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## COUNTRY PROGRAMME SUMMARY

THE AGENCY'S TECHNICAL CO-OPERATION  
PROGRAMME WITH  
GUATEMALA  
  
1982 - 1992  
  
COUNTRY PROGRAMME SUMMARIES

EVALUATION SECTION

DEPARTMENT OF TECHNICAL CO-OPERATION

**THE AGENCY'S TECHNICAL CO-OPERATION**

**PROGRAMME WITH**

**GUATEMALA**

**1982 - 1992**

**COUNTRY PROGRAMME SUMMARIES**

This report contains a review of the Agency's technical co-operation activities in Guatemala carried out during 1982 - 1992. In terms of coverage and analytical depth, country programme summaries stand somewhere midway between in-depth country programme evaluations and individual project evaluations. They attempt to provide a comprehensive, descriptive picture of the Agency's co-operation with a Member State in a manner that will be particularly useful for programming decisions. The attempt is very much to describe -- largely through statistical data -- not to provide independent analysis and evaluation.

IAEA-CPS-92/05

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**GUATEMALA**

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## INTRODUCTION

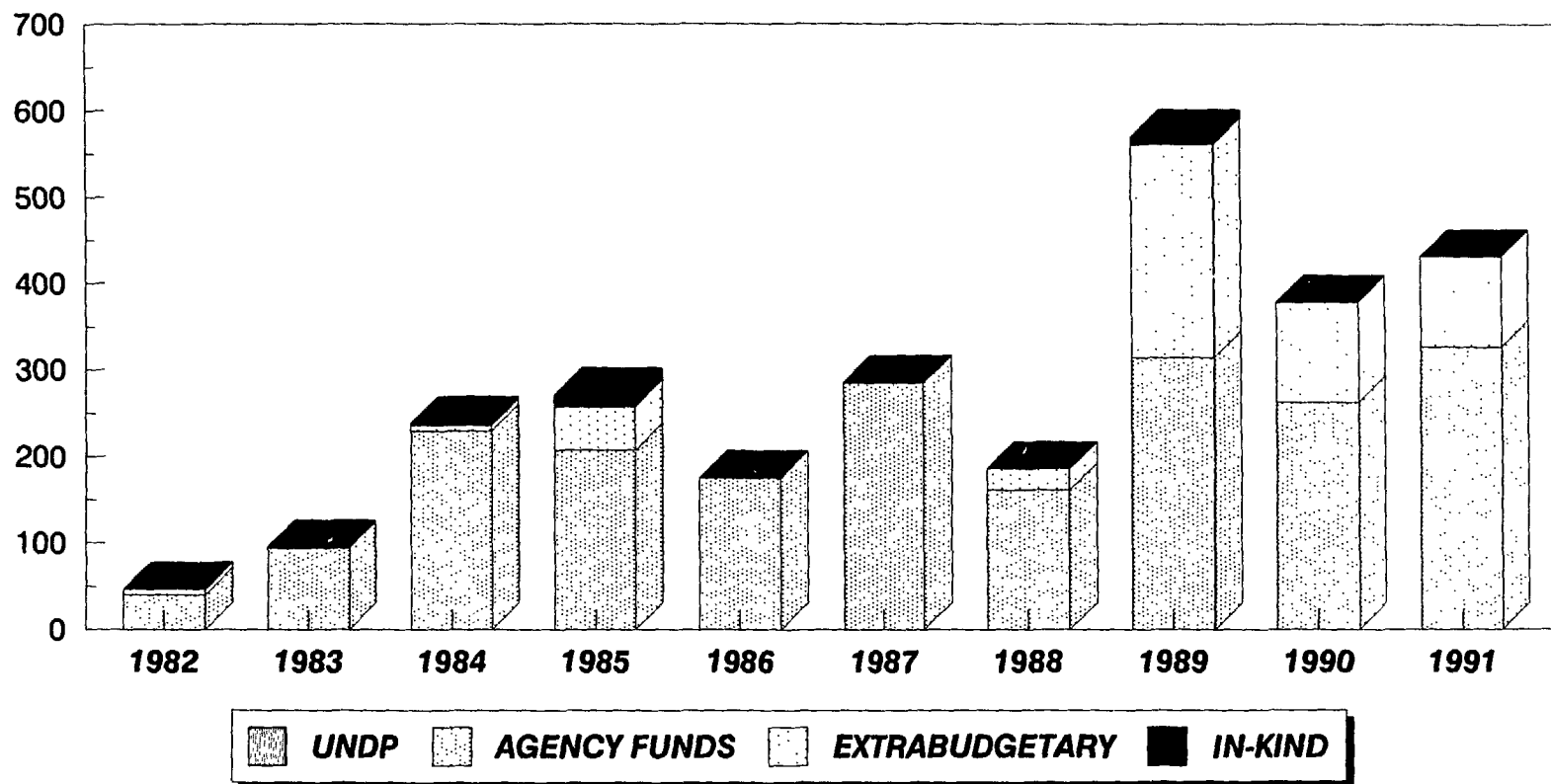
The country programme summary reported on here is one in the series of such studies being undertaken of the Agency's TC programme with Member States. With over \$3 million of Agency support received, Guatemala ranks 46<sup>th</sup> among all recipients of technical assistance in the period 1958 - 1991.

Almost three quarters of the assistance during the past ten years has been provided in the form of equipment (72%), followed by training (15%) and expert services (13%). Seventy-eight per cent of the resources were provided by the Technical Assistance and Co-operation Fund, the rest was made available through extrabudgetary contributions (21%) and assistance in kind (1%).

With regard to project disbursements by sector, the largest areas have been nuclear physics and chemistry (37%), agriculture (28%), nuclear medicine (16%) and hydrology (8%). The remaining 11% were shared by general atomic energy development, nuclear raw materials, nuclear engineering and technology, and nuclear safety.

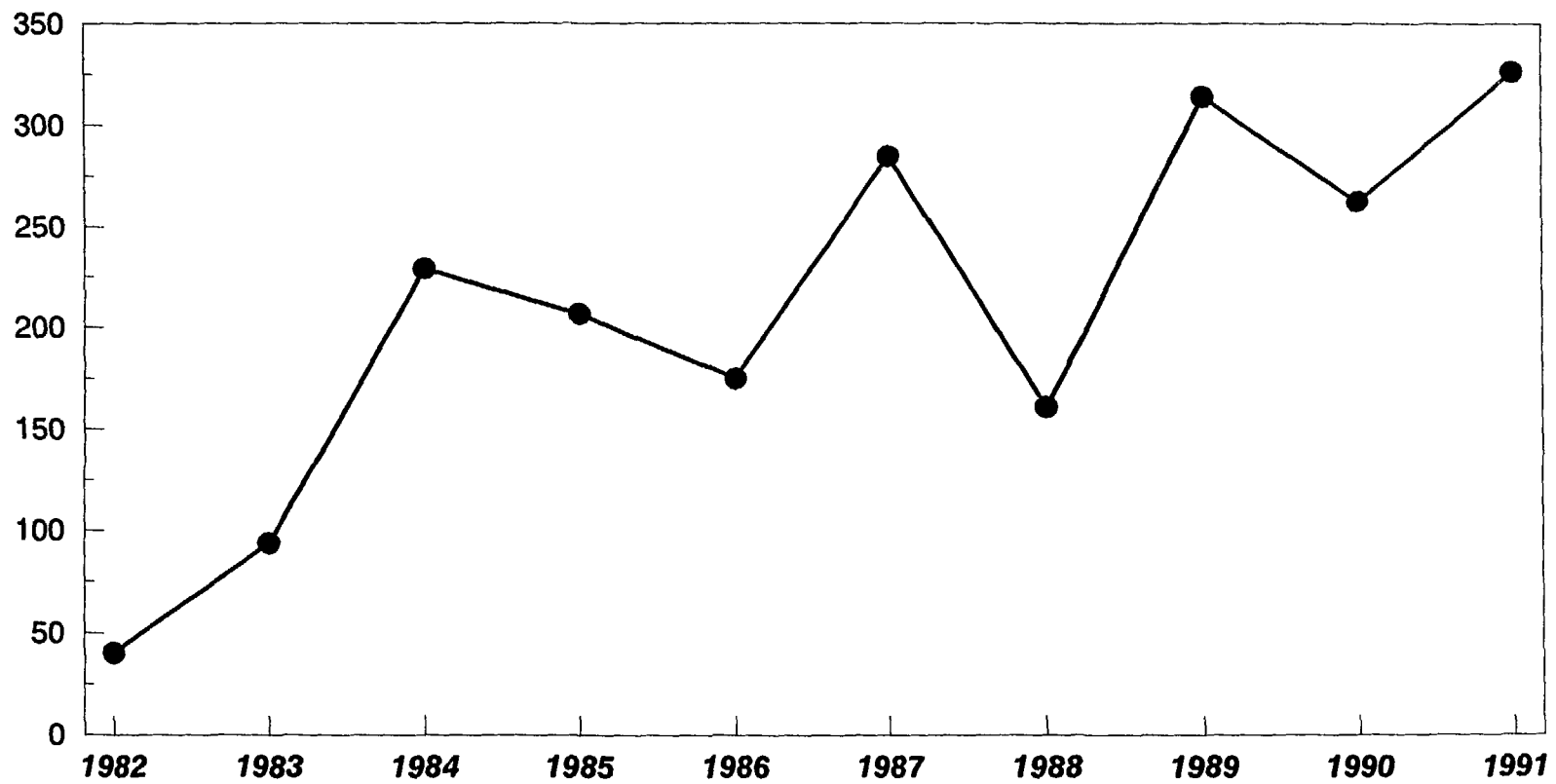
**ASSISTANCE PROVIDED BY THE AGENCY TO  
GUATEMALA, BY SOURCE, 1982 - 1991**

THOUSANDS OF DOLLARS



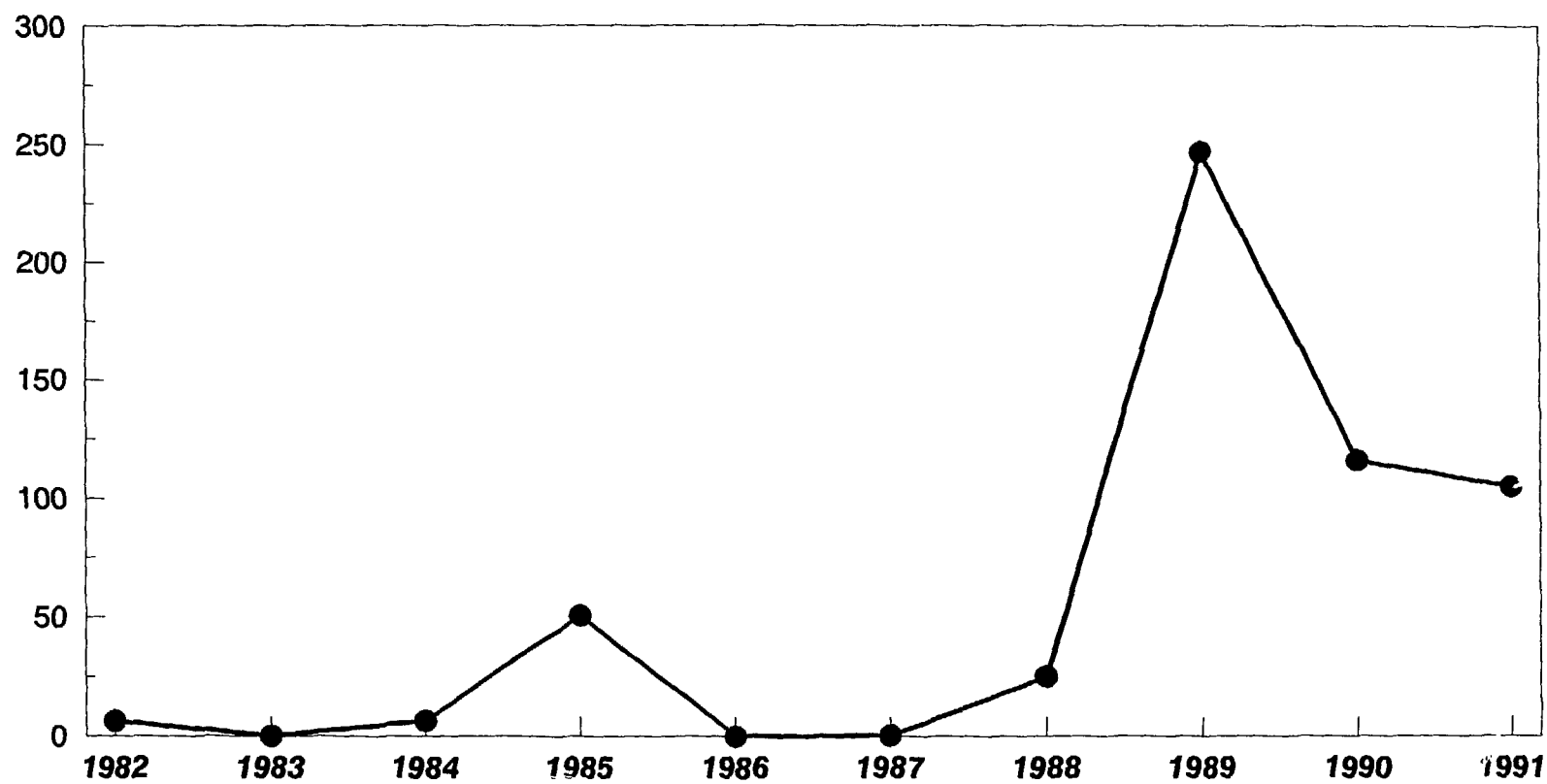
**TACF ASSISTANCE PROVIDED TO  
GUATEMALA, 1982 - 1991**

THOUSANDS OF DOLLARS

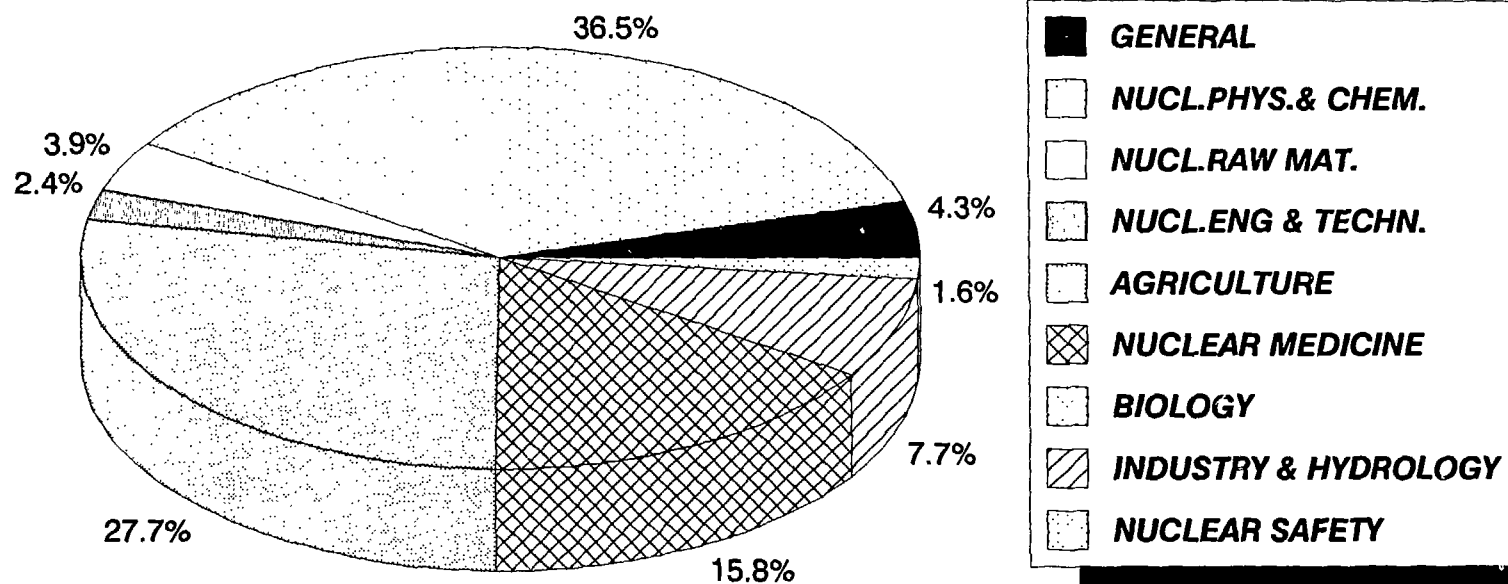


**EXTRABUDGETARY ASSISTANCE PROVIDED TO  
GUATEMALA, 1982 - 1991**

THOUSANDS OF DOLLARS



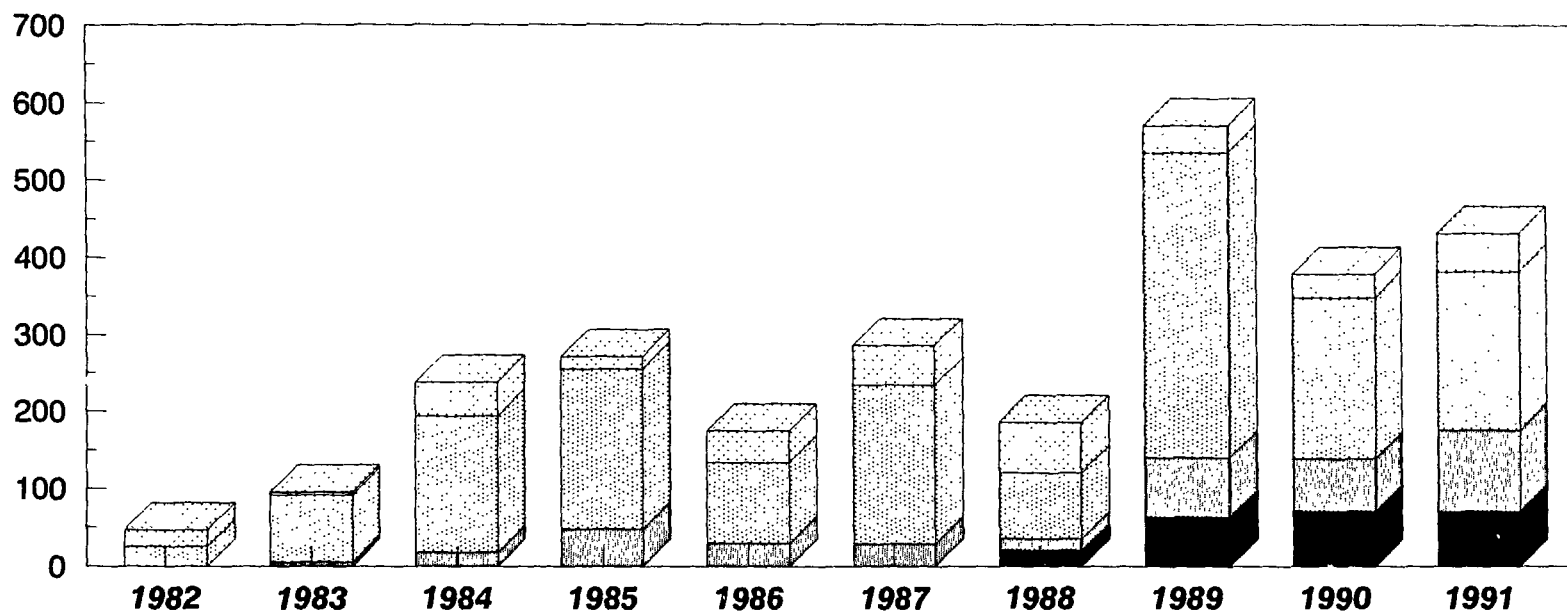
**TC PROJECT DISBURSEMENTS IN GUATEMALA, BY SECTOR  
1982 - MARCH 1992**





## ASSISTANCE PROVIDED BY THE AGENCY TO GUATEMALA, BY TYPE, 1982 - 1991

THOUSANDS OF DOLLARS



	<b>SUBCONTRACTS</b>		<b>GROUP TRAINING</b>		<b>FELLOWSHIPS</b>
	<b>EQUIPMENT</b>		<b>EXPERTS</b>		

**EXPERT SERVICES, EQUIPMENT AND PROJECT-FUNDED  
TRAINING PROVIDED TO GUATEMALA,  
1982 - MARCH 1992**

**DOLLARS**

1,200,000

1,000,000

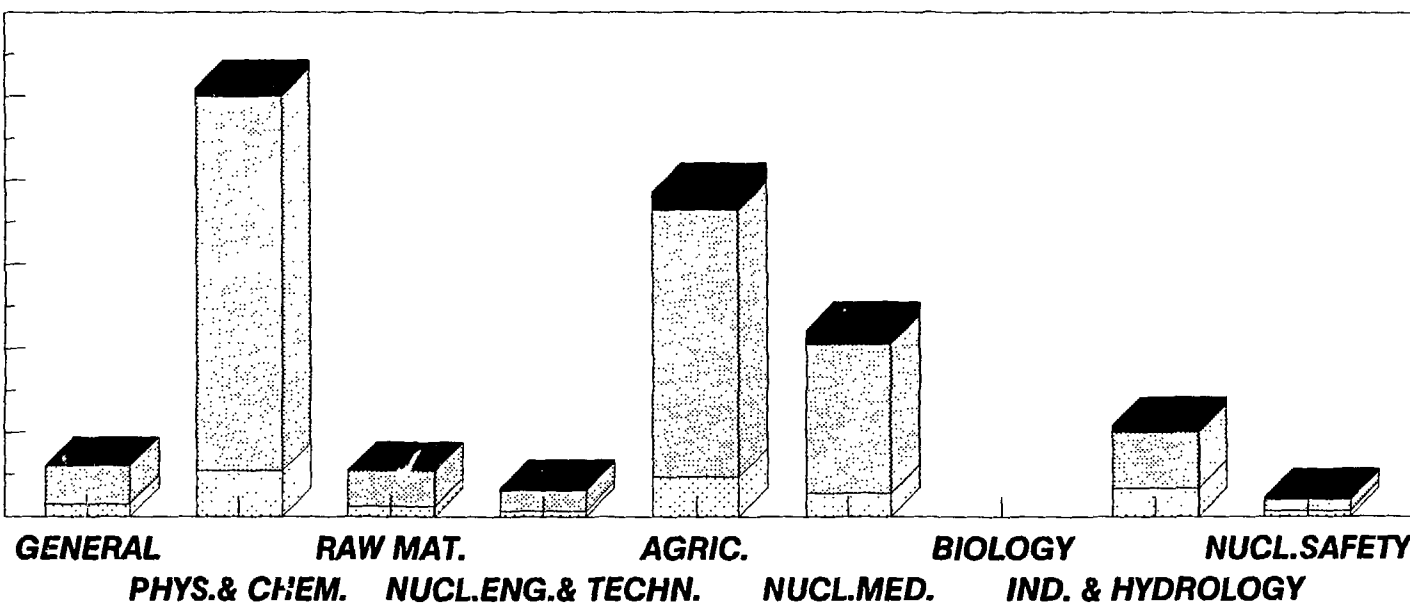
800,000

600,000

400,000

200,000

0



**EXPERTS**

**EQUIPMENT**

**TRAINING**

THE AGENCY'S TECHNICAL CO-OPERATION PROGRAMME WITH GUATEMALA

ALL SOURCES

GUATEMALA'S RANKING AS A TC RECIPIENT  
1958 - 1991  
(in \$1000)

YEAR	RANKING	AMOUNT
1958-81	64 <sup>th</sup>	358.3
1982	60 <sup>th</sup>	46.3
1983	59 <sup>th</sup>	95.2
1984	32 <sup>nd</sup>	237.6
1985	29 <sup>th</sup>	270.8
1986	47 <sup>th</sup>	174.8
1987	42 <sup>nd</sup>	284.9
1988	45 <sup>th</sup>	185.6
1989	22 <sup>nd</sup>	569.8
1990	35 <sup>th</sup>	378.2
1991	33 <sup>rd</sup>	431.3
1958-91	46 <sup>th</sup>	3032.8

"TOP FIVE" RECIPIENTS OF AGENCY ASSISTANCE  
1958 - 1991 (in \$1000)

ALL SOURCES

Year	I	II	III	IV	V	GUATEMALA
1958-81	BRA 7907.9	IND 6670.7	ARG 5200.4	PAK 5091.2	CHI 5005.7	64 <sup>th</sup> - 358.3
1982	EGY 807.5	PER 746.4	CUB 715.7	COL 667.7	THA 654.3	60 <sup>th</sup> - 46.3
1983	EGY 2077.9	PER 1116.8	VIE 948.1	PHI 778.6	IRA 722.1	59 <sup>th</sup> - 95.2
1984	EGY 3625.9	PER 1750.4	THA 1094.6	CUB 1028.7	PHI 881.2	32 <sup>th</sup> - 237.6
1985	EGY 2494.8	PER 1120.7	THA 1117.4	BGD 1068.2	PHI 963.7	29 <sup>th</sup> - 270.8
1986	EGY 2317.0	BRA 1452.9	THA 1169.4	POL 1050.3	BGD 896.4	47 <sup>th</sup> - 174.8
1987	HUN 3452.6	EGY 1775.4	THA 1742.4	INS 1312.5	YUG 1223.2	42 <sup>nd</sup> - 284.9
1988	EGY 1486.9	BUL 1361.6	CPR 1278.5	THA 1158.7	BRA 1096.7	45 <sup>th</sup> - 185.6
1989	CPR 1542.3	EGY 1505.1	THA 1205.3	BRA 1096.5	INS 999.1	22 <sup>nd</sup> - 569.8
1990	POL 2308.1	CPR 2005.0	VIE 1589.2	INS 1412.6	BRA 1229.1	35 <sup>th</sup> - 378.2
1991	INS 1305.2	CPR 975.0	EGY 959.8	BRA 951.2	BUL 934.7	33 <sup>rd</sup> - 431.3
1958-91	EGY 22222.3	BRA 17021.1	THA 14596.1	PER 12631.1	INS 12383.8	46 <sup>th</sup> - 3032.8

"TOP FIVE" RECIPIENTS OF AGENCY ASSISTANCE  
1958 - 1991 (in \$1000)

TECHNICAL ASSISTANCE AND CO-OPERATION FUND

Year	I	II	III	IV	V	GUATEMALA
1958-81	HUN 2533.0	PAK 2010.9	EGY 1898.7	THA 1712.8	BRA 1704.8	68 <sup>th</sup> - 166.1
1982	EGY 507.1	HUN 438.2	CUB 430.7	ECU 398.4	ZAM 354.9	56 <sup>th</sup> - 40.0
1983	EGY 1049.4	VIE 897.4	POL 667.8	PAK 498.5	PHI 430.0	52 <sup>nd</sup> - 93.8
1984	EGY 1197.2	CUB 655.6	ECU 565.6	BGD 506.3	BUL 472.4	28 <sup>th</sup> - 228.9
1985	BGD 991.8	VIE 745.0	THA 708.7	BRA 571.8	POR 538.7	30 <sup>th</sup> - 206.6
1986	BRA 1381.8	THA 871.9	POL 833.5	BGD 823.9	SYR 751.8	43 <sup>rd</sup> - 174.8
1987	HUN 3305.2	DRK 986.8	BUL 888.5	INS 885.8	EGY 878.9	34 <sup>th</sup> - 284.6
1988	BUL 1195.6	PER 856.5	EGY 768.6	INS 751.7	MAL 656.0	44 <sup>th</sup> - 160.7
1989	EGY 990.9	CPR 868.2	POR 769.6	CHI 756.9	MAL 619.4	27 <sup>th</sup> - 314.0
1990	POL 1562.3	VIE 1518.8	DRK 1156.2	IRA 958.0	YUG 933.4	38 <sup>th</sup> - 262.3
1991	BUL 893.1	PAK 868.8	INS 855.1	VIE 817.6	CPR 814.5	37 <sup>th</sup> - 326.5
1958-91	EGY 9591.3	HUN 8256.5	POL 7793.5	BRA 7433.5	PAK 7346.0	49 <sup>th</sup> - 2258.4

ASSISTANCE PROVIDED BY THE AGENCY TO GUATEMALA

Financial Summary 1982 - 1991  
(In thousands of dollars)

Year	ASSISTANCE PROVIDED, BY TYPE						ASSISTANCE PROVIDED, BY SOURCE					
	Experts	Equipment	Fellowships	Group training	Sub-contracts	Total	UNDP	TACF CC	TACF NCC	Extra-budgetary	In-kind	Total
1982	21.0	25.3	-	-	-	46.3	-	40.0	0.1	6.2	-	46.3
1983	3.4	86.3	5.5	-	-	95.2	-	75.2	18.6	-	1.4	95.2
1984	43.8	175.8	18.0	-	-	237.6	-	228.9	-	6.4	2.3	237.6
1985	16.8	205.8	48.2	-	-	270.8	-	182.0	24.6	50.4	15.8	270.8
1986	41.1	104.3	29.4	-	-	174.8	-	174.8	-	-	-	174.8
1987	50.9	204.8	29.2	-	-	284.9	-	264.3	20.3	0.3	-	284.9
1988	65.5	84.8	15.3	-	20.0	185.6	-	148.8	11.9	24.9	-	185.6
1989	34.9	394.5	77.1	-	63.3	569.8	-	308.1	5.9	246.7	9.1	569.8
1990	31.1	208.4	67.9	-	70.8	378.2	-	259.3	3.0	115.9	-	378.2
1991	49.7	205.7	105.1	-	70.8	431.3	-	326.5	-	104.8	-	431.3
1982-91	358.2	1 695.7	395.7	-	224.9	2 674.5	-	2 007.9	84.4	555.6	26.6	2 674.5

TECHNICAL CO-OPERATION PROJECTS IN GUATEMALA  
BY SECTOR

PROJECTS COMPLETED AND OPERATIONAL 1982 - 1992

TOTAL PROJECT ALLOTMENTS AND DISBURSEMENTS  
(as of 31 March 1992)

SECTOR	NO. OF PROJECTS	ALLOTMENTS \$	% OF TOTAL	DISBURSEMENTS \$	% OF TOTAL
General atomic energy development	1	133 546	4.0	120 684	4.3
Nuclear physics and chemistry	5	1 144 697	34.2	1 018 022	36.5
Nuclear raw materials	1	112 325	3.4	107 970	3.9
Nuclear engineering and technology	1	74 650	2.2	66 336	2.4
Nuclear techniques in agriculture	6	991 801	29.7	772 213	27.7
Nuclear medicine	5	502 162	15.0	441 339	15.8
Nuclear techniques in biology	-	-	-	-	-
Nuclear techniques in industry and hydrology	2	246 065	7.4	215 848	7.8
Nuclear safety	1	136 843	4.1	44 301	1.6
TOTAL	22	3 342 089	100.0	2 786 713	100.0

TECHNICAL CO-OPERATION PROJECTS IN GUATEMALA  
 COMPLETED AND OPERATIONAL, BY SECTOR, 1982 - 1992  
 (As of 31 March 1992)

Sector	No. of projects	Total project allotments \$	Total project disbursements \$
<u>Completed projects</u>			
General atomic energy development	1	133 546	120 684
Nuclear physics and chemistry	2	416 502	409 426
Nuclear raw materials	1	112 325	107 970
Nuclear engineering and technology	-	-	-
Nuclear techniques in agriculture	3	548 663	539 688
Nuclear medicine	3	242 991	240 917
Nuclear techniques in biology	-	-	-
Nuclear techniques in industry & hydrology	1	137 750	142 734
Nuclear safety	-	-	-
TOTAL	11	1 591 777	1 561 419
<u>Operational projects</u>			
General atomic energy development	-	-	-
Nuclear physics and chemistry	3	728 195	608 596
Nuclear raw materials	-	-	-
Nuclear engineering and technology	1	74 650	66 336
Nuclear techniques in agriculture	3	443 138	232 525
Nuclear medicine	2	259 171	200 422
Nuclear techniques in biology	-	-	-
Nuclear techniques in industry & hydrology	1	108 315	73 114
Nuclear safety	1	136 843	44 301
TOTAL	11	1 750 312	1 225 294



EXPERT SERVICES, EQUIPMENT AND PROJECT-FUNDED TRAINING PROVIDED TO GUATEMALA, BY SECTOR  
 PROJECTS COMPLETED AND OPERATIONAL 1982 - 1992  
 (As of 31 March 1992)

FIELD	TOTAL PROJECT ALLOTMENTS				TOTAL PROJECT DISBURSEMENTS			
	EXPERT SERVICES		EQUIPMENT	TRAINING	EXPERT SERVICES		EQUIPMENT	TRAINING
	M/M	\$	\$	\$	M/M	\$	\$	\$
General atomic energy development	9/00	41 000	92 546	-	5/20	29 472	91 212	-
Nuclear physics and chemistry	23/15	176 910	937 412	30 375	17/17	107 816	890 888	19 318
Nuclear raw materials	4/02	27 435	84 890	-	3/02	23 386	84 584	-
Nuclear engineering and technology	2/00	16 200	53 350	5 100	1/28	13 386	48 062	4 888
Nuclear techniques in agriculture	19/28	166 631	727 499	97 671	11/17	93 132	635 257	43 824
Nuclear medicine	11/00	67 500	398 907	35 755	9/12	54 587	354 462	32 290
Nuclear techniques in biology	-	-	-	-	-	-	-	-
Nuclear techniques in industry & hydrology	7/07	58 765	151 200	36 100	6/18	66 910	132 663	16 275
Nuclear safety	5/00	46 950	70 993	18 900	1/22	13 384	26 388	4 529
TOTAL	81/22	601 391	2 516 797	223 901	57/16	402 073	2 263 516	121 124

AGENCY FELLOWS FROM GUATEMALA

1982 - 1992<sup>1</sup>  
(As of 31 March 1992)

Sector	No. of fellowships	No. of months/days	Host countries
General atomic energy development	4	4/20	ARG, URU, IAEA
Nuclear physics	8	18/10	COS, NIC, ELS, FRA, SIN
Nuclear chemistry	4	15/04	AUS, BRA, CUB, IAEA
Nuclear raw materials	3	13/05	BRA, COS, IAEA
Nuclear engineering and technology	2	7/01	ARG, BRA
Nuclear techniques in agriculture	11	97/29	ARG, BRA, MEX, USA, UK, IAEA
Nuclear medicine	11	73/26	URU, MEX, BRA, CHI, SPA, UK, IAEA
Nuclear techniques in biology	-	-	-
Nuclear techniques in industry and hydrology	8	21/02	ARG, BRA, GER, IAEA
Nuclear safety	8	26/08	BRA, ECU, COL, VEN, MEX, ARG, SPA, IAEA
TOTAL	59	277/15	

<sup>1</sup>/ Only includes fellows who have completed or at least started training.

GUATEMALA  
FELLOWSHIPS LONGER THAN 12 M/M  
1982 - 1992  
(As of 31 March 1992)

Name	Field of study	Host country	Date	Duration	Project
RENDON ARANA	Entomology/insect genetics	UK	Sep.89 - Sep.90	12/00	RLA/0/011
RENDON ARANA	Entomology/insect genetics	UK	Jan.91 - Jan.92	12/00	RLA/0/014
ROMERO ORELLANA	Entomology	IAEA	Jan.91 - Feb.92	13/24	RLA/0/011
RUEDA CALVET	Soil/plant/water relationships	BRA	Feb.84 - Mar.86	25/09	GUA/5/005
PADILLA MORALES	Nuclear medicine	URU	Mar.88 - Mar.89	12/01	GUA/6/007
ROSALES RUEDA	Nuclear medicine	MEX	Mar.85 - Mar.87	24/02	GUA/6/004

GUATEMALAN NATIONALS WHO WERE AWARDED MORE THAN ONE  
FELLOWSHIP OR SCIENTIFIC VISIT  
1982 - 1992  
(As of 31 March 1992)

Name	Field of study	Host country	Date	Duration	Project
ALVAREZ VARGAS	1. Radiation protection 2. Radiation protection	BRA SPA	Mar.89 - Jun.89 Started: Jan.92	3/01 4/00	RLA/0/011 GUA/9/003
GODOY MAZARIEGOS	1. Nuclear legislation 2. Nuclear law	ARG URU	Apr.84 - Jul.84 Oct.84	3/00 0/06	- RLA/0/007
MONTEPEQUE ROLDAN	1. Plant breeding 2. Plant breeding 3. Mutation breeding of rice	BRA ARG USA	Nov.85 - Dec.85 Jun.86 - Feb.87 Jul.91 - Jan.92	0/26 8/00 6/01	RLA/0/006 RLA/0/006 RLA/0/011
MORALES SANCHEZ	1. Analytical nuclear physics 2. INTS	FRA IAEA	Apr.85 - Oct.85 Oct.89	5/17 0/19	GUA/1/003 RLA/0/011
PADILLA MORALES	1. Nuclear medicine 2. Nuclear medicine	URU IAEA	Mar.88 - Mar.89 Oct.91	12/01 0/02	GUA/6/007 GUA/6/008
RENDON ARANA	1. Entomology/insect genetics 2. Entomology/insect genetics	UK UK	Sep.89 - Sep.90 Jan.91 - Jan.92	12/00 12/00	RLA/0/011 RLA/0/014

AGENCY TRAINING COURSES WITH GUATEMALAN PARTICIPATION

1982 - 1992  
(As of 31 March 1991)

Field	Number of participants	Number of courses
General atomic energy development	5	5
Nuclear physics	2	2
Nuclear chemistry	9	9
Nuclear raw materials	1	1
Nuclear engineering and technology	17	17
Nuclear techniques in agriculture	26	22
Nuclear medicine	14	14
Nuclear techniques in biology	-	-
Nuclear techniques in industry & hydrology	54	53
Nuclear safety	20	18
TOTAL	148	141

**MULTIPLE PARTICIPATION IN AGENCY TRAINING COURSES  
BY GUATEMALAN NATIONALS  
1982 - 1992  
(As of 31 March 1991)**

Name	Course No.	Course title	Year	Location
AGUILAR RIVAS	RLA/8/005 (136)	RTC on ultrasonics in welded joints	1986	BRA
	RLA/8/005 (144)	Regional Seminar on NDT in fracture mechanics	1985	BRA
	RLA/8/013 (018)	RTC on acoustic emission	1989	ARG
	RLA/8/013 (109)	RWS on criteria for conception and management of test pieces for qualification and certification of NDT personnel	1991	CHI
ALARCON CACEROS	RLA/8/005 (078)	RTC on ultrasonics (level II)	1985	PER
	RLA/8/006 (001)	RTC on computer-aided NDT	1986	MEX
	RLA/8/013 (002)	RWS on qualification and certification	1988	BRA
	RLA/8/013 (003)	RWS on preparation of test specimens	1988	BRA
	RLA/8/013 (009)	International XII World Conference on NDT	1989	NET
	RLA/8/013 (010)	international workshop on project achievements	1989	GER
	RLA/8/013 (011)	Regional seminar on NDT advanced techniques	1989	GER
	RLA/8/013 (012)	Regional seminar on NDT advanced techniques	1989	ITA
	RLA/8/013 (035)	RTC on NDT in quality assurance	1989	BRA
	RLA/8/013 (072)	RWS on underwater inspection	1990	BRA
	RLA/8/017 (016)	RWS on NDT for quality	1992	CHI
ALVAREZ VARGAS	RLA/8/013 (058)	RWS on radiation protection for radiographers	1990	ARG
	RLA/9/009 (008)	RTC on quality control of diagnostic X-ray equipment	1988	BRA
	RLA/9/009 (011)	RTC on dosimetric assessment on internal contamination	1988	BRA
	RLA/9/009 (041)	RTC on clinical and radiation protection dosimetry	1989	BRA
	RLA/9/009 (045)	RTC on radiation protection in radiodiagnosis	1990	ECU
	RLA/9/011 (003)	RWS on co-ordinated research work on disposal of medical and industrial radiation sources	1991	COL
	RLA/9/011 (005)	Regional symposium on radiation protection and nuclear safety	1991	ARG
AYALA JIMENEZ	RLA/2/003 (004)	First RWS on nuclear analytical techniques	1989	COL
	RLA/2/003 (007)	Second RWS on nuclear analytical techniques	1990	ARG
	RLA/2/003 (010)	RWS on nuclear analytical techniques and quality assurance	1990	ARG
	RLA/4/006 (013)	RTC on high-resolution radiation detectors	1988	ARG

**MULTIPLE PARTICIPATION IN AGENCY TRAINING COURSES  
BY GUATEMALAN NATIONALS  
1982 - 1992  
(As of 31 March 1991)**

Name	Course No.	Course title	Year	Location
BALDIZON MARROQUIN	RLA/8/014 (006)	Regional II technical co-ordination meeting on the study of resources and contamination of underground water	1991	CUB
	RLA/8/015 (001)	RTC on the use of tracers to study contaminant dispersion in surface waters	1991	ARG
CHAVEZ BIETTI	INT/9/082 (001)	ITC on radiological protection and nuclear safety	1987	ARG
	RLA/9/009 (010)	Fourth RWS on radiation protection	1988	COL
	RLA/9/009 (012)	Regional seminar on quality control in radiotherapy	1988	PER
	RLA/9/009 (042)	Fifth RWS on radiation protection	1989	BRA
ESCOBAR LEIVA	RLA/4/006 (012)	RWS on development of appropriate software for small computers	1988	PAR
	RLA/4/008 (004)	RTC on repair of multi-channel analysers	1991	BRA
FLORES VELIZ	RLA/8/005 (223)	Regional informative course on eddy current testing in boiler-tube inspection	1988	CHI
	RLA/8/013 (005)	Regional informative course on NDT in composite materials	1988	PER
	RLA/8/013 (023)	RTC on eddy currents in ferromagnetic materials	1989	CHI
	RLA/8/013 (056)	RWS on quality assessment	1990	BRA
	RLA/8/013 (061)	RTC on inspection of LPG cylinders	1990	PER
	RLA/8/013 (111)	RWS on inspection of LPG cylinders	1991	DOM
	RLA/8/017 (001)	RWS on industrial quality in production and maintenance	1991	BRA
FRANCO	INT/5/108 (001)	ITC on the induction and use of mutations in plant breeding	1987	AUS
	RLA/5/021 (002)	RWS on improvement of rice and other cereals through mutation breeding	1988	CZE COL
FREIRE MARTINEZ	RLA/2/007 (001)	Advanced RWS on the synthesis of modern radiopharmaceuticals	1992	ARG
	RLA/6/014 (001)	RTC on preparation and control of radiopharmaceuticals	1989	CHI
GONZALEZ JUAREZ	INT/4/085 (001)	ITC on advanced nuclear electronics	1986	JAM
	INT/4/096 (001)	ITC on advanced interfacing in nuclear experiments	1988	DOM
	RLA/4/006 (007)	RWS on repair of nuclear instrument module (NIM)	1987	URU
	RLA/4/006 (017)	RTC on advanced aspects of nuclear spectroscopy	1989	PAR

MULTIPLE PARTICIPATION IN AGENCY TRAINING COURSES  
BY GUATEMALAN NATIONALS  
1982 - 1992  
(As of 31 March 1991)

Name	Course No.	Course title	Year	Location
GRUENER ANTILLON	RLA/9/009 (002)	RWS on calibration procedures in dosimetry	1986	ECU
	RLA/9/009 (005)	RWS on radiation protection	1987	PER
GUILLEN MORENO	RLA/9/009 (045)	RTC on radiation protection in radiodiagnosis	1990	ECU
	RLA/9/011 (004)	RTC on thermoluminescence applied to dosimetry	1991	ECU
MONTEPEQUE ROLDAN	RLA/5/021 (001)	RTC on the use of mutation techniques in connection with cereals in in-vitro cultures	1987	PER
	RLA/5/021 (002)	RWS on improvement of rice and other cereals through mutation breeding	1988	COL
	RLA/5/021 (005)	Second RWS on improvement of rice and other cereals in Latin America through mutation breeding	1990	BRA
NORIEGA MOTA	RLA/4/006 (002)	RWS on design, mounting and maintenance of modular nuclear instrumentation	1986	COL
	RLA/4/006 (011)	RTC for technicians on maintenance and electromechanical problems of nuclear and related instruments in medicine	1988	COS
PADILLA MORALES	INT/6/040 (001)	ITC on nuclear medicine	1991	GER
	RLA/6/015 (001)	RTC on medical scintigraphy	1990	CUB
RAMIREZ MORALES	INT/4/108 (001)	ITC on interfacing in nuclear experiments	1991	MAG
	RLA/4/006 (021)	RWS on maintenance of gamma cameras	1990	COL
RICHTER DE PENADOS	RLA/6/011 (001)	Regional train-the-trainers course on radioisotope methodology with special emphasis on radioimmunoassay	1988	ARG
	RLA/6/012 (001)	RTC on promotion and use of bulk reagents for radioimmunoassay of thyroid related hormones	1988	CHI
RODRIGUEZ JIMENEZ	RLA/0/012 (001)	RTC on design, management and evaluation techniques of IAEA TC projects	1990	MEX
	RLA/4/007 (002)	RWS on radioisotope production in reactors, including the technology of radionuclide generators	1986	ARG
	RLA/4/007 (006)	RTC on radioisotope production and processing	1989	MEX



MULTIPLE PARTICIPATION IN AGENCY TRAINING COURSES  
BY GUATEMALAN NATIONALS  
1982 - 1992  
(As of 31 March 1991)

Name	Course No.	Course title	Year	Location
SANABRIA DIAZ	INT/5/112 (001)	ITC on the induction and use of mutations in plant breeding RTC on food irradiation technology	1988	AUS
	RLA/5/020 (002)		1987	ARG
SANCHEZ ARENALES	INT/1/037 (001)	ITC on advanced data processing and interpretation in X-ray fluorescence analysis RWS on small computer software for projects in nuclear laboratories: "Development of Integrated Software" RTC on acoustic emission and holography in NDT	1985	YUG
	RLA/4/006 (009)		1987	AUS
	RLA/8/006 (010)		1985	BRA
SORIA LEMUS	RLA/8/005 (088)	Regional study tour on NDT	1985	CAN
	RLA/8/005 (200)	Regional VIII meeting of the working group (NDT)	1987	BOL
	RLA/8/005 (232)	Regional IX meeting of the working group (NDT)	1988	PER
	RLA/8/005 (233)	Regional II congress on NDT	1988	PER
	RLA/8/006 (007)	RTC on industrial radiography (level II)	1984	PER
	RLA/8/006 (012)	RTC on industrial radiography (level III)	1986	COL
	RLA/8/013 (024)	RTC on real time radiography	1989	BRA
	RLA/8/013 (026)	Regional working group meeting (NDT)	1989	COS
RLA/8/013 (106)	RTC on preparation of test procedures	1991	GUY	
TORRES GARCIA	RLA/8/005 (086)	Regional train-the-trainers course (NDT)	1985	CAN
	RLA/8/006 (008)	RTC on surface methods (level III)	1985	BRA
VILLAGRAN RIVERA	INT/5/103 (001)	ITC on the use of isotope and radiation techniques in studies on biological nitrogen fixation RWS on food irradiation RTC on general aspects of food irradiation	1986	AUS
	RLA/5/020 (001)		1986	BRA
	RLA/5/020 (003)		1988	CHI

PROJECTS COMPLETED IN GUATEMALA SINCE 1982  
(As of 31 March 1992)

STARTED	PROJECT NO.	TITLE	ALLOTMENTS				DISBURSEMENTS				COMPLETED
			EXPERTS		EQUIPMENT	TRAINING	EXPERTS		EQUIPMENT	TRAINING	
			M/M	\$	\$	\$	M/M	\$	\$	\$	
1978	GUA/0/003	Applied nuclear science	9/00	41 000	92 546	-	5/20	29 472	91 212	-	1983
1983	GUA/1/003	X-ray fluorescence in mineral analysis	9/14	63 035	280 692	-	9/15	55 910	280 199	-	1989
1988	GUA/2/002	Nuclear analytical laboratory	3/12	24 480	48 295	-	3/18	24 990	48 327	-	1990
1983	GUA/3/003	Uranium prospection	4/02	27 435	84 890	-	3/02	23 386	84 584	-	1988
1983	GUA/5/005	Radioisotopes in agriculture	4/05	27 415	202 451	2 471	4/05	26 742	202 512	2 820	1990
1984	GUA/5/006	Medfly eradication programme	1/15	10 350	69 885	-	1/16	8 495	71 678	-	1988
1988	GUA/5/007	Control of mediterranean fruit fly	0/22	6 026	230 065	-	0/14	2 442	224 999	-	1991
1976	GUA/6/004	Radioimmunoassay <sup>1</sup>	3/00	9 000	39 000	-	3/03	15 947	29 147	-	1986

<sup>1/</sup> Figures for equipment include in-kind equipment offered (\$30 000) and actually donated (\$21 732) by the USA.

PROJECTS COMPLETED IN GUATEMALA SINCE 1982  
(As of 31 March 1992)

STARTED	PROJECT NO.	TITLE	ALLOTMENTS				DISBURSEMENTS				COMPLETED
			EXPERTS		EQUIPMENT	TRAINING	EXPERTS		EQUIPMENT	TRAINING	
			M/M	\$	\$	\$	M/M	\$	\$	\$	
1983	COS/6/006	Preparation and control of radiopharmaceuticals	3/00	20 400	115 241	-	3/07	20 694	116 335	-	1990
1986	COS/6/007	Nuclear medicine laboratory	3/00	20 850	38 500	-	3/02	17 946	40 848	-	1990
1984	COS/8/007	Isotopes in hydrology	4/00	29 250	92 700	15 800	3/28	33 067	93 392	16 275	1991
	TOTAL	11 projects	45/10	279 241	1 294 265	18 271	41/10	259 091	1 283 233	19 095	

OPERATIONAL PROJECTS IN GUATEMALA  
(As of 31 March 1992)

STARTED	PROJECT NO.	TITLE	ALLOTMENTS				DISBURSEMENTS			
			EXPERTS		EQUIPMENT	TRAINING	EXPERTS		EQUIPMENT	TRAINING
			M/M	\$	\$	\$	M/M	\$	\$	\$
1984	GUA/1/004	Dosimetry laboratory (SSDL)	5/00	44 950	286 825	15 125	1/04	9 128	269 667	14 488
1989	GUA/1/005	Dosimetry laboratory (phase II)	3/13	25 350	253 000	14 850	2/04	7 903	226 899	4 830
1989	GUA/2/003	Nuclear analytical laboratory	2/06	19 095	68 600	400	1/06	9 885	65 796	-
1989	GUA/4/003	Nuclear instrumentation laboratory	2/00	16 200	53 350	5 100	1/28	13 386	48 062	4 888
1989	GUA/5/008	Mutation breeding	3/20	33 250	104 858	53 000	1/21	15 441	54 384	17 824
1989	GUA/5/009	Nuclear techniques in soil sciences	4/26	42 190	74 080	31 300	2/25	31 495	57 088	23 180
1991	GUA/5/010	Immunoassay techniques in diagnosis of animal diseases	5/00	47 400	46 160	10 900	0/26	8 517	24 596	-
1989	GUA/6/008	Nuclear medicine laboratory (in-vitro)	-	-	22 700	34 755	-	-	21 899	32 290
1990	GUA/6/009	Upgrading of a radiotherapy department	2/00	17 250	183 466	1 000	-	-	146 233	-

OPERATIONAL PROJECTS IN GUATEMALA  
(As of 31 March 1992)

STARTED	PROJECT NO.	TITLE	ALLOTMENTS				DISBURSEMENTS			
			EXPERTS		EQUIPMENT	TRAINING	EXPERTS		EQUIPMENT	TRAINING
			M/M	\$	\$	\$	M/M	\$	\$	\$
1991	GUA/8/009	Isotopic studies of geothermal fields	3/07	29 515	58 500	20 300	2/20	33 843	39 271	-
1991	GUA/9/003	Radiological protection	5/00	46 950	70 993	18 900	1/22	13 384	26 388	4 529
	TOTAL	11 projects	36/12	322 150	1 222 532	205 630	16/06	142 982	980 283	102 029

Footnote-a/ projects not yet upgraded:

GUA/3/004 Uranium exploration  
GUA/6/010 Nuclear medicine  
GUA/8/008 Industrial radiography

**COUNTERPART INSTITUTIONS IN GUATEMALA (I)**

(By Project)

<u>Project No.</u>	<u>Institute</u>	<u>Counterpart(s)</u>
<u>GENERAL ATOMIC ENERGY DEVELOPMENT</u>		
GUA/0/003	General Directorate of Mining and Hydrocarbons, Industrial Department, Guatemala City	PINEDA GONZALEZ
<u>NUCLEAR PHYSICS AND CHEMISTRY</u>		
GUA/1/003	General Directorate of Nuclear Energy, Guatemala City	AYALA JIMENEZ
GUA/1/004	General Directorate of Nuclear Energy, Guatemala City	RODRIGUEZ JIMENEZ GOMEZ Y GOMEZ
GUA/1/005	General Directorate of Nuclear Energy, Guatemala City	RODRIGUEZ JIMENEZ GOMEZ Y GOMEZ
GUA/2/002	General Directorate of Nuclear Energy, Guatemala City	AYALA JIMENEZ
GUA/2/003	General Directorate of Nuclear Energy, Guatemala City	AYALA JIMENEZ
<u>NUCLEAR MATERIALS</u>		
GUA/3/003	1. Ministry of Energy and Mines, General Directorate of Mines, Guatemala City 2. General Directorate of Nuclear Energy, Guatemala City	PAIZ LUCERO PINEDA GONZALEZ
<u>NUCLEAR ENGINEERING AND TECHNOLOGY</u>		
GUA/4/003	General Directorate of Nuclear Energy, Guatemala City	ESCOBAR LEIVA

**COUNTERPART INSTITUTIONS IN GUATEMALA (I)**

(By Project)

<u>Project No.</u>	<u>Institute</u>	<u>Counterpart(s)</u>
<u>AGRICULTURE</u>		
GUA/5/005	1. General Directorate of Nuclear Energy, Guatemala City	RUEDA CALVET
	2. University of San Carlos, Faculty of Agronomy, Guatemala City	MONTEPEQUE ROLDAN SALAZAR
	3. Nutritional Institute for Central America and Panama, Guatemala City	ARROJAVE
GUA/5/006	MOSCAMED Programme, Breeding and Sterilization Laboratory, Guatemala City	MATA PEREIRA HENTZE PENADOS
GUA/5/007	MOSCAMED Programme, Breeding and Sterilization Laboratory, Guatemala City	HENTZE PENADOS
GUA/5/008	1. General Directorate of Nuclear Energy, Guatemala City	MONTEPEQUE ROLDAN
	2. Institute of Agricultural Science and Technology, Guatemala City	-
GUA/5/009	1. General Directorate of Nuclear Energy, Guatemala City	TZI TZIBOY
	2. Institute of Agricultural Science and Technology, Guatemala City	ALFARO VILLATORO PEREZ
GUA/5/010	1. Ministry for Agriculture, Livestock and Food, General Directorate for Livestock Services, Guatemala City	BARRIENTOS
	2. University of San Carlos, Faculty of Veterinary Medicine and Animal Science, Guatemala City	CAJAS

**COUNTERPART INSTITUTIONS IN GUATEMALA (I)**

(By Project)

<u>Project No.</u>	<u>Institute</u>	<u>Counterpart(s)</u>
<u>NUCLEAR MEDICINE</u>		
GUA/6/004	General Directorate of Mining and Hydrocarbons, Guatemala City	GONZALEZ
GUA/6/006	General Directorate of Nuclear Energy, Guatemala City	GUTIERREZ ALVAREZ
GUA/6/007	1. San Juan de Dios General Hospital, Nuclear Medicine Unit, Guatemala City 2. General Directorate of Nuclear Energy, Guatemala City	GUTIERREZ ALVAREZ RODRIGUEZ JIMENEZ PINEDA GONZALEZ
GUA/6/008	1. San Juan de Dios General Hospital, Nuclear Medicine Unit, Guatemala City 2. General Directorate of Nuclear Energy, Guatemala City	GUTIERREZ ALVAREZ RICHTER DE PENADOS
GUA/6/009	1. Institute of Cancerology, Guatemala City 2. General Directorate of Nuclear Energy, Guatemala City	ESCOBAR AGUIRRE SOLARES-HERNANDEZ
<u>NUCLEAR TECHNIQUES IN INDUSTRY AND HYDROLOGY</u>		
GUA/8/007	1. General Directorate of Nuclear Energy, Guatemala City 2. National Institute of Seismology, Volcanology and Hydrology, Department of Underground Waters, Guatemala City	ARAGON CASTILLO ARAGON CASTILLO ALVAREZ E.
GUA/8/009	National Institute for Electrification, Geothermal Development Unit, Guatemala City	CAICEDO ROLDAN MANZO
<u>NUCLEAR SAFETY</u>		
GUA/9/003	General Directorate of Nuclear Energy, Guatemala City	ALVAREZ VARGAS



**COUNTERPART INSTITUTIONS IN GUATEMALA (II)**

(By Institute)

**GUATEMALA CITY**

**General Directorate of Nuclear Energy  
Guatemala City**

GUA/1/003	X-Ray Fluorescence in Mineral Analysis
GUA/1/004	Dosimetry Laboratory (SSDL)
GUA/1/005	Dosimetry Laboratory (Phase II)
GUA/2/002	Nuclear Analytical Laboratory
GUA/2/003	Nuclear Analytical Laboratory
GUA/3/003	Uranium Prospection
GUA/4/003	Nuclear Instrumentation Laboratory
GUA/5/005	Radioisotopes in Agriculture
GUA/5/008	Mutation Breeding
GUA/5/009	Nuclear Techniques in Soil Science
GUA/6/006	Preparation and Control of Radiopharmaceuticals
GUA/6/007	Nuclear Medicine Laboratory
GUA/6/008	Nuclear Medicine Laboratory (In-vitro)
GUA/6/009	Upgrading of a Radiotherapy Department
GUA/8/007	Isotopes in Hydrology
GUA/9/003	Radiological Protection

**General Directorate of Mining and Hydrocarbons  
Guatemala City**

GUA/6/004	Radioimmunoassay
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**General Directorate of Mining and Hydrocarbons  
Industrial Department  
Guatemala City**

GUA/0/003	Applied Nuclear Science
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**Ministry of Energy and Mines  
General Directorate of Mines  
Guatemala City**

GUA/3/003	Uranium Prospection
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**Ministry of Agriculture, Livestock and Food  
General Directorate for Livestock Services  
Guatemala City**

GUA/5/010	Immunoassay Techniques in Diagnosis of Animal Diseases
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**COUNTERPART INSTITUTIONS IN GUATEMALA (II)**  
(By Institute)

**GUATEMALA CITY** (cont'd)

**Institute of Agricultural Science and Technology**  
**Guatemala City**

GUA/5/008    Nutation Breeding  
GUA/5/009    Nuclear Techniques in Soil Sciences

**Nutritional Institute for Central America and Panama**  
**Guatemala City**

GUA/5/005    Radioisotopes in Agriculture

**National Institute of Seismology, Volcanology and Hydrology**  
**Department of Underground Waters**  
**Guatemala City**

GUA/8/007    Isotopes in hydrology

**Institute of Cancerology**  
**Guatemala City**

GUA/6/009    Upgrading of a Radiotherapy Department

**National Institute for Electrification**  
**Geothermal Development Unit**  
**Guatemala City**

GUA/8/009    Isotopic Studies of Geothermal Fields

**MOSCAMED Programme**  
**Breeding and Sterilization Laboratory**  
**Guatemala City**

GUA/5/006    Medfly Eradication Programme  
GUA/5/007    Control of Mediterranean Fruit Fly

**University of San Carlos**  
**Faculty of Agronomy**  
**Guatemala City**

GUA/5/005    Radioisotopes in Agriculture

**COUNTERPART INSTITUTIONS IN GUATEMALA (II)**  
(By Institute)

**GUATEMALA CITY (cont'd)**

**University of San Carlos**  
**Faculty of Veterinary Medicine and Animal Science**  
**Guatemala City**

GUA/5/010    Immunoassay Techniques in Diagnosis of Animal Diseases

**San Juan de Dios General Hospital**  
**Nuclear Medicine Unit**  
**Guatemala City**

GUA/6/007    Nuclear Medicine Laboratory  
GUA/6/008    Nuclear Medicine Laboratory (In-vitro)

**THE AGENCY'S TECHNICAL CO-OPERATION PROGRAMME WITH  
GUATEMALA  
SINCE 1982**

**LONG-TERM EXPERT ASSIGNMENTS**

NONE

**RESEARCH CONTRACTS/AGREEMENTS IN GUATEMALA SINCE 1982 <sup>1</sup>**  
**(As of 31 March 1992)**

Field of activity	No. of contracts/ agreements	Amount allocated \$
Nuclear physics	1	4 000
Nuclear chemistry	2	22 000
Nuclear techniques in agriculture	10	84 400
Nuclear medicine	4	33 500
Nuclear techniques in hydrology	3	62 997
TOTAL	20	206 897

<sup>1</sup>/ New awards since 1982

**SCIENTISTS FROM GUATEMALA SERVING AS AGENCY  
TECHNICAL CO-OPERATION EXPERTS OR  
TRAINING COURSE LECTURERS  
1982 - 1992  
(As of 31 March 1992)**

Name	No. of assignments	Project(s)
AGUILAR RIVAS	1	RLA/8/005
ALARCON CACEROS	4	RLA/8/005, RLA/9/006, RLA/8/013
ALVAREZ VARGAS	3	RLA/9/009, RLA/9/011
AYALA JIMENEZ	4	COL/2/009, COS/2/002, DOM/8/004, PAN/2/004
BALDIZON MARROQUIN	2	RLA/8/014
BATRES MARTINEZ	1	RLA/8/006
ESCOBAR LEIVA	1	RLA/4/008
FLOREX VELIZ	1	RLA/8/013
GONZALES ARENAS	1	RLA/8/005
GONZALES JUAREZ	3	INT/4/054, RLA/4/006
GUILLEN MORENO	1	RLA/9/011
HERNANDEZ VELASQUEZ	1	RLA/4/008
LINARES	1	INT/0/048
MATA PEREIRA	1	INT/0/038
MENCOS MENDIZABAL	2	RLA/8/005
MONTEPEQUE ROLDAN	1	RLA/5/021
MORALES SANCHEZ	4	DOM/1/004, RLA/0/009, RLA/2/003
PINEDA GONZALEZ	5	RLA/0/006
PINZON GONZALEZ	1	INT/4/054
RICHTER DE PENADOS	4	RLA/6/011, RLA/6/016
RODAS	1	RLA/8/005
RODRIGUEZ JIMENEZ	1	GUA/2/002
ROSALES TORRES	1	RLA/8/006

**SCIENTISTS FROM GUATEMALA SERVING AS AGENCY  
TECHNICAL CO-OPERATION EXPERTS OR  
TRAINING COURSE LECTURERS  
1982 - 1992  
(As of 31 March 1992)**

Name	No. of assignments	Project(s)
SANCHEZ ARENALES	4	COS/1/005, INT/0/040, RLA/4/006
SORIA LEMUS	6	RLA/8/005, RLA/8/006, RLA/8/013
TORRES GARCIA	1	RLA/8/005
VELASQUEZ VASQUEZ	1	RLA/0/006
TOTAL	57	

**AGENCY FELLOWSHIPS AND SCIENTIFIC VISITS  
HOSTED BY GUATEMALA  
1982 - 1992  
(As of 31 March 1992)**

Recipient country	No. of fellowships	No. of scientific visits	TOTAL <sup>1</sup>
ALGERIA	-	1	1
ARGENTINA	-	1	1
CHILE	-	2	2
COLOMBIA	1	-	1
ECUADOR	1	1	2
EGYPT	-	1	1
MAURITIUS	3	1	4
MOROCCO	-	3	3
PAKISTAN	-	1	1
THAILAND	-	1	1
TUNISIA	-	1	1
TOTAL	5	13	18

<sup>1</sup>/ Includes trainees who have completed or at least started their studies.



**REGIONAL AND INTERREGIONAL TRAINING EVENTS  
HOSTED BY GUATEMALA  
1982 - 1992  
(As of 31 March 1992)**

Course No.	Course Title	Participants	Year
RLA/0/009 (005)	Third RTC for librarians and information specialists in nuclear science and technology	9	1990
RLA/4/006 (008)	Regional seminar on recent advances in nuclear data acquisition and analysis systems	15	1987
RLA/4/006 (022)	RTC on maintenance of power supplies in nuclear instruments	10	1990
RLA/5/021 (006)	Advanced RTC on doubled haploid techniques in mutation breeding	7	1990
RLA/5/026 (001)	RTC and seminar on the sterile insect technique for fruit fly control or eradication	12	1989
RLA/8/005 (128)	RTC on surface methods (level II)	11	1986
RLA/8/006 (015)	International workshop on implementation and implications of ISO international standard	6	1988
RLA/8/013 (110)	RWS on non-destructive testing in civil works	15	1991
8 COURSES	TOTAL	85	