CIAT

1980-1981

Program and Budget

and

1983

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Centro Internacional de Agricultura Tropical, CIAT.

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Note: Figures given in this document are in United States dollars unless otherwise indicated.

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THE 1980 - 1981

BUDGET REQUEST AND PROJECTION

The proposed budget for 1980-1981 amounts to $34,142,000 for core operations, divided $15,920,000 for 1980 and $18,222,000 for 1981 and $1,461,000 for capital divided $ 915,000 for 1980 and $546,000 for 1981. The proposed budget includes 76 senior staff positions including 14 for regional services staff 12 of which have not previously been projected as core funded. The 62 senior staff positions net for 1980, if regional services are excluded, represents an increase of one position over those budgeted in 1979 (note the 1979 budget includes 2 positions now classified as regional services staff).

The following table gives a comparison of budgeted amounts for 1978 to 1981:

	1978/79			Proposed 1980/81			
	1978	1979*	Total	1980	1981	Total	% Incr.
Core operations ($000)	9977	12619	22596	15920	18222	34142	51
Capital ($000)	755	788	1543	915	546	1461	(5)
	10732	13407	24139	16835	18768	35603	47
Income	432	400	832	400	400	800	(4)
Net Requirements	10300	13007	23307	16435	18368	34803	49

* Budget adjusted for $82,000 underspent in 1978 portion of the 1978/9 budget period.

In previous years it has been assumed that regional services staff will be special project funded. We are now recommending that this very important function be incorporated in our core funded operations. We hope, however, that the same donors, who have in the past funded the few regional services staff positions as special projects and other similar donors, will be able to fund these activities as restricted core in the future. The following table gives a comparison of senior staff positions.

Senior Staff Positions	1978	1979	1980	1981
For research activities, etc.	59	59	62	62
For regional services	2	2	11	14
	61	61	73	76

A substantial part of the increase in the 1980/81 budget over the 1978/79 budget is due to the one time effect of incorporating regional services staff in the core budget. The following table compares the budgets for the two periods and projections separated between research activities and regional services (figures are in 1979 dollars).

	1978	1979	1980	1981
		(Constant 1979 dollars)		
Research Activities				
Budgeted & projected in 1978/79 budget	11045	*11403	*12997	*13256
Current proposal	10949	12485	13875	14371
Regional Services				
Budgeted & projected in 1978/79 budget	148	134	283	283
Current proposal	148	134	683	1017

* Adjusted for extra $625,000 provided for inflation in 1979.

Another factor which makes the percentage increase of 1980/81 over 1979/80 appear high is inflation between 1978 and 1979. To correct this distortion, the following table sets out budget figures for all the years 1978 to 1981 and shows increases in real terms between each year and each two year budget.

	Operations Budget ($ thousand 1979)	
	Without New Regional Serv.	With New Regional Serv.
1978	11,097	11,097
1979	12,619	12,619
% increase 1979/78	14%	14%
1980	14,032	14,558
% increase 80/79	11%	15%
1981	14,521	15,388
% increase 81/80	3%	6%
1978-79	23,716	23,716
1980-81	28,553	29,946
% increase 80-81/78-79	20%	26%

In addition to the total of $1,461,000 for capital, we are including increases of $350,000 in 1980 and $200,000 in 1981 for working capital to maintain the total available at the equivalent of 30 days' operating expenses.

The following table analyses the difference between the 1978/79 core operations budget and the proposed budget for 1980/81. A brief explanation of each of the increases is given in the paragraphs following the table (the paragraph numbers refer to those given against each item in the table) :

		$ 000	%
1978/9	Core Operations Budget	22,596	
1)	Cost of full two years' operation with level of activity assumed for end of 1979		
	a) For inflation between 1978-1979	1,718	7.6
	b) For real increases in 1978-1979	477	2.1
2)	Inflation	4,196	18.6
3)	Expansion of research activities:		
	a) Additional senior staff (5)	389	1.7
	b) Additional scientific & sup.staff (17)	189	0.8
	c) Additional support staff (57) and funds for honoraria, temporary employees and overtime	689	3.0
	d) Additional supplies, services & travel costs	427	1.9
4)	Expansion of regional services		
	a) Additional senior staff (12)	805	3.6
	b) Additional support staff (24), & temporary employees & overtime	282	1.2
	c) Additional supplies, services & travel costs	307	1.4
5)	Other increases		
	a) Assistant to the Director General	108	0.5
	b) Additional positions in Int.Coop.& service units	495	2.2
	c) Additional supplies, services and general operating expenses	870	3.8
	d) Additional trainee stipends & allowances, temp.	560	2.5
	e) Additional equipment replacement	384	1.7
	f) Contingency	106	0.5
6)	Reductions in Programs		
	a) Discontinuation of Swine Program	(412)	(1.8)
	b) Senior staff for training in communication	(44)	(0.2)
1980/81	BUDGET	34,142	51.1

1a) The 1978/1979 revised budget included increases in costs because of inflation during the period. Besides the effect of inflation between 1979 and 1980 and 1981, (covered in the 2) below) the 1980/81 budget is greater than the 1978/79 budget because it includes two years at the 1979 level of prices rather than only the one year at that level in the 1978/79 budget.

1b) The 1978/79 budget included increases of seven senior staff, 22 scientific and supervisory level personnel and 173 clerical and other support staff. These increases occurred gradually over the period and in some cases recruitment was slower than expected. In 1980/81, except for the normal attrition represented by the vacancy factor, we expect these positions to be filled for the full period. The extra cost in 1980/1 will be about $477,000.

2) The relatively high rates of inflation pertaining in Colombia in 1976 and 1977 have apparently declined somewhat in the last year so that official figures for 1978 show an inflation rate of 20%. In addition, devaluation of the Colombian peso, which was only 4% versus the dollar in 1977, increased in 1978 to 8% and is expected to be 10% in 1979.

In projecting inflation and devaluation, we have sought information from several sources to arrive at various rates of inflation for Colombia and the United States (the country from which we import most items not purchased locally) and the rate of devaluation of the Colombian peso. The rates so determined were then weighted according to the mix of locally purchased and imported goods and services to develop composite rates. These rates, which have been used in arriving at the global inflation figures shown in the previous table and table 1,are as follows:

	1980	1981	1982	1983
Staff costs	9.9%	8.7%	8.7%	8.7%
Supplies and services	7.6%	7.6%	7.6%	7.6%
Travel	7.4%	8.2%	8.7%	9.4%
Petroleum products	50.0%	50.0%	50.0%	50.0%

3a) The following additional senior staff positions are proposed for research:

Beans	:	Agronomy - Crop Systems
Cassava	:	Feeding Systems (Utilization)
Rice	:	Physiology/Agronomy (Upland Rice)
		Breeding (Upland Rice)
		Economics (Upland Rice)

3b) A total of 17 additional scientific and supervisory level positions (research associates and assistants) are proposed. This provides a ratio of 2 per senior staff plus an extra one for the economist in each program and an administrative assistant for each coordinator.

3c) A total of 57 extra clerical and other support positions are proposed. These increases are net of reductions of 30 laborers due to mechanization noted in the section on capital. In addition honoraria, temporary employees and overtime increase by $260,000.

3d) These increases are for the additional costs associated with the increase in senior staff and other increases.

4a) The following additional senior staff positions are proposed for regional services:

	1980	1981
Beans	: Eastern Africa I	Eastern Africa II
	Central America & Caribbean	
Cassava	: Andean Zone	Asia II
	Asia I	Southern Cone - S. America II
	Southern Cone - S.America I	
	Central America & Caribbean	
Tropical Pastures	: Southern Cone - S. America	
	Humid Tropics I	
	Humid Tropics II	

In addition two existing positions based in Brazil will in future be considered as regional services personnel for the Southern Cone.

4b) Each regional services staff position is budgeted with a secretary and a technician. This represents an increase of 24 positions. In addition funds are provided for temporary or contract employees in each location.

4c) Each regional services staff position has been budgeted with $4,000 for supplies, and services and $10,000 for travel.

5a) This budget follows a new organization structure which the Director General will be presenting to the Board. The only increase in senior staff positions is one for an assistant to the Director General.

5b) Additional scientific and supervisory level positions are proposed for International Cooperation (7) and Administration (1). Also 25 additional other support staff are proposed for the general operating units.

5c) These increases are for the expansion of activities and physical structures.

5d) The training budget includes funds for granting scholarships for the academic part of an MSA degree not previously budgeted and an increase in the number of visiting research associates and thesis scholars. Also, temporary employees and overtime funds have been increased in some of the International Cooperation and service units.

5e) The estimated cost for equipment replacement is $334,000 in 1980 and $413,000 in 1981 which is an increase of $384,000 over the 1978/9 total.

5f) A contingency amounting to 1 per cent of the total budget has been included to allow the Director General to cover unexpected needs for funds or support positions which develop during the budget period.

6a) A separate report and recommendations regarding the Swine Program will be presented to the Board of Trustees. This budget proposal assumes that the program will be terminated at the end of 1979.

6b) After thorough review of the results of decentralizing training to the individual programs and the consequent needs of the centralized coordination and support function, it has been concluded that the second senior staff position is not required. The presently budgeted position, which is unfilled, will therefore be eliminated in 1980.

BUDGET CHANGES

In each section of this document which deals with a particular program or unit expalantions are given for changes in budgeted resources. There are certain changes, however, which affect almost every unit which are more conveniently handled globally. The following paragraphs explain these changes.

1) The concept of vacancy factors, introduced in the 1978/79 budget, to recognise the delays in filling new positions and finding replacements when staff leave, has been continued in this budget proposal. The vacancy factors for local staff have proved to be reasonable but for senior staff we have increased the factor applied from 2% to an average of 10% to recognize the low fill ratio (man-years divided by positions) every year in this category.

2) Senior staff costs increase in 1980 above normal levels because distributed personnel costs are substantially increased by the cost of relocating the large numbers of new senior staff.

3) Most services are centrally provided and no "charge" is made to programs or units for their use of the services. Previously there was one exception to this norm for the cost of printing publications which were budgeted within each program. Now this has been changed so that as from 1980 all such costs are budgeted within the Communication Support Unit. This results in reductions in services in many programs.

DIRECTOR CROPS RESEARCH

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Director									
N.N.	1.5	2.0	2.0	2.6	2.0	2.0	11.4	12.0	12.0
Vacancy Factor	-	-	-	0.1	0.1	0.1	0.6	0.9	0.9
	1.5	2.0	2.0	2.5	1.9	1.9	10.8	11.1	11.1

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	155,876	234,868	390,744	246,060	244,329	490,389	26
Supplies	240	5,580	5,820	1,500	1,500	3,000	(48)
Services	228	3,626	3,854	100	100	200	(95)
Travel	10,167	18,044	28,211	22,200	22,200	44,400	57
Replac. Equip.	31		31				
	166,542	262,118	428,660	269,860	268,129	537,989	26

BUDGET CHANGES

The two director positions for crops research and land resources research have been created out of the previous positions for Associate Director General - Research and Coordinator of Special Studies. The costs for 1978/79 of these positions and their support have been divided equally between the two new offices. In addition, the $155,000 which is 60% of funds for post doctorals (40% is included in Training) and visiting scientist funds of $90,000, have been divided between the two offices in proportion to the total research budgets of the two divisions.

The office of the Director includes six clerical and other support staff starting in 1980.

PROGRAM COMMENTARY

The objective of the Crops Research division is to develop improved plant material and associated low-cost production technologies in cassava, field beans, and rice. The division is comprised of three major research programs (Bean Program, Cassava Program, Rice Program) plus a cluster of three research support units (Station Operations, Genetic Resources, Laboratory Services). The Director of Crops Research has the overall responsibilities for all research activities in the division.

BEAN PROGRAM

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/
Research									
Soil Microbiology									
P. Graham	2.0	2.0	2.0	3.6	4.0	4.0	18.5	19.7	21.0
Physiology									
D. Laing	2.0	2.0	2.0	4.0	4.0	4.0	28.6	30.0	30.0
Breeding I									
S. Temple	2.0	2.0	2.0	1.7	2.5	4.0	27.0	28.5	29.0
Breeding II									
S. Singh	2.0	2.0	2.0	1.7	3.5	4.0	18.6	21.7	23.0
Virology									
F. Morales	0.6	2.0	2.0	3.4	4.0	4.0	21.0	20.7	21.0
Micology									
H. Schwartz	2.0	2.0	2.0	3.5	4.0	4.0	15.0	23.0	28.0
Entomology (Coord.)									
A. Schoonhoven	2.0	2.0	2.0	4.0	5.5	6.0	48.7	59.8	54.0
Breed.Agr.(Climb.Beans)									
J. Davis	1.4	2.0	2.0	3.7	4.0	4.0	19.1	23.7	26.0
Agronomy (Prel.Trials)									
M. Thung	2.0	2.0	2.0	3.5	4.0	4.0	10.1	20.0	20.0
Agronomy (Intl. Trials)									
O. Voysest	2.0	2.0	2.0	4.0	4.0	4.0	22.0	22.0	22.0
Agronomy (Crop.Syst.)									
N.N.	-	1.5	2.0	-	2.0	4.0	-	14.7	23.0
Economics									
J. Sanders	2.0	2.0	2.0	5.4	6.0	6.0	6.7	9.7	10.0
	20.0	23.5	24.0	38.5	47.5	52.0	235.3	293.5	307.0
Vacancy Factor	0.2	1.5	2.3	1.3	2.9	3.1		22.9	24.6
	19.8	22.0	21.7	37.2	44.6	48.9	235.3	270.6	282.4
Regional Services									
Central Amer.& Caribb.									
G. Galvez		1.5	2.0					3.2	4.0
Eastern Africa I-N.N.		1.5	2.0					3.2	4.0
Eastern Africa II-N.N.		0.5	2.0					1.3	4.0
Southern Cone - N.N.			0.5						1.3
		3.5	6.5					7.7	13.3
Vacancy Factor		0.3	0.7					0.5	0.1
		3.2	5.8					7.2	13.

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Research							
Personnel	894,251	1,133,052	2,027,303	1,235,513	1,269,492	2,505,005	24
Supplies	85,027	100,000	185,027	115,000	115,000	230,000	24
Services	40,911	31,525	72,436	10,000	10,000	20,000	(72)
Travel	75,400	81,257	156,657	103,350	103,350	206,700	32
Replac. Equip.	6,695	34,000	40,695	38,000	51,000	89,000	119
	1,102,284	1,379,834	2,482,118	1,501,863	1,548,842	3,050,705	23

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Regional Services							
Personnel				83,472	185,352	268,824	∞
Supplies				9,000	10,500	17,500	∞
Services				2,000	3,000	5,000	∞
Travel				20,200	30,300	50,500	∞
Replac. Equip.				-	-		
				112,672	229,152	341,824	∞

BUDGET CHANGES

An additional senior staff position is proposed for agronomy (cropping systems). With this addition the agronomy group for climbing beans, preliminary trials, international trials, and cropping systems is completed. The previously projected position for a lunatus breeder is not now proposed (see Program Commentary below).

Scientific and supervisory staff are increased by two for the new position and one for an administrative assistant.

Four regional services staff are proposed --two starting in 1980, one in 1981 and one in 1983. The position to start in 1980 is for the region covering Central America and the Caribbean. The position has been available since September 1977 under the auspices of the UNDP special project on International Cooperation, and funding is assured through June 1980. It is hoped that UNDP will continue funding of the position as restricted core thereafter. The function of the position is to (a) provide a formal link between the Bean Program with regional and national institutions in the area; (b) to provide collaborators of the Bean Program in the region with promising germplasm and technical assistance; (c) to coordinate the evaluation nurseries of the Bean Program in the region; (d) to carry out to a limited degree bean research project that deal with regional problems (e.g., bean golden mosaic), and (e) to identify professionals for CIAT training and to engage in follow-up activities of past CIAT training participants in the region.

As the research results of the Bean Program increasingly take on the form of improved bean production technology, it is deemed important to expand the active international collaboration efforts to other important bean production areas of the world. Of foremost importance is the Eastern Africa region where large areas are planted to beans and where beans constitute a major protein source in the diets of the population. The proposed regional services staff positions (one to start in 1980, the other in 1981) are to follow in the footsteps of an existing Dutch foreign aid project in the region. The proposed positions are (a) to provide formal links with research/development agencies in the area; (b) to assess the bean production constraints in the region and to carry out on a limited basis research projects that have a bearing on the production constraints in the area; (c) to build up a network of collaborators in the region and to service this network with promising plant material and technical assistance; and (d) to arrange for the regional evaluation of promising lines. Given the local preponderance of determinate cultivars (and the need to introduce improved materials from the CIAT breeding program), plus the importance of diseases as a major production constraint, it is anticipated that the two proposed staff positions would be for an agronomist/breeder and a pathologist. A request has been made to the Dutch Government for restricted core funding for the two Eastern Africa positions.

PROGRAM COMMENTARY

Importance of Beans

Beans (Phaseolus vulgaris L.) are an important protein component of diets in many countries, especially for lower income people. The FAO estimates world annual production at around 12.3 million tons, but this is known to include other grain legumes. Latin America annually produces 3.7 million tons, or about 35 percent of the world total, with Brazil (2.1 million tons) and Mexico (1 million tons) being the largest producers. East Africa is also an important dry bean zone, with around 1 million tons produced annually. In that area people strongly depend on beans as a source of protein.

During the last decade production in Latin America has increased only 0.27 percent per year, far below the 2.8 percent annual population growth rate. Improved production was achieved through increases in the area sown, while productivity decreased overall. Production and productivity increased however, in a few countries, particularly those with active bean improvement programs. As a consequence of decreased availability of beans, per capita consumption in Latin America has declined, in some countries very dramatically. In the last decade, per capita consumption in Peru decreased from 9.3 to 5.7 kg and in Brazil, from 26.6 to 22.2 kg. This decline in consumption will of necessity mean further deterioration in the diets of the lower-income segment of the population.

Problems of the Crop

While the yield potential of many of the commercial varieties now in use in Latin America ranges from two to three tons per hectare, average yields are only around 600 kilograms. The principal reason for this low actual yield appears to be the heavy disease pressure on beans. Beans are susceptible to a wide spectrum of diseases which reduce yields in some areas to less than 100 kg/ha. Several diseases are seed-transmitted, and thus are widely distributed. While it is generally recognized that diseases are more severe in Latin America (the genetic center for beans), diseases are also numerous and severe in Africa, possibly due to seed-borne disease introduction. Beans also suffer from strong insect pressures. Both pest factors make beans a high-risk crop unable to compete with soybeans, sorghum, etc. for the better lands. Consequently, beans have been forced into more marginal lands where they face additional hazards of uncertain rainfall and low nitrogen and phosphorus levels in the soil.

The principal fungal and viral diseases, all seed-transmitted, are bean common mosaic virus (BCMV), anthracnose, angular leaf spot, and bacterial blight. Bean rust is highly variable in incidence and, while not a seed-transmitted pathogen, severely affects yields in all bean production zones. Several other diseases, e.g. halo blight, golden mosaic virus, yellow mosaic virus, ascochyta, grey spot, etc. are occasionally and/or locally important.

Empoasca leafhoppers are the principal insect pest but chrysomelids, pod borers, mites, bean flies, and soil pests, are also important. Stored beans are highly susceptible

to bruchid damage and the absence of adequate storage technology forces the prompt marketing of beans. This enhances price fluctuations over and above those caused by production variations.

Bush beans in many areas are of very poor plant type. Lodging and consequent pod contact with soil contribute to pod rot and the accumulation of pathogens in the seed. The absence of certified, disease-free seed production programs in Latin America, and the custom of most farmers to save their own seed enhances the disease pressure from seed-borne diseases. With respect to climbing beans, most materials are excessively vigorous, of late maturity and with low yield potential. The interaction of these types with available or improved maize varieties is of critical importance to the improvement of climbing beans, but has not yet been evaluated adequately.

Through travel, visits of national program scientists and collaborative experiments we have a reasonably accurate conception of production constraints. However, more knowledge is desired on production areas, cropping systems and soil and climatological conditions affecting bean production.

Program Objectives

The Bean Program's principal objective is to produce, in collaboration with national programs, technology which will lead to improving bean productivity and production. The following primary activities support the principal objective.

1. Genotype improvement, especially for disease resistance. Short-term objectives are resistance to BCMV, rust, bacterial blight, angular leaf spot and leafhoppers. Longer-term objectives are in the area of plant architecture improvement. While stability and potential, increased bean quality and efficiency in fertilizer use will be added as objectives in the future.

2. Development of improved agronomic practices compatible with improved genotypes and different cropping systems.

3. Training to strengthen the research and technology transfer activities of cooperating national programs.

4. International cooperation at all levels for the development of an active bean research network throughout the target areas.

Program Strategies

The varietal improvement program depends heavily on the vast genetic variability available in the CIAT germplasm collection managed by the Genetic Resources Unit. Parents are selected from this collection and hybridizations made to combine the following desired genetic variability.

1. Resistance to priority diseases and pests, while maintaining or increasing yield potential. Where pest resistance levels are inadequate, they are being increased through special breeding activities. Additional projects are under way to incorporate resistance to golden mosaic virus, Apion and web blight.

2. Improved plant architecture with lodging resistance (as a disease avoidance mechanism), and improved yield potential and variability in maturity to fit various cropping systems. Some degree of drought tolerance is also being sought.

3. Decreased dependence on fertilizers is being sought by breeding for more efficient bean variety/Rhizobium strain combinations that have higher nitrogen fixation levels. Genotypes which can utilize applied phosphorus efficiently are also being investigated. Variability for tolerance to high soil aluminum is being evaluated although the program tries to concentrate most of its resources in those areas where beans are now being produced and which are, at worst, only moderately acid in reaction (except for areas in Brazil).

4. Germplasm variability for protein content, cooking time, and other quality aspects have been encountered. A close monitoring of parents and breeding lines will be maintained by the Food Quality Research section in CIAT's Laboratory Services Unit.

5. Photoperiod insensitivity is proving useful in the relatively wide adaptation of advanced materials.

6. The bean program has to obey national and local seed color and seed size preferences which vary greatly from country to country. An overall reduction in seed size of the many large-seeded commercial materials appears justified from agronomic and economic viewpoints.

Agronomic practices are usually rather site-specific; these will remain as national program responsibilities, particularly with respect to plant density, weed control and fertilizer use.

Genetic improvement of the lima bean (Phaseolus lunatus) that was considered in earlier budgets would require strong support from both the agronomy and pathology groups of the bean team. Both are areas where the P. vulgaris improvement program presently requires all available resources. In addition, inquiries at national program levels suggest that there is little demand for improved lima bean germplasm. While Mexico and Peru are interested in the crop it appears that breeding work can be handled adequately by national programs. It is concluded, therefore, that we should maintain our world responsibility for the lima bean through germplasm collection, evaluation, maintenance and distribution and that these tasks could be

handled by a postdoctoral fellow attached to the Genetic Resources Unit. The Bean Program intends to convert the previously projected position for 1980 and onwards for the P. lunatus breeder to a cropping systems agronomist. This change will relieve pressures on the other two agronomists and considerably strengthen farm-level testing of new technology and training efforts.

The following program structure and responsibilities are envisaged for 1980 and beyond:

1. Breeding (Bush Beans)

   The two existing positions remain, although both scientists will have increased involvement in preliminary and international yield testing with respect to parent and progeny evaluation.

2. Breeding-Agronomy (Climbing Beans)

   The breeding responsibilities for this position remain but emphasis on agronomic aspects of the bean/maize direct association and relay systems will be increased. Organization of the international yield and adaptation program for climbing beans is assigned to the agronomist indicated below.

3. Agronomist (Preliminary Yield Testing)

   The responsibilities of this position include: (a) preliminary yield evaluation of advanced lines from the bush bean breeding program in collaboration with the breeders, (b) screening of germplasm and advanced lines for tolerance to adverse soil conditions, particularly low phosphorus content, low pH and high aluminum saturation, and (c) aspects of the intercropping of beans with crops other than maize.

4. Agronomist (International Testing Program)

   The responsibilities of this position include: (a) the organization of the international yield and adaptation nurseries for both bush and climbing beans, and (b) seed multiplication for these networks.

5. Agronomist (Cropping Systems)

   This position will have responsibilities for evaluating new bean technology within the prevailing cropping systems for beans in the target area particularly with respect to developing methodologies for on-farm technology evaluation. The position will include a training component as well as non-site specific cultural practices agronomy.

The remainder of the program senior staff scientists (the entomologist, economist, physiologist, pathologist (fungal), virologist, and microbiologist), will

continue in their present responsibilities. The economist will continue to have an input in farm-level evaluation of technology, including studies on constraints to technology adoption by farmers, and in the area of analysis of macro- and micro-production and consumption data. He will also be involved in evaluating international yield test data.

Bean improvement is a difficult task for the relatively small CIAT-based program to achieve in isolation. Through an aggressive training program we hope to raise the scientific capability of bean researchers in the target area and to catalyze research within the national programs. Two short courses per year and postgraduate internships are the main vehicles to achieve the goals. In-country training courses are foreseen for 1980 and onwards.

With improved technology being developed and the increasing intensity of our network it has become necessary to post staff outside CIAT to coordinate the multiple aspects of the network. The first outposted staff became operative in Central America and the Caribbean in 1977. A second position is planned to initiate our collaboration with East Africa countries by stationing a senior scientist in that area, followed by a further position in 1981 for the same region.

Status of the Program

The program has identified genetic variability for resistance to most pests but in some cases, further pyramiding of resistance levels is required. The program makes several thousand hybridizations a year, and these progenies pass through a successive set of nurseries to test for pest resistances, adaptation and yield. Lines that enter international testing possess resistance or tolerance to three or more pests and have a yield potential equal or superior to commercial varieties. The best selections within each main color group, both for bush and climbing beans, are entered annually into international yield and adaptation nurseries. The entries include not only CIAT breeding lines, but also elite materials from national programs. In the non-black seeded lines, the improved materials frequently require fine tuning with respect to seed size and color. From previous international nurseries national programs have selected lines for hybridization and regional testing, and some have been named or are to be named as new varieties in the near future. For example, Cuba, the largest importer of beans in Latin America, expects to be self-sufficient in beans in few years based initially on the variety ICA-Pijao, selected from international yield testing. In Honduras, early segregating progenies from crosses at CIAT were further selected by former trainees and four lines are being multiplied after successful regional testing. Agronomic studies on farms have shown that herbicide use and increased plant densities are profitable for farmers. Insecticides and fungicides are only acceptable as curative sprays, while fertilizer use is a risky investment when climatic conditions are likely to affect yield. Beans associated with maize reduce pest incidence levels, and safe seed storage can be achieved by treating beans with vegetable oils.

SPECIAL PROJECTS

The UNDP provides funds for an integrated training and international cooperation project which includes an international cooperation expert (regional services coordinator) for Beans in Central America. Funds provided cover the expert through June 1980 at which time, as noted earlier, the position is proposed as core funded.

A collaborative project between the University of Gembloux and CIAT has been funded by the Belgian Government since 1977. The project is to work in the areas of germplasm evaluation, flower physiology and interspecific hybridization of a range of Phaseolus species. The project involves one FAO associate expert stationed at CIAT, with support personnel and other costs totalling about $24,000 per annum.

In addition to the above, bilateral funding through CIAT for personnel directly assisting national institutions is being provided or has been requested for the following:

Guatemala: Two professionals are stationed at the Instituto de Ciencia y Tecnología Agricola (ICTA) through which CIAT collaborates with ICTA in the development of the research and extension programs of that institution. The two USAID-funded positions are:

-Bean Production/Plant Pathology Specialist (through February, 1980)

-Agronomy/Bean Production Specialist (through April, 1980)

Peru, Bolivia, Ecuador: A request for funding of one Bean Agronomy position to serve this area has been submitted to the Swiss Government. The project is to be of a four-year duration, and, if funded, will start in the latter half of 1979.

CASSAVA PROGRAM

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Research									
Feeding Systems - N.N.	-	2.0	2.0	-	3.0	4.0	-	16.0	18.0
Physiology									
J.Cock (Coordinat.)	2.0	2.0	2.0	4.0	5.5	6.0	*36.9	*31.0	*28.0
Breeding									
K. Kawano	2.0	2.0	2.0	3.0	4.0	4.0	35.7	37.7	38.0
Germplasm Development									
C. Hershey (Post.D)	1.4	2.0	2.0	1.5	4.0	4.0	10.0	21.5	22.0
Pathology									
C. Lozano	2.0	2.0	2.0	3.6	4.0	4.0	23.7	25.8	26.0
Entomology									
A. Bellotti	2.0	2.0	2.0	4.0	4.0	4.0	28.5	32.0	32.0
Plant Nutrition									
R. Howeler	2.0	2.0	2.0	4.0	4.0	4.0	28.0	30.0	30.0
Cultural Practices									
D. Leihner	2.0	2.0	2.0	3.8	4.0	4.0	31.0	39.0	40.0
Economics									
J. Lynam	1.5	2.0	2.0	4.0	6.0	6.0	7.2	10.0	10.0
Regional Trials									
J. Toro	2.0	2.0	2.0	4.0	4.0	4.0	24.7	24.0	24.0
	16.9	20.0	20.0	31.9	42.5	44.0	225.7	267.0	268.0
Vacancy Factor	0.2	1.3	1.3	1.1	2.6	2.6	9.9	20.8	20.9
	16.7	18.7	18.7	30.8	39.9	41.4	215.8	246.2	247.1
Regional Services									
Asia									
R. Obordo		2.0	2.0					4.0	4.0
Asia (Phytosanitary)									
N.N.		0.5	2.0					1.3	4.0
S. Cone I - N.N.		1.5	2.0					3.2	4.0
S. Cone II - N.N.		0.5	2.0					1.3	4.0
C. America & Caribbean									
N.N.		1.5	2.0					3.2	4.0
Andean Zone									
A. Castro		2.0	2.0					4.0	4.0
		8.0	12.0					17.0	24.0
Vacancy Factor		0.6	1.0					1.1	1.6
		7.4	11.0					15.9	22.4

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Research							
Personnel	781,241	1,027,810	1,809,051	1,184,094	1,187,998	2,372,092	31
Supplies	61,625	56,745	118,370	97,000	97,000	194,000	64
Services	3,682	34,047	37,729	15,000	15,000	30,000	(20)
Travel	92,842	57,616	150,458	86,150	86,150	172,300	15
Replac. Equip.		29,000	29,000	40,000	53,000	93,000	221
	939,390	1,205,218	2,144,608	1,422,244	1,439,148	2,861,392	33

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Regional Services							
Personnel				205,700	330,998	536,698	∞
Supplies				14,000	21,000	35,000	∞
Services				4,000	6,000	10,000	∞
Travel				40,400	60,600	101,000	∞
Replac. Equip.							
				264,100	418,598	682,698	∞

BUDGET CHANGES

One senior staff position and support staff are being added for utilization. This proposal was discussed and accepted by the Board in 1978. In addition to the personnel costs, $50,000 is included for visiting scientists and post doctorals and substantial sums for supplies and contracted work.

The new technology being developed by the program is now at the stage where it can have a positive impact on production. As a result efforts are being markedly increased in outreach to ensure that the technology be adapted to local conditions and finally distributed to farmers. In order to do this increases in regional services staff are requested as follows. Two positions in Asia to coordinate CIAT's efforts in Asia and facilitate introduction of plant material probably by tissue culture in the future. Two positions to serve the southern cone of Latin America, the emphasis being on technology adaptation and transfer. One position based at CIAT to cover Peru, Ecuador, Colombia and Venezuela and another probably based in the Dominican Republic to serve Central America and the Caribbean. Of the six positions, the second positions in Asia and the southern cone are planned from 1981 and the other four from 1980.

PROGRAM COMMENTARY

Importance of Cassava

Cassava is grown exclusively in the tropics where it is the third most important food crop (excepting sugar) in terms of total dry matter produced. The estimated world production is approximately 110 million tons of fresh roots (about 35 millions tons of dry roots) produced on about 11 million hectares. Most of the production occurs on small farms situated in areas of poorer soils without irrigation facilities. Average yields of close to 10 t/ha are significantly below the potential for the crop.

Within the IARC framework, CIAT has responsibility for cassava on a global basis. However, as the sister institute IITA has responsibility for the African region, the Center's activities are focused on the Americas and Asia. Both Latin America and Asia produce similar amounts of cassava, approximately 33 million tons per year. In tropical Latin America, on a dry weight basis, cassava is the third most important crop after rice and corn. The dry matter production of cassava is greater than the combined production of wheat and sorghum in the region. More than half the cassava is produced on small farms of less than ten hectares and consumption is greatest in rural areas. Increased consumption in the urban areas appears to be limited by the crop's perishability that makes it high priced in the cities. Over the last 20 years, rate of increase of production has lagged behind the population increase.

In Asia production has been increasing at more than 4 percent per year. The increased production has mainly occurred due to increased area planted, except in India. (In the state of Kerala, India, where most cassava is produced, there is a strong national research and extension program and in the period from 1961-1965 to 1971-1975, the per hectare yield has increased from 9 to 16 tons.) In the rest of Asia, yields have been stagnant with the main production increase due to a sixfold increase in area planted in the last 20 years in Thailand. (Thailand is the world's largest exporter of dry cassava for animal feed; in 1978 she exported some four million tons.)

The use of cassava as an energy source for animal rations is becoming more important. Several countries are making plans to use more marginal land for cassava production, and are thus able to free better land for more demanding crops, and to reduce imports of cereal grains at the same time that income and employment in marginal areas can be generated.

It is estimated that cassava forms a major part of the diet of 300-500 million people in the less-developed tropical regions. It is most commonly found in the poorer agricultural zones and as such is a main source of income for small-scale producers and is a staple in many areas for the low income consumer. Traditionally, cassava has been one of the first crops planted when new agricultural land is first colonized and hence it plays a major role in the increase of arable land in the tropics.

Problems of the Crop

Its long growth cycle and vegetative reproduction make cassava propagation very slow, and the transfer of material from region to region is always fraught with dangers of introducing pests and diseases. Some of these problems can probably be overcome by tissue culture techniques. Nevertheless, these techniques are only applicable for the initial transfer and propagation of foundation stocks of new varieties. The propagation of material for large-scale use by farmers will always be slow and hence adoption by farmers will not be rapid.

Harvested cassava roots are extremely perishable; this causes marked price fluctuations and also very high prices in the urban sector. The extreme perishability of cassava is probably one of the main factors limiting expansion of production for the fresh market.

The use of cassava as an energy component of animal feeds has great potential. While much is known about the nutritional aspects of cassava for animal feed, the manner in which the cassava is handled and processed for feed needs much investigation if its potential is to be realized.

Program Objectives

The Cassava Program was initiated in 1971 and became fully operational in 1973. The program objectives are:

1. To develop technology for production of high yields of cassava, that does not require high levels of inputs. Particular emphasis is being placed on developing technology for regions that have traditionally been considered unsuitable for crop production due to the low fertility of the soil and poor rainfall distribution.

2. To develop technologies that can be used to reduce the perishability and to facilitate transportation of cassava.

3. To make new genetic material and production technologies available to local and national agencies and assist them in the transfer of new technology to the producers.

Program Strategies

Functionally, the cassava program has three major sections. The first is devoted to developing and validating production technology, the second to processing and utilization technology, and the third to adapting and transfering the technology to specific regions.

Yields on farmers' fields are limited by low yield potential of varieties, diseases, pests, weed competition, incorrect fertilizer applications and sub-optimal agronomic

practices. Production technology development attempts to remove these restraints through two basic areas of emphasis: Improvement of germplasm, and the provision of simple technology to remove production constraints.

The development of improved germplasm is a tedious and slow process. It is estimated that four to six years are needed between identifying suitable parents and having the progeny field tested. However, the possible payoff from germplasm improvement is tremendous. For example, if improved germplasm were to increase production of cassava in Thailand by only 10 percent, then the benefits accruing to the farmers in only one year would be greater than the total investment in cassava research at CIAT up to the present. Furthermore, these benefits would be obtained with minimum extra input by the farmers. Hence, major emphasis is placed on improving germplasm so that varieties can be produced that are disease and pest resistant, grow well on low fertility soils and produce high yields.

To solve problems in the short term and problems that can not be resolved by improved germplasm, great emphasis is also placed on "cultural practices." These include biological control of pests, phytosanitary practices, selection of planting material, optimum plant population. The practices are always developed so that they require low levels of purchased inputs. For example, since it is unlikely that varieties with low nitrogen requirement can be developed, CIAT's strategy is to define the most efficient use of nitrogen inputs. Similarly, since it is very difficult to develop varieties tolerant to the many organisms that attack planting material, emphasis is placed on the development of cheap, efficient chemical control methods. In the case of pesticides, it is recognized that in a long-season crop such as cassava, the repeated use of foliar applications is extremely costly. When varietal resistance can not be found, (as in the case of the hornworm), CIAT's strategy is to develop biological controls.

The development of technology to decrease perishability of cassava and improve its utilization is a new facet of the Program's activities. In the area of fresh cassava storage, the strategy is to develop methods that can be used at the farm level. The most likely lines of success appear to be using pretreatment of the plants before harvesting by removing leaves, and/or cheap packaging that allows the roots to cure combined with a chemical disinfectant.

The major emphasis in utilization will be for animal feed, with special attention being paid to the way the crop can be handled. This will include work on sun drying and use of the whole plant in the form of silage. Utilization techniques such as starch or alcohol production and bread making will not be developed at CIAT as other agencies are actively engaged in these areas of investigation.

Knowledge of new cassava technology is spread by personal contacts, conferences, training and distribution of publications and other media. The outreach staff are responsible for seeing that this information flow occurs and that those persons who need the information receive it.

Training programs not only help disseminate knowledge of new technology but also help to strengthen national agencies. The training of researchers from national agencies is geared towards training multidisciplinary groups who can, on return to their national agencies, reach a critical mass so as to be effective in their work. Most training up to now has been oriented to increasing national capacity to develop, adapt and validate new technology. The requirements of several national agencies have now shifted to training of larger numbers of extension workers. This need will be met by the development of in-country training programs.

An additional and extremely important aspect of developing national agencies has been and will continue to be the assistance in planning research and development programs. This work mainly involves extended consultancy visits by CIAT outreach staff.

Expected Results

1. Technology development. High-yielding varieties for many cassava growing areas already exist. Improved quality and resistance will be gradually incorporated. Varieties suitable for the acid infertile soil regions will be available by 1982. Cultural practice packages for cassava production exist and will be improved so that by 1982, with the new varieties, farmers should be able to obtain 20 t/ha under very poor conditions and 40 t/ha under excellent conditions. By 1982, simple cassava storage methods should be ready for commercial use.

2. Production increase. In certain areas of Colombia and the Dominican Republic, CIAT-selected varieties are already being used on farmers' fields. It is expected that by 1982, CIAT varieties and production technology are sufficiently widely used to show production increases on a regional level.

SPECIAL PROJECTS

Since 1976 IDRC has funded two projects for outreach and training to provide a regional services coordinator for Latin America and another for Asia plus production training courses and postgraduate training. These projects are due to end this year and as noted earlier it is proposed to incorporate the functions in core. It is hoped that IDRC will agree to continue funding the activities as a restricted core contribution. Resources provided in 1979 are as follows :

Coordinators (A. Castro & R. Obordo)	Latin America 1.0 M-Y	Asia 1.0 M-Y
Personnel Costs	$ 39,000	$ 46,500
Supplies & Services		8,000
Travel	10,000	15,000
Support services	16,750	10,500
Contingencies	15,000	15,000
	$ 80,750	$ 95,000

RICE PROGRAM

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Upland Physiology/Agron N.N.		2.0	2.0		4.0	4.0		25.8	26.0
Irrigated Agron. (Coord) J. Gonzalez	2.0	-	-	2.7	-	-	19.2	-	-
Irrigated Breeding H. Weeraratne	2.0	2.0	2.0	4.8	6.0	6.0	26.4	31.3	31.0
Irrig./Upland Path. S. Ahn	1.0	2.0	2.0	2.0	4.0	4.0	12.5	26.7	27.0
Irrigated/Upland Agron. N.N.	-	1.5	2.0	-	3.0	4.0	-	20.7	23.0
Upland Breeding N.N.	-	1.5	2.0	-	3.0	4.0	-	23.5	27.0
Irrig./Upland Economy N.N.	-	1.5	2.0	-	3.0	4.0	-	10.3	12.0
	5.0	10.5	12.0	9.6	23.0	26.0	58.1	138.3	146.0
Vacancy Factor	0.1	1.3	1.6	0.4	1.4	1.6	3.0	10.8	11.4
	4.9	9.2	10.4	9.2	21.6	24.4	55.1	127.5	134.6

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	176,997	335,909	512,906	543,633	658,804	1,202,437	134
Supplies	15,383	20,888	36,271	34,600	35,800	70,400	94
Services	1,642	1,893	3,535	4,000	4,000	8,000	126
Travel	9,986	22,060	32,046	51,750	51,750	103,500	223
Replac. Equip.		11,000	11,000	15,000	22,000	37,000	236
	204,008	391,750	595,758	648,983	772,354	1,421,337	139

BUDGET CHANGES

Starting in 1980 the Program will expand to six senior staff positions so as to start work on favored upland rice. Up to the present work has only been undertaken specifically for irrigated rice. This expansion of three senior staff and the functions of the different disciplines are described in the Program Commentary below. Support staff and costs increase proportionately with the senior staff.

PROGRAM COMMENTARY

Importance of the Crop

Rice is one of the most widely cultivated crops in Latin America. Presently, there are nearly seven million hectares planted to rice in Latin America (two-thirds of which are in Brazil) with an estimated total production of some 13 million metric tons per year. Rice represents a staple in the diets of the region's people. Estimates for annual per capita rice consumption are placed at 9 kilograms in Mexico, 17 kilograms in Venezuela, 29 kilograms in Colombia, and 45 kilograms in Brazil.

In the past 15 years, rice production in the area has increased at an annual rate of 2.8 percent, equal to the population growth rate. In general, one-third of the increases in production can be attributed to increases in yield. The remaining two-thirds were due to increases in the area planted to rice. This proportion, however, has varied from country to country. In Colombia, Ecuador, Panama, Belize, Haiti, and Trinidad & Tobago, most of the increases were due to yield increases. In contrast, recorded production increases in Brazil, Cuba, Argentina, Bolivia, Paraguay and Guatemala were mostly due to area increases.

Overall, gross rice imports to Latin America have increased from approximately 385,000 tons in the period 1963-1965 to some 470,000 tons in the period 1973-1975. As a result of increased exports from some countries, notably Colombia, Venezuela, Uruguay and Surinam, net regional imports have remained at around 150,000 tons per year.

In recent years, high-yielding dwarf cultivars of rice grown under irrigated conditions have made significant contributions to increased productivity in Asia. Latin America, especially Colombia, has also benefited from these new cultivars, where dramatically increased yields could be achieved under conditions of good water control. However, since upland rice (i.e. rice grown on un-bunded fields that are prepared and seeded under dry conditions and that depend only on rainfall for moisture) accounts for no less than 70 percent of the rice area grown in the region, the new achievements have had but limited impact on the majority of the rice cultivated in Latin America. Presently, upland rice yields an average of 1.5 t/ha (compared to about 3.9 t/ha for irrigated rice). Nevertheless, upland rice accounts for more than 50 percent of total rice production in Latin America, hence even a small improvement in upland yields will necessarily result in a rather dramatic production increase in the region.

Problems of the Crop

Three major areas of general production constraints to increased rice production in Latin America can be identified. Foremost are agronomic factors such as water control, land preparation, seeding methods, weed control and fertilization. For irrigated rice, research on cultural practices that are of a non-specific nature is rather complete; today, the priorities in cultural practices are in the areas of technology transfer and location-specific agronomic research. The latter, of course, is primarily within the domain of national research institution responsibilities.

A second constraint to increased production is varietal improvement. Much has already been achieved in yield capacity of modern varieties; the challenges in varietal improvement are to close the gap between potential and actual yields (largely through improved farming practices with modern varieties) and to stabilize acceptable high actual yields. This is basically a problem of creating stable resistance to Pyricularia (rice blast disease), the only pathogen presently causing widespread or epidemic infections on a regional basis. Losses from Pyricularia are substantial in some areas. Added to this are costs for chemical control, reduced prices for damaged grain and foregone yields wherever producers refrain from aiming at maximum productivity because of the threat of blast attacks. Failure to obtain stable resistance forces the release of new varieties every one or two years.

A third major production constraint includes the other pathogens and pests that are not so widespread as blast but, nevertheless, can be devastating in specific areas. Of most importance are the fungal diseases Rhyncosporium (leaf scald), Helminthosporium (brown leaf spot) and Corticum (sheath blight); a bacterial disease, Xanthomonas (leaf blight); and a range of insect pests (including Sogatodes oryzicola, the vector of the "hoja blanca" virus).

Upland rice production has an additional group of constraints that result from environmental stresses. Plant types developed to be grown under the favorable irrigated conditions are not necessarily suitable for upland culture. Moreover, upland rice is often cultivated on marginal soils which are frequently characterized by low pH levels and high levels of aluminum, manganese and iron. The relatively low water-holding capacity of the soil in the root zone of the rice plant creates severe drought stresses, even during relatively short dry periods. All of these stresses make the plant less tolerant to attacks from the pests and diseases mentioned earlier.

Objectives of the Program

The objective of the Rice Program is to develop and transfer improved varieties and production technologies to contribute to increased production, productivity and quality of rice in Latin America. In pursuit of this objective, the Rice Program closely collaborates with the International Rice Research Institue (IRRI), whenever possible adapting its plant materials and technologies to the specific needs of the region.

Up to the present, CIAT has emphasized only lowland, irrigated rice. Beginning in 1980, it will also include upland rice as it is cultivated in the more favorable dry lands of Latin America. Work on upland rice is clearly indicated by a number of reasons, including the following:

1. The large proportion of rice production in Latin America which is currently grown under upland conditions.

2. The large amount of land available for expansion of rice production on upland conditions.

3. The large amount of capital investment required for expansion of irrigated rice production, even though large areas suitable for this type of rice culture are available in the region.

4. The fact that most of the small farmers producing rice do so under upland conditions.

5. The fact that rice technology developed for irrigated conditions has not proven very useful for upland rice culture.

6. The fact that national programs have not yet developed their research work on favored upland rice, nor their human and physical resources, to the point where they can produce exclusively, by themselves, the appropriate technology for upland rice production.

Strategies of the Program

A. Irrigated Rice

The Rice Program will continue its work in irrigated rice with the inputs of Breeding (one full senior staff position), Pathology (one half senior staff position), and Agronomy/Training (one half senior staff position).

The possibilities for further yield increases are being explored through the introduction of several widely adapted, high-yielding parents to the breeding program. In rice blast, two new approaches are being tried: (a) the development of multiline varieties, and (b) combining resistance factors from several progenitors. With regard to sheath blight and leaf scald diseases, efforts to breed for resistance have not yet been initiated in this region. Three new sources of resistance identified from sheath blight nurseries are being utilized to incorporate resistance into several promising lines and varieties. Similar efforts will be carried out against leaf scald. Breeding for resistance to the green plant hopper (Sogatodes oryzicola), the primary vector of the "hoja blanca" virus, will impart avoidance of the disease. Present varieties possess resistance in the form of a single dominant gene derived from the IR-8 variety. However, it is entirely possible that new physiological races of the hopper will develop. Therefore, identification of additional genes for resistance and their incorporation into superior lines is planned.

B. Upland Rice

The Rice Program's emphasis on upland rice will be on production systems for the more favored upland conditions. The "favorable" and "unfavorable" conditions are the two extremes on a continuum. Favorable upland rice may be defined as the dry-land rice grown on unbunded fields that are flat or gently sloping with annual rainfall of 1,500 mm or more with at least 250 mm of monthly average rainfall in each of the growing months, and not more than 10 rainless-day periods during reproductive and ripening stages. In these areas, water-holding capacity of soil is good to excellent with no severe soil fertility problems that cannot be corrected by fertilizer application. Unfavorable upland rice, on the other hand, may be defined

as rice grown on unbunded fields with varying slopes and with annual rainfall of less than 1,500 mm and monthly average rainfall of less than 250 mm in each of the growing months, and more than 10 rainless-day periods during reproductive and ripening stages. In those areas, water-holding capacity of soil is poor to very poor with varying degrees of soil problems (some soil problems can be corrected with fertilizers; others, such as highly acid soils with high aluminum saturation, cannot be easily amended). The CIAT Rice Program will concentrate its activities in developing upland rice technology for the more favored end of the continuum of which the above two definitions constitute the extremes. By doing so, the Rice Program will develop certain components of technology (e.g. better tolerance to water stress, more vigor for competing with weeds, etc.) which will be useful in the unfavored regions. It is expected that both CIAT-based efforts as well as the national programs in upland rice will derive considerable benefits from the materials gathered on a worldwide basis for the upland nurseries of the International Rice Testing Program. All of these are supported by the large and growing research program for upland rice at IRRI.

Starting in 1980, upland rice work will be pursued with direct inputs from physiology, pathology, breeding, agronomy, and agricultural economics.

Physiology. A full-time physiology senior staff position is budgeted. The soil-plant-climate relations of upland rice are very different to that of lowland rice. However, most studies have been made on the latter. It is highly probable that a different plant type is needed for upland conditions so as to better tolerate adverse conditions and shade out weeds (the flooded rice varieties have not been selected for tolerance to water stress or soil problems). The physiologist will describe the soil-plant-climate relations, and define the genetic variability available for use by the breeder so as to overcome the soil-climate stresses.

Pathology. The budgeted senior staff pathologist will devote half of his time to upland rice. His responsibilities will be to determine the losses caused by, and the distribution of various diseases under upland conditions. Those that are economically important will be studied and control methods devised. It is envisaged that control will normally be by varietal resistance, and hence major emphasis will be placed on finding resistance sources and developing rapid screening methods.

Breeding. One full time senior staff breeder is budgeted for upland rice. His responsibility will be to develop varieties that give high yields under upland conditions. In order to do this, sources of tolerance to diseases, pests, adverse soil conditions and limited levels of water stress will be identified. These sources will then be used in a screening program to obtain varieties suitable for upland conditions.

Agronomy. The functions of the existing agronomy position for irrigated rice agronomy/training will be modified to provide for at least half time in upland rice agronomy. Up to the present little agronomic work has been done on upland rice and it is likely that considerable yield increase can be obtained by improved agronomic practices, particularly weed control. The agronomist will be responsible for developing non-location specific farming practices for upland rice. As new upland varieties are developed, new production technology may be required. The agronomy section will develop this production technology and evaluate it with the new varieties under varied conditions. The agronomist will also assist national programs, through consultation, collaborative research and

training, to convert upland to irrigated rice production in areas where this can be done easily and economically.

Economist. A full time rice economist is budgeted. The economist will first make a survey of upland rice growing areas in climatic, edaphic and economic terms. Emphasis will be placed on determining in which areas improved upland rice may be more economically viable than flooded rice so that technology can be developed for these areas. He will also work with the agronomist in determining which areas curren under upland culture would best be converted to irrigated production. Once the new upland rice technology is developed, the economist will evaluate it in terms of relev with special attention to the small farm sector.

C. Technology Transfer

Transfer of new technology to other countries is based on cooperation with national agencies through training, germplasm exchange, technical advice and technical bulletins.

The training strategy is also integrated with research and outreach. Productio courses will provide training on practical aspects according to the program objectives

Most of the national programs are handicapped due to lack of trained personne for expanding their programs. It is proposed to train a few individuals at a time from each country in rice breeding and production. On completion of their training they will become key professionals for transferring technology as well as strengthening their respective national programs.

Testing advanced breeding lines and superior varieties from several sources throughout the world is being done in an extensive system of cooperative trials and disease nurseries. These materials will be brought to CIAT initially for preliminary evaluation and screening and those suitable in terms of adaptation, yielding potential grain quality and resistance to pests and diseases will be selected to multiply seed and to make up specific nurseries for the International Rice Testing Program for Latin Ame rica. This work is coordinated by the IRRI/CIAT liaison scientist, who is a member of the IRRI staff working as an integral component of the CIAT Rice Program.

Availability of good quality seed of promising lines and varieties is an essenti prerequisite for their wide evaluation. CIAT undertakes a large seed multiplication project of new improved varieties primarily to provide nucleus materials for national programs.

SPECIAL PROJECTS

As noted above, IRRI provides funds for stationing a Liaison Scientist for Latin America at CIAT. CIAT provides support services and IRRI provides about $100,000 per annum for support staff, supplies, services, equipment and international travel.

GENETIC RESOURCES UNIT

RESOURCES - CORE

Personnel-Man years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Germplasm Collection									
L. Song	2.0	2.0	2.0	6.0	9.5	10.0	24.5	30.3	32.0
Tissue Culture									
W. Roca	1.7	2.0	2.0	1.0	3.5	4.0	7.7	11.0	10.0
Plant Biochemist (Coord.)									
R. Luse	2.0	-	-	2.8	-	-	3.7	-	-
	5.7	4.0	4.0	9.8	13.0	14.0	35.9	41.3	42.0
Vacancy Factor				0.4	0.8	0.8	1.8	3.2	3.3
	5.7	4.0	4.0	9.4	12.2	13.2	34.1	38.1	38.7

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	186,441	272,213	458,654	220,357	233,013	453,370	(1)
Supplies	20,135	26,481	46,616	20,000	20,000	40,000	(14)
Services	1,151	9,458	10,609	3,300	4,700	8,000	(25)
Travel	12,918	10,974	23,892	10,200	14,200	24,400	2
Replac. Equip.		8,000	8,000	6,000	7,000	13,000	63
	220,645	327,126	547,771	259,857	278,913	538,770	(2)

BUDGET CHANGES

The senior staff position for the plant biochemist together with the support staff and other costs is being transferred to the Laboratory Services unit to take charge of that unit, including plant growth facilities (greenhouses, etc.), and be responsible for a Food Quality and Nutrition Laboratory.

Seven scientific and supervisory level positions are proposed, of which five are for operation and maintenance of the germplasm collection and two in support of the tissue culture acitivities. This is an increase of two.

Funds are included as from 1981 ($8,000) to cover germplasm collection activities presently funded by IBPGR (see note on special project below).

PROGRAM COMMENTARY

The basic activities of the Genetic Resources Unit have been established and fully operative since mid-1978. These activities include:

-assembly and collection of germplasm for CIAT's commodity programs,

-maintenance and storage of the germplasm collections,

-evaluation, both agronomic and taxonometric, of all materials, leading to cataloging of descriptors,

-distribution of germplasm to both CIAT plant breeders and to national crop improvement programs.

All of these activities are designed to allow full utilization of the valuable genetic resources still available in nature for the improvement of the major food crops Phaseolus beans and cassava as well as the tropical forages (both legumes and grasses). Indeed, the basic commodity of CIAT --and of the other International Centers-- is improved plant germplasm with which to develop more productive farming systems.

By early 1979 the Genetic Resources Unit had a collection of over 21,000 accessions of Phaseolus beans, covering four main species (Ph. vulgaris, lunatus, acutifolius and coccineus). This represents the largest collection of bean germplasm in the world and considerable effort is being made to build stocks of genetically pure, viable seed. Characterization of this material is based on 32 standard descriptors plus many other data on collection site, disease resistance, environmental adaptation, etc. The system of computerized data management now being developed permits efficient filing and rapid retrieval of such information, plus multivariate analysis to identify duplicates and genetically similar clusters of individuals within the wide range of genetic diversity.

Evaluation procedures similar to that for beans and data management systems are now being developed for CIAT's collection of cassava germplasm (nearly 2500 accessions in early 1979) and of forages germplasm (some 4500 accessions, especially of Andropogon gayanus, Desmodium ovalifolium, Stylosanthes capitata, Zornia latifolia and Brachiaria decumbens), in close cooperation with the respective programs. It is hoped that by this expansion of the Unit's activities, the needs of these programs for well characterized germplasm can be met.

The routine activities of seed storage and of germplasm distribution have become well established. It is anticipated that at least 50,000 bean and forage accessions will be in storage by the end of 1982. Distribution of germplasm, which reached nearly 15,000 Phaseolus samples in 1978, is expected to continue at high

levels as more information is cataloged and made available to the national crop improvement programs.

One of the most exciting of the Unit's activities in 1978 --and one that is expected to be fully operational in late 1979-- was the development of meristem tissue culture methods for (a) conservation of cassava germplasm in clonal form for long periods of time (e.g. 2-3 years), (b) international transfer of cassava germplasm free of disease and virus contamination, so as to meet plant quarantine regulations, and (c) rapid multiplication of materials to meet the demands of a national program for several thousand stakes of an improved line. The cycle from meristem tissue culture to plants in the field, passing through test tube and greenhouse propagation, was first achieved by the Unit's plant physiologist in late 1978. Exchange of cassava germplasm between CIAT and CENARGEN, the Brazilian germplasm center, was initiated early in 1979 and will be utilized to obtain germplasm from both Brazil and Mexico, recognized centers of genetic diversity for cassava.

SPECIAL PROJECTS

The International Board for Plant Genetic Resources (IBPGR) has provided a grant of $33,100 towards the costs of international collection activities for Phaseolus bean germplasm in Latin America. These collection trips --planned for 6-8 months per year during 1978-80 and possibly beyond-- are done in close cooperation with national institutes, and most of the grant will be used to cover costs incurred by the national groups.

LABORATORY SERVICES

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Quality & Nutrition									
R. Luse	-	2.0	2.0	-	2.0	2.0	-	6.0	6.0
Laboratories	-	-	-	2.0	3.5	4.0	30.6	32.0	32.0
Greenhouses	-	-	-	-	2.0	2.0	4.0	6.0	6.0
	-	2.0	2.0	2.0	7.5	8.0	34.6	44.0	44.0
Vacancy Factor				0.1	0.4	0.5	1.3	3.5	3.5
	-	2.0	2.0	1.9	7.1	7.5	33.3	40.5	40.5

Direct Costs (US Dollars)

	Current Budget			Proposed Budget		
	1978 Actual	1979 Revised	Total	1980	1981	Total
Personnel	81,559	107,082	188,641	207,469	209,725	417,194
Supplies	30,310	35,749	66,059	45,000	44,000	89,000
Services	3,178	4,770	7,948	6,000	6,000	12,000
Travel		1,383	1,383	5,650	6,400	12,050
Replac. Equip.	30,220	17,000	47,220	20,000	25,000	45,000
	145,267	165,984	311,251	284,119	291,125	575,244

BUDGET CHANGES

The senior staff position for Plant Biochemist, previously included in Genetic Resources, will be transferred to this unit to be responsible for a Food Quality and Nutrition Laboratory. In addition, this person will be responsible for supervision and coordination of all laboratory services which will in future also include plant growth facilities.

Scientific and supervisory level personnel are increased by three of which one is transferred with the senior staff position, one is needed for supervision of the main analytical services laboratory and one position at the technical level in plant growth facilities is upgraded. An extra technician is added to the instrument maintenance gro

PROGRAM COMMENTARY

The Laboratory Services provide support to CIAT's commodity programs through the following activities:

1. Analysis --primarily chemical-- of soil, water and plant tissue samples submitted by scientists in the programs for purposes of agronomic management and fertilizer recommendations.

2. Development of analytical methods needed by the programs through provision of space, equipment and advice for special research projects.

3. Maintenance and repair of all CIAT laboratory instruments and laboratory equipment.

4. Operation of a special washing and sterilization facility for glassware.

5. Maintenance of colonies of small animals (rabbits, mice, rats).

The first activity is by far the largest: 5234 soil samples and 12,270 plant tissue samples were submitted for analysis in 1978. On these 17,500 samples, 81,160 assays were carried out. This very large analytical load represents an increase of 16,250 assays over the previous year (1977) and is 2.3 times the level of analytical demand made in 1976. This increase is closely related to the expansion of CIAT's activities into new experimental sites. Since more emphasis is being placed on off-site research by the programs, this large amount of analytical work is expected to continue (though not to increase) in the years ahead.

These present activities of the Laboratory Services Unit are being supplemented by those of a newly formed Food Quality and Nutrition Laboratory, which will carry out routine monitoring of certain parameters of nutritional value and consumer acceptance in CIAT's commodities, especially beans. Here, such important factors as protein content, digestability, cooking time, and palatability will be measured in CIAT materials (selected germplasm, advanced lines) so that "improved" varieties will be not only agronomically superior but also have high nutritional value and consumer acceptance. Related research into analytical methodology, simple food processing techniques and community food utilization patterns will be carried out, in cooperation wherever possible with regional and national institutes of nutrition and food science. Cooperative programs are already underway with INCAP in Guatemala and the Instituto Nacional de Nutrición in Venezuela.

The senior scientist in charge of the Laboratory Services Unit will have research responsibilities in the Food Quality and Nutrition Laboratory, but will also supervise the Analytical Services and Support Laboratories. Since a number of new plant growth facilities (glasshouses, mesh houses, growth rooms) are being put into operation and require new arrangements for supervision and maintenance, these are also being placed under the supervision of this scientist. By so doing, there should be a more integrated coordination of the several laboratory-oriented activities and facilities within CIAT.

STATION OPERATIONS UNIT

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical &	
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1
Farm Superintendent A. Díaz	2.0	2.0	2.0	6.0	6.0	6.0	149.2	174.0
Vacancy Factor				0.2	0.4	0.4	5.0	13.7
	2.0	2.0	2.0	5.8	5.6	5.6	144.2	160.3

ect Costs (US Dollars)

	Current Budget			Proposed Budget		
	1978 Actual	1979 Revised	Total	1980	1981	Total
Personnel	329,292	311,174	640,466	373,591	384,708	758,299
Supplies	84,143	118,156	202,299	130,000	142,000	272,000
Services	4,064	11,097	15,161	10,500	10,500	21,000
Travel	2,463	4,007	6,470	3,400	3,400	6,800
Replac. Equip.	23,670	34,000	57,670	35,000	40,000	75,000
	443,632	478,434	922,066	552,491	580,608	1,133,099

BUDGET CHANGES

The revised budget for 1979 reflects a reorganization of functions whereby the labor pool was disbanded and positions assigned to programs where small better controlled pools have been established. Also the maintenance of tractors and other other farm machinery, which in 1978 was added to the Motor Pool, has been returned to this unit. For 1980 24 additional other support staff are proposed. Two are to establish a separate fabrication shop, two are to operate small tractors, proposed as part of the mechanization plan, and two extra are needed in the tractor maintenance shop. The rest of the increase is needed to provide additional personnel in Quilichao and in Palmira with the expanded operations at both stations.

Supplies and services increase owing to increased operations and for electricity at Quilichao now that supply lines have been connected.

PROGRAM COMMENTARY

Station Operations supports all of CIAT's research programs and research units. On a yearly basis, it responds to some 400 work requests from the various research programs.

Station Operations maintains both the 522 hectare main station at CIAT headquarters as well as the 180-hectare Quilichao sub-station. At the main station, some 242 hectares are utilized by the research programs. Land areas that are not utilized by the programs are maintained weed-free or are used for seed production, demonstration plots, or commercial crop production. Commercially produced crops are sold for about $190,000 per annum and generate net income of about $100,000.

In the new Quilichao research site, CIAT's programs in Tropical Pastures, Cassava, and Beans presently occupy some 86 hectares. An additional 35 hectares are in pastures to maintain the cattle used by the Tropical Pastures Program for investigative purposes.

DIRECTOR LAND RESOURCES RESEARCH

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Director									
N.N.	1.5	2.0	2.0	2.6	2.0	2.0	11.4	12.0	12.0
Vacancy Factor				0.1	0.1	0.1	0.6	0.9	0.9
	1.5	2.0	2.0	2.5	1.9	1.9	10.8	11.1	11.1

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	138,950	212,878	351,828	198,460	196,729	395,189	12
Supplies	162	5,202	5,364	1,300	1,300	2,600	(52)
Services	229	3,625	3,854	100	100	200	(95)
Travel	9,282	15,537	24,819	17,000	17,000	34,000	37
Replac. Equip.	31		31				
	148,654	237,242	385,896	216,860	215,129	431,989	12

BUDGET CHANGES

The two director positions for crops research and land resources research have been created out of the previous positions for Associate Director General - Research and Coordinator of Special Studies. The cost for 1978/79 of these positions and their support have been divided equally between the two new offices. In addition, the $ 155,000 which is 60% of funds for post doctorals (40% is included in Training) and visiting scientist funds of $90,000, have been divided between the two offices in proportion to the total research budgets of the two divisions.

The office of the Director includes six clerical and other support staff starting in 1980.

PROGRAM COMMENTARY

The objective of the Land Resources Research division is to develop low-cost technology components for increasing the productivity of selected agricultural production systems in marginal lands of the tropics in Latin America. The division is comprised of two research entities (Tropical Pastures Program and Special Studies), plus one research support unit (Data Services). The Director of Land Resources Research has the overall responsibilities for all research activities in the division.

TROPICAL PASTURES PROGRAM

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Research									
Coordinator									
P. Sanchez	2.0	2.0	2.0	3.7	2.0	2.0	17.7	8.0	8.0
Legume Breeding									
M. Hutton (50%)+PD	1.5	2.0	2.0	3.8	4.0	4.0	20.8	18.0	17.0
Gross Breeding									
M. Hutton (50%)+PD	1.0	2.0	2.0	2.4	4.0	4.0	8.2	17.0	17.0
Pathology									
J. Lenne (P.D)	1.5	2.0	2.0	4.8	4.0	4.0	16.3	26.0	25.0
Entomology									
M. Calderón (P.D.)	-	2.0	2.0	2.0	4.0	4.0	8.0	25.0	25.0
Germpl./Introd.Eval.									
R.Schultze-Kraft	2.0	2.0	2.0	4.0	4.0	4.0	23.8	25.0	24.0
Forage Agronomy									
N.N.	1.5	2.0	2.0	4.0	4.0	4.0	17.5	17.5	18.0
Forage Agronomy (CMG)									
B. Grof	2.0	2.0	2.0	3.9	4.0	4.0	17.9	24.0	24.0
Seed Production									
J. Ferguson	2.0	2.0	2.0	5.6	4.0	4.0	33.0	39.0	39.0
Soil Microbiology									
J. Halliday	2.0	2.0	2.0	2.0	4.0	4.0	13.4	21.0	21.0
Plant Nutrition									
J. Salinas	1.6	2.0	2.0	2.3	4.0	4.0	16.4	29.0	29.0
Pasture Develop.(CMG)									
J. Spain	2.0	2.0	2.0	3.5	4.0	4.0	18.1	20.0	20.0
Pasture Utilization									
O. Paladines	2.0	2.0	2.0	3.8	4.0	4.0	24.0	32.0	32.0
Cattle Prod.Systems									
N.N.	1.5	2.0	2.0	4.0	4.0	4.0	19.3	16.5	16.0
Animal Health									
E. Aycardi	2.0	2.0	2.0	6.7	8.0	8.0	22.1	25.0	25.0
Economics									
G. Nores	2.0	2.0	2.0	5.9	6.0	6.0	6.0	8.0	8.0
Training/Reg. Trials									
L. Tergas	2.0	2.0	2.0	4.4	4.0	4.0	12.5	17.0	16.0
	28.6	34.0	34.0	66.8	72.0	72.0	295.0	368.0	364.0
Vacancy Factor	0.3	3.4	4.5	2.3	4.3	4.3	13.8	28.6	28.3
	28.3	30.6	29.5	64.5	67.7	67.7	281.2	339.4	335.7

P.D. = Post Doctoral
CMG = Carimagua based.

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Regional Services									
Forage Agr. *									
D. Thomas	-	1.5	2.0				7.0	4.0	4.0
Pasture Dev. *									
W. Couto	2.0	2.0	2.0	1.0			9.3	4.0	4.0
Cattle Prod. *									
P. Moore	2.0	2.0	2.0	1.0			7.5	4.0	4.0
Forage Agr. Selva									
N.N.	-	1.5	2.0					3.3	4.0
Pasture Dev. Selva									
N.N.	-	1.5	2.0					3.3	4.0
S.E. Asia									
N.N.			0.5						1.3
	4.0	8.5	10.5	2.0			23.8	18.6	21.3
Vacancy Factor	-	0.9	1.3	0.1			1.9	1.3	1.4
	4.0	7.6	9.2	1.9			21.9	17.3	19.9

* Serving Brazil, Paraguay and Bolivia.

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Research							
Personnel	1,251,423	1,795,282	3,046,705	1,836,247	1,762,620	3,598,867	18
Supplies	168,279	181,889	350,168	147,500	150,500	298,000	(15)
Services	6,403	43,396	49,799	20,000	20,000	40,000	(20)
Travel	191,655	171,064	362,719	163,350	163,350	326,700	(10)
Replac. Equip.	3,965	61,000	64,965	61,000	73,000	134,000	106
	1,621,725	2,252,631	3,874,356	2,228,097	2,169,470	4,397,567	14

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Regional Services							
Personnel	113,978	106,000	219,978	233,634	296,244	529,878	141
Supplies	7,846	6,000	13,846	17,500	17,500	35,000	153
Services	878	2,000	2,878	5,000	5,000	10,000	247
Travel	9,423	20,000	29,423	50,500	50,500	101,000	243
Replac. Equip.							
	132,125	134,000	266,125	306,634	369,244	675,878	154

BUDGET CHANGES

An entomologist is proposed as from 1980 since experience has shown that a continuing capability in this area is needed. In order not to increase senior staff positions for research the Legume Agronomy and Plant Exploration positions are merged into a Germplasm Evaluation position.

Two senior staff positions based in Brazil have, with the change to including all regional services staff in core, been listed separately from the research activities under regional services. Support staff for these positions have been reduced to the standard two each.

The supplies budget, which previously covered several areas of investigation not specifically budgeted, has been reduced to requirements for ongoing activities. Travel has also been reduced to $9,500 per senior staff position.

It is proposed to add three new senior staff positions for regional services. These are in addition to the two already noted, which were formerly considered as research. One of the new positions is to be based in Brazil responsible for Brazil, Paraguay and Bolivia. This position will be funded by UNDP through June 1980 and it is hoped that UNDP will continue funding as restricted core thereafter. Two of the positions are in response to the Board's request to evaluate the feasibility of initiating on-site testing of materials in a humid tropical area. The so called "selva" positions are therefore being proposed in response to what is considered an urgent need with over five million hectares of pastures cleared from rainforest in the Amazon basin and most of them seriously degraded.

BUDGET CHANGES

An entomologist is proposed beginning in 1980 since experience has shown that a continuing capability in this area is needed. This is possible without increasing senior staff positions for research by merging the Legume Agronomy and Plant Exploration positions into a Germplasm Evaluation position.

With the decision to include all regional services staff in core, the two senior staff positions based in Brazil have been listed separate from research activities under regional services. Support staff for these positions have been reduced to the standard two each.

The supplies budget, which previously covered several areas of investigation not specifically budgeted, has been reduced to requirements for ongoing activities. Travel has also been reduced to $9,500 per senior staff position.

Three new senior staff positions for regional services are proposed. These are in addition to the two already noted, which were formerly considered as research staff. One of the new staff members is to be based in Brazil, responsible for Brazil, Paraguay and Bolivia. This position will be funded by UNDP through June 1980 and it is hoped that UNDP will continue this funding as restricted core thereafter. Two of the additional positions are to initiate testing of germplasm in a humid tropical area. The Program urgently needs additional screening sites, especially in the more humid tropics, to test forage germplasm under a wider range of climatic and edaphic conditions which largely determine the incidence and virulence of diseases and insects. There is the possibility of encountering "wild type" resistance in some species but it will not be identified unless materials are tested in the major ecosystems identified within the target area.

PROGRAM COMMENTARY

A change in the Program's name from Beef Program to Tropical Pastures Program is proposed, in order to reflect more accurately its activities and to permit a better articulation of its objectives and expected outputs. The term "pastures" rather than forages emphasizes the low input implication of the animal directly harvesting its own feed. The term "tropical", although somewhat redundant at CIAT, underscores our emphasis on species adapted to lowland tropical environments with acid soils. The operational philosophy of the Program, however, remains the same.

Importance of the Products of the Program

The Tropical Pastures Program has four major products: beef, milk, conservation of tropical ecosystems, and resource base expansion. A short summary of the importance of these products follows.

1. Beef. Beef is one of the main staple foods of Latin American urban and rural poor, and one of the principal reasons why protein malnutrition is less acute in tropical America than in Africa or Asia. During the last 15 years the annual growth in demand for beef in tropical America (5.6%)

has exceeded increases in production (3.6%). This gap is resulting in real price increases which will cause a decrease in beef consumption by families of the lower 25% income strata which presently use from 8 to 16% of their total budget to buy beef. The high price elasticities of demand for beef also suggest that increases in beef production leading to lower real prices would have a larger impact on consumption and quality of diet than production increases for any other major staple food crop consumed by the Latin American poor. In order to accomplish this, production costs, particularly social costs, must be reduced and this is more likely possible in the acid, infertile soil areas because of their present low opportunity costs.

2. Milk. The situation with milk production trends in tropical America is similar to that of beef with low per capita production (1/4 of US's), and imports of milk and by-products tripling in the last 10 years. The Program's target area survey has shown that milk production from beef cattle farms is an important source of income in many areas and that its importance increases with decreasing farm size.

3. Conserving Tropical Ecosystems. The Oxisol-Ultisol savanna and cerrado regions of tropical Latin America, covering 300 million hectares, are no longer only "potential" areas of expansion. As new roads are built, development is taking place at an ever increasing rate. Much of this development takes place without appropriate soil management technology, resulting in land abandonment, soil erosion, and the conversion of land into unproductive pastures. Extensive, pasture-based beef production is the most widespread land use in the region, and, if properly managed, one of the most ecologically sound. Well-managed, productive and persistant grass/legume pastures not only provide excellent protection against soil erosion but improve soil fertility because of nitrogen fixation and nutrient recycling by plants and the grazing animal. On the other hand, poorly managed pastures can be disastrous, especially on more sloping sites.

4. Expanding the land resource base. In addition to its ecological implications, pasture-based beef production can serve as a catalyst for settling the Oxisol-Ultisol regions, primarily because the initial infrastructure investment is much lower than for crop production. The development of well-managed pastures increases the value of the land. When roads provide improved access to markets, it becomes more profitable to devote part of the land to crop production, with beef gradually moving to new settlement areas. Also, intercropping pastures with annual or perennial crops is feasible. Therefore, beef can serve as a wedge to develop this important resource base and open the way for integrated agriculture development. Furthermore, increases in beef production in Oxisol-Ultisol regions permit alternative uses of better soils located closer to markets which should be used for more intensive crop production.

Program Objectives

The objective of the Tropical Pastures Program is to develop and transfer, together with national institutions, improved, low cost pasture production technology for acid, infertile soils regions, in order to increase beef and milk production, conserve and improve soil resources of tropical ecosystems, and provide a basis for an economically and ecologically sound utilization of under-exploited land resources in tropical America.

Program Strategies

The overall strategy described in detail in the 1978-79 budget proposal is unchanged. In summary, it consists of collecting, breeding and evaluating a wide range of pasture legume and grass accessions for adaptation, productivity and persistence in acid infertile soils with minimum fertilizer and lime inputs. Germplasm is screened for tolerance to high soil acidity, low phosphorus availability, drought, fire, disease and insect stresses. Compatible grass-legume mixtures are tested for performance under grazing, nutritional value and cattle liveweight gains at the three main stations (Quilichao, Carimagua, Brasilia), a proposed screening site in the humid tropics, and in the established network of regional trials throughout the target area (managed by national research and development institutions). In addition to germplasm development, specific technology components such as low-cost pasture establishment methods, research methods for improving nitrogen fixation in legumes, seed production technology, use of low-cost phosphorus fertilizer sources, improved animal management and health practices are developed. The information is integrated into cattle production systems such as the present one operating in Carimagua involving the strategic use of a small proportion (10%) of the grazing area in improved legume-based pastures. Technology components are evaluated in both biological and economic terms. Seed of promising accessions are multiplied, for eventual release by national institutions.

The transfer of technology is integrated with research activities primarily through the training of specialists in soil-plant-animal relationships from collaborating research and development institutions throughout the target area, via special courses, or individualized training. Technology is validated by these and other individuals through coordinated regional trials. Communications of results are facilitated by seminars, network workshops, and special publications.

SPECIAL PROJECTS

A study of Beef Production Systems in Latin America, known as the ETES Project, constitutes a special project of the Tropical Pastures Program. Its purpose is to characterize the ranges in beef production farms in the impact area and to provide the bases for on-farm validation of improved technology. This project is financed by the German Agency for Technical Cooperation (GTZ) and operates as part of the Cattle Production Systems section of the Tropical Pastures Program, with on-site work in the Colombian and Venezuelan Llanos and in the Brazilian Cerrado. The three year project started in late 1977. Resources for 1980 when the project

is due to end are:

	1980
Animal scientists (Brazil & Venezuela/M-Y)	2
Economist (M-Y)	1
Personnel Costs	100,000
Supplies and services	5,000
Travel	17,000
Total	122,000

The UNDP provides funds for an integrated training and international cooperation project which includes an international cooperation expert (regional services coordinator) for Tropical Pastures for Brazil, Paraguay and Bolivia. Funds provided cover the expert through June 1980 at which time, as noted earlier, the position is proposed as core funded.

SPECIAL STUDIES

RESOURCES - CORE

None.

PROGRAM COMMENTARY

The objectives of Special Studies are: (develop a systematic and realistic appraisal of the land resources in CIAT's target area; and (b) to explore the potential utilization of selected systems components in the enhancement of the productivity of tropical crops, with special emphasis on the commodities being researched at CIAT and on the particular problems of resource-poor farmers.

To achieve these objectives, the Unit operates on the basis of well-defined, terminal projects, each one of which is staffed and allocated other resources on the basis of the respective objectives of the various projects.

SPECIAL PROJECTS

An IDRC funded collaborative research project with IFDC on phosphorous is carried out by two IFDC senior staff based at CIAT. The objectives of the project are to develop direct use of low cost phosphorus fertilizer sources for crops and pastures in acid, infertile soils of tropical and subtropical Latin America. Annual resources for the CIAT portion of this project are as follows:

Personnel (man-years)	
Soil Fertility Expert - W. Fenster	1.0
Soil Chemist - A. León	1.0
Support Staff	13.0
Costs ($)	
Personnel	126,000
Supplies & services	27,000
Travel	13,000
Equipment	5,000
Indirect expenses	22,000
	193,000

A proposal has been prepared for a special project on Land Resource Evaluation in tropical Latin America. The objective of the project would be to characterize the land resources of the area in terms of climate, vegetation, topography, soil properties and aggregation into land systems. The information obtained would be used in defining research priorities and technology transfer strategies. The following resources are included in the project proposal:

	1980	1981	1982
Personnel (man-years)			
Soil Geographer	1	1	1
Climatologist	1	1	1
Land Economist	1	1	1
Support Staff	7	7	7
Costs ($)			
Personnel	260,000	237,000	335,000
Supplies & services	30,000	35,000	35,000
Travel	55,000	55,000	45,000
Support services	81,000	78,000	100,000
Equipment	37,000	10,000	10,000
	463,000	415,000	525,000

CARIMAGUA STATION

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
				3.0	9.5	10.0	9.0	10.0	10.0
Vacancy Factor				0.1	0.6	0.6	0.2	0.5	0.5
				2.9	8.9	9.4	8.8	9.5	9.5

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	189,087	68,217	257,304	241,346	252,031	493,377	92
Supplies	24,455	69,355	93,810	101,500	101,500	203,000	116
Services	23,798	12,610	36,408	23,500	24,000	47,500	30
Travel	55,719	43,995	99,714	32,890	33,750	66,640	(33)
Replac. Equip.	(28,983)		(28,983)	9,000	13,000	22,000	-
	264,076	194,177	458,253	408,236	424,281	832,517	82

BUDGET CHANGES

Costs of this unit are paid 50 percent by the Colombian Institute for Agriculture (ICA) and 50 percent by CIAT. The CIAT/ICA comanagement of the Carimagua station had started in June 1977--which was after the budget for 1978/79 was prepared. Since then, operations at Carimagua have increased dramatically and the personnel and funds required for its administration are far more than the 1978/79 budget contemplated. In addition, the new facilities are now coming on stream and operating costs are expected to rise still further.

The 1980/81 budget therefore includes substantial increases both in personnel and in funds. CIAT proposes adding three scientific and supervisory level staff for, respectively, chief of maintenance, treasurer and auditor. ICA assigned personnel will increase from 80 to 98 to provide additional support in the following areas: maintenance, workshops, warehouse, food and housing and field operations. Supplies and services are both expected to increase markedly to cover requirements in the new facilities.

PROGRAM COMMENTARY

The Carimagua research station is located 350 kilometers east of Villavicencio, near the Meta-Vichada border, at 4-1/2°N latitude, 71-1/2°W longitude in the Eastern Plains of Colombia. Carimagua's climate, soil, vegetation and topographic conditions are typical of one of the greatest land resources in the world that is just beginning to be exploited: the tropical American savannas, which comprise 300 million hectares.

In 1969, the Instituto Colombiano Agropecuario (ICA) purchased 22,000 hectares of land, and field work was initiated in early 1970. In February 1977, an agreement was signed between ICA and CIAT for the development of a cooperative ICA/CIAT research program in the Llanos.

Under the terms of the agreement, an advisory committee composed of three ICA managers and three CIAT senior staff members is responsible for coordinating and directing operations of the station. CIAT and ICA are conducting independent research projects aimed at increasing agricultural and cattle production in the Eastern Plains.

DATA SERVICES

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Head									
G. Mendoza	2.0	2.0	2.0	13.0	18.0	18.0	15.7	26.0	26.0
Vacancy Factor				0.5	1.1	1.1	0.5	1.4	1.4
	2.0	2.0	2.0	12.5	16.9	16.9	15.2	24.6	24.6

Direct Costs **(US Dollars)**

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	141,692	192,757	334,449	243,198	241,870	485,068	45
Supplies	10,240	8,909	19,149	14,950	14,900	29,850	56
Services	70,804	96,159	166,963	114,650	114,650	229,300	37
Travel	2,241	4,635	6,876	5,850	5,850	11,700	70
Replac. Equip.		6,000	6,000	9,000	12,000	21,000	250
	224,977	308,460	533,437	387,648	389,270	776,918	46

BUDGET CHANGES

The budget for this unit was modified in 1979 to reflect the new organization for computer services. This involved the transfer of positions and funds from certain other units. In addition, as from 1980 the meterelogical section will form part of the Data Services Unit.

The demand and need for statistical, data and computer services has increased substantially and this proposal therefore includes increases of one scientific and supervisory level staff, two clerical staff and about $25,000 per annum for supplies and services. Much of the increase in supplies and services is based on estimates of costs associated with CIAT's in-house computer, expected to be delivered in April, and of likely use of DANE's computer once the in-house computer becomes operational.

PROGRAM COMMENTARY

The Data Services Unit is a central services unit responsible for providing research design consultation plus data analysis and data management services to the Center's research, administration, and training activities. The Unit is comprised of three specialized sections.

Statistical Services

The general function of this section is to plan and execute all activities related to the application of statistical and mathematical techniques to the various research activities carried out by CIAT. Specific functions include:

-To provide statistical advice in all stages of an experiment or project;

-To implement and develop quantitative techniques applicable to CIAT research, specifically those needed in the study of production systems;

-To provide training in quantitative methods to professionals at CIAT (both CIAT professional staff as well as training participants).

Data Bank Services

The principal function of this section is to provide scientific data management support to the various data banks of the Center's research programs and units.

While the responsibility for the collection and utilization of data rests with the respective research programs and units, the Data Bank Services Section assumes the function of providing the software and programming support for the development, implementation, and maintenance of these information systems.

Computer Services

The general function of this section is to provide programming support to all computerized CIAT activities, and to operate and maintain the Center's computer equipment.

The analyses of small experiments are accomplished through "desk-top computers" available within the Unit. Larger experiments, surveys, data banks and mathematical programming are achieved through the utilization of the IBM 370-145 computer belonging to the Departamento Administrativo de Estadística (DANE), an agency of the Colombian Government. CIAT is connected to the DANE computer over standard telephone line. The level of scientific services requested to the Unit has steadily increased during the last years, not only because of the expanded research CIAT activities, but also due to the increasing awareness of CIAT researchers of the available services and facilities. This, in addition to the increasing computing needs of CIAT's administration, have lead to the contracting of an in-house computer IBM S/34 which can

work both as a local computer for the processing of administrative jobs, and for medium sized scientific and data management tasks, as well as a terminal to DANE's computer for large scale computation.

Meterological Service

The Center's meterological service is administratively attached to the Data Services Unit. The meterological service maintains a meterological station at the CIAT main station and collaborates with various Colombian agencies in the collection of data from eight other sites at which CIAT is conducting research in Colombia. The service provides twice yearly summaries of current data to users. It consists of one technician who is required to visit all stations to check the quality of the data at least once per year.

DIRECTOR INTERNATIONAL COOPERATION

RESOURCES - CORE

Personnel-Man years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Director									
A. Grobman	2.0	2.0	2.0	-	1.5	2.0	4.0	4.0	4.0
Vacancy Factor					0.1	0.1	0.1	0.2	0.2
	2.0	2.0	2.0	-	1.4	1.9	3.9	3.8	3.8

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	81,596	111,566	193,162	108,637	113,993	222,630	15
Supplies	778	1,135	1,913	1,300	1,600	2,900	52
Services	328	694	1,022	750	850	1,600	57
Travel	24,634	32,116	56,750	35,500	35,500	71,000	25
Replac. Equip.	925		925				
	108,261	145,511	253,772	146,187	151,943	298,130	17

BUDGET CHANGES

In previous years provision has been made for salaries of outreach contract staff before and between assignments. Only once has it been used and now, with the inclusion of regional services staff in core, it is no longer required. Travel funds have been increased slightly for national program personnel to visit CIAT. $22,000 is provided. An administrative assistant is added to provide support for the administrative duties of the Director, International Cooperation, to provide continuity during the Director's extensive travel and to collect and organize data for country profiles.

PROGRAM COMMENTARY

The objective of International Cooperation is to assure the rapid and efficient transfer of improved production technologies developed at CIAT to national research and development agencies (both public and private).

International Cooperation consists of:

1. The Office of the Director, International Cooperation;
2. Training;
3. Documentation Services;
4. Communication Support; and
5. Seed Research and Training;
6. Collaborative Projects (e.g. CIMMYT-CIAT Andean Region Maize Project)

The Director of International Cooperation has the overall responsibility for all activities in the division. Also, in liaison with the Directors of Land Resources and Crops Research, he arranges and administers collaborative efforts with international, regional, or national institutions, through which the research endeavors of CIAT can be complemented and/or through which new technologies can be validated and adapted to conditions within a given setting.

REGIONAL SERVICES STAFF

Also ascribed to the office of the Director is the important function of providing guidance to the regional services staff of the various research programs, and of assuring that this staff is provided with the necessary logistical and administrative support.

Due to budget constraint and limitations of administrative capacity, each commodity program only budgets regional services staff positions that are of highest strategical importance for the purposes of successful attainment of the program's objectives. In order to determine which these are, the following criteria are carefully weighed: (a) percentage of the world area devoted to that commodity located in the region; (b) the potential for expansion of production (area and yields) of that commodity in the region; (c) the importance of the commodity in the diets of the people of that region, especially those with limited resources; (d) the importance of that commodity as a component of the farming systems of producers in that region, especially those with limited resources; (e) the expressed interest of regional and national agricultural leaders in the development in that commodity and for the stationing of CIAT staff in the region; (f) a comparative advantage for CIAT's involvement over that of other organizations; (g) the viability of national programs in the region in relation to their ability to utilize such services and benefit the farmers; and (h) the existence of a formal or informal organization through which the regional staff may operate.

As a general budgeting principle, regional services staff are funded from the core budget. Whenever possible, arrangements are sought with selected funding agencies that allow for the financing of regional services staff through restricted core allocations.

The major role of regional services staff is to serve their respective regions by

contributing to the institutional transfer of CIAT-generated technology. While they are normally given research assignments, their research activities are mainly in the validation and adaptation of CIAT-generated technology to the conditions of the region where they serve. Through their role in international testing activities, regional services staff play an important technology generation function that does not detract from the major rationale for the establishment of their position, to exercise a technology transfer function which cannot be done satisfactorily from headquarters.

The table below summarizes the regional services staff who are to be financed out of core operations budget in 1980-81. The positions are budgeted in the respective commodity programs.

REGIONAL SERVICES STAFF IN CORE BUDGET 1980-1981

Program	Region	Number	Location	Comments
BEANS	Central America & Caribbean	1*	San José	
	Eastern Africa I	1**	Open	
	Eastern Africa II	1**	Open	To start in 1981
CASSAVA	Asia I	1***	Los Baños (Philippines)	
	Asia II	1	Los Baños (Philippines)	To start in 1981
	Southern Cone I	1		
	Southern Cone II	1		To start in 1981
	Peru, Ecuador, Colombia, Venezuela	1***	CIAT	
	Central America & Caribbean	1	Dom. Republic	
TROPICAL PASTURES	Brazil, Paraguay, Bolivia	1*	Brasilia	
	Brazil, Paraguay, Bolivia	2	Brasilia	
	Humid tropical acid soil regions of Latin America	2	Open	

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* Positions are funded through mid-1980 under the UNDP Special Project on International Cooperation; UNDP has been approached to continue to fund these positions as part of an overall continuation of the project beyond mid-1980 in the form of a restricted core allocation to CIAT.

** Negotiations are under way with the Dutch Government whereby the latter would fund this position through a restricted core allocation to CIAT.

*** Positions are funded through 1979 by IDRC. It is hoped that IDRC will continue to finance these positions in the form of a restricted core allocation to CIAT.

The following table provides a summary overview of the resources that have been budgeted in the respective commodity programs in order to support the core-budgeted regional services staff in 1980-81.

	1980			1981		
	Pos.	M-Y	$ 000	Pos.	M-Y	$ 000
Beans	2	1.00	113	3	2.50	229
Cassava	4	3.00	264	6	5.00	419
Tropical Pastures	5	3.50	307	5	5.0	369
	11	7.50	684	14	12.50	1017

SPECIAL PROJECTS

Since March 1973, the Rockefeller Foundation has funded a special project through CIAT to assist and strengthen ICTA, the national agricultural research institution in Guatemala. The grant will terminate at the end of 1980. Approximate inputs are expected to be as follows:

	1979	1980
Associate Director - ICTA	1.0 M-Y	1.0 M-Y
Coordinator of Experiment Stations - ICTA	1.0 M-Y	1.0 M-Y
Personnel Costs	*	*
Supplies, services & travel	15,000	16,000

* Rockefeller Foundation provides these staff on a no-cost basis to the project.

In November 1978 an agreement was signed with the Swiss Development Cooperation for the funding, over a three year period, of a Seed Training, Outreach and Research Unit. The objectives of the project are to:

1. Train personnel in government and private institutions primarily from all Latin American and Caribbean countries in various aspects of seed industry and seed program development.

2. Extend technical collaboration to countries in the region interested in seed program development, with the aim of expanding the production of high quality seed of improved cultivars at all levels from the breeder to the commercial stage with main emphasis on but not restricted to the commodities with which CIAT works.

3. Conduct specific research in seed technology highly relevant to CIAT commodity interests and relevant to problems of the impact areas.

4. Provide CIAT with a single unit to cooperate with commodity programs in multiplying, processing, storing and distributing advanced experimental materials, or Breeder and Basic Seed to collaborating countries for further multiplication.

Resources to be provided by the project are as follows :

	1979	1980	1981
Personnel (M-Y)			
Unit Head - J. Douglas	1.0	1.0	1.0
Seed Produc. Spec.- N.N.		1.0	1.0
Scientific & Supervisory Staff	1.0	4.0	4.0
Other support staff	4.0	6.0	6.0
Costs ($000)			
Personnel	126	257	274
Training	59	164	195
Supplies & services	18	20	23
Travel	40	22	57
Capital- Const. & equipment	322	10	
Overhead	72	120	142
	637	593	691

In addition a proposal has been made to AID jointly by CIAT and Mississippi State University for a project which would complement the Swiss funded project and whose purpose would be to improve the seed production and delivery systems of countries in the region. The total cost over five years for the CIAT portion is estimated at $1,406,575. This includes one senior staff, support staff and funds for training, seminars, training materials, and an information center for seeds.

Apart from the above, special projects for outreach and training activities are listed in the commodity and training sections as follows :

UNDP - International Cooperation Experts in Beans, Forages and Rice. Support of courses, trainees and training materials.

IDRC - Cassava outreach production specialists for Asia and Latin America.

TRAINING AND CONFERENCES

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Training Office (Coord.)									
F. Fernández	2.8	2.0	2.0	18.6	20.0	25.0	9.7	13.5	16.0
Conferences				2.0	2.0	2.0	6.0	6.0	6.0
	2.8	2.0	2.0	20.6	22.0	27.0	15.7	19.5	22.0
Vacancy Factor				0.6	1.3	1.6	0.6	1.3	1.4
	2.8	2.0	2.0	20.0	20.7	25.4	15.1	18.2	20.6

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	524,881	684,997	1,209,878	805,003	910,165	1,715,168	42
Supplies	16,555	9,142	25,697	12,928	12,928	25,856	1
Services	33,186	31,828	65,014	28,837	28,837	57,674	(11)
Travel	101,301	218,468	319,769	199,149	215,149	414,298	30
Replac. Equip.	2,113		2,113				
	678,036	944,435	1,622,471	1,045,917	1,167,079	2,212,996	36

BUDGET CHANGES

The senior staff position for Instructional Techniques and Communication has been vacant for the last six months since the Communication Support Unit was established. Since many of the functions previously handled by this position are now handled by the Communication Support Unit and much of the training function has been decentralized to programs, we have decided that one senior staff position, with appropriate support, is sufficient to handle the coordination function. An extra scientific and supervisory level person is added instead.

This budget includes resources for the following activities:

	1978		1979		1980		1981	
	M-Y	$000	M-Y	$000	M-Y	$000	M-Y	$000
Post doctoral fellows	3	50	4	104	4	103	4	103
Visiting Res. Assoc. & Thesis Scholars	15	68	20	199	20	136	25	173
Scholarships (MSA)	-	-	-	-	10	130	10	208
Post-graduate interns	35	206	30	206	30	222	30	222
Conferences		77		167		167		167

Post doctoral fellows are divided between the research programs (included in the offices of the directors) and training in recognition of the fact that some are engaged solely to help or strengthen research whilst others are brought in to be trained. We are recommending returning, on a limited scale, to granting scholarships to enable certain carefully selected individuals to do the academic part of their studies for an MSA degree. This will always be in association with practical work on one of CIAT's commodities.

PROGRAM COMMENTARY

CIAT has reached a stage in its development where the results of research have evolved into transferable technologies. At the same time, national institutions are increasingly focusing their attention on CIAT as a source of improved production technologies that they may further test and adapt to local conditions, use in cooperative research endeavors, or utilize as departure points for independent efforts in generating local technologies. In this context, training acquires increased relevance as a means to: (a) accomplish inter-institutional transfer of technology; (b) help link research and extension; and (c) strengthen national institutions to act cooperatively as well as independently in applied research on CIAT's commodities. Through training, CIAT serves the objective of transferring improved production technologies at the same time that young professionals are prepared for commodity-based research and agricultural development careers in their home institutions.

The increased importance of training for purposes of technology transfer and the strengthening of national institutions is demonstrated by the fact that the number of professionals enrolling in training at the Center increased from 195 in 1977 to 314 in 1978, with about 85 percent of the training participants coming from Latin American countries.

Training for Research Networks

CIAT training activities place emphasis on the formation of technology validation networks that extend throughout the target areas of the various commodity programs and are largely maintained by former CIAT training participants. The networks are coordinated by the respective program outreach scientists, as is the case, for example, in forages for the acid infertile regions, beans and rice in Central America, cassava in Latin America and Asia, and swine throughout Latin America. CIAT conferences are utilized to backstop the various developing validation networks. Typically, such conferences include graduates of CIAT's training, plus other professionals from national and international research organizations. During 1978, each of the three major commodity programs of the Center had held such a conference.

Training continues to be offered at the postgraduate level. Included are postgraduate internships plus MS and PhD thesis research projects that are carried out in conjunction with academic degree programs of collaborating universities.

All of CIAT's training is commodity-based. Training takes place on a decentralized basis in the sense that each research program or unit assumes the responsibility of providing relevant training experiences to the training participants assigned to it. A centralized training coordination function is ascribed to the Coordinator of Training to assure: (a) continuity of the various training efforts at CIAT across commodities; (b) efficiency of administration; (c) adherence to Center-wide training standards; (d) effective sharing of training resources; and

(e) integration of relatively independent training efforts into overall CIAT outreach strategies.

In 1978, about half of the participants of CIAT's training were financed out of CIAT's core funds. The UNDP International Cooperation project provided funds for another one-third of the participants. Twenty-eight other individual donors had provided financing for the remaining scholarships. These donors include international agencies and national organizations. Core funding is projected to cover about half of the man-years of training in the period 1980-1983.

Conferences

Both in 1980 and 1981, one conference event (i.e. seminar, workshop or symposium) is planned per research program, plus one across commodities. These international conference events are primarily intended to support the research validation networks of each commodity. In addition to these events, CIAT will continue to co-sponsor with other institutions and/or agencies selected conference events that are directly related to the generation and/or transfer of new production technologies.

SPECIAL PROJECTS

The UNDP has funded a three year project for integrated training and international cooperation which provides resources for production of training materials and several training courses. The project is due to end in September 1980 but we hope that it may be extended for a further three years.

Many international and national institutions provide funds to support one or more trainees or even whole training courses. Such funding covers a substantial portion of total trainee funding.

COMMUNICATION SUPPORT

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Analysis (Head)									
F. Kramer	1.5	2.0	2.0	3.0	6.0	6.0	1.0	2.0	2.0
Editor									
C. Bower	2.0	2.0	2.0	5.8	8.0	10.0	2.0	2.5	4.0
Editor									
M. Gutierrez	2.0	2.0	2.0	-	-	-	1.7	4.0	4.0
Graphic Arts				5.9	7.5	8.0	38.9	43.2	44.0
Public Information				6.2	8.0	8.0	3.8	4.0	4.0
	5.5	6.0	6.0	20.9	29.5	32.0	47.4	55.7	58.0
Vacancy Factor	-	-	-	0.8	1.8	1.9	1.7	4.0	4.2
	5.5	6.0	6.0	20.1	27.7	30.1	45.7	51.7	53.8

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	266,447	438,297	704,744	475,101	495,367	970,468	38
Supplies	23,937	28,068	52,005	32,600	32,650	65,250	25
Services	133,104	132,210	265,314	194,550	210,650	405,200	53
Travel	3,104	11,814	14,918	16,700	16,600	33,300	123
Replac. Equip.	171	17,000	17,171	15,000	20,000	35,000	104
	426,763	627,389	1,054,152	733,951	775,267	1,509,218	43

BUDGET CHANGES

Three additional scientific and supervisory level positions are proposed. One is for an English/Spanish translator, one for an additional assistant editor and one for a head of printing. In addition four other support staff are added for a photomechanic and three technicians. These increases are needed to handle the increased workload in the Unit.

As noted earlier, printing of publications, which was previously budgeted in each program, is from 1980 onwards budgeted in this unit in the same way as for the services provided by other units. This adds about $ 50,000 to the supplies and services amounts. $15,500 is included for visiting writers for the first time.

PROGRAM COMMENTARY

Objectives of the Unit

The objectives of the Communication Support Unit are: (a) to package and disseminate the results of CIAT's research to appropriate audiences; (b) to maintain and improve CIAT's image with donors, client countries, and the general public; (c) to serve the publication needs of other CIAT units (e.g. Documentation Services, Conferences); and (d) to provide general information services (e.g. photography, graphic arts, Xerox, and printing) to the Center and its various administrative entities.

Activities of the Unit

The Communication Support Unit has the following action plans for the various areas where a need for CIAT-generated information exists.

1. Technical Information

Annual Report. The Annual Report of CIAT program activities is published on a yearly basis -- both as a compendium of reports of all programs and units as well as separate publications, each one devoted to a research program. The Annual Report is produced both in English and in Spanish.

Research Highlights. The report of research highlights is produced as a full-color publication. It is intended to disseminate technical information explained in a popular style as a principal means of communicating the Center's activities and achievements to contacts at all levels. Research Highlights are published in English and in Spanish and contain some 140 pages.

Other Technical Publications. CIAT has several other publications series in which technical information is being published (e.g. Research Monographs, New Production Technologies, Technology Impact Studies, Field Manuals, Production Manuals, and Seminar Proceedings). During the budget cycle 1980/1981, an attempt will be made to increase the number of these publications that are made available to the Center's research collaborators and contacts and to the interested public.

2. Newsletters

NotiCIAT. This quarterly newsletter has been designed to inform the Center's contacts on: (a) Program developments at CIAT; (b) New production and research methodology resulting from CIAT's efforts; and (c) CIAT's technology transfer projects and activities. NotiCIAT is intended for all of CIAT's contacts-- technical and non-technical. It is published both in English and in Spanish.

Commodity-Specific Newsletters. Four commodity-specific newsletters are produced by the Communication Support Unit. Two of these are managed in the Documentation Services Unit and two in the Communication Support Unit. The commodity-specific newsletters contain information on: (a) Developments within the respective CIAT commodity programs; (b) New research and production technology (both CIAT and non-CIAT generated); and, (c) Information on commodity-related work in cooperating regional and national programs. The purpose of these commodity-specific newsletters is to provide workers in existing networks with regular information

from the respective CIAT commodity programs.

3. Training Materials

Efforts to package commodity-related technical information into didactic sets (i.e. audiotutorials) will continue during the 1980/1981 budget cycle. The commodities and areas covered are: cassava, field beans, rice, tropical pasture production, weed control, and seed technology.

4. General Information

To help keep the general public informed of CIAT's goals, activities and achievements, the Unit plans to continue to periodically produce information brochures on the Center and on specific commodity programs. Also planned is a continuation of the efforts to design/produce selected audiovisual programs for visitors, the production of two short films on CIAT's activities, and the design/dissemination of a series of articles on the Center and its research efforts to be disseminated to existing mass communication channels.

DOCUMENTATION SERVICES

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Librarian (Head) F. Monge	2.0	2.0	2.0	17.0	21.5	22.0	40.4	44.0	44.0
Vacancy Factor				0.5	1.3	1.3	1.6	3.2	3.2
	2.0	2.0	2.0	16.5	20.2	20.7	38.8	40.8	40.8

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	216,608	253,881	470,489	297,625	301,002	598,627	27
Supplies	76,388	65,528	141,916	95,000	95,000	190,000	34
Services	21,082	31,525	52,607	42,400	39,100	81,500	55
Travel	2,263	3,263	5,526	3,150	3,150	6,300	14
Replac. Equip.	1,564		1,564	11,000	12,000	23,000	1371
	317,905	354,197	672,102	449,175	450,252	899,427	34

BUDGET CHANGES

Two additional scientific and supervisory level and one clerical positions are proposed for 1980 to enable the unit to mount full scale documentation services for all three major commodities. No provision is made in this budget for continuation of documentation services in economics.

Library books which, according to CG norms when a library is being established, have in the past been charged to capital, are as from 1980 included in supplies. $20,000 is provided for this purpose. Supplies and services also increase somewhat for the extra documentation services.

PROGRAM COMMENTARY

Objectives of the Unit

Following CIAT's commodity research emphasis, the Documentation Services Unit aims at:

1. Providing scientific and technical information in support of research activities both at CIAT as well as in national institutions;

2. Transferring information about technologies available to increase agricultural production in the tropics, and

3. Projecting to the countries an accurate image of CIAT as an institution dedicated to research and technology transfer in those commodities of CIAT's concern.

Activities of the Unit

At present, the Documentation Services Unit has a library with approximately 40,000 volumes and receives 1302 journals regularly. The library operates as a regular specialized library, but more important, it provides personalized services such as the Content Pages and Documentation activities which will be described in more detail.

Content Pages

The Content Pages is a current awareness monthly publication that lists the tables of contents of selected journals. Three areas are covered: Animal Sciences, covering 350 journals; Plant Sciences, covering 300 journals; and Social Sciences, covering 58 journals. They are subscribed by almost 2000 scientists in Latin America, who select articles of their interest and request photocopies.

In 1978, photocopies of 11,500 articles were requested on the basis of Content Pages.

Documentation

Documentation services cover four areas: Cassava, in which the Center has the only known complete collection of everything published on this crop; field beans, limited to literature applicable to tropical environments; tropical pastures and forages, which started in March, 1978; and Latin American Agricultural Economics and Development. Abstract cards of articles in these areas are distributed 10 times per year to over 2000 scientists in the world.

A significant increase in the numbers of subscribers to these documentation services took place in 1978 -- 263 new subscriptions for cassava; 296 for beans; 205 for Agricultural Economics; and 314 for pastures and forages.

Annual cumulative volumes of abstracts processed during each year are published. To date, 4 volumes have been published in cassava, 3 in beans, 3 in Latin American Agricultural Economics, and 1 in Tropical Pastures and Forages. Cassava and Bean abstracts are published simultaneously in English and Spanish while the other two areas are published only in Spanish.

Requests for photocopies of over 1000 articles in the Documentation Center were received during 1978.

Specialized literature searches, on the basis of specific descriptors, are done at the Documentation Center through a mechanized system of information retrieval. In 1978, 134 searches were made as follows: 59 in cassava, 45 in beans, 26 in agricultural economics, and 4 in tropical forages. In addition, 14 short bibliographies were prepared by conventional methods.

A Cassava Newsletter is published twice a year in English and Spanish. The success of this publication has attracted already many contributions from users in the world, despite the fact that only four issues habe been published to date.

Other publications of the Documentation Center published in 1978 include state-of-the-art reports, such as Cassava Pests and their Control, by Anthony Bellotti and A. van Schoonhoven, Cassava Drying, by Rupert Best, a practical manual which describes a simple method for small-scale drying of cassava, and the Proceedings of the Cassava Protection Workshop. Two other state-of-the-art reports are being published in 1979, as well as two additional smaller publications.

Although cassava is the only commodity in which CIAT has been able to offer the full range of services, the same model is being followed for beans and tropical forages. Thus, a newsletter in tropical forages will start publication in 1979.

Networking Activities

The accomplishments of documentation activities at CIAT can be summarized as the introduction of a pragmatic approach of delivering information in a readily usable form directly to the user. This model for collecting and disseminating information on a commodity specialization basis and producing services which promptly reach the users is being adopted both at the national and international levels. Within the IARC system, IITA started some years ago the Grain Legume Information Center following CIAT's experience in cassava and ICRISAT established this year the Sorghum and Millets Information Center for which they requested and received advisory services from the Head of CIAT's Documentation Services Unit. AGRIS (FAO) and AGRINTER (IICA), two international information networks, would like to establish information activities of this nature for other commodities as well.

Workshop. Given the broad spectrum of literature to be covered by an information service on Agricultural Economics and Development, collaboration with the Inter-American Institute of Agricultural Sciences (IICA) through AGRINTER was sought in order to make this service more regional and comprehensive. As a first step, a workshop was held at CIAT where 31 Latin American social scientists offered their appraisals

of present services as well as suggestions to improve and expand the system. Further conversations between the two institutions will take place in 1979.

Training. The first Agricultural Documentation Course given formally by the Center was given to 16 participants from 11 Latin American countries. The main purpose of this two-month course was to instill in the participants a philosophy of rapid, efficient service and a practical orientation for working under restricted budgets with techniques that are appropriate and easily applicable under the conditions found in the LDCs. In addition to the basic operative functions, administrative aspects were also dealt with, aiming at the establishment of similar information services in the countries.

Evaluation. As part of the periodical evaluations for the various services lent by the Documentation Services Unit, a survey of CEDEAL users was carried out in 1978. Similar surveys are underway, at present, for the other documentation areas. Highlights of a preliminary analysis of this survey are:

1. Only 3 percent of Content Pages users, and 1.8 percent of abstract cards subscribers assign a limited usefulness to these services. The great majority regards them as highly useful.

2. The highest source for obtaining technical photocopies is not the CIAT library, but local libraries, which indicates that these information services have a highly significant multiplier effect in the countries.

Computerization. The comparatively small amount of literature available on cassava has up to the present made possible the use of a simple mechanical system for organization of the documentation/information on this crop. However, expansion of the information available and services provided, as well as movement into other commodities which have a much more extensive literature resource, suggest the need to computerize the documentation services, as well as other library activities in 1980.

SPECIAL PROJECTS

An IDRC funded project for a Cassava Information Center, which has provided funds for a documentalist and various publications, will come to an end in 1979. Most of the functions and continuing publications will be covered out of the core budget starting in 1980.

ADMINISTRATION

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Director General J. Nickel	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0	4.0
Assistant to D.G. N.N.	-	2.0	2.0	-	-	-	-	2.0	2.0
Executive Officer J. Cuéllar	2.0	2.0	2.0	19.0	22.0	22.0	80.8	90.0	92.0
Controller A. Urquhart	2.0	2.0	2.0	16.8	16.0	16.0	42.3	51.8	54.0
	6.0	8.0	8.0	37.8	40.0	40.0	127.1	147.8	152.0
Vacancy Factor				1.1	2.4	2.4	3.3	7.6	7.8
	6.0	8.0	8.0	36.7	37.6	37.6	123.8	140.2	144.2

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	787,388	851,002	1,638,390	964,702	977,123	1,941,825	19
Supplies	28,535	27,481	56,016	43,266	43,866	87,132	56
Services	65,948	85,602	151,550	69,200	69,200	138,400	(9)
Travel	58,005	60,722	118,727	60,850	60,850	121,700	3
Replcc. Equip.	25,864		25,864				
	965,740	1,024,807	1,990,547	1,138,018	1,151,039	2,289,057	15

BUDGET CHANGES

An Assistant to the Director General at the senior staff level is proposed.

Both the Controller and the Executive Officer need additional help to handle the increasing workload. Seven clerical and other support positions are added for the Controller and five for the Executive Officer. For the latter, one position is upgraded to the scientific & supervisory level.

Supplies are increased to cover small equipment items needed in the various administrative units. Services are reduced on the assumption that certain personnel functions, presently contracted out, will be handled in-house.

PROGRAM COMMENTARY

Grouped under Administration are the Board of Trustees and the offices of the Director General, the Controller and the Executive Officer. These offices, together with the three Directors, are responsible for overall administrative and financial management of the Center.

GENERAL OPERATING EXPENSES

RESOURCES - CORE

Personnel-Man-years	Senior Staff			Scientific & Supervisory			Clerical & Other		
	78/9	80/1	82/3	78/9	80/1	82/3	78/9	80/1	82/3
Physical Plant Maintenance				6.0	6.0	6.0	88.2	102.5	104.0
Physical Plant Security				-	-	-	71.7	72.0	72.0
Physical Plant Cleaning				-	-	-	112.0	122.5	126.0
Physical Plant Gardens				-	-	-	22.0	22.0	22.0
Motor Pool				2.0	2.0	2.0	85.4	100.0	102.0
				8.0	8.0	8.0	379.3	419.0	426.0
Vacancy Factor				0.2	0.5	0.5	15.2	33.1	33.6
				7.8	7.5	7.5	364.1	385.9	392.4

Direct Costs (US Dollars)

	Current Budget			Proposed Budget			
	1978 Actual	1979 Revised	Total	1980	1981	Total	% Incr.
Personnel	758,352	749,715	1,508,067	818,081	846,944	1,665,025	10
Supplies	351,979	436,668	788,647	477,585	502,385	979,970	24
Services	421,165	409,056	830,221	511,822	552,022	1,063,844	28
Travel	14,711	12,004	26,715	14,900	15,200	30,100	13
Other Expenses	135,178	81,648	216,826	140,000	145,000	285,000	31
Replac. Equip.	5,728	74,000	79,728	75,000	85,000	160,000	101
	1,687,113	1,763,091	3,450,204	2,037,388	2,146,551	4,183,939	21

BUDGET CHANGES

The following positions are added to handle the increased areas to be serviced and workload resulting from expansions in the rest of the Center :

Maintenance	-	6 mechanics
Cleaning	-	6 cleaners
Motor Pool	-	3 mechanics
		1 panel beater
		1 preventive maintenance supervisor
		4 drivers
* Food & Housing	-	1 switchboard operator
		1 housekeeper
		3 kitchen helpers

* Costs of this unit are covered by charges made and subsidy included in personnel costs.

Supplies are increased to provide for increased office and cleaning supplies. Services increase substantially principally because of much higher electricity consumption for such new areas as plant growth facilities, the seed unit, etc. and increased insurance needed for additional buildings, staff, etc.

The table above for direct costs includes expenses related to the units listed plus general operating expenses. Details of the general operating expenses are given in the following table:

	Budget 78/79	Budget 80/81
Office supplies	131,000	155,000
Electricity	269,000	475,000
Boiler fuel, chemicals, etc.	52,000	58,000
Telephone	143,000	150,000
Telex and cables	60,000	71,000
Postage	167,000	210,000
Insurance	132,000	225,000
Other	38,000	68,000
	992,000	1,412,000

PROGRAM COMMENTARY

The Palmira installations consist of 12 buildings or complexes of buildings, including two laboratory buildings, plus 76 living units and recreational facilities, plant growth facilities and swine and cattle facilities. The gross area of buildings is 27,500 square meters, of which 62 percent is air-conditioned. Surrounding grounds and gardens cover 45,000 square meters.

Other than electricity, for which only an emergency generator is maintained, CIAT provides all its own services. The Physical Plant includes resources to run these services, maintain all buildings and grounds in a serviceable and clean fashion and provide security.

CIAT operates a fleet of about 215 vehicles which includes buses, trucks, vans, pickups, jeeps and passenger cars from various manufacturers. The Motor Pool is responsible for: servicing, repairing and maintaining these vehicles; providing bus services to transport personnel to and from work and regular services during the day and night to Cali and Palmira for employees, visitors and trainees; providing transport of supplies to Carimagua; and providing vehicles and drivers for special services when needed.

CAPITAL REQUIREMENTS

The proposed capital budget of $1,461,000 includes $106,000 for construction in 1980 and $151,000 in 1981 and $809,000 for equipment in 1980 and $395,000 in 1981. In addition $550,000 is needed to maintain working capital pari passu with the operating budget at the CG Norm of 30 days' operating expenses.

CONSTRUCTION (Category I Projects)

Glasshouse

CIAT has recently completed the construction of three new glasshouses, to give five in total, two new large screenhouses and a new service building for the whole area. Modifications are presently underway to the old service building to convert it into eight growth rooms and a small common laboratory area.

The master plan developed in connection with the above expansion of facilities included a sixth glasshouse which was not budgeted and was therefore left for a second phase. It is proposed that it be built in 1981 at an estimated cost of $95,000.

Building Modifications

As new buildings are completed, several internal moves will be made. These will require modifications to existing buildings and $30,000 is therefore provided for this in 1980.

Infrastructure at CIAT Managed Experimental Stations

Besides Palmira, CIAT now comanages the ICA station at Carimagua and manages the station at Quilichao and we are looking for an intermediate altitude station for the Bean Program. This is needed for screening for cooler temperature diseases and yield testing of variesties for lower temperature adaptation.

Substantial investments have been made at Quilichao to establish the necessary infrastructure and at Carimagua to complement ICA's new and existing infrastructure. This budget proposal therefore includes only relatively small amounts for certain additional items. At Quilichao a building is needed to provide more work space and storage for the increasing number of scientists working at the station. Estimated cost for the 400 m^2 building is $12,000. We are trying to obtain an additional 90 hectares at Quilichao which will require fencing and roads estimated to cost $15,000.

At Carimagua simple storage sheds are needed in various locations to avoid having to haul supplies and equipment each day to the work area. The new construction at Carimagua over and above that contemplated when the new water supply system was designed means that its capacity has to be increased.

Exact requirements for the Intermediate Altitude Station cannot be defined until the actual site is identified and we can see what is available and what has to be added. An estimated $22,000 in 1980 and $30,000 in 1981 should, however, be sufficient.

The station operations function presently occupies one patio of the original station operations building. When the Seed Unit is built (out of the Swiss Funded special project) we will move the silos which are in the patio. By building an extension to the buildings in the machinery park we could accommodate the other functions, such as tractor maintenance, which are handled in the station operations' patio and thereby free up this space for the Bean Program which occupies the adjacent patio. The cost of this extension is estimated at $23,000.

EQUIPMENT (Category II Projects)

Scientists have always found it difficult to predict the specific items of equipment they will need since they depend so much on results of their research and the future directions this will take. Equipment, unlike people, is designed to do a particular job and cannot be changed to do a different job. Making predictions for a two year budget period in effect means looking ahead for up to three years; this is apparently very difficult.

In view of the above we have this time decided that the overall total for equipment for each research program should be determined using a formula. The formula used is $3,000 (1979 dollars) per annum for each existing staff position and $5,000 for each new position. Each program has prepared lists of major items which they now foresee as being needed out of the totals. The tables at the end of this section give details of these lists.

Equipment items listed by support units were extensively reviewed by the Budget Review Committee and only items of the highest priority are now recommended in this proposal.

One substantial item in the equipment list is the emergency generator costing $112,000. A consultant has recently reviewed our whole electrical supply capacity to see what our needs are for emergency on stand-by generator capacity. The conclusions are that our present 420 KVA emergency generator is sufficient to handle purely emergency situations, when the electrical supply from outside is temporarily interupted, but that additional capacity is needed to keep reduced services going when electricity is rationed. Since the country's generation

capacity has not been expanded as quickly as hoped, it is expected that some form of rationing will have to be imposed if, as has happened in the past, low rainfall affects the supply of hydroelectricity. The proposed 750 KVA and the existing 420 KVA generators would enable CIAT to operate essential minimum services during such periods.

A specially appointed ad hoc committee recently studied ways to centralize, standardize and improve field equipment so that many field operations currently done by hand can be mechanized and thereby save labor. The committee's recommendations for new items of equipment can for the most part be obtained by replacing existing equipment and this proposal therefore includes only $25,000 (in Station Operations) for mechanization. In anticipation of the savings in labor to be derived from mechanization, the laborers included in the research programs have been reduced by 5% in 1980 and a further 5% in 1981. It is anticipated that more substantial reductions can be made in later years.

Projections of equipment have been made using a similar formula to that for fixing budget amounts adjusted for inflation.

SUMMARY OF CAPITAL REQUIREMENTS

	Budget			Projections		
	1980	1981	Total	1982	1983	Total
Category I Projects (Construction)						
Glasshouse		95,000	95,000			
Building Modifications	30,000	-	30,000			
Infrastructure at CIAT managed experimental stations:						
Quilichao -						
Central Serv.Bldg.		12,000	12,000			
Roads & Fences	15,000	-	15,000			
Carimagua -						
Field Storage sheds		14,000	14,000			
Expansion of water system	16,000		16,000			
Intermediate altitude station -						
Various	22,000	30,000	52,000			
Palmira -						
Extension ov mach. park & serv.area	23,000	-	23,000			
Category II Projects (Equipment)	809,000	395,000	1,204,000	385,000	454,000	839,000
	915,000	546,000	1,461,000	385,000	454,000	839,000

SPECIFIC EQUIPMENT AND OTHER CAPITAL

REQUIREMENTS OF PROGRAMS

	Budget			Projection		
	1980	1981	Total	1982	1983	Total
Beans						
Field plot sprayer		6,000				
Field plot planting equip.	8,000					
Thresher		8,000				
Irrigation equipment		10,000				
Growth Chamber		6,000				
Laminar flowhood & installation (2)	6,000	6,000				
Drying room for plant samples	10,000					
Seed germinators (2)	8,000					
Sundries	10,000	7,000				
Equipment for Regional Services staff	11,000	13,000				
	53,000	56,000	109,000	60,000	73,000	133,000
Cassava						
Growth chambers (2)	5,500	6,000				
Pressure bomb		1,200				
Diffusion porometer	1,000					
Micronizer	500					
Combine (shared)	4,000					
Balances (3)	1,100	2,400				
Light traps (10)	7,000					
Microscopes (2)	2,200	2,400				
Insect rearing room		5,000				
Pelleter	11,000					
Forage harvester & trailer	11,000					
Fermentor		6,000				
Solar drier		2,400				
Cassava planter		8,500				
Compressor		1,200				
Integrating light meter		1,800				
Miscellaneous	13,700	26,100				
	57,000	63,000	120,000	64,000	70,000	134,000

	Budget			Projections		
	1980	1981	Total	1982	1983	Total
Rice						
Microscopes	1,900	2,200				
Safety cabinet	1,800					
Incubator	2,000					
Freeze dryer		3,300				
Spectrophotometer		2,000				
Balances (2)	2,300	1,500				
Seed dryer	3,000					
Sundry field equip.	8,000	6,000				
Sundry laboratory equip.	7,000	7,000				
	26,000	22,000	48,000	24,000	26,000	50,000
Genetic Resources						
Small tillage equip. for off-site work	3,500					
Microscope for plant chromosome scoring		4,000				
Sundry laboratory equip.	3,000	3,000				
	6,500	7,000	13,500	8,000	9,000	17,000
Laboratory Services						
Refrigerated water bath	2,000					
Sample evaporator	2,000					
Strip chart recorder	3,500					
Electronic line stabilizers (2)		2,000				
Sundry laboratory equip.	3,500	4,000				
Pot washer	3,500					
Steam sterilizer	4,500					
Electronic balance	3,000					
Sundry greenhouse equip.	4,000	13,000				
	26,000	19,000	45,000	10,000	11,000	21,000

	Budget			Projections		
	1980	1981	Total	1982	1983	Total
Station Operations						
Cultipacker	4,000					
Field cultivator	5,000					
Gated pipe irrigation equipment	14,000	15,000				
Farm fabrication shop equipment	8,000	4,000				
Harrow		4,000				
Rotary mower (Quilichao)	2,000					
Irrigation equip.(Quilichao)	11,000					
Equipment for intermediate altitude station :						
Tractor	10,000					
Pick-up	10,000					
Farm implements	6,000	5,000				
Equipment for farm mechanization	25,000					
Sundry equipment	6,000	4,000				
	100,000	32,000	132,000	50,000	55,000	105,000
Tropical Pastures						
Corrals	13,000	5,000				
Pasture establish.equip.	8,000	8,500				
Forage dryer (Selva)	5,000					
Portable electric fences	1,000	1,000				
Seed harvesting equip.	5,000	18,000				
Tractor implements	3,000	3,000				
Heavy duty pumps (10)	3,000	3,000				
Portable cattle scales (6)	5,000	5,500				
Seed processing equip.	1,000	4,000				
Screenhouse - Selva	3,000					
Sprinkler irrigation equip.	2,000	2,500				
Field plot equipment	15,500	14,500				
Laboratory & greenhouse equipment	14,500	11,000				
Neutron density probe		4,000				
	79,000	80,000	159,000	88,000	104,000	192,000

	Budget			Projections		
	1980	1981	Total	1982	1983	Total
Carimagua						
Vehicles (2)	18,000					
Office equipment	8,500					
Library equipment	3,000					
Housing equipment	5,000					
Balance	1,500					
Deep well pumps (10)	3,000	3,000				
Rotovator	4,500					
Recreational facilities	22,000					
Sundry equipment	11,000	12,000				
	76,500	15,000	91,500	20,000	22,000	42,000
Data Services						
Magnetic disks (4)	1,000	1,500				
Meterological equipment	4,000					
	5,000	1,500	6,500	4,000	4,000	8,000
Training & Conferences						
Typewriters for trainees (10)	1,500	2,000				
Computer print-out storage	2,000					
Slide viewers with sound (10)	1,500	2,000				
Transits (2)	1,000	1,500				
Television & playback unit		2,500				
	6,000	8,000	14,000	4,000	4,000	8,000
Communication Support						
Folder	4,000					
Printing press	27,500					
Numbering unit for Multilith	1,500					
Binder		12,000				
	33,000	12,000	45,000	12,000	13,000	25,000

	Budget			Projections		
	1980	1981	Total	1982	1983	Total
Documentation Services						
Terminal for on-line use of data banks	4,000					
Microform reader/printer		9,000				
Microform contact dupl.	3,000					
Library stacks, files, etc.	5,500	5,000				
	12,500	14,000	26,500	4,000	4,000	8,000
Controller						
Calculators for new staff	3,000	500	3,500	2,000	2,000	4,000
Executive Officer						
Office equipment	6,000	3,500				
Warehouse equipment	5,000	2,500				
Furniture & Furnishings for addit. personnel (all programs) :						
Senior Staff	14,000	4,000				
Scientific & Supervis.	15,000	3,000				
Clerical	38,000	8,000				
Vehicles for new staff	119,000	27,000				
	197,000	48,000	245,000	20,000	40,000	60,000
Physical Plant						
Additional emergency generator (750 KVA) with transformer, control panel, & installation	112,000					
Plane (wood)		5,000				
Telephone testing equip.	3,500	4,000				
Stand-by office equip.	3,000					
Floor cleaners (2)	1,500	2,000				
Mowers (2)	1,000					
Walkie-talky equipment	3,000					

	Budget			Projections		
	1980	1981	Total	1982	1983	Total
Laundry equipment	3,500	2,000				
Recreational equipment	1,000	1,000				
Food cupboards (2)		3,000				
	128,500	17,000	145,500	15,000	17,000	32,000
TOTAL EQUIPMENT	809,000	395,000	1,204,000	385,000	454,000	839,000

TABLE I

CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL

SUMMARY OF MAN-YEARS AND COSTS BY PROGRAM AND ACTIVITY

	BUDGET						PROPOSED BUDGET						PROJECTIONS					
	1978 a/		1979 b/		Total		1980		1981		Total		1982		1983		Total	
	* M-Y	$ 000	M-Y	$ 000	M-Y	$ 000	M-Y	$ 000	M-Y	$ 000	M-Y	$ 000	M-Y	$ 000	M-Y	$ 000	M-Y	$ 000
CROPS RESEARCH																		
Office of the Director c/	0.8	166	0.7	262	1.5	428	1.0	217	1.0	215	2.0	432	1.0	215	1.0	215	2.0	430
Beans	9.4	1102	10.6	1380	20.0	2482	12.5	1615	14.5	1778	27.0	3393	15.0	1855	15.5	1949	30.5	3804
Cassava	7.9	939	9.0	1205	16.9	2144	13.0	1686	15.0	1858	28.0	3544	16.0	1937	16.0	1953	32.0	3890
Rice	2.0	204	3.0	392	5.0	596	4.5	649	6.0	772	10.5	1421	6.0	784	6.0	792	12.0	1576
Genetic Resources	2.7	221	3.0	327	5.7	548	2.0	260	2.0	279	4.0	539	2.0	281	2.0	284	4.0	565
Laboratory Services		145		166		311	1.0	284	1.0	291	2.0	575	1.0	296	1.0	301	2.0	597
Station Operations	1.0	444	1.0	478	2.0	922	1.0	552	1.0	581	2.0	1133	1.0	586	1.0	591	2.0	1177
SUB-TOTAL	23.8	3221	27.3	4210	51.1	7431	35.0	5263	40.5	5774	75.5	11037	42.0	5954	42.5	6085	84.5	12039
LAND RESOURCES RESEARCH																		
Office of the Director c/	0.8	149	0.7	237	1.5	386	1.0	270	1.0	268	2.0	538	1.0	268	1.0	268	2.0	536
Tropical Pastures	15.6	1754	17.0	2387	32.6	4141	20.5	2535	22.0	2539	42.5	5074	22.0	2570	22.5	2644	44.5	5214
Carimagua		264		194		458		408		424		832		426		431		857
Data Services	1.0	225	1.0	308	2.0	533	1.0	388	1.0	389	2.0	777	1.0	389	1.0	392	2.0	781
SUB-TOTAL	17.4	2392	18.7	3126	36.1	5518	22.5	3601	24.0	3620	46.5	7221	24.0	3653	24.5	3735	48.5	7388
Swine	2.0	179	2.0	233	4.0	412		-		-		-		-		-		-
TOTAL RESEARCH	43.2	5792	48.0	7569	91.2	13361	57.5	8864	64.5	9394	122.0	18258	66.0	9607	67.0	9820	133.0	19427
Of which Regional Services	2.0	132	2.0	134	4.0	266	7.5	683	12.5	1017	20.0	1700	14.0	1122	15.0	1235	29.0	2357
INTERNATIONAL COOPERATION																		
Office of the Director	1.0	108	1.0	146	2.0	254	1.0	146	1.0	152	2.0	298	1.0	152	1.0	152	2.0	304
Training & Conferences	1.5	679	1.3	945	2.8	1624	1.0	1046	1.0	1167	2.0	2213	1.0	1248	1.0	1325	2.0	2573
Communication Support	2.5	427	3.0	627	5.5	1054	3.0	734	3.0	775	6.0	1509	3.0	790	3.0	790	6.0	1580
Documentation Services	1.0	318	1.0	354	2.0	672	1.0	449	1.0	450	2.0	899	1.0	452	1.0	456	2.0	908
TOTAL INTERNAT. COOP.	6.0	1532	6.3	2072	12.3	3604	6.0	2375	6.0	2544	12.0	4919	6.0	2642	6.0	2723	12.0	5365
ADMINISTRATION																		
Board of Trustees		40		48		88		43		43		86		43		43		86
Director General	1.0	138	1.0	158	2.0	296	2.0	213	2.0	210	4.0	423	2.0	210	2.0	210	4.0	420
Controller	1.0	343	1.0	342	2.0	685	1.0	357	1.0	364	2.0	721	1.0	366	1.0	367	2.0	733
Executive Officer	1.0	445	1.0	477	2.0	922	1.0	525	1.0	535	2.0	1060	1.0	535	1.0	535	2.0	1070
TOTAL ADMINISTRATION	3.0	966	3.0	1025	6.0	1991	4.0	1138	4.0	1152	8.0	2290	4.0	1154	4.0	1155	8.0	2309
GENERAL OPERATING EXPENSES																		
Physical Plant		750		788		1538		836		862		1698		867		872		1739
Motor Pool		433		449		882		520		553		1073		558		563		1121
General Expenses		504		526		1030		681		731		1412		826		924		1750
TOTAL GENERAL OPERATING		1687		1763		3450		2037		2146		4183		2251		2359		4610
OTHER																		
Contingency				190		190		144		152		296		156		161		317
Provision for Price Changes								1362		2834		4196		4543		6527		11070
TOTAL CORE	52.2	9977	57.3	12619	109.5	22596	67.5	15920	74.5	18222	142.0	34142	76.0	20353	77.0	22745	153.0	43098
TOTAL SPECIAL PROJECTS		1306		2332		3638		1500		1500		3000		1500		1500		3000
CATEGORIES OF EXPENSE																		
Personal Services		7230		9071		16301		10532		11108		21640		11320		11489		22809
Supplies		1012		1222		2234		1409		1461		2870		1479		1495		2974
Services		835		951		1786		1066		1124		2190		1194		1266		2460
Travel		693		805		1498		933		985		1918		993		1020		2013
Equipment		72		298		370		334		413		747		503		602		1105
Other		135		82		217		140		145		285		165		185		350
Contingency				190		190		144		152		296		156		161		317
SUB-TOTAL		9977		12619		22596		14558		15388		29946		15810		16218		32028
Provision for Price Changes								1362		2834		4196		4543		6527		11070
TOTAL CORE		9977		12619		22596		15920		18222		34142		20353		22745		43098

* M-Y = Man-years of Senior Staff

a/ Figures shown are actual expenses incurred in 1978

b/ The 1979 portion of the 1978/79 budget has been increased by the $82,000 underspent in the 1978 portion of the budget.

c/ Includes Assoc. D.G.- Research & Special Studies divided by two plus share of visiting scientists and post doctorals.

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TABLE II

CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL

SUMMARY OF SOURCES AND APPLICATION OF FUNDS

	BUDGET			PROPOSED BUDGET			PROJECTIONS		
	1978 a/	1979	Total	1980	1981	Total	1982	1983	Total
SOURCES OF FUNDS									
Core Operations									
Unrestricted									
Australia	182	185	367						
Belgium	157	185	342						
Canada (CIDA)	982	980	1962						
European Economic Community		1070	1070						
Ford Foundation	200	150	350						
Germany (Federal Republic)	1096	1060	2156						
Interamerican Dev. Bank	2400	2650	5050						
International Development Assoc. (World Bank)	202	250	452						
Japan	200	400	600						
Netherlands	200	250	450						
Norway	207	210	417						
Rockefeller Foundation	300	300	600						
Switzerland	228	300	528						
United Kingdom	353	415	768						
United States (AID)	2600	3300	5900						
Unidentified sources		432	432	15520	17822	33342	19953	22345	42298
Balance from previous period		82							
Income applied in year	432	400	832	400	400	800	400	400	800
SUB-TOTAL	9739	12619	22276	15920	18222	34142	20353	22745	43098
Restricted									
Kellogg Foundation	320		320						
TOTAL CORE OPERATING FUNDS	10059	12619	22596	15920	18222	34142	20353	22745	43098
Capital									
Interamerican Development Bank	235		235						
International Development Assoc. (World Bank)	620	917	1537						
Unidentified sources		21	21	1617	924	2541	535	654	1189
Balance from previous period	1689	763	1689						
Balance of working funds	700	800	700	950	1300	950	1500	1650	1500
Other	31		31						
TOTAL CAPITAL FUNDS	3275	2501	4213	2567	2224	3491	2035	2304	2689
Special Projects									
Belgium	52	28	80						
CIMMYT (CIDA)	126	85	211						
Ford Foundation		5	5						
Germany (GTZ)	71	30	101						
Interamerican Development Bank	34	41	75						
IBPGR	25		25						
International Development Research Centre	229	236	465						
International Fertilizer Development Center	41	100	141						
International Rice Research Institute	99	100	199						
Rockefeller Foundation	(13)	32	19						
Switzerland	637	593	1230						
United Kingdom	(18)		(18)						
U.N. Development Programme	721	600	1321						
United States (AID)	104	130	234						
Other	(1)		(1)						
Unidentified sources				1400	1500	2900	1500	1500	3000
Balance from previous period	351	1152	351	800	700	800	700	700	700
TOTAL SPECIAL PROJECTS	2458	3132	4438	2200	2200	3700	2200	2200	3700
TOTAL FUNDS	15792	18252	31247	20687	22646	41333	24588	27249	49487
APPLICATION OF FUNDS									
Core Operations	9977	12619 b/	22596	15920	18222	34142	20353	22745	43098
Capital	1712	1551	3263	915	546	1461	385	454	839
Special Projects	1306	2332	3638	1500	1500	3000	1500	1500	3000
Unexpended Balances									
Unrestricted Core	82	-	-						
Capital	763	-	-						
Working Funds	800	950	950	1300	1500	1500	1650	1850	1850
Special Projects	1152	800	800	700	700	700	700	700	700
SUB-TOTAL	2797	1750	1750	2000	2200	2200	2350	2550	2550
TOTAL APPLICATIONS	15792	18252	31247	20335	22468	40803	24588	27249	49487
Memo :									
1. Total Core Operating Funds Required	10059	12619	22678	15920	18222	34142	20353	22745	43098
Less Unexpended balance previous period	-	(82)	(82)						
Less Earned Income Applied current year	(432)	(400)	(832)	(400)	(400)	(800)	(400)	(400)	(800)
Net Core Operating Funds Required	9627	12137	21764	15520	17822	33342	19953	22345	42298
2. Total Capital Funds Required	3244	2501	4182	2215	2046	2961	2035	2304	2689
Less Unexpended balance previous period	(1689)	(763)	(1689)						
Less Balance of Working Funds	(700)	(800)	(700)	(950)	(1300)	(950)	(1500)	(1650)	(1500)
Net Capital Funds Required	855	938	1793	1265	746	2011	535	654	1189
3. Total Funds Required from Donors	10482	13075	23557	16785	18568	35353	20488	22999	43487
4. Total Earned Income	432	400	832	400	400	800	400	400	800
Applied to Core Operations	(350)	(482)	(832)	(400)	(400)	(800)	(400)	(400)	(800)
Applied to Capital	-	-	-	-	-	-	-	-	-
Balance carried forward	82	(82)	-	-	-	-	-	-	-

a/ Figures are actual for 1978

b/ The 1979 Core Operations Budget has been increased by the $82,000 underspent in 1978.

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TABLE III

CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL

SUMMARY FINANCIAL DATA 1977 - 1981

(US $ Thousands)

	Actual 1977	Actual 1978	Original 1979	Revised 1979	Budget 1980	Budget 1981
Current Assets						
Cash	2481	3540	600	1500	2000	2500
Receivable from Donors	288	93	700	500	500	500
Receivable from Employees	91	92	70	100	120	130
Receivable from Others	1091	992	500	1000	1100	1200
Inventories	549	678	350	650	700	750
Prepaid Expenses	10	9	30	10	10	10
Total Current Assets	4510	5404	2250	3760	4430	4990
Fixed Assets						
Research Equipment	2104	2450				
Aircraft		664				
Vehicles	1110	1649				
Furnishings & Office Equipment	1103	1177				
Buildings	4954	5616				
Other	69	160				
Total Fixed Assets	9340	11716	12626	14177	15092	15638
TOTAL ASSETS	13850	17120	14876	17937	19522	20628
Liabilities						
Bank Loan		650		450	200	-
Bank Overdraft		182		500	500	500
Accounts Payable	1542	1702	700	1374	2000	2200
Grants Received in Advance	228	667	300	350	324	614
Total Liabilities	1770	3201	1000	2674	3024	3314
Fund Balances						
Invested in fixed assets	9340	11716	12626	14177	15092	15638
Unexpended Funds :						
Core Unrestricted		82				
Working Fund Grants	700	206	950	286	706	976
Capital Grants	1689	763				
Special Projects	351	1152	300	800	700	700
Total Fund Balances	12080	13919	13876	15263	16498	17314
TOTAL LIABILITIES AND FUND BALANCES	13850	17120	14876	17937	19522	20628

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ROPICAL

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TABLE IV

EARS Budget 80	81	OTHER SUPPORT STAFF POSITIONS Act. 78	Rev. 79	Budget 80	81	MAN-YEARS Act. 78	Rev. 79	Budget 80	81	TOTAL STAFF POSITIONS Act. 78	Rev. 79	Budget 80	81	MAN-YEARS Act. 78	Rev. 79	Budget 80	81
1.0	1.0	5.5	6.5	5	5	2.7	6.3	5.0	5.0	10.5	10.5	8	8	5.5	10.0	8.0	8.0
11.0	12.5	101	121	140	144	95.4	120.7	135.5	142.3	143	163	190	198	131.5	162.3	181.5	194.3
12.0	14.0	110	119	132	131	92.6	118.5	127.5	130.5	146	155	181	184	120.5	154.0	173.0	181.5
3.0	4.0	32	37	71	69	17.6	36.0	62.3	69.0	44	50	94	92	23.9	48.7	79.8	92.0
1.0	1.0	18	22	20	20	12.1	21.0	19.3	20.0	28	33	30	30	19.6	31.8	28.3	30.0
1.0	1.0	20	21	21	21	13.9	20.7	21.0	21.0	21	22	27	27	14.9	21.7	26.5	27.0
3.0	3.0	85	62	86	86	82.0	61.3	82.0	86.0	92	69	93	93	88.9	68.3	89.0	93.0
32.0	36.5	371.5	388.5	475	476	316.3	384.5	452.6	473.8	484.5	502.5	623	632	404.8	496.8	586.1	625.8
1.0	1.0	5.5	6.5	5	5	2.7	6.3	5.0	5.0	10.5	10.5	8	8	5.5	10.0	8.0	8.0
17.0	19.0	165	194	178	173	106.7	188.5	177.5	173.0	237	265	254	250	162.7	257.5	251.0	250.0
3.0	3.0	2	2	2	2	1.4	2.0	2.0	2.0	7	7	10	10	5.0	7.0	9.5	10.0
12.0	12.0			1	1			1.0	1.0	12	19	23	23	11.7	19.0	23.0	23.0
33.0	35.0	172.5	202.5	186	181	110.8	196.8	185.5	181.0	266.5	301.5	295	291	184.9	293.5	291.5	291.0
		10	11			8.7	11.0			18	19			15.5	19.0		
65.0	71.5	554	602	661	657	435.8	592.3	638.1	654.8	769	823	918	923	605.2	809.3	877.6	916.8
8.0	12.5			11	14			9.5	13.3	2	3	33	42	2.0	2.5	25.0	38.3
2.0	2.0									3	3	4	4	3.0	3.0	3.5	4.0
4.0	5.5	5	5	5	5	4.0	5.0	5.0	5.0	24	20	22	23	19.8	19.3	21.0	22.5
7.0	7.5	16	17	21	21	15.9	17.0	20.3	21.0	34	41	46	48	32.3	40.5	44.3	47.0
5.0	5.0	18	17	17	17	16.0	17.0	17.0	17.0	33	31	34	34	29.4	31.0	33.5	34.0
18.0	20.0	39	39	43	43	35.9	39.0	42.3	43.0	94	95	106	109	84.5	93.8	102.3	107.5
2.0	2.0	1	1	1	1	1.0	1.0	1.0	1.0	4	4	6	6	4.0	4.0	6.0	6.0
25.0	26.8									33	29	35	36	32.1	29.0	34.0	35.8
42.0	44.0	4	4	2	2	3.7	4.0	2.0	2.0	53	52	58	58	49.8	52.0	56.0	58.0
69.0	72.8	5	5	3	3	4.7	5.0	3.0	3.0	90	85	99	100	85.9	85.0	96.0	99.8
4.0	4.0	144	146	156	158	140.9	146.0	153.5	157.5	151	153	163	165	147.1	153.0	160.5	164.5
3.0	3.0	44	39	48	48	40.2	39.0	46.0	48.0	48	43	52	52	44.2	43.0	50.0	52.0
12.8	13.0	54	54	58	58	54.6	54.0	57.0	58.0	68	68	73	73	66.3	68.0	71.8	73.0
		2	2	2	2	1.9	2.0	2.0	2.0	2	2	3	3	1.9	2.0	2.5	3.0
19.8	20.0	244	241	264	266	237.6	241.0	258.5	265.5	269	266	291	293	259.5	266.0	284.8	292.5
171.8	184.3	842	887	971	969	714.0	877.3	941.9	966.3	1222	1269	1414	1425	1035.1	1254.1	1360.7	1416.6
8.6	9.2					-	70.1	75.3	77.2					-	88.6	97.7	104.1
163.2	175.1	842	887	971	969	714.0	807.2	866.6	889.1	1222	1269	1414	1425	1035.1	1165.5	1263.0	1312.5

CENTRO INTERNACIONAL DE AGRIC

TABLE OF POSITIONS AND

	SENIOR STAFF								SCIENTIFIC AND SUPERVISORY								SUPPORT CLERI			
	POSITIONS				MAN-YEARS				POSITIONS				MAN-YEARS				POSITIONS			
	Act. 78	Rev. 79	Budget 80	81	Act. 78	Rev. 79	Budget 80	81	Act. 78	Rev. 79	Budget 80	81	Act. 78	Rev. 79	Budget 80	81	Act. 78	Rev. 79	Budget 80	81
CROPS RESEARCH																				
Office of the Director	1	1	1	1	0.8	0.7	1.0	1.0	2.5	1.5	1	1	1.1	1.5	1.0	1.0	1.5	1.5	1	1
Beans	11	11	14	15	9.4	10.6	12.5	14.5	21	21	24	26	17.5	21.0	22.5	25.0	10	10	12	13
Cassava	9	9	14	16	7.9	9.0	13.0	15.0	18	19	22	22	13.4	18.5	20.5	22.0	9	8	13	15
Rice	3	3	6	6	2.0	3.0	4.5	6.0	6	7	13	13	2.8	6.7	10.0	13.0	3	3	4	4
Genetic Resources	3	3	2	2	2.7	3.0	2.0	2.0	6	6	7	7	3.8	6.0	6.0	7.0	1	2	1	1
Laboratory Services			1	1			1.0	1.0	1	1	4	4	1.0	1.0	3.5	4.0			1	1
Station Operations	1	1	1	1	1.0	1.0	1.0	1.0	3	3	3	3	3.0	3.0	3.0	3.0	3	3	3	3
SUB-TOTAL	28	28	39	42	23.8	27.3	35.0	40.5	57.5	58.5	74	76	42.6	57.7	66.5	75.0	27.5	27.5	35	38
LAND RESOURCES RESEARCH																				
Office of the Director	1	1	1	1	0.8	0.7	1.0	1.0	2.5	1.5	1	1	1.1	1.5	1.0	1.0	1.5	1.5	1	1
Tropical Pastures	19	19	22	22	15.6	17.0	20.5	22.0	40	40	36	36	28.8	40.0	36.0	36.0	13	12	18	19
Carimagua									2	2	5	5	1.0	2.0	4.5	5.0	3	3	3	3
Data Services	1	1	1	1	1.0	1.0	1.0	1.0	5	8	9	9	5.0	8.0	9.0	9.0	6	10	12	12
SUB-TOTAL	21	21	24	24	17.4	18.7	22.5	24.0	49.5	51.5	51	51	35.9	51.5	50.5	51.0	23.5	26.5	34	35
Swine	2	2			2.0	2.0			4	4			3.0	4.0			2	2		
TOTAL RESEARCH	51	51	63	66	43.2	48.0	57.5	64.5	111	114	125	127	81.5	113.2	117.0	126.0	53	56	69	73
of which Regional Services	2	2	11	14	2.0	2.0	7.5	12.5										1	11	14
INTERNATIONAL COOPERATION																				
Office of the Director	1	1	1	1	1.0	1.0	1.0	1.0			1	1			0.5	1.0	2	2	2	2
Training and Conferences	2	2	1	1	1.5	1.3	1.0	1.0	13	10	11	11	10.6	10.0	11.0	11.0	4	3	5	6
Communication Support	3	3	3	3	2.5	3.0	3.0	3.0	9	13	15	16	8.4	12.5	14.0	15.5	6	8	7	8
Documentation Services	1	1	1	1	1.0	1.0	1.0	1.0	9	9	11	11	8.0	9.0	10.5	11.0	5	4	5	5
TOTAL INTERNATIONAL COOP.	7	7	6	6	6.0	6.3	6.0	6.0	31	32	38	39	27.0	31.5	36.0	38.5	17	17	19	21
ADMINISTRATION																				
Director General	1	1	2	2	1.0	1.0	2.0	2.0	1	1	1	1	1.0	1.0	1.0	1.0	1	1	2	2
Controller	1	1	1	1	1.0	1.0	1.0	1.0	9	8	8	8	8.8	8.0	8.0	8.0	23	20	26	27
Executive Officer	1	1	1	1	1.0	1.0	1.0	1.0	10	10	11	11	9.0	10.0	11.0	11.0	38	37	44	44
TOTAL ADMINISTRATION	3	3	4	4	3.0	3.0	4.0	4.0	20	19	20	20	18.8	19.0	20.0	20.0	62	58	72	73
GENERAL OPERATING																				
Physical Plant									3	3	3	3	3.0	3.0	3.0	3.0	4	4	4	4
Motor Pool									1	1	1	1	1.0	1.0	1.0	1.0	3	3	3	3
Food & Housing									2	2	2	2	2.0	2.0	2.0	2.0	12	12	13	13
Farm Production											1	1			0.5	1.0				
TOTAL GENERAL OPERATING									6	6	7	7	6.0	6.0	6.5	7.0	19	19	20	20
GRAND TOTAL	61	61	73	76	52.2	57.3	67.5	74.5	168	171	190	193	133.3	169.7	179.5	191.5	151	150	180	187
Less Vacancy Factors					-	0.8	3.0	6.2					-	10.2	10.8	11.5				
NET TOTAL	61	61	73	76	52.2	56.5	64.5	68.3	168	171	190	193	133.3	159.5	168.7	180.0	151	150	180	187

TABLE V

CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL

BUDGET AND PROJECTION OF POSITIONS AND MANPOWER

	SENIOR STAFF								SCIENTIFIC AND SUPERVISORY STAFF							
	1980		1981		1982		1983		1980		1981		1982		1983	
	Pos.	M-Y	Pos.	M-Y	Pos.	M-Y	Pos.	M-Y	Pos.	M-Y	Pos.	M-Y	Pos.	M-Y	Pos.	M-Y
CROPS RESEARCH																
Office of the Director	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0
Beans	14	12.5	15	14.5	15	15.0	16	15.5	24	22.5	26	25.0	26	26.0	26	26.0
Cassava	14	13.0	16	15.0	16	16.0	16	16.0	22	20.5	22	22.0	22	22.0	22	22.0
Rice	6	4.5	6	6.0	6	6.0	6	6.0	13	10.0	13	13.0	13	13.0	13	13.0
Genetic Resources	2	2.0	2	2.0	2	2.0	2	2.0	7	6.0	7	7.0	7	7.0	7	7.0
Laboratory Services	1	1.0	1	1.0	1	1.0	1	1.0	4	3.5	4	4.0	4	4.0	4	4.0
Station Operations	1	1.0	1	1.0	1	1.0	1	1.0	3	3.0	3	3.0	3	3.0	3	3.0
SUB-TOTAL	39	35.0	42	40.5	42	42.0	43	42.5	74	66.5	76	75.0	76	76.0	76	76.0
LAND RESOURCES RESEARCH																
Office of the Director	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0
Tropical Pastures	22	20.5	22	22.0	22	22.0	23	22.5	36	36.0	36	36.0	36	36.0	36	36.0
Carimagua									5	4.5	5	5.0	5	5.0	5	5.0
Data Services	1	1.0	1	1.0	1	1.0	1	1.0	9	9.0	9	9.0	9	9.0	9	9.0
SUB-TOTAL	24	22.5	24	24.0	24	24.0	25	24.5	51	50.5	51	51.0	51	51.0	51	51.0
TOTAL RESEARCH	63	57.5	66	64.5	66	66.0	68	67.0	125	117.0	127	126.0	127	127.0	127	127.0
of which Regional Services	11	7.5	14	12.5	14	14.0	16	15.0								
INTERNATIONAL COOPERATION																
Office of the Director	1	1.0	1	1.0	1	1.0	1	1.0	1	0.5	1	1.0	1	1.0	1	1.0
Training & Conferences	1	1.0	1	1.0	1	1.0	1	1.0	11	11.0	11	11.0	13	12.0	13	13.0
Communication Support	3	3.0	3	3.0	3	3.0	3	3.0	15	14.0	16	15.5	16	16.0	16	16.0
Documentation Services	1	1.0	1	1.0	1	1.0	1	1.0	11	10.5	11	11.0	11	11.0	11	11.0
TOTAL INTERNATIONAL COOP.	6	6.0	6	6.0	6	6.0	6	6.0	38	36.0	39	38.5	41	40.0	41	41.0
ADMINISTRATION																
Director General	2	2.0	2	2.0	2	2.0	2	2.0	1	1.0	1	1.0	1	1.0	1	1.0
Controller	1	1.0	1	1.0	1	1.0	1	1.0	8	8.0	8	8.0	8	8.0	8	8.0
Executive Officer	1	1.0	1	1.0	1	1.0	1	1.0	11	11.0	11	11.0	11	11.0	11	11.0
TOTAL ADMINISTRATION	4	4.0	4	4.0	4	4.0	4	4.0	20	20.0	20	20.0	20	20.0	20	20.0
GENERAL OPERATING																
Physical Plant									3	3.0	3	3.0	3	3.0	3	3.0
Motor Pool									1	1.0	1	1.0	1	1.0	1	1.0
Food & Housing									2	2.0	2	2.0	2	2.0	2	2.0
Farm Production									1	0.5	1	1.0	1	1.0	1	1.0
TOTAL GENERAL OPERATING									7	6.5	7	7.0	7	7.0	7	7.0
GRAND TOTAL	73	67.5	76	74.5	76	76.0	78	77.0	190	179.5	193	191.5	195	194.0	195	195.0
Less Vacancy Factors		3.0		6.2		6.3		6.4		10.8		11.5		11.6		11.6
NET TOTAL	73	64.5	76	68.3	76	69.7	78	70.6	190	168.7	193	180.0	195	182.4	195	183.4

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