops its own evaluation techniques and procedures to assess the efficiency of its operations, it is considered that there is need for a central point or clearing-house to co-ordinate procedures which involve evaluation of a project of concern to several organizations, to standardize methodology and terms and to try to develop a more rational system of evaluation within the United Nations system. For this, a mutually agreed framework is needed, but all organizations would not be required to follow identical evaluation procedures.

49. Evaluation may be made at different stages of the programme, namely, project preparation, appraisal of original requests during project operations and on conclusion of the provision of international aid when an attempt to assess results is made. Within the Agency, project preparation is facilitated by follow-up missions, visits by Headquarters staff members, and discussions with Government representatives in the technical Ministries and with the UNDP Resident Representative. The appraisal of requests involves determination of technical soundness and, subsequent to project approval, operational review. The technical possibility and soundness of the original requests are assessed by Agency staff members and, where necessary, through subsequent correspondence and, if appropriate, by consultants. The operational review is concerned mainly with the practical aspects of project activities, for example the recruitment of experts and equipment procurement, and is a continuing process which is an integral part of the routine established in the light of many years of operating experience. In the following paragraphs some results achieved through the provision of Agency assistance for national and regional projects are assessed. No attempt is made to assess the overall impact on economic and social development because, on the one hand, the assistance provided by the Agency is only a small part of the total aid, both multilateral and bilateral, which is being given, and, on the other hand, the impact is essentially a matter for the recipient Government to determine in the light of its own development plan and priorities. It is also clear that progress in several of the Agency's activities, particularly those concerned with education and some basic research which lead to an increased awareness of the benefits of science, cannot be measured quantitatively, and that the indirect results will only become evident after several years.

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[7] See document GC(XIII)/INF/111, para. 46.

2. Evaluation of Agency programmes and projects

(a) Agricultural development

50. In spite of efforts to diversify the economy, two thirds of the developing countries depend on agriculture - ranging from the production of basic commodities to their processing - for their economic survival. The role of atomic energy in agricultural development is well established, and the Agency's technical assistance programme reflects the varying stages of development, including research, in recipient countries.

(i) Soil science

51. In one country, the provision of neutron probes, for the measurement of moisture content in soil profiles, and lectures on the application of nuclear techniques in crop production given by an expert at a newly-created agricultural school have led the Government to provide funds for the establishment of a radioisotope laboratory with supporting facilities. Research, with the aid of nuclear techniques, has been aimed at solving local problems of practical importance and at training local scientists. Research was designed to increase crop yields through better management, better plant nutrition and more efficient water use.

(ii) Plant breeding

52. The successful performance of induced mutants in the Near East led three countries to request technical assistance to increase the efficiency of their mutation breeding programmes. This assistance was provided in the form of expert services and some field and laboratory equipment.

(iii) Pest control and pesticides

53. Nuclear techniques play an important role in the development of safe and effective pest control operations, for example in the study of the mechanisms of cocoa-disease transmission by mealy bug vectors and in the identification of the natural predators of cocoa pests. Studies designed to suppress the rice stem borer, codling moth, cotton boll worm and tsetse fly by the use of the sterile male technique are proceeding on a laboratory pilot scale in several countries affected by these pests. The study of pesticide residues, involving the use of labelled compounds, is helping one country to use more efficient methods of application. Isotope tracer techniques provide a powerful and sometimes unique tool for studying pesticide contamination problems relating to food and the environment, but this tool remains largely unexploited in the developing countries at present.

(iv) Food preservation

54. Increasing attention is being given to radiation processing as a technique to prevent losses of stored food products. The advice and assistance of Agency experts has been concentrated on pilot-scale projects in which profitable use can be made of the data resulting from the wholesomeness testing of irradiated products carried out in developed countries. In one country, a large laboratory designed for the study of the preservation of meat and fruit by radiation is being constructed, and an Agency planning expert will be associated with the project from the beginning, thereby ensuring that a sound impetus is given to the future programme. In another country, studies on a limited scale are being carried out on the preservation of dates. Elsewhere, vital research on the formation of aflatoxin in groundnuts and their resultant toxicity is being initiated, using a bench irradiator. Another example of work in this field was an overall review of food irradiation programmes in a developing country aimed at co-ordinating the activities in various institutes. A number of project proposals, including a research programme, was developed with the aim of studying the disinfestation by irradiation of mangoes and papayas

for possible export. In two countries, studies on enzyme preparations are being carried out, utilizing radiation technology.

55. These projects are all being carried out in the countries where the problems are acute; they represent a positive step towards the undertaking of essential research in existing institutes, utilizing national personnel. This reduces a country's reliance on foreign expertise and the need to pay royalties on processes covered by foreign patents. In this way the limited local resources in manpower and facilities can be concentrated on the solution of pressing problems and the research programmes integrated into national agricultural development plans. Steps will however have to be taken by agricultural authorities to ensure that the results achieved in their research stations are communicated to growers and producers through the country's agricultural extension service.

(b) Other nuclear energy applications

56. Several developing countries have advanced far in their atomic energy programmes, resulting in the introduction of modern nuclear methods and technology into commercial and other areas where conventional methods had dominated. For example, the neutron activation analysis technique for geochemical prospecting of minerals is used on a routine basis in one country. The potentialities of the use of radiation in wood-plastic-combination techniques for its plywood industry and graft polymerization for its textile industry have been drawn to the attention of one Government which is now prepared to invest in projects utilizing these techniques. Elsewhere, a group consisting of five members of a research centre has been trained by an Agency expert, using Agency-provided equipment, in the applications of industrial radiography in bridge construction, iron casting, railway rail inspection, shipbuilding, etc. Services are now being provided by the group to other industrial companies concerned with construction. These and similar activities which are given priority in Governments' requests are dealt with below.

(i) Medical applications

57. The use of nuclear techniques in social development, i.e. education and health, has not been neglected by recipient Governments. In several countries radioisotope departments were established in general hospitals in 1969, and diagnostic services involving the use of these techniques are now an integral part of those countries' health programmes. In one country, the advice of an expert was provided, together with the appropriate equipment, over a four-year period, and this had the effect of ensuring that a wide range of diagnostic tests, involving the use of radioisotopes, could be carried out, and that facilities for treatment with unsealed radioactive sources were available. Besides the routine work, research, in which radioisotopic techniques were used, was carried out in various fields of medicine, and the results have been published in professional medical journals. In another country, where some staff and equipment were available in a new hospital, the advice given by an international expert provided the necessary impetus and co-ordination to ensure that an appropriate hospital physics service was available. This expert will, at the request of the Government, return later as a consultant for short-term visits two or three times a year. In recent years, the advice provided by Agency experts has enabled at least four countries to produce virtually all the radioisotopes they need for medical purposes.

58. Contact is maintained with WHO personnel working on programmes in national health. In the establishment of a radiation isotope centre in one country, radiography training was provided by WHO and hospital physics training by an Agency expert. In three months alone over 700 patients visited the centre which, with considerable assistance from the expert, has now developed into an important asset for the national health service. An advanced training course on medical applications of radioisotopes for participants from the region was recently held at the centre. In another country, rehabilitation of a radioisotope department which had ceased to function was assisted by an Agency medical expert; the

department's work was integrated into the activities of the hospital with the help of the existing staff and some WHO experts. A regional adviser on hospital physics visited some 12 countries where he advised atomic energy and public health authorities, calibrated radiation sources, gave lectures and conducted seminars. These visits proved most useful since the expert was able to promote a proper understanding of the need for adequate dosimetry and radiation protection; throughout his assignment close contact was maintained with WHO field staff.

(ii) Industrial applications

59. The number of requests for assistance in the application of radioisotopes and radiation to solve industrial problems continues to grow. In 1968 regional advisers in Latin America and Asia and the Far East assisted in identifying areas of application directly related to the development of countries in these regions, and in 1969 assignments carried out by specialists were instrumental in advancing industrial radioisotope technology. The fact that these assignments were concerned with practical applications is encouraging since it demonstrates that requesting countries were aware of the significant contribution nuclear technology can make to industrial development.

60. In Thailand, a specialist conducted courses in advanced industrial radiography, demonstrating the latest technology, in which equipment provided mainly by the Agency was used. As a result, a competent team of Thai scientists is now providing local industry with a service which was previously only available to a few large companies. This service involves the use of quality control and inspection techniques designed primarily for building and pipeline construction, and the award of an inspection contract for work which was formerly performed by an overseas contractor demonstrates its effectiveness. In a similar assignment in Indonesia, an expert assisted in identifying field applications of gamma radiography, performing a wide variety of demonstrations and tests, and in making industry aware of the benefits to be derived from non-destructive testing. A competent and enthusiastic team of scientists is now performing routine inspections with advice from the expert, whose assignment was extended at the request of the Government. Gamma radiography is a relatively elementary but effective nuclear technique for guaranteeing product integrity, and its use in these two projects has led to an extension of the range of practical applications of nuclear techniques in these two countries.

61. Neutron activation analysis is developing as a useful tool in geobotanical and geochemical prospecting for non-nuclear minerals. Work in this field has been performed in the Philippines to identify potential gold-bearing areas, and an expert assisted in improving chemical separation and counting methods to increase the sensitivity of the technique. This work will continue, supported through a co-ordinated research contract programme, with the object of using activation analysis as the main tool in assessing the mineral potential of previously unexplored areas.

62. In India, the manufacture of sheet materials such as steel, plastic and foil is being increased to meet the requirements of a rapidly expanding industry. Transportable thickness gauging equipment was provided to demonstrate the advantages of this well-proven technique, together with the services of an expert in the development of nucleonic gauging equipment and its assembly. Apart from assisting in surveying the potential market for these gauges within the country, the expert helped to develop a new type of thickness gauge, using novel concepts. This instrument will be manufactured in India and installed in a variety of factories.

63. The Government of Singapore has recognized the usefulness of nuclear techniques in industrial development and has long-term plans to train scientists and industrialists in nuclear technology. As a preparatory step, an expert assisted in assessing the potential for these techniques and, as a result, it was possible to identify numerous areas where

immediate application could be beneficial. The provision of more specialists and equipment, particularly for quality control, will assist a small team of local technologists in its efforts to improve product quality.

64. In Guatemala, an Agency expert helped in the use of radioisotope gauging and tracer techniques to solve specific industrial problems. During his assignment, training was given to local staff who participated in the investigation and assessment of the results of experiments involving the use of radioisotopes in factories. A wide range of industries is now aware of the effectiveness of nuclear techniques and is using them to advantage.

65. Training in radioisotope technology at the university level is now recognized as an essential part of higher education. In Kenya, an expert assisted in the establishment of a radioisotope laboratory, delivered a series of lectures and helped to prepare a course suitable for engineering students. At the same time several practical experiments involving the use of nuclear techniques were devised and initiated with a view to using radioisotope technology to solve problems in road construction and forestry.

66. The use of large radiation sources to effect changes in chemical systems is the basis of experimental work being carried out in Yugoslavia. After giving lectures and training, an expert assisted in establishing a research programme on radiation chemistry applied to polymeric systems. This long-range project is aimed at assessing the merits of both chemical and radiation grafting in the production of plastics.

67. The application of nuclear techniques in industry is making them more attractive to industrially developing countries and a continued expansion in their use in coming years is foreseen.

(iii) Nuclear raw materials

68. Although there is at present a temporary slow-down in the growth rate in the nuclear reactor industry and in uranium purchasing, the medium- and long-term outlook for the uranium supply industry is very bright. An authoritative estimate of uranium requirements for the world's nuclear power industry amounts to 930 000 tons of U_3O_8 for the period up to 1985, which at a price of $8 per pound would have a value of approximately $15 000 million.

69. Developing countries could undoubtedly benefit from this uranium demand if economically workable deposits could be found within their territories and exploited. They might benefit in two ways, namely by using their own national uranium in national nuclear power stations and through the commercial export of uranium. In the first case, the economic advisability of installing nuclear power stations would have to be determined for each country and, when this had been established, a viable national uranium production industry might be built up - even if the world uranium price was not always adhered to - with a view to saving foreign currency, utilizing national resources and providing employment and training. In the second case, that is the production of uranium for commercial sale on the world market, the cost of the uranium would have to be sufficiently lower than the prevailing world price to ensure a volume of sales that would yield a reasonable profit margin, and this would predicate the discovery and the efficient exploitation of fairly large, good-grade uranium deposits. It would, therefore, be advantageous for all developing countries to know what their potential resources of nuclear raw materials are.

70. Because of the demands for exploration and production to be expected in the future, it is the Agency's policy to provide extensive assistance to developing countries in regard to nuclear raw materials. Preliminary favourability studies, for example, are suitable subjects for assistance by short-term, low-cost missions intended merely to help

a country to determine the advisability of embarking on larger and more expensive exploration programmes. In countries where uranium exploration has already reached a more advanced stage, technical assistance can be provided in the form of experts and equipment to promote the use of many more specialized techniques such as aerial scintillometer surveying, geophysical and geochemical ground surveys, evaluation of ore deposits, uranium ore analysis and uranium concentrate processing. In countries where there are already favourable indications of uranium occurrences and where the supporting infrastructure is suitable, much larger pre-investment projects involving the use of exploration techniques, drilling, mining methods and planning for production could be very valuable in discovering and evaluating the uranium resources of the country and bringing the work to the pre-plant design stage.

71. During 1969 the Agency conducted a vigorous programme with regard to nuclear raw materials. In order to collect basic information which would prove useful for technical assistance assessments, a questionnaire on national uranium exploration activity from 1945 to 1969 and covering geological information was sent to all Member States in mid-1969 and elicited a good response.

72. To promote training in uranium exploration and evaluation, the Agency, in co-operation with the Government of Argentina, held a training course in Buenos Aires and the uranium-producing districts of Western Argentina in 1969 at which both the theoretical and practical aspects of the subject were covered and in which 16 geologists and mining engineers from Latin America participated. Further training courses in this subject and in uranium ore analysis are envisaged. During 1969 expert advice and equipment were provided to three countries, Bolivia, Greece and Tunisia, to help them carry out exploration and evaluation programmes. Agency staff members visited four countries, Greece, India, Indonesia and Pakistan, to advise on various aspects of nuclear raw materials programmes, and in two of these countries assistance was given to Government authorities in preparing requests for UNDP(SF) assistance for multi-million dollar projects covering long-term uranium exploration and development. Inquiries were received from a number of other countries about the possibilities of obtaining technical assistance in establishing such programmes in the near future.

(iv) Nuclear power

73. The wide range of the technical assistance programme is reflected in the nature of the projects being assisted. It extends from the provision of initial advice to atomic energy planners on the phased introduction of nuclear techniques into economic and social development plans to the provision of sophisticated electronic equipment and related expert advice essential for nuclear power programmes. The assistance provided by the Agency to developing countries in the introduction of nuclear power includes the granting of fellowships in, for example, nuclear engineering and technology, in support of their programmes to create the required scientific infrastructure. In one country, following a decision to introduce nuclear power, a mission of four experts recommended a comprehensive programme to be carried out by several experts, which would lead to the establishment of a nuclear power plant. Elsewhere, the advice of nuclear technologists, reactor physicists and nuclear instrumentation experts, provided in association with a research reactor, acted as an incentive and helped to raise the level of scientific and technological knowledge so that nuclear power could be introduced in the countries concerned.

74. In one country an expert provided advice with regard to testing the suitability of foreign-produced fuel for its first nuclear power reactor and also advised on the requirements for domestic fabrication of the fuel elements needed.

75. The 1969 survey course on technical and economic aspects of nuclear power covered a much wider range of topics than hitherto. The subjects dealt with were: the current status of various reactor systems and their costs (including small and medium-sized

reactors of special interest to developing countries); operating experience and safety; methods of evaluating the economics of nuclear and conventional power plants; nuclear fuel cycles; the supply of fuel and related services; problems involved in the planning and implementation of nuclear power projects; and regulatory aspects of nuclear power.

(c) Higher education

(i) Fellowship training

76. Evaluation of the Agency's fellowship programme, which is carried out on a continuing basis, has shown that over the period 1958-1967 about 95% of fellowship holders had returned to their countries upon completion of their training. It is too early to evaluate the fellowship programme for 1968 and 1969 as the number of reports and completed questionnaires submitted by fellows is not yet sufficient for this purpose; there are, however, clear indications that the evaluation will show that the results were as satisfactory as before.

77. It is clear that applications of radiation and radioisotopes in medicine, agriculture and industry continue to be priority subjects for training, since over 40% of awards are for training in these subjects. There has been a gradual decrease in the awards for training in radiochemistry and nuclear physics, partly because these subjects are now being included to an increasing extent in the curricula of universities and the necessary instruction can be obtained locally.

78. The advanced stage of development of atomic energy programmes in the developing countries is reflected in the steady increase in the number of requests for training in highly specialized subjects, but it is sometimes difficult to find suitable training facilities for the candidates as training is available only in a few countries. The implementation of fellowships in these subjects is, therefore, also subject to delay because of the difficulty in finding suitable host countries.

79. The evaluation of the training programmes shows that Member States consider participation by their nationals in Agency study tours and seminars very valuable. The use of this method of training and exchanging information could be increased with advantage. It is clear that the reports published on the study tours were also of interest to Member States.

(ii) National and regional training

80. The almost universal trend towards the creation of national institutes of higher education, including most aspects of nuclear technology, is reflected in many Agency-assisted projects. These institutes, which are available to all students, greatly assist in establishing the scientific basis essential for social and economic development. Even the provision of a modest amount of equipment to a university science faculty has in many countries an effect out of all proportion to its cost in helping local facilities to encourage nationals to study at home rather than abroad. In one country, an expert introduced nuclear physics into the university curriculum and his lectures contributed substantially to the success of practically all the students offering physics for their final degree, in contrast to previous years. In another instance, in order to train the necessary national specialists for the development of the country's atomic energy programme - which includes plans for a power reactor - an Agency visiting professor developed a research and training programme up to the doctorate level in the Institute of Physics of the Federal University, thereby making possible the study of a subject which is usually studied only in the developed countries.

81. The integration of research reactor centres into teaching and research programmes at universities and other institutes of higher learning has encouraged both staff and students. In one country, all electronic work for university departments will be concentrated in the

reactor centre, which is on the campus, together with a centralized service for training in the use and construction of electronic equipment and the repair of instrumentation. A similar approach will be adopted with regard to radiobiology research and training. In another country, however, the lack of co-ordination between the atomic energy authorities and the university has led to duplication of effort and equipment, and the experts provided were not able to achieve the objective of establishing a reasonable programme. Experience has shown that problems common to a region can often best be studied and solved within that region. To this end, travel arrangements were made for a group of four scientists to study food irradiation applications in a centre in the region; another group of five received on-the-job training in radiation entomology techniques. In addition, scientific visits were arranged for directors of institutes and similarly qualified personnel to visit their colleagues at other centres in the region and discuss problems of mutual interest.

82. The number of applications received from Member States for participation in the Agency's training courses on the use of isotopes and radiation in entomology, food irradiation technology and techniques, medical applications of radioisotopes, hospital physics, radiation protection, uranium prospection and ore analyses, maintenance and repair of nuclear instrumentation, industrial applications of radioisotopes, and in survey courses on economic and technical aspects of nuclear power was, in some instances, more than double the number of places which were available. To meet the demand, it is planned to organize further training courses on these subjects.

83. On the other hand, the number of applications for participation in some advanced training courses planned for countries in an individual region was small and the qualifications of some of the candidates did not enable them to benefit fully from the training. Such courses are usually more successful when held on an international or inter-regional basis.

84. Inter-agency co-operation contributed to the success of many of the short-term training projects listed in Annex II to this report. In addition, the Agency advised other United Nations organizations and assisted them in incorporating some atomic energy applications in training projects carried out by them which were on subjects of interest to the Agency as well. In this way, the Agency can ensure that the great potential of nuclear techniques is made use of and that such techniques make an appropriate contribution, in conjunction with the basic sciences and conventional methods, to scientific and economic development.

(d) Project implementation and follow-up action

(i) Counterpart and expert personnel

85. As in previous years, most recipient Governments have commented favourably on the technical level and competence of the experts assigned to their countries. The experts have, with a few exceptions, been provided with appropriate counterpart personnel, which reflects the effectiveness of the Agency's fellowship programme. A difficulty does, however, arise in some cases where Government or Government-controlled research institutes pay such low salaries that research personnel are compelled to seek additional income from outside sources and counterparts are unable to observe official working hours.

86. Basically, the technical assistance programme seeks to transfer knowledge and skills. This requires the experts to adapt themselves to their new environment. This is sometimes facilitated by the assignment of a national of one country in the region to another in the same region, and the language and cultural background greatly expedite project implementation; the increasing number of experts from developing countries has been a noticeable feature of the technical assistance programme in recent years. In general, experts have succeeded in adapting themselves and maintaining excellent relations with all concerned throughout their assignments.

(ii) Follow-up action and impact

87. The catalytic effect of international experts on economic and social development has long been a characteristic of technical assistance programmes. Recently, all United Nations organizations have tried to ascertain the extent of investment or other form of follow-up action by recipient Governments in the case of internationally-supported projects. Since most Agency support is only part of the total support provided, follow-up action in the case of individual Agency projects (represented by an expert and some equipment) is difficult to assess quantitatively and may not be ascertained for several years. However, one country has reported that its atomic energy authorities believe their budget has been increased from year to year in order to complement equipment provided by the Agency and to expand or extend study programmes abroad which were initiated with Agency funds. In another country, the fact that assistance had been received in such varied fields as activation analysis, radiochemistry, nuclear instrumentation, the use of radioisotopes in medicine and agriculture, hospital physics and radiation protection had led the Government to create an atomic energy authority whose task will be to plan, co-ordinate, direct and administer atomic energy activities. It has been reported from a further country that an Agency expert's recommendations on the development of black beach sands has resulted in the Government seeking bilateral financial aid with a view to developing the economic minerals contained in these sands.

88. In another country, short-term visits by experts who in previous years assisted in the creation of a large research institute have helped to ensure that the institute is engaged in fruitful work on behalf of numerous domestic enterprises in agriculture and related industries. In a further country, the Agency's technical assistance in radio-isotope production, nuclear physics, etc. has brought about an expansion of the national atomic energy programme, and the national atomic energy council has consequently received additional funds to increase the power of an existing research reactor and to permit the construction of an additional one. Two factors are, however, contributing to delays by Governments in implementing successive phases of their atomic energy programmes, namely the general lack of funds for development and the scarcity of foreign exchange for the purchase of essential spare parts and replacement equipment. Although these are factors beyond the Agency's control, the need for adequate counterpart support (sometimes involving additional staff for which budgetary provision is essential to ensure the viability of a project) is stressed during negotiations with recipient Governments leading to the provision of assistance by the Agency.

89. The assistance provided by the Agency in 1969 has, by and large, been reflected in the impact being made by the utilization of nuclear techniques in economic and social development plans. The actual impact produced by such assistance differs from country to country and is influenced by the nature of the projects, the skill of the experts in dealing with local problems, the policies of the Governments with regard to scientific matters and the financial and other support they give to the projects. In several cases the successful implementation of a particular project led to its integration into programmes of development relating to agriculture, industry, health and power production. In most cases the assistance provided for the various uses of atomic energy produces an impact which cannot be attributed to any one project.

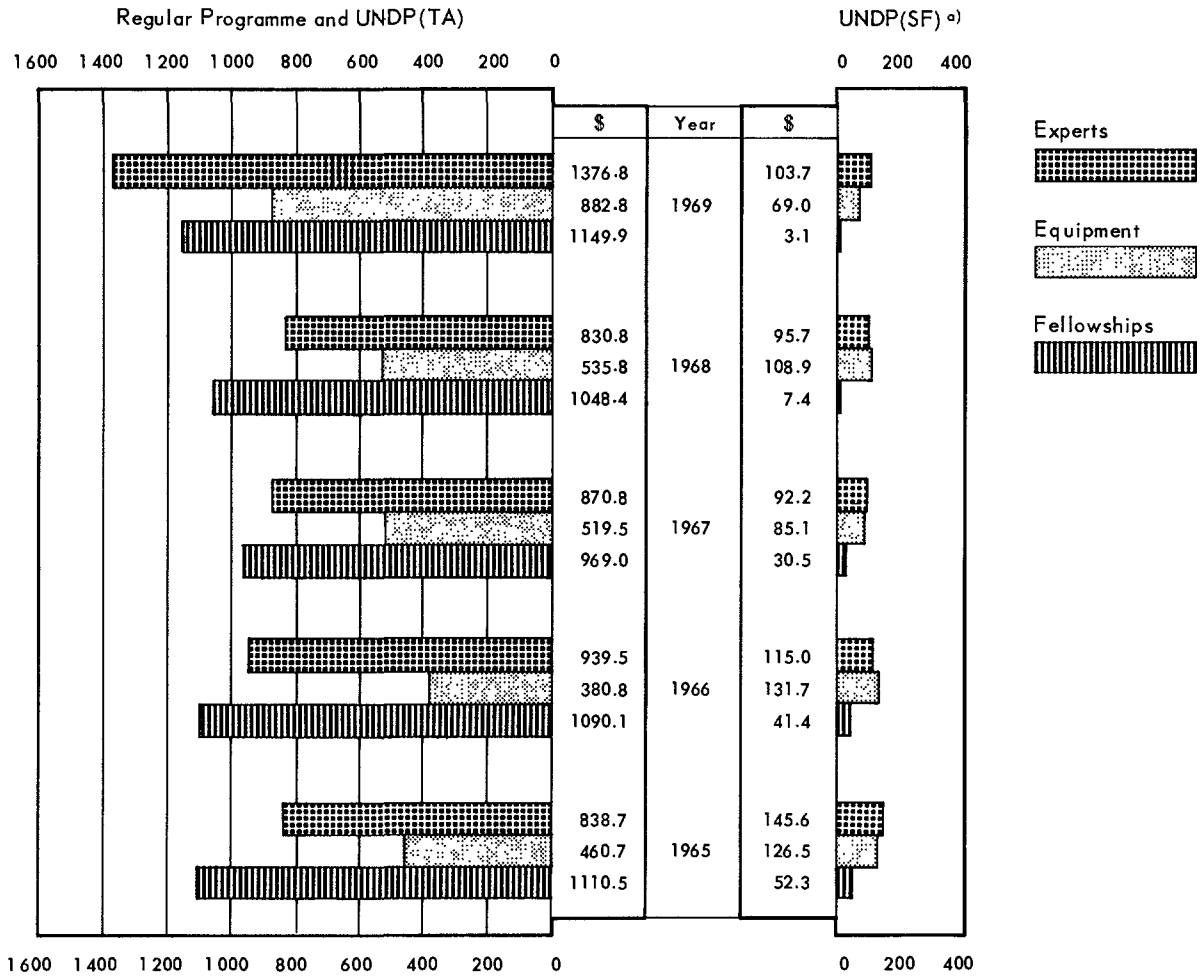
Part III. CONCLUSIONS

90. In the past year persistent shortfall in Member States' voluntary contributions to the General Fund has made it impossible to implement fully the regular programme approved for a given year. Now, at the beginning of the Second Development Decade, there is hope that the target figure for voluntary contributions, established at $2 million nearly nine years ago, will be reached. With regard to the, admittedly fragmentary, assistance available under the regular programme, requests for assistance received from 24 countries were met in 1962 (excluding a funds-in-trust project), and five of those countries are not among the 52 Member States which are to receive experts or equipment, or both, under the 1970 regular programme. There has therefore been an increase of 33 in the number of recipient countries over a period of nine years, and it is reasonable to expect that, as the number of countries that can make use of nuclear energy for their own development grows, their requirements for technical assistance from the Agency will also increase. It follows, therefore, that additional resources are urgently required in order to meet the most elementary needs of the developing countries.

91. For the first time in the history of the Agency's technical assistance programme (not taking UNDP(SF) assistance into account), the total aid provided during a given year not only reached the $3 million mark, but exceeded it by a comfortable margin in 1969. The backlog of projects still to be implemented, the growth in the value of assistance provided by UNDP(TA) under its new "continuous programming" system for projects to be carried out by the Agency, and the improved prospect of an increase in voluntary contributions to the General Fund and assistance in kind justify the expectation that projects valued at $4 million can be implemented each year, provided the target figure for voluntary contributions is reached. This expectation will be realized only if Member States take the necessary steps; for example by requesting increased assistance from UNDP(TA) for nuclear energy projects, to ensure that the present volume of technical assistance can not only be maintained but progressively increased.

FIGURE 7

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



a) The UNDP(SF) figures given here do not reflect expenditures on sub-contracts and miscellaneous project costs, which include "experts" and "equipment"; these amounted to an additional $372 100 in 1965-66, $205 500 in 1967-68, and $88 000 in 1969.

ANNEX I

STATISTICAL TABLES

Introductory Notes

Resources

1. Fig. 1 and Table 1 show only the resources made available for approved field programmes of technical assistance and do not include EPTA or UNDP(TA) overhead cost allocations. In addition, data in respect of offers of assistance in kind have been up-dated to 31 December 1969, the estimated value of Type II fellowship offers has been changed to reflect the resources that were available when the fellowships were awarded, and it was also adjusted, where necessary, at the time the fellows were placed. 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 headings "in kind", or "free experts" or "Type II fellowships" are estimated in accordance with the following rules:

(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 recipient country is based on the costs incurred); 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.

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

Assistance provided

3. In Tables 4, 5, 7 and 8, the assistance provided by the Agency (experts, equipment and fellowships) includes actual cash payments against 1969 and prior years' obligations, regardless of the time when funds were made available or obligated, plus the total value of assistance in kind, shown according to the year in which it was provided. Thus, the unpaid balance of funds obligated in 1969 is not included in the financial data relating to assistance provided, but is shown separately in column 9 of Table 4; the total cumulative unpaid balance of funds obligated in 1969 and prior years 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 "International projects" 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 programmes and international projects; and

(c) Fellowships. In Table 3, where awards are classified by place of study, new 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(TA) country, Agency Type I and Type II awards shown in Tables 3 and 6 constitute the total effective awards as of 31 December 1969 (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(TA)" and "Agency Type I" (in Table 5 under "Number of fellowships"). and are financed either by UNDP(TA) or the Agency, they are not in the same category as Type I, Type II or the UNDP(TA) country awards. On the other hand, in Tables 7 and 8 the expenditure on regional advisers, short-term training projects and study at the Trieste Centre is not shown as assistance to individual countries but is given under "International projects". It will be noted that the total assistance provided in respect of "International projects" in Tables 7 and 8 corresponds to the relevant totals under "Short-term training projects" in Table 4. None of the tables includes any reference to local participants in short-term training projects.

International projects

7. In the broadest sense, this heading covers regional projects for which experts' services only were provided (e.g., the regional adviser on industrial applications of isotopes and radiation), regional and inter-regional projects for which experts, equipment and fellowships were provided (short-term training projects) and regional and inter-regional projects for which fellowships only were provided (e.g., at the Trieste Centre). In Tables 7 and 8 only the expenditure on regional advisers, training at the Trieste Centre and short-term training projects is given under "International projects".

8. In 1969, eight fellowships were awarded for study at the Trieste Centre. The total cost of fellowship training at the Centre in 1969 amounted to $42 800. However, as $35 000 transferred from Operating Fund II to Operating Fund I was used to meet part of these costs, it is not possible to specify from which of these two funds individual fellowships at the Centre were financed.

UNDP(SF) activities and funds-in-trust arrangements

9. Although these are mentioned in the report as part of the Agency's technical co-operation activities, none of the statistical tables includes data relating to UNDP(SF) activities, or projects carried out under funds-in-trust arrangements.

Figures and percentages

10. 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: 1960-1969

(in thousands of dollars)

Year	UNDP(TA)		Agency		Sub-totals		Total
	Monetary (1a)	In kind[a/] (1b)	Monetary (2a)	In kind[a/] (2b)	UNDP(TA) (3)	Agency (4)	(3) + (4) (5)
1960	633	1	1008	884	634	1892	2526
1961	786	1	981	518	787	1499	2286
1962	828	-	1146	588	828	1734	2562
1963	954	-	1230	480	954	1710	2664
1964	946	5	1115	613	951	1728	2679
1965	901	8	1200	503	909	1703	2612
1966	893	-	1263	518	893	1781	2674
1967	1076	3	1380	564	1079	1944	3023
1968	1134	5	1348	571	1139	1919	3058
1969	748	4	1586	623	752	2209	2961
1960-1969	8899	27	12257	5862	8926	18119	27045

a/ Estimated: see Introductory Notes, paras 1 and 2 to this Annex.

Table 2

Agency funds for technical assistance: 1960-1969

(in thousands of dollars)

Item	1960-1965	1966	1967	1968	1969	1960-1969
Target for voluntary contributions to the General Fund[a/]	11 300	2 000	2 000	2 000	2 000	19 300
Budgeted for technical assistance	9 581	1 749	1 876	1 878	1 874	16 958
Amount pledged[a/]	7 781	1 277	1 432	1 424	1 493	13 407
Actually made available for technical assistance from the General Fund and Operating Fund II	6 680	1 263	1 380	1 348	1 586	12 257

a/ The use of funds from voluntary contributions is not restricted to technical assistance activities but also coveres other operations of the Agency like the Monaco and Seibersdorf laboratories, the Trieste Centre and, up to 1967 research contracts.

Table 3

Experts in the field, classified by nationality, and fellowship awards, classified by place of study: 1969

Country of origin of experts or place of study for holders of fellowship awards	Experts					Fellowship awards						
	UNDP(TA)		Agency		Total	UNDP(TA)		Agency				Total
	Paid	Free	Paid	Free		Country	Regional	Type I	Type II	Regional	Scientific visits	
Argentina	2	-	3	-	5	-	14	-	4	-	-	18
Australia	1	-	-	-	1	-	2	2	-	-	-	4
Austria	3	-	-	-	3	1	-	1	2	-	1	5
Belgium	2	-	1	1	4	1	-	1	5	-	-	7
Brazil	-	-	-	-	-	-	13	-	-	-	-	13
Canada	-	-	6	-	6	-	-	4	-	-	1	5
China	-	-	-	-	-	-	3	-	-	-	-	3
Costa Rica	-	-	-	-	-	1	-	-	-	-	-	1
CSSR	13	-	14	-	27	-	14	-	1	-	-	15
Denmark	7	-	1	-	8	1	-	3	5	-	1	10
Finland	1	-	-	-	1	-	-	-	-	-	-	-
France	4	-	7	-	11	5	-	19	-	-	2	26
Germany, F.R.	9	-	5	2	16	1	-	1	25	-	4	31
Greece	-	-	-	-	-	-	-	1	-	-	-	1
Hungary	2	-	3	-	5	-	-	-	1	-	1	2
Iceland	-	-	-	-	-	-	-	3	-	-	-	3
India	8	-	9	-	17	-	16	-	7	-	-	23
Iran	1	-	-	-	1	-	29	-	-	-	-	29
Iraq	1	-	-	-	1	-	-	-	-	-	-	-
Israel	2	-	1	-	3	-	-	-	1	-	1	2
Italy	-	-	3	1	4	-	-	1	17	-	4	22
Japan	-	-	2	-	2	1	1	1	6	-	-	9
Mexico	-	-	2	-	2	-	-	1	2	-	-	3
Netherlands	1	-	1	-	2	1	-	1	6	-	2	10
New Zealand	-	-	1	-	1	-	1	1	-	-	-	2
Nigeria	1	-	1	-	2	-	-	-	-	-	-	-
Norway	1	-	-	-	1	-	-	-	-	-	-	-
Pakistan	1	-	-	-	1	-	-	-	-	-	-	-
Philippines	1	-	-	-	1	-	3	-	-	-	-	3
Poland	3	-	1	-	4	-	27	-	1	-	1	29
Romania	-	-	1	-	1	-	-	-	-	-	-	-
Spain	1	-	4	-	5	-	-	-	5	-	-	5
Sweden	3	-	4	1	8	2	-	3	5	-	3	13
Switzerland	-	-	1	-	1	-	-	1	-	-	1	2
Thailand	-	-	-	-	-	-	9	-	-	-	-	9
Turkey	1	-	1	-	2	-	-	-	-	-	-	-
UAR	2	-	-	-	2	-	-	-	-	-	-	-
UK	15	-	17	3	35	9	-	48	-	-	6	63
USA	15	-	16	5	36	7	-	4	43	36	3	93
USSR	3	-	3	-	6	-	14	-	8	-	-	22
Venezuela	1	-	-	-	1	-	-	-	-	-	-	-
Yugoslavia	1	-	3	-	4	-	-	-	1	-	4	5
Sub-total	106	-	111	13	230	30	146	96	145	36	35	488
CERN, Geneva						-	-	1	-	-	-	1
IAEA, Austria						1	-	9	-	32	6	48
IAEA, Monaco Laboratory						1	-	-	-	-	1	2
IAEA, Trieste Centre						-	-	8	-	-	-	8
Joint Institute for Nuclear Research, Dubna, USSR						-	-	-	1	-	-	1
NPY/NORA Reactor Physics Project						-	-	3	-	-	-	3
Pan-American Training Course on Metallurgy, Buenos Aires						-	-	1	-	-	-	1
Uppsala International Seminar, Sweden						-	-	4	-	-	-	4
Sub-total						2	-	26	1	32	7	68
Total	106	-	111	13	230	32	146	122	146	68	42	556[a]

a/ The difference between the number of awards (484) and the number of places of study (556) is due to the fact that six fellows each studied in two different countries (two UNDP(TA) country awards, three Type I awards and one Type II award); the 14 study tour participants visited three countries (UNDP(TA) regional awards); the 15 participants in the demonstration project in the region of Asia and the Far East visited 24 countries (UNDP(TA) regional awards), and the 13 holders of scientific visit awards went to 42 places of study.

B. DISTRIBUTION OF TECHNICAL ASSISTANCE

Table 4

Types of technical assistance: 1960-1969[a]

(in thousands of dollars)

YEAR Type of resource	Experts		Visiting professors		Equipment		Fellowships		Research fellowships		Short-term training projects		Mobile radioisotope laboratory		TOTAL		Assistance outstanding: Unliquidated obligations	Assistance outstanding: In kind balance[b]	TOTAL (8)+(9)+(10)
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		at 31 December 1969 (9)	(10)	(11)
	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	$	$
1960-1965																			
EPTA	1710.8	41.8	-	-	769.5	18.8	935.1	22.9	-	-	670.9	16.4	2.2	0.1	4 088.5	100.0	-	-	4 088.5
Agency monetary[b]	1739.8	28.4	559.3	9.1	939.8	15.3	2299.3	37.5	116.4	1.9	369.9	6.0	111.5	1.8	6 136.0	100.0	19.2	-	6 155.2
Assistance in kind[b]	112.5	3.2	-	-	466.2	13.0	2977.8	83.4	-	-	2.1	0.0	12.8	0.4	3 571.4	100.0	-	16.9	3 588.3
TOTAL	3563.1	25.8	559.3	4.1	2175.5	15.8	6212.2	45.0	116.4	0.8	1042.9	7.6	126.5	0.9	13 795.9	100.0	19.2	16.9	13 832.0
1966																			
UNDP(TA)	354.0	42.7	-	-	195.8	23.6	97.1	11.7	-	-	181.8	22.0	-	-	828.7	100.0	-	-	828.7
Agency monetary[b]	359.0	36.0	106.4	10.7	115.9	11.6	279.1	28.0	23.4	2.4	112.6	11.3	0.2	0.0	996.6	100.0	17.2	-	1 013.8
Assistance in kind[b]	9.9	1.7	-	-	36.7	6.3	529.0	90.4	-	-	9.5	1.6	-	-	585.1	100.0	-	1.1	586.2
TOTAL	722.9	30.0	106.4	4.4	348.4	14.5	905.2	37.5	23.4	1.0	303.9	12.6	0.2	0.0	2 410.4	100.0	17.2	1.1	2 428.7
1967																			
UNDP(TA)	337.0	42.0	-	-	174.5	21.8	123.2	15.4	-	-	166.8	20.8	-	-	801.5	100.0	-	-	801.5
Agency monetary[b]	345.4	34.7	90.4	9.1	220.4	22.2	232.5	23.4	19.3	1.9	86.6	8.7	-	-	994.6	100.0	102.4	-	1 097.0
Assistance in kind[b]	1.6	0.3	-	-	75.1	13.3	483.2	85.8	-	-	3.3	0.6	-	-	563.2	100.0	-	14.2	577.4
TOTAL	684.0	29.0	90.4	3.8	470.0	19.9	838.9	35.6	19.3	0.8	256.7	10.9	-	-	2 359.3	100.0	102.4	14.2	2 475.9
1968																			
UNDP(TA)	378.9	42.8	-	-	224.2	25.3	96.8	11.0	-	-	184.9	20.9	-	-	884.8	100.0	156.9	-	1 041.7
Agency monetary[b]	304.4	31.9	34.0	3.6	209.6	22.9	308.8	32.4	14.1	1.5	82.1	8.6	-	-	953.0	100.0	183.7	-	1 136.7
Assistance in kind[b]	0.6	0.1	-	-	80.4	13.9	485.4	84.1	-	-	10.8	1.9	-	-	577.2	100.0	-	102.7	679.9
TOTAL	683.9	28.3	34.0	1.4	514.2	21.3	891.0	36.9	14.1	0.6	277.8	11.5	-	-	2 415.0	100.0	340.6	102.7	2 858.3
1969																			
UNDP(TA)	579.2	46.8	-	-	296.7	24.0	132.0	10.6	-	-	230.0	18.6	-	-	1 237.9	100.0	245.6	-	1 483.5
Agency monetary[b]	578.9[c]	36.7	121.9	7.7	452.8	28.7	336.9	21.3	19.9	1.3	67.3	4.3	-	-	1 577.7	100.0	516.3	-	2 094.0
Assistance in kind[b]	4.3	0.7	-	-	82.0	13.8	497.5	83.8	-	-	10.1	1.7	-	-	593.9	100.0	-	491.4	1 085.3
TOTAL	1162.4	34.1	121.9	3.6	831.5	24.4	966.4	28.3	19.9	0.6	307.4	9.0	-	-	3 409.5	100.0	761.9	491.4	4 662.8
1960-1969																			
EPTA-UNDP(TA)	3359.9	42.8	-	-	1660.7	21.2	1384.2	17.7	-	-	1434.4	18.3	2.2	-	7 841.4	100.0	402.5	-	8 243.9
Agency monetary[b]	3327.5	31.2	912.0	8.6	1938.5	18.2	3456.6	32.4	193.1	1.8	718.5	6.7	111.7	1.1	10 657.9	100.0	838.8	-	11 496.7
Assistance in kind[b]	128.9	2.2	-	-	740.4	12.6	4972.9	84.4	-	-	35.8	0.6	12.8	0.2	5 890.8	100.0	-	626.3	6 517.1
TOTAL	6816.3	28.0	912.0	3.7	4339.6	17.8	9813.7	40.2	193.1	0.8	2188.7	9.0	126.7	0.5	24 390.1	100.0	1241.3	626.3	26 257.7

a/ Data as at 31 December 1969.
b/ Estimated; see Introductory Notes, paras 4 and 5, to this Annex.
c/ The 1969 figures for "Experts" include miscellaneous and bank charges amounting to $5300 under "Agency monetary".

Table 5

Fields of activity of technical assistance: 1969

Field	Number of expert assignments	Cost of equipment (in thousands of dollars)	Number of fellowship awards[a/]
General atomic energy development	25	9.1	49
Nuclear physics	28	95.7	63
Nuclear chemistry	21	110.1	35
Prospecting, mining and processing of nuclear materials	6	33.4	27
Nuclear engineering and technology	33	39.3	87
Application of isotopes and radiation in agriculture	54	280.5	97
Application of isotopes and radiation in medicine	17	66.6	34
Application of isotopes and radiation in biology	14	42.7	20
Other fields of application of isotopes and radiation	21	164.7	26
Safety in nuclear energy	19	40.7	46
TOTAL	238[b/]	882.8	484

a/ These figures include 177 participants in 11 regional and inter-regional training projects and 13 holders of awards for scientific visits.

b/ The difference between the number of assignments by field of activity (238) and by recipient country (236; see Fig. 2.B) is due to the fact that each of two experts served in two different fields of activity in the same country.

Table 6

Recipients of experts and fellowship awards: 1969

RECIPIENT	Number of experts classified by place of assignment										Number of fellowship awards classified by nationality of recipient							
	UNDP(TA)				Agency				Total		UNDP(TA)		Agency				Total	
	Paid		Free		Paid		Free						Type I		Type II			
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Country programmes																		
Albania	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	12	2	12
Algeria	-	-	-	-	1	1	-	-	1	1	-	-	2	24	-	-	2	24
Argentina	2	3	-	-	5	11	1	1	8	15	1	6	6	61	4	40	11	107
Bolivia	1	1	-	-	2	5	-	-	3	6	-	-	2	17	1	12	3	29
Brazil	1	12	-	-	3	11	-	-	4	23	3	36	3	27	7	11	13	134
Bulgaria	-	-	-	-	1	1	-	-	1	1	2	6	6	47	6	65	14	118
Burma	3	25	-	-	2	12	-	-	5	37	-	-	-	-	1	12	1	12
Cambodia	1	11	-	-	1	1	-	-	2	12	-	-	-	-	-	-	-	-
Cameroon	1	12	-	-	-	-	-	-	1	12	-	-	-	-	-	-	-	-
Ceylon	-	-	-	-	1	2	-	-	1	2	1	12	2	18	-	-	3	30
Chile	1	1	-	-	2	8	-	-	3	9	-	-	3	32	-	-	3	32
China	3	5	-	-	2	15	-	-	5	20	2	16	3	25	5	51	10	92
Colombia	2	17	-	-	-	-	-	-	2	17	-	-	-	-	1	12	1	12
Congo, D. R.	-	-	-	-	1	4	-	-	1	4	-	-	1	12	-	-	1	12
Cuba	-	-	-	-	1	4	-	-	1	4	-	-	2	4	1	2	3	6
Cyprus	-	-	-	-	-	-	-	-	-	-	-	-	3	8	-	2[a/]	3	10
CSSR	-	-	-	-	-	-	-	-	-	-	2	4	4	44	7	50	13	98
Ecuador	1	8	-	-	1	7	-	-	2	15	-	-	-	-	3	30	3	30
El Salvador	-	-	-	-	1	3	-	-	1	3	-	-	-	-	1	12	1	12
Ethiopia	-	-	-	-	-	-	-	-	-	-	-	-	2	16	-	-	2	16
Ghana	1	12	-	-	-	-	-	-	1	12	-	-	5	32	-	-	5	32
Greece	7	22	-	-	5	7	-	-	12	29	-	-	5	49	6	44	11	93
Guatemala	1	6	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-
Hungary	3	5	-	-	4	14	-	-	7	19	-	-	6	42	5	40	11	82
Iceland	-	-	-	-	1	4	-	-	1	4	-	-	1	12	-	-	1	12
India	1	6	-	-	4	7	-	-	5	13	-	-	4	44	6	55	10	99
Indonesia	1	7	-	-	5	27	-	-	6	34	-	-	1	2	8	75	9	77
Iran	2	14	-	-	3	10	-	-	5	24	-	-	2	17	3	32	5	49
Iraq	4	32	-	-	2	13	-	-	6	45	2	12	4	43	7	83	13	138
Israel	1	2	-	-	3	5	-	-	4	7	-	-	1	2	-	-	1	2
Jamaica	1	1	-	-	-	-	-	-	1	1	-	-	1	12	-	-	1	12
Jordan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	10	1	10
Kenya	1	5	-	-	1	1	-	-	2	6	-	-	1	4	1	3	2	7
Korea, R.	-	-	-	-	3	18	-	-	3	18	-	-	4	46	6	63	10	109
Lebanon	-	-	-	-	2	12	-	-	2	12	-	-	3	9	-	-	3	9
Mexico	5	12	-	-	4	20	-	-	9	32	-	-	-	-	1	10	1	10
Morocco	1	1	-	-	2	12	-	-	3	13	-	-	1	12	-	-	1	12
Nicaragua	-	-	-	-	1	6	-	-	1	6	-	-	-	-	-	-	-	-
Nigeria	1	11	-	-	2	6	-	-	3	17	-	-	-	-	-	-	-	-
Pakistan	1	1	-	-	1	10	-	-	2	11	-	-	3	29	6	62	9	91
Panama	-	-	-	-	-	-	-	-	-	-	-	-	1	12	-	-	1	12
Peru	1	6	-	-	2	8	-	-	3	14	1	12	1	1	1	10	3	23
Philippines	3	11	-	-	3	13	-	-	6	24	-	-	3	34	8	90	11	124
Poland	2	2	-	-	-	-	-	-	2	2	2	6	5	49	7	66	14	121
Romania	-	-	-	-	1	3	-	-	1	3	7	21	6	55	6	52	19	128

RECIPIENT	Number of experts classified by place of assignment										Number of fellowship awards classified by nationality of recipient							
	UNDP(TA)				Agency				Total		UNDP(TA)		Agency				Total	
	Paid		Free		Paid		Free						Type I		Type II			
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Senegal	-	-	-	-	2	3	-	-	2	3	-	-	-	-	-	-	-	-
Sierra Leone	1	3	-	-	1	9	-	-	2	12	-	-	-	-	-	-	-	-
Singapore	-	-	-	-	2	5	-	-	2	5	-	-	-	-	-	-	-	-
Sudan	1	9	-	-	1	1	-	-	2	10	-	-	3	30	-	-	3	30
Syria	1	1	-	-	-	-	-	-	1	1	-	-	-	-	3	36	3	36
Thailand	2	15	-	-	3	15	-	-	5	30	3	24	4	36	5	58	12	118
Tunisia	1	12	-	-	1	4	-	-	2	16	-	-	3	36	-	-	3	36
Turkey	2	24	-	-	7	18	-	-	9	42	3	29	2	16	3	34	8	79
Uganda	1	12	-	-	1	10	-	-	2	22	-	-	1	7	-	-	1	7
UAR	2	9	-	-	2	13	-	-	4	22	-	-	4	39	9	100	13	139
Uruguay	1	5	-	-	3	14	-	-	4	19	-	-	-	-	4	33	4	33
Venezuela	-	-	-	-	2	18	-	-	2	18	-	-	-	-	3	32	3	32
Viet-Nam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	18	2	18
Yugoslavia	4	4	-	-	1	1	-	-	5	5	1	6	4	36	6	58	11	100
Zambia	-	-	-	-	1	2	-	-	1	2	-	-	-	-	-	-	-	-
Sub-total	69	345	-	-	100	394	1	1	170	740	30	190	118	1041	146	1435	294	2666
International projects																		
Africa	2	2	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-
Americas	2	13	-	-	-	-	-	-	2	13	-	-	-	-	-	-	-	-
Asia and the Far East	1	1	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-
Short-term training projects	37	23	-	-	12	3	12	1	61	27	109	136	68	67	-	-	177	203
Scientific visits	-	-	-	-	-	-	-	-	-	-	-	-	13	18	-	-	13	18
Sub-total	42	39	-	-	12	3	12	1	66	43	109	136	81	85	-	-	190	221
GRAND TOTAL	111	384	-	-	112	397	13	2	236[b/]	783	139	326	199	1126	146	1435	484	2887

(1) Number.

(2) Number of man-months.

a/ One 4-month award was financed from two sources (2 months under Type I and 2 months under Type II fellowships): the award is shown under "Type I".

b/ The difference between the number of assignments (236) and the actual number of experts (230) is due to the fact that each of six experts served in two countries.

Table 7

Financial summary: 1969

(in thousands of dollars)

RECIPIENT	Assistance provided									Assistance outstanding		TOTAL (8) + (9) + (10)
	By type				By source					Unliquidated obligations	In kind balance[a]	
					UNDP(TA)		Agency					
	Experts	Equipment	Fellowships	TOTAL	Monetary	In kind[a]	Monetary	In kind[a]	TOTAL	at 31 December 1969		
	(1)	(2)	(3)	(4)	(5a)	(5b)	(6)	(7)	(8)	(9)	(10)	(11)
Country programmes												
Afghanistan	-	0.5	1.7	2.2	-	-	0.5	1.7	2.2	-	1.4	3.6
Albania	-	-	4.5	4.5	-	-	-	4.5	4.5	-	1.0	5.5
Algeria	0.7	-	4.5	5.2	-	-	5.2	-	5.2	4.7	-	9.9
Argentina	29.7	27.9	40.7	98.3	24.1	-	56.7	17.5	98.3	43.5	12.7	154.5
Austria	-	-	3.9	3.9	-	-	3.9	-	3.9	-	-	3.9
Bolivia	10.2	29.2	12.1	51.5	22.3	-	20.6	8.6	51.5	12.8	2.2	66.5
Brazil	34.2	45.0	48.0	127.2	43.3	-	22.1	61.8	127.2	32.7	21.6	181.5
Bulgaria	0.2	10.5	24.6	35.3	5.5	-	21.7	8.1	35.3	50.9	25.0	111.2
Burma	54.8	18.8	10.9	84.5	48.6	-	33.9	2.0	84.5	40.9	7.4	132.8
Cambodia	24.1	1.0	-	25.1	24.5	-	0.6	-	25.1	6.5	-	31.6
Cameroon	18.3	-	-	18.3	18.3	-	-	-	18.3	1.3	-	19.6
Ceylon	3.8	7.7	2.6	14.1	1.8	-	12.3	-	14.1	31.8	-	45.9
Chile	23.6	19.5	24.5	67.6	32.8	-	30.0	4.8	67.6	35.3	11.7	114.6
China	33.5	2.0	41.1	76.6	15.2	-	32.6	28.8	76.6	31.4	21.9	129.9
Colombia	29.7	12.3	12.9	54.9	42.0	-	-	12.9	54.9	1.1	35.0	91.0
Congo, D.R.	6.4	6.4	5.5	18.3	-	-	9.5	8.8	18.3	9.0	2.1	29.4
Cuba	9.1	1.4	1.2	11.7	-	-	11.0	0.7	11.7	6.5	-	18.2
Cyprus	-	16.0	3.4	19.4	10.7	-	8.0	0.7	19.4	1.4	0.4	21.2
CSSR	-	-	18.6	18.6	-	-	6.4	12.2	18.6	12.0	10.5	41.1
Ecuador	26.6	6.4	3.8	36.8	14.2	-	18.8	3.8	36.8	3.9	12.2	52.9
El Salvador	4.4	-	-	4.4	-	-	4.4	-	4.4	0.1	15.4	19.9
Ethiopia	-	-	4.9	4.9	-	-	4.9	-	4.9	5.7	6.9	17.5
Ghana	16.2	1.0	7.3	24.5	15.8	-	7.5	1.2	24.5	35.6	-	60.1
Greece	49.8	11.4	28.1	89.3	39.9	-	35.4	14.0	89.3	30.1	22.3	141.7
Guatemala	11.1	19.3	1.6	32.0	18.6	-	11.9	1.5	32.0	3.2	-	35.2
Hungary	24.9	41.0	30.0	95.9	29.5	-	50.5	15.9	95.9	28.2	11.7	135.8
Iceland	6.0	-	1.9	7.9	-	-	7.9	-	7.9	5.3	-	13.2
India	21.7	50.1	80.6	152.4	48.3	-	56.8	47.3	152.4	23.1	25.7	201.2
Indonesia	69.2	36.4	42.8	148.4	46.1	-	71.4	30.9	148.4	50.9	23.7	223.0
Iran	51.5	16.3	13.3	81.1	30.6	-	41.2	9.3	81.1	5.9	13.1	100.1
Iraq	65.0	45.6	35.4	146.0	60.6	-	63.1	22.3	146.0	46.0	34.4	226.4
Israel	13.5	39.6	2.6	55.7	3.8	-	51.9	-	55.7	11.1	-	66.8
Jamaica	1.2	9.2	-	10.4	10.4	-	-	-	10.4	6.6	12.2	29.2
Jordan	0.3	-	0.9	1.2	0.3	-	0.9	-	1.2	-	6.0	7.2
Kenya	12.6	3.1	5.8	21.5	13.1	-	7.4	1.0	21.5	-	-	21.5
Korea, R.	28.2	8.9	51.2	88.3	(0.1)	-	49.8	38.6	88.3	15.7	37.3	141.3
Lebanon	20.2	16.9	7.9	45.0	-	-	45.0	-	45.0	9.2	-	54.2
Madagascar	-	7.7	-	7.7	-	-	7.7	-	7.7	15.2	-	22.9
Mexico	54.3	30.0	9.2	93.5	47.3	-	39.5	6.7	93.5	47.6	5.5	146.6
Morocco	19.4	8.3	3.3	31.0	1.7	-	29.3	-	31.0	10.6	-	41.6
Nicaragua	12.6	6.8	-	19.4	-	-	19.4	-	19.4	3.8	-	23.2
Nigeria	27.1	9.1	4.2	40.4	16.2	-	19.7	4.5	40.4	18.0	12.0	70.4
Pakistan	25.5	17.8	43.3	86.6	6.2	-	53.2	27.2	86.6	42.7	32.1	161.4
Panama	-	-	-	-	-	-	-	-	-	3.4	-	3.4
Paraguay	-	-	1.7	1.7	-	-	-	1.7	1.7	-	-	1.7
Peru	24.7	13.3	2.4	40.4	18.8	-	21.6	-	40.4	24.7	2.5	67.6
Philippines	39.8	8.0	57.5	105.3	25.6	-	48.1	31.6	105.3	24.4	38.8	168.5
Poland	2.7	26.6	33.2	62.5	7.5	-	43.2	11.8	62.5	17.4	25.2	105.1
Romania	5.7	12.6	30.9	49.2	2.1	-	36.3	10.8	49.2	27.1	12.7	89.0
Saudi Arabia	-	-	4.7	4.7	-	-	-	4.7	4.7	-	-	4.7
Senegal	6.8	7.4	0.8	15.0	-	-	15.0	-	15.0	8.0	-	23.0
Sierra Leone	17.4	-	-	17.4	4.5	-	12.9	-	17.4	4.8	-	22.2
Singapore	9.3	13.4	-	22.8	-	-	22.8	-	22.8	2.4	-	25.2
Spain	-	-	4.4	4.4	-	-	-	4.4	4.4	-	-	4.4
Sudan	15.3	3.6	6.7	25.6	11.8	-	13.8	-	25.6	7.4	-	33.0

RECIPIENT	Assistance provided									Assistance outstanding		TOTAL (8) + (9) + (10)
	By type				By source					Unliquidated obligations	In kind balance[a]	
					UNDP(TA)		Agency					
	Experts	Equipment	Fellowships	TOTAL	Monetary	In kind[a]	Monetary	In kind[a]	TOTAL	at 31 December 1969		
	(1)	(2)	(3)	(4)	(5a)	(5b)	(6)	(7)	(8)	(9)	(10)	(11)
Syria	1.2	4.6	3.0	9.0	9.0	-	-	-	9.0	3.9	10.4	23.3
Thailand	58.8	26.7	66.3	151.8	51.3	-	55.4	45.1	151.8	49.2	21.7	222.7
Tunisia	34.2	15.2	19.4	68.8	24.1	-	44.1	0.6	68.8	34.2	4.2	107.2
Turkey	64.3	17.2	40.2	121.7	43.0	-	46.9	31.8	121.7	48.1	10.4	180.2
Uganda	40.2	6.7	-	46.9	31.0	-	15.9	-	46.9	4.4	-	51.3
UAR	35.4	15.0	22.8	73.2	16.2	-	38.8	18.2	73.2	63.5	35.2	171.9
Uruguay	33.1	20.7	4.5	58.3	21.9	-	31.9	4.5	58.3	25.5	7.9	91.7
Venezuela	32.4	-	12.2	44.6	-	-	40.4	4.2	44.6	13.0	11.3	68.9
Viet-Nam	-	6.8	10.1	16.9	-	-	4.4	12.5	16.9	1.1	4.1	22.1
Yugoslavia	12.8	39.0	26.7	78.5	49.5	-	24.4	4.6	78.5	45.8	18.5	142.8
Zambia	5.3	11.3	-	16.6	-	-	16.6	-	16.6	27.4	-	44.0
Sub-total	1279.0	831.5	986.3	3096.8	1007.9	-	1505.1	583.8	3096.8	1176.0	626.3	4899.1
International projects												
Africa	0.6	8.6	-	9.4	9.4	-	-	-	9.4	4.4	-	13.8
Americas	41.5	6.1	11.8	59.4	58.9	0.5	-	-	59.4	20.5	-	79.9
Asia and the Far East	12.7	5.9	10.2	28.8	28.8	-	-	-	28.8	3.9	-	32.7
Inter-regional projects	37.7	30.5	106.6	174.8	132.9	3.1	32.3	6.5	174.8	36.5	-	211.3
Trieste Centre	-	-	35.0	35.0	-	-	35.0	-	35.0	-	-	35.0
Sub-total	92.5	51.3	163.6	307.4	230.0	3.6	67.3	6.5	307.4	65.3	-	372.7
Miscellaneous												
Bank charges	5.3	-	-	5.3	-	-	5.3	-	5.3	-	-	5.3
GRAND TOTAL	1376.8	882.8	1149.9	3409.5	1237.9	3.6	1577.7	590.3	3409.5	1241.3	626.3	5277.1

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

Table 8

Financial summary: 1958-1969

(in thousands of dollars)

RECIPIENT	Assistance provided									Assistance outstanding		TOTAL (8) + (9) + (10)
	By type				By source					Unliquidated obligations	In kind balance[a]	
					UNDP(TA)		Agency					
	Experts	Equipment	Fellowships	TOTAL	Monetary	In kind[a]	Monetary	In kind[a]	TOTAL	at 31 December 1969		
	(1)	(2)	(3)	(4)	(5a)	(5b)	(6)	(7)	(8)	(9)	(10)	(11)
Country programmes												
Afghanistan	74.9	78.6	54.8	208.3	70.1	-	86.5	51.7	208.3	-	1.4	209.7
Albania	-	-	12.3	12.3	-	-	-	12.3	12.3	-	1.0	13.3
Algeria	11.0	-	12.4	23.4	10.3	-	6.1	7.0	23.4	4.7	-	28.1
Argentina	445.3	297.5	415.9	1 158.7	420.9	0.6	459.5	277.7	1 158.7	43.5	12.7	1 214.9
Austria	62.0	13.8	109.7	185.5	-	-	126.0	59.5	185.5	-	-	185.5
Bolivia	80.3	65.9	44.1	190.3	46.8	-	119.1	24.4	190.3	12.8	2.2	205.3
Brazil	480.9	270.7	319.1	1 070.7	433.3	-	446.5	190.9	1 070.7	32.7	21.6	1 125.0
Bulgaria	4.2	26.1	206.1	236.4	6.0	-	163.6	66.8	236.4	50.9	25.0	312.3
Burma	263.2	138.9	86.3	488.4	347.7	-	86.4	54.3	488.4	40.9	7.4	536.7
Cambodia	69.4	29.3	1.7	100.4	24.5	-	68.6	7.3	100.4	6.5	-	106.9
Cameroon	18.9	1.6	-	20.5	20.5	-	-	-	20.5	1.3	-	21.8
Ceylon	173.7	81.1	28.9	283.7	99.7	-	147.1	36.9	283.7	31.8	-	315.5
Chile	176.9	119.4	128.6	424.9	144.6	-	186.8	93.5	424.9	35.3	11.7	471.9
China	205.9	93.1	432.9	731.9	219.4	-	210.8	301.7	731.9	31.4	21.9	785.2
Colombia	146.5	66.6	117.6	330.7	129.6	-	92.2	108.9	330.7	1.1	35.0	366.8
Congo, D.R.	41.5	39.7	19.3	100.5	9.6	-	70.1	20.8	100.5	9.0	2.1	111.6
Costa Rica	5.6	10.7	-	16.3	-	-	5.6	10.7	16.3	-	-	16.3
Cuba	27.9	6.8	8.0	42.7	-	-	39.8	2.9	42.7	6.5	-	49.2
Cyprus	2.4	16.0	3.4	21.8	10.7	-	10.4	0.7	21.8	1.4	0.4	23.6
CSSR	-	-	231.3	231.3	-	-	152.7	78.6	231.3	12.0	10.5	253.8
Denmark	12.9	-	31.3	44.2	-	-	31.2	13.0	44.2	-	-	44.2
Ecuador	44.8	32.3	62.2	139.3	35.5	-	64.9	38.9	139.3	3.9	12.2	155.4
El Salvador	31.7	6.0	6.5	44.2	14.1	-	20.7	9.4	44.2	0.1	15.4	59.7
Ethiopia	9.7	8.7	6.2	24.6	-	-	24.6	-	24.6	5.7	6.9	37.2
Finland	0.5	-	39.4	39.9	1.8	-	7.2	30.9	39.9	-	-	39.9
France	-	-	15.9	15.9	-	-	2.4	13.5	15.9	-	-	15.9
Germany, F.R.	-	1.6	1.4	3.0	-	-	3.0	-	3.0	-	-	3.0
Ghana	193.4	48.3	71.9	313.6	92.2	-	187.0	34.4	313.6	35.6	-	349.2
Greece	471.1	64.4	249.6	785.1	299.2	-	311.8	174.1	785.1	30.1	22.3	837.5
Guatemala	25.0	47.2	27.5	99.7	48.1	-	34.2	17.4	99.7	3.2	-	102.9
Hong Kong	20.0	20.6	-	40.6	-	-	40.6	-	40.6	-	-	40.6
Hungary	27.8	83.4	290.1	401.3	54.7	-	265.3	81.3	401.3	28.2	11.7	441.2
Iceland	25.7	62.8	15.8	104.3	-	-	51.9	52.4	104.3	5.3	-	109.6
India	37.4	101.0	575.6	714.0	173.8	-	188.2	352.0	714.0	23.1	25.7	762.8
Indonesia	262.2	102.7	517.8	882.7	206.3	-	298.9	377.5	882.7	50.9	23.7	957.3
Iran	403.0	37.8	309.4	750.2	311.8	0.5	256.8	181.1	750.2	5.9	13.1	769.2
Iraq	208.0	68.5	231.3	507.8	156.0	-	216.1	135.7	507.8	46.0	34.4	588.2
Israel	152.4	174.0	99.5	425.9	112.9	-	227.4	85.6	425.9	11.1	-	437.0
Italy	9.0	-	160.1	169.1	-	-	95.6	73.5	169.1	-	-	169.1
Ivory Coast	6.0	4.3	2.9	13.2	10.3	-	2.9	-	13.2	-	-	13.2
Jamaica	7.5	9.2	-	16.7	10.4	-	6.3	-	16.7	6.6	12.2	35.5
Japan	50.1	-	322.3	372.4	49.8	-	129.4	193.2	372.4	-	-	372.4
Jordan	28.1	-	12.4	40.5	39.6	-	0.9	-	40.5	-	6.0	46.5
Kenya	26.4	53.0	7.9	87.3	27.5	-	58.8	1.0	87.3	-	-	87.3
Korea, R.	203.8	74.1	549.6	827.5	115.0	-	363.7	348.8	827.5	15.7	37.3	880.5
Lebanon	50.4	26.4	22.8	99.6	-	-	92.6	7.0	99.6	9.2	-	108.8
Madagascar	-	7.7	1.9	9.6	-	-	9.6	-	9.6	15.2	-	24.8
Mali	2.1	-	-	2.1	2.1	-	-	-	2.1	-	-	2.1
Mexico	318.0	148.1	174.8	640.9	234.1	-	283.5	123.3	640.9	47.6	5.5	694.0
Monaco	-	-	4.2	4.2	-	-	4.2	-	4.2	-	-	4.2
Morocco	78.7	57.4	43.6	179.7	43.7	-	112.3	23.7	179.7	10.6	-	190.3
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	12.6	7.1	20.1	39.8	-	-	39.8	-	39.8	3.8	-	43.6
Nigeria	35.3	32.7	29.8	97.8	24.1	-	36.4	37.3	97.8	18.0	12.0	127.8
Norway	-	-	9.6	9.6	-	-	5.3	4.3	9.6	-	-	9.6
Pakistan	336.5	200.7	359.2	896.4	263.4	-	403.5	229.5	896.4	42.7	32.1	971.2
Panama	4.1	-	-	4.1	4.1	-	-	-	4.1	3.4	-	7.5
Paraguay	10.3	4.6	32.1	47.0	-	-	31.3	15.7	47.0	-	-	47.0
Peru	94.4	45.3	37.4	177.1	75.1	-	79.8	22.2	177.1	24.7	2.5	204.3

RECIPIENT	Assistance provided									Assistance outstanding		TOTAL (8) + (9) + (10)
	By type				By source					Unliquidated obligations	In kind balance[a]	
					UNDP(TA)		Agency			at 31 December 1969		
	Experts	Equipment	Fellowships	TOTAL	Monetary	In kind[a]	Monetary	In kind[a]	TOTAL			
	(1)	(2)	(3)	(4)	(5a)	(5b)	(6)	(7)	(8)	(9)	(10)	(11)
Philippines	264.7	247.6	523.2	1 035.5	360.4	8.9	335.7	330.5	1 035.5	24.4	38.8	1 098.7
Poland	3.5	125.8	478.6	607.9	142.9	-	324.9	140.1	607.9	17.4	25.2	650.5
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
Romania	22.3	59.3	189.9	271.5	29.1	-	171.1	71.3	271.5	27.1	12.7	311.3
Saudi Arabia	18.8	2.9	10.5	32.2	-	-	25.2	7.0	32.2	-	-	32.2
Senegal	77.6	63.4	10.6	151.6	53.2	0.8	97.6	-	151.6	8.0	-	159.6
Sierra Leone	23.3	-	-	23.3	4.5	-	18.8	-	23.3	4.8	-	28.1
Singapore	20.3	19.3	1.4	41.0	-	-	37.3	3.7	41.0	2.4	-	43.4
South Africa	-	-	107.8	107.8	-	-	42.1	65.7	107.8	-	-	107.8
Spain	-	-	54.1	54.1	-	-	31.0	23.1	54.1	-	-	54.1
ıdan	90.7	41.5	35.2	167.4	27.7	-	131.6	8.1	167.4	7.4	-	174.8
~weden	-	-	8.8	8.8	-	-	8.8	-	8.8	-	-	8.8
Switzerland	-	-	12.6	12.6	-	-	5.6	7.0	12.6	-	-	12.6
Syria	3.8	4.8	4.2	12.8	12.8	-	-	-	12.8	3.9	10.4	27.1
Thailand	484.3	143.0	555.3	1 182.6	387.2	-	483.5	311.9	1 182.6	49.2	21.7	1 253.5
Tunisia	176.9	82.1	136.8	395.8	135.7	-	228.4	31.7	395.8	34.2	4.2	434.2
Turkey	402.2	175.1	404.5	981.8	230.8	-	471.1	279.9	981.8	48.1	10.4	1 040.3
Uganda	66.2	43.8	5.3	115.3	77.4	-	37.9	-	115.3	4.4	-	119.7
UAR	220.3	192.9	472.0	885.2	204.0	0.8	367.2	313.2	885.2	63.5	35.2	983.9
USA	-	-	2.6	2.6	-	-	2.6	-	2.6	-	-	2.6
Uruguay	67.9	54.2	20.2	142.3	36.2	-	89.7	16.4	142.3	25.5	7.9	175.7
Venezuela	80.4	30.7	150.1	261.2	14.0	-	128.8	118.4	261.2	13.0	11.3	285.5
Viet-Nam	48.8	52.3	74.2	175.3	31.4	-	80.9	63.0	175.3	1.1	4.1	180.5
Yugoslavia	118.3	148.5	586.0	852.8	339.2	-	347.1	166.5	852.8	45.8	18.5	917.1
Zambia	5.3	11.3	-	16.6	-	-	16.6	-	16.6	27.4	-	44.0
Sub-total	7744.7	4447.9	10 518.7	22 711.3	6511.2	11.6	10 077.5	6111.0	22 711.3	1176.0	626.3	24 513.6
International projects												
Africa	30.7	29.5	9.5	69.7	69.7	-	-	-	69.7	4.4	-	74.1
Americas	165.2	61.1	63.3	289.6	272.8	8.6	6.6	1.6	289.6	20.5	-	310.1
Asia and the Far East	190.3	55.4	33.9	279.6	276.0	1.5	2.1	-	279.6	3.9	-	283.5
Europe	21.0	18.6	17.3	56.9	56.9	-	-	-	56.9	-	-	56.9
'dle East	5.8	1.2	5.3	12.3	12.3	-	-	-	12.3	-	-	12.3
~er-regional projects	308.5	186.4	776.3	1 271.2	746.7	3.7	500.4	20.4	1 271.2	36.5	-	1 307.7
Trieste Centre	-	-	210.0	210.0	-	-	210.0	-	210.0	-	-	210.0
Sub-total	721.5	352.2	1 115.6	2 189.3	1434.4	13.8	719.1	22.0	2 189.3	65.3	-	2 254.6
Miscellaneous												
Bank charges	59.3	-	-	59.3	22.1	-	37.2	-	59.3	-	-	59.3
Mobile laboratories storage	-	6.5	-	6.5	-	-	6.5	-	6.5	-	-	6.5
GRAND TOTAL	8525.5	4806.6	11 634.3	24 966.4	7967.7	25.4	10 840.3	6133.0	24 966.4	1241.3	626.3	26 834.0

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

ANNEX II

REGIONAL AND INTER-REGIONAL PROJECTS: 1969

A. UNDP(TA)

1. Visiting seminar on food irradiation

   Nine countries in South East Asia and the Far East
   6 January-7 February.

2. Training course on radiation microbiology

   Bombay, India, 7 April-16 May.

3. Training course on radioisotope production

   Warsaw, Poland, 5 May-20 June.

4. Study tour (seminar) on waste management techniques and programmes

   CSSR, Poland and USSR, 8 July-20 August.

5. Training course on planning for the handling of radiation accidents

   Teheran, Iran, 1-13 September.

6. Training course in uranium prospection

   Buenos Aires and Salta, Argentina, 8 September-31 October.

7. Training course on the application of isotope techniques in hydrology

   São Paulo, Brazil, 6 October-21 November.

8. Training course on the use of isotopes and radiation equipment in soil and plant nutrition studies

   Teheran, Iran, 3 November-19 December.

9. Research and demonstration project on the use of isotopes in animal parasitology

   Nairobi, Kenya.

10. Regional adviser on hospital physics

    Bogotá, Colombia.

11. Regional adviser on industrial applications of radioisotopes

    Latin America.

12. Demonstration project in the application of neutron diffraction (IPA project)

    Manila, Philippines.

13. Training and demonstration programme on advanced atomic energy technology

    Asia and the Far East.

B. AGENCY'S REGULAR PROGRAMME

1. Advanced training course on food irradiation technology and techniques
   Massachusetts, United States, 18 June-25 July.

2. Survey course on economic and technical aspects of nuclear power
   IAEA Headquarters, Vienna, Austria, 1-12 September.

3. Training course on the use of isotopes and radiation in entomology
   Florida, United States, 6 October-28 November.

C. FAO'S REGULAR PROGRAMME

1. Training course on the use of radiation and mutagen treatments for crop improvement
   Casaccia, Italy, 12 May-20 June.

ANNEX III

IAEA ISOTOPE HYDROLOGICAL SERVICES: UNDP(SF) SUB-CONTRACTS IN 1969[1]

Country or region and project number	Title	Cost of services provided
Afghanistan AFG-4	Ground-water investigations (United Nations)	$ 730
Algeria ALG-9	Natural resource surveys, agricultural experimentation and demonstration in the Hodna Region, Central Algeria (FAO)	3 720
Jamaica JAM-3	Ground-water survey in two areas of the interior (FAO)	470
Jordan JOR-9	Investigation of the sandstone aquifers of East Jordan (FAO)	4 180
Nicaragua NIC-8	Ground-water investigations in the Central Pacific coastal region (United Nations)	60
Niger NER-8	Surveys for the agricultural development of the Dallol Maouri (FAO)	1 020
Senegal SEN-9	Establishment of a master plan for water supply and sewerage for Dakar and surrounding areas (WHO/United Nations) [2]	5 020
Spain SPA-9	Hydrogeological investigations in the Guadalquivir River Basin (FAO)	290
Africa Regional REG-100	Survey of ground-water resources in the Northern Sahara (UNESCO)	1 800
		$17 290

[1] The organization for which the sub-contract was carried out is given following the project title.

[2] In this project the Agency assisted the United Nations, which is itself a sub-contractor to the executing agency, WHO.